



2024

# ALUMINUM ELECTROLYTIC CAPACITORS

CAT.NO.E1001Y



# Aluminum Electrolytic Capacitors

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- Precautions and Guidelines
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## Aluminum Electrolytic Capacitors

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- Precautions and Guidelines
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## Technical Note

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## Appendix

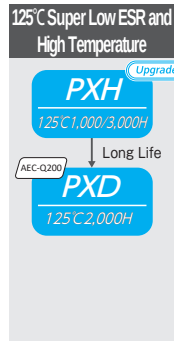
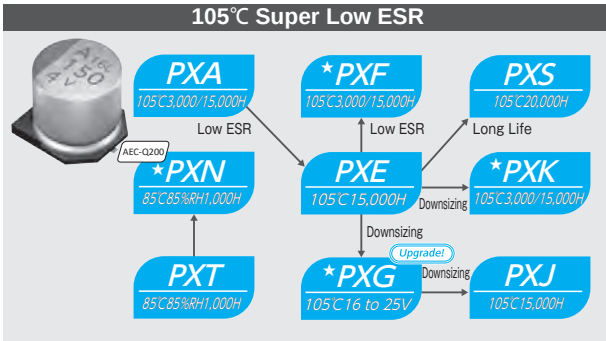
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☆: Recommendation products  
 [AEC-Q200] : AEC-Q200 compliant. Please contact your local Chemi-Con office for more details, test data, information and also non indicated products.

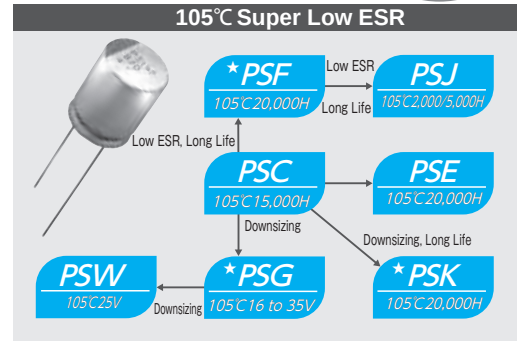
## CONDUCTIVE POLYMER ALUMINUM SOLID CAPACITORS

Digitalization  
Super Low ESR

### SURFACE MOUNT TYPE



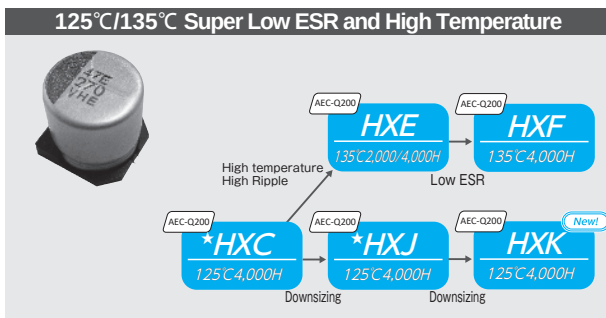
### RADIAL LEAD TYPE



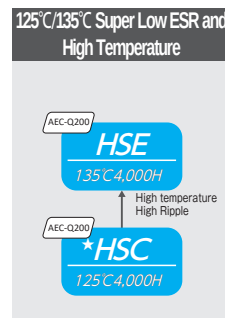
## CONDUCTIVE POLYMER HYBRID ALUMINUM ELECTROLYTIC CAPACITORS

Digitalization  
Super Low ESR  
Automotive  
Application

### SURFACE MOUNT TYPE

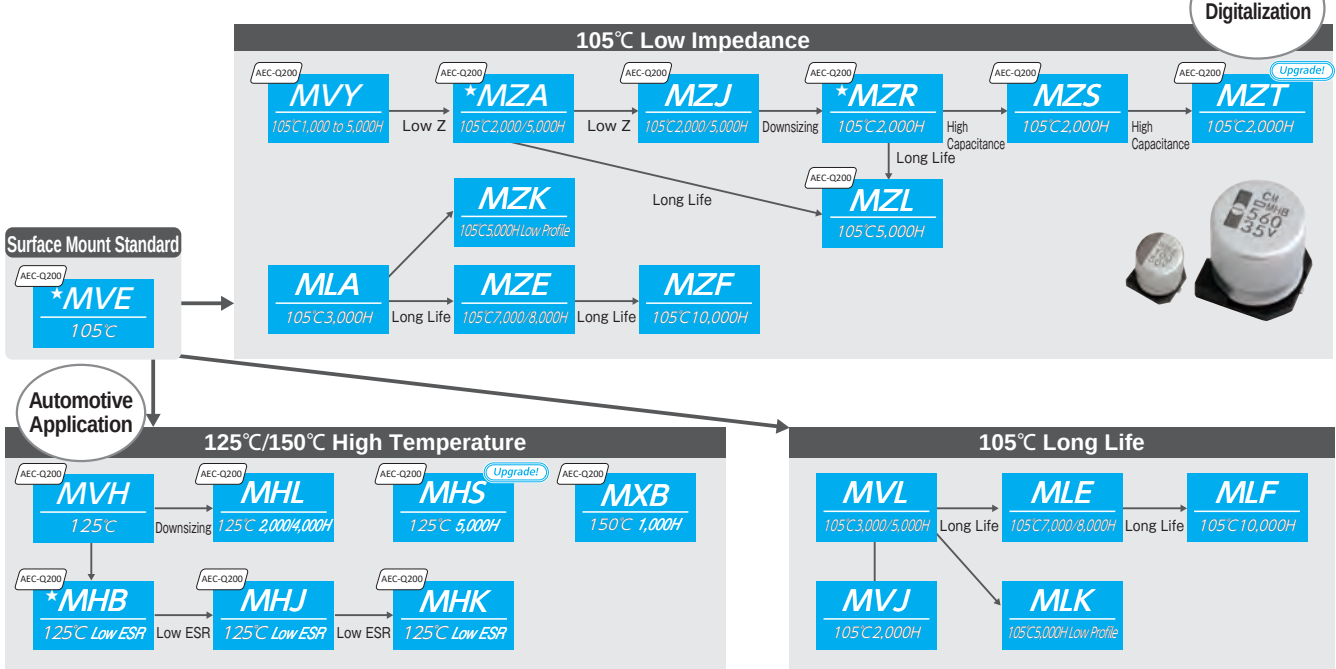


### RADIAL LEAD TYPE



## ALUMINUM ELECTROLYTIC CAPACITORS

### SURFACE MOUNT TYPE



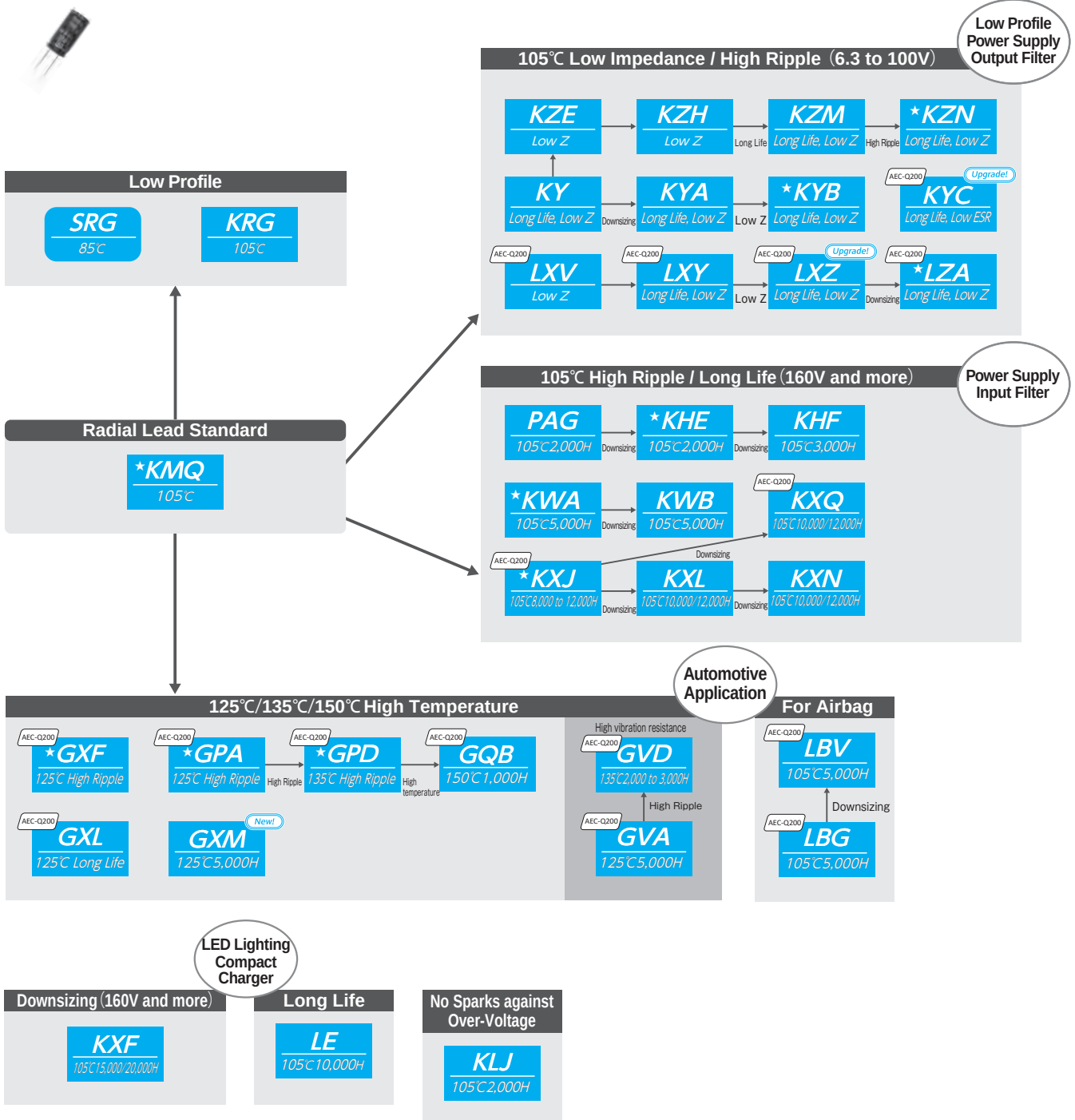


# GROUP CHART

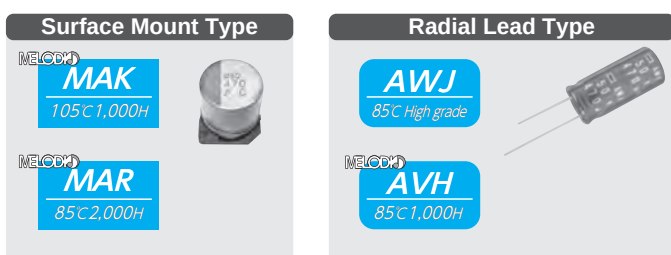
☆: Recommendation products  
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## ALUMINUM ELECTROLYTIC CAPACITORS

### RADIAL LEAD TYPE



### For Audio

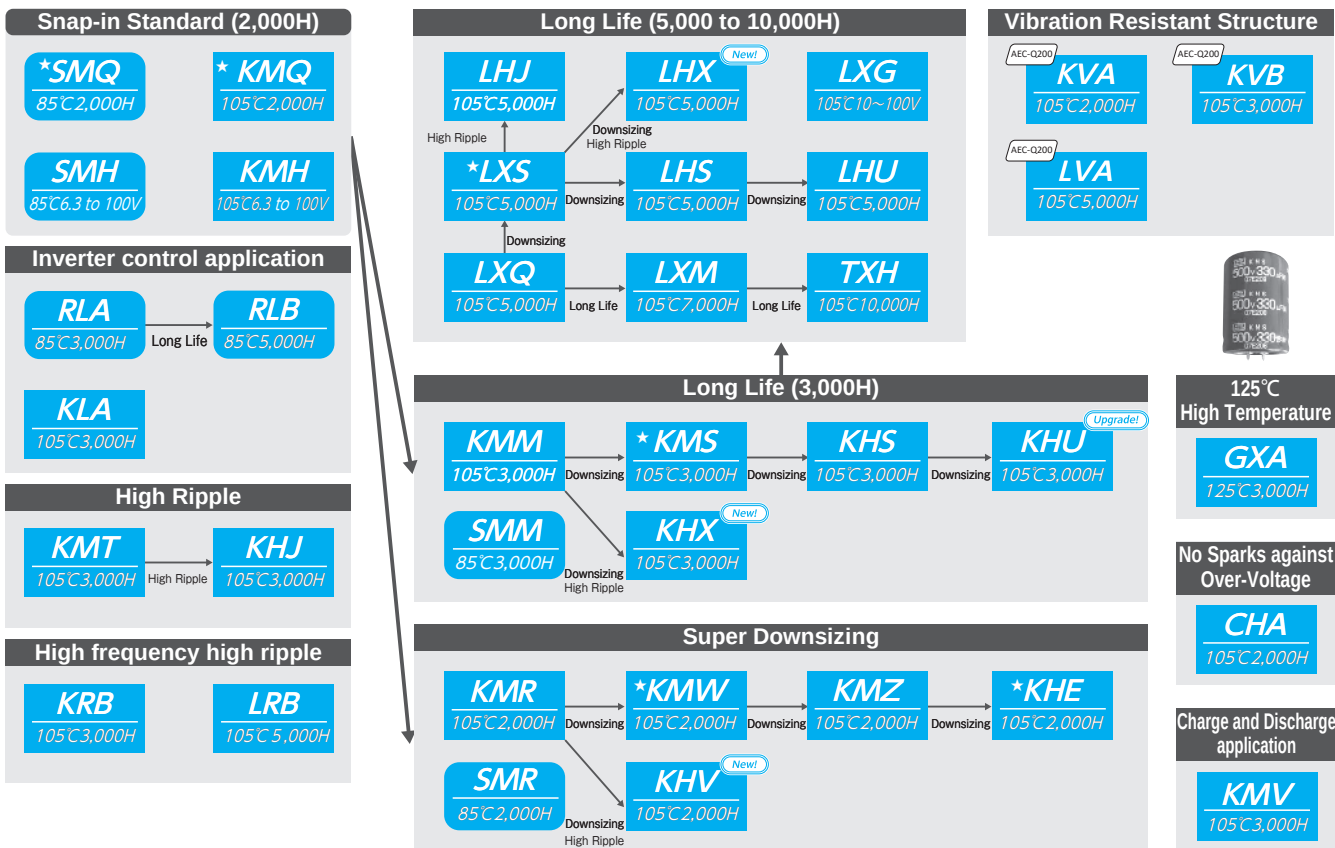




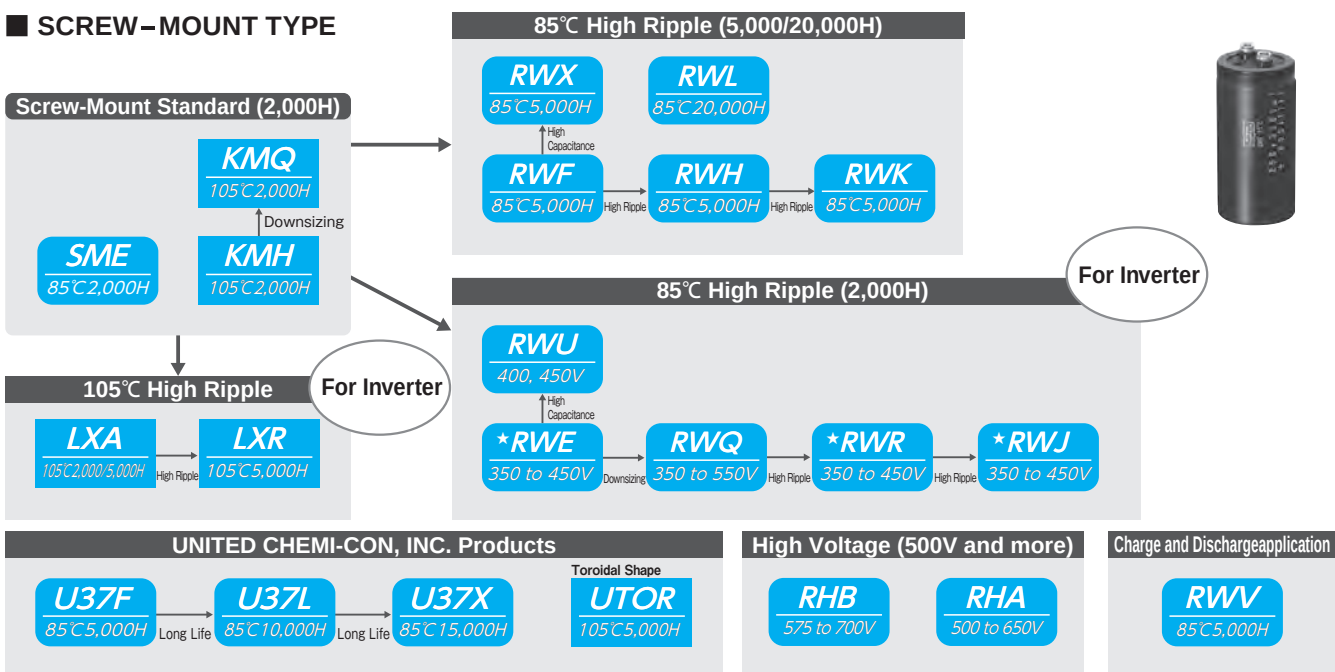
☆: Recommendation products  
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## ALUMINUM ELECTROLYTIC CAPACITORS

### ■ SNAP-IN TYPE



### ■ SCREW-MOUNT TYPE





# CAPACITOR SERIES TABLE, CONTENTS

## ■ CONDUCTIVE POLYMER ALUMINUM SOLID CAPACITORS

| Series             |                | Features                                                     | Standard Type | Miniaturization Low profile type | Low Z | Long life | High temperature | AEC-Q200 | Terminal type | Endurance (+R=With ripple)   | Rated voltage range (Vdc) |
|--------------------|----------------|--------------------------------------------------------------|---------------|----------------------------------|-------|-----------|------------------|----------|---------------|------------------------------|---------------------------|
| Surface Mount Type | PXN            | Super low ESR, high ripple current, high moisture resistance |               | ●                                | ●     | ●         |                  | ●        | SMD           | 105°C 5,000 hours            | 2.5 to 16                 |
|                    | PXT            | Super low ESR, high ripple current, high moisture resistance |               | ●                                | ●     | ●         |                  |          | SMD           | 105°C 15,000 hours           | 2.5 to 16                 |
|                    | PXJ            | Super low ESR, high ripple current, downsizing               |               | ●                                | ●     | ●         |                  |          | SMD           | 105°C 15,000 hours           | 2.5 to 25                 |
|                    | PXG (Upgrade!) | Super low ESR, high ripple current, downsizing               | ●             | ●                                | ●     | ●         |                  |          | SMD           | 105°C 3,000 to 15,000 hours  | 16 to 25                  |
|                    | PXK            | Super low ESR, high ripple current, downsizing               | ●             | ●                                | ●     | ●         |                  |          | SMD           | 105°C 3,000 to 15,000 hours  | 2.5 to 16                 |
|                    | PXS            | Super low ESR, high ripple current                           |               | ●                                | ●     | ●         |                  |          | SMD           | 105°C 20,000 hours           | 4 to 16                   |
|                    | PXF            | Super low ESR, high ripple current                           | ●             | ●                                | ●     | ●         |                  |          | SMD           | 105°C 3,000 to 15,000 hours  | 2 to 10                   |
|                    | PXE            | Super low ESR, high ripple current                           |               | ●                                | ●     | ●         |                  |          | SMD           | 105°C 15,000 hours           | 2.5 to 16                 |
|                    | PXA            | Super low ESR, high ripple current                           |               | ●                                | ●     | ●         |                  |          | SMD           | 105°C 3,000 to 15,000 hours  | 2.5 to 25                 |
|                    | PXD            | 125°C, super low ESR, high ripple current                    |               | ●                                | ●     |           | ●                | ●        | SMD           | 125°C 2,000 hours            | 2.5 to 10                 |
| Radial Lead Type   | PXH (Upgrade!) | 125°C, super low ESR, high ripple current                    |               | ●                                | ●     |           | ●                |          | SMD           | 125°C 1,000 to 3,000 hours   | 2.5 to 20                 |
|                    | PSW            | Super low ESR, high ripple current, downsizing               |               | ●                                | ●     |           |                  |          | Radial        | 105°C 5,000 hours            | 25                        |
|                    | PSJ            | Super low ESR, high ripple current, downsizing               |               | ●                                | ●     |           |                  |          | Radial        | 105°C 2,000 to 5,000 hours   | 2.5                       |
|                    | PSG            | Super low ESR, high ripple current                           | ●             | ●                                | ●     | ●         |                  |          | Radial        | 105°C 15,000 to 20,000 hours | 16 to 35                  |
|                    | PSK            | Super low ESR, high ripple current                           | ●             | ●                                | ●     | ●         |                  |          | Radial        | 105°C 20,000 hours           | 2.5 to 6.3                |
|                    | PSF            | Super low ESR, high ripple current                           | ●             | ●                                | ●     | ●         |                  |          | Radial        | 105°C 20,000 hours           | 2 to 16                   |
|                    | PSE            | Super low ESR, high ripple current                           |               | ●                                | ●     | ●         |                  |          | Radial        | 105°C 20,000 hours           | 2.5 to 6.3                |
|                    | PSC            | Super low ESR, high ripple current                           |               | ●                                | ●     | ●         |                  |          | Radial        | 105°C 15,000 hours           | 2.5 to 16                 |

## ■ CONDUCTIVE POLYMER HYBRID ALUMINUM ELECTROLYTIC CAPACITORS

| Series             |            | Features                                  | Standard Type | Miniaturization Low profile type | Low Z | Long life | High temperature | AEC-Q200 | Terminal type | Endurance (+R=With ripple)     | Rated voltage range (Vdc) |
|--------------------|------------|-------------------------------------------|---------------|----------------------------------|-------|-----------|------------------|----------|---------------|--------------------------------|---------------------------|
| Surface Mount Type | HXF        | 135°C, super low ESR, high ripple current |               |                                  | ●     | ●         | ●                | ●        | SMD           | 135°C 4,000 hours +R           | 25 to 63                  |
|                    | HXE        | 135°C, super low ESR, high ripple current |               |                                  | ●     | ●         | ●                | ●        | SMD           | 135°C 2,000 to 4,000 hours +R  | 16 to 63                  |
|                    | HXK (New!) | 125°C, super low ESR, high ripple current |               |                                  | ●     | ●         | ●                | ●        | SMD           | 125°C 4,000 hours +R           | 16 to 35                  |
|                    | HXJ        | 125°C, super low ESR, high ripple current |               |                                  | ●     | ●         | ●                | ●        | SMD           | 125°C 4,000 hours +R           | 16 to 63                  |
|                    | HXC        | 125°C, super low ESR, high ripple current | ●             |                                  | ●     | ●         | ●                | ●        | SMD           | 125°C 4,000 hours +R           | 16 to 80                  |
|                    | HXD        | 105°C, super low ESR, standard            | ●             |                                  | ●     |           |                  | ●        | SMD           | 105°C 5,000 to 10,000 hours +R | 16 to 80                  |
| Radial Lead Type   | HSE        | 135°C, super low ESR, high ripple current |               |                                  | ●     | ●         | ●                | ●        | Radial        | 135°C 4,000 hours +R           | 25 to 63                  |
|                    | HSC        | 125°C, super low ESR, high ripple current | ●             |                                  | ●     | ●         | ●                | ●        | Radial        | 125°C 4,000 hours +R           | 25 to 80                  |
|                    | HSD        | 105°C, super low ESR, standard            | ●             |                                  | ●     |           |                  | ●        | Radial        | 105°C 10,000 hours +R          | 25 to 80                  |

## ■ ALUMINUM ELECTROLYTIC CAPACITORS

| Series             |                     | Features       | Standard Type | Miniaturization Low profile type | Low Z | Long life | High temperature | AEC-Q200 | Terminal type | Endurance (+R=With ripple) | Rated voltage range (Vdc) |
|--------------------|---------------------|----------------|---------------|----------------------------------|-------|-----------|------------------|----------|---------------|----------------------------|---------------------------|
| Surface Mount Type | General Purpose     | MVE            |               | ●                                | ●     |           |                  | ●        | SMD           | 105°C 1,000 to 2,000 hours | 6.3 to 100                |
|                    | Low Impedance       | MZT (Upgrade!) |               | ●                                | ●     |           |                  | ●        | SMD           | 105°C 2,000 hours          | 16 to 35                  |
|                    |                     | MZS            |               | ●                                | ●     |           |                  | ●        | SMD           | 105°C 2,000 hours          | 25 & 35                   |
|                    |                     | MZL            |               |                                  | ●     | ●         |                  | ●        | SMD           | 105°C 5,000 hours          | 6.3 to 50                 |
|                    |                     | MZR            | ●             | ●                                | ●     |           |                  | ●        | SMD           | 105°C 2,000 hours          | 6.3 to 50                 |
|                    |                     | MZJ            |               | ●                                | ●     |           |                  | ●        | SMD           | 105°C 2,000 to 5,000 hours | 6.3 to 50                 |
|                    |                     | MZA            | ●             | ●                                | ●     | ●         |                  | ●        | SMD           | 105°C 2,000 to 5,000 hours | 6.3 to 100                |
|                    |                     | MVY            |               |                                  | ●     |           |                  | ●        | SMD           | 105°C 1,000 to 5,000 hours | 6.3 to 100                |
|                    |                     | MZF            |               |                                  | ●     | ●         |                  |          | SMD           | 105°C 10,000 hours         | 6.3 to 50                 |
|                    |                     | MZE            |               |                                  | ●     | ●         |                  |          | SMD           | 105°C 7,000 to 8,000 hours | 6.3 to 50                 |
|                    |                     | MZK            |               | ●                                | ●     | ●         |                  |          | SMD           | 105°C 5,000 hours          | 6.3 to 35                 |
|                    |                     | MLA            |               |                                  | ●     | ●         |                  |          | SMD           | 105°C 3,000 hours          | 6.3 to 50                 |
|                    | Long Life           | MLF            |               |                                  |       | ●         |                  |          | SMD           | 105°C 10,000 hours         | 6.3 to 50                 |
|                    |                     | MLE            |               |                                  |       | ●         |                  |          | SMD           | 105°C 7,000 to 8,000 hours | 6.3 to 50                 |
|                    |                     | MLK            |               | ●                                |       | ●         |                  |          | SMD           | 105°C 5,000 hours          | 6.3 to 35                 |
|                    |                     | MVL            |               |                                  |       | ●         |                  |          | SMD           | 105°C 3,000 to 5,000 hours | 6.3 to 50                 |
|                    |                     | MVJ            |               |                                  |       | ●         |                  |          | SMD           | 105°C 2,000 hours          | 6.3 to 50                 |
|                    | Special Application | MHS (Upgrade!) |               | ●                                | ●     | ●         | ●                | ●        | SMD           | 125°C 2,000 to 5,000 hours | 16 to 100                 |
|                    |                     | MVH            |               |                                  | ●     | ●         | ●                | ●        | SMD           | 125°C 1,000 to 5,000 hours | 10 to 100                 |
|                    |                     | MHL            |               |                                  | ●     | ●         | ●                | ●        | SMD           | 125°C 2,000 to 4,000 hours | 10 to 35                  |
|                    |                     | MHB            | ●             |                                  | ●     |           | ●                | ●        | SMD           | 125°C 1,500 to 3,000 hours | 10 to 100                 |
|                    |                     | MHJ            |               |                                  | ●     |           | ●                | ●        | SMD           | 125°C 2,000 to 3,000 hours | 10 to 35                  |
|                    |                     | MHK            |               |                                  | ●     |           | ●                | ●        | SMD           | 125°C 2,000 hours          | 35                        |
|                    |                     | MXB            |               |                                  | ●     | ●         | ●                | ●        | SMD           | 150°C 1,000 hours          | 25 & 35                   |

● : Recommendation products

AEC-Q200 : AEC-Q200 compliant. Please contact your local Chemi-Con office for more details, test data, information and also non indicated products.



# CAPACITOR SERIES TABLE, CONTENTS

## ALUMINUM ELECTROLYTIC CAPACITORS

| Series           |                                    |                               | Features                                                | Standard Type | Miniaturization Low profile type | Low Z | Long life | High temperature | AEC-Q200 | Terminal type | Endurance (+R=With ripple)      | Rated voltage range (Vdc) |
|------------------|------------------------------------|-------------------------------|---------------------------------------------------------|---------------|----------------------------------|-------|-----------|------------------|----------|---------------|---------------------------------|---------------------------|
| Radial Lead Type | Low Profile                        | SRG                           | φ 10×12.5 to φ 18×25mm, low profile                     |               | ●                                |       |           |                  |          | Radial        | 85°C 2,000 hours                | 6.3 to 50                 |
|                  |                                    | KRG                           | φ 10×12.5 to φ 18×25mm, low profile                     |               | ●                                |       |           |                  |          | Radial        | 105°C 1,000 hours               | 6.3 to 50                 |
|                  | General Purpose                    | KMQ                           | 105°C, downsizing                                       |               | ●                                |       |           |                  |          | Radial        | 105°C 1,000 to 2,000 hours +R   | 6.3 to 450                |
|                  | Power Supply Output, Low Impedance | KZN                           | Long life, low impedance                                |               | ●                                | ●     | ●         |                  |          | Radial        | 105°C 6,000 to 10,000 hours +R  | 6.3 to 100                |
|                  |                                    | KZM                           | Long life, super low impedance                          |               | ●                                | ●     | ●         |                  |          | Radial        | 105°C 6,000 to 10,000 hours +R  | 6.3 to 50                 |
|                  |                                    | KZH                           | Super low impedance, downsizing                         |               | ●                                | ●     | ●         |                  |          | Radial        | 105°C 5,000 to 6,000 hours +R   | 6.3 to 35                 |
|                  |                                    | KZE                           | Low impedance, downsizing                               |               | ●                                | ●     | ●         |                  |          | Radial        | 105°C 2,000 to 5,000 hours +R   | 6.3 to 100                |
|                  |                                    | KYC <small>(Upgrade!)</small> | Low ESR, downsizing                                     |               | ●                                | ●     | ●         |                  | ●        | Radial        | 105°C 3,000 to 5,000 hours +R   | 16 to 100                 |
|                  |                                    | KYB                           | Low impedance, downsizing                               |               | ●                                | ●     | ●         |                  |          | Radial        | 105°C 4,000 to 10,000 hours +R  | 6.3 to 100                |
|                  |                                    | KYA                           | Low impedance, downsizing                               |               | ●                                | ●     | ●         |                  |          | Radial        | 105°C 4,000 to 10,000 hours +R  | 6.3 to 100                |
|                  |                                    | KY                            | Low impedance, standard                                 | ●             |                                  | ●     | ●         |                  |          | Radial        | 105°C 6,000 to 10,000 hours +R  | 6.3 to 100                |
|                  |                                    | LZA                           | Low impedance, downsizing                               |               | ●                                | ●     | ●         |                  | ●        | Radial        | 105°C 4,000 to 7,000 hours +R   | 6.3 to 35                 |
|                  |                                    | LXZ <small>(Upgrade!)</small> | Low impedance, downsizing                               | ●             | ●                                | ●     | ●         |                  | ●        | Radial        | 105°C 2,000 to 8,000 hours +R   | 6.3 to 63                 |
|                  |                                    | LXY                           | Low impedance                                           |               |                                  | ●     | ●         |                  | ●        | Radial        | 105°C 2,000 to 8,000 hours +R   | 10 to 63                  |
|                  |                                    | LXV                           | Low impedance                                           |               |                                  | ●     | ●         |                  | ●        | Radial        | 105°C 2,000 to 5,000 hours +R   | 6.3 to 100                |
|                  | Power Supply Input                 | KXQ                           | Long life, downsizing, for input filtering              |               | ●                                |       | ●         |                  | ●        | Radial        | 105°C 10,000 to 12,000 hours +R | 400 to 450                |
|                  |                                    | KXN                           | Long life, downsizing, for input filtering              |               | ●                                |       | ●         |                  |          | Radial        | 105°C 10,000 to 12,000 hours +R | 350 to 450                |
|                  |                                    | KXL                           | Long life, downsizing, for input filtering              |               | ●                                |       | ●         |                  |          | Radial        | 105°C 10,000 to 12,000 hours +R | 400 to 450                |
|                  |                                    | KXJ                           | Long life, downsizing, for input filtering              | ●             | ●                                |       | ●         |                  | ●        | Radial        | 105°C 8,000 to 12,000 hours +R  | 160 to 500                |
|                  |                                    | KWB                           | Low profile, long life for input filtering              |               | ●                                |       | ●         |                  |          | Radial        | 105°C 5,000 hours +R            | 400 to 450                |
|                  |                                    | KWA                           | Low profile, long life for input filtering              |               | ●                                |       | ●         |                  |          | Radial        | 105°C 5,000 hours +R            | 400 to 450                |
|                  |                                    | KHF                           | Low profile, high ripple for input filtering            |               | ●                                |       |           |                  |          | Radial        | 105°C 3,000 hours +R            | 400 to 450                |
|                  |                                    | KHE                           | Low profile, high ripple for input filtering            |               | ●                                |       |           |                  |          | Radial        | 105°C 2,000 hours +R            | 400 to 450                |
|                  |                                    | PAG                           | Low profile, for input filtering                        |               | ●                                |       |           |                  |          | Radial        | 105°C 2,000 hours +R            | 200 to 450                |
|                  |                                    | KLJ                           | No sparks with DC overvoltage, for input filtering      |               | ●                                |       |           |                  |          | Radial        | 105°C 8,000 to 12,000 hours +R  | 200 to 450                |
|                  |                                    | KXF                           | Long life, downsizing, for input filtering              |               | ●                                |       | ●         |                  |          | Radial        | 105°C 15,000/20,000 hours +R    | 160 to 450                |
|                  | Power Supply Output                | LE                            | Long life, downsizing                                   |               | ●                                |       | ●         |                  |          | Radial        | 105°C 10,000 hours +R           | 10 to 100                 |
|                  | High Temperature                   | GPA                           | 125/150°C, downsizing (Guaranteed short time at 150°C)  |               | ●                                | ●     | ●         | ●                | ●        | Radial        | 125°C 3,000 to 5,000 hours +R   | 25 to 100                 |
|                  |                                    | GVA                           | 125°C, high vibration resistance                        |               | ●                                | ●     | ●         | ●                | ●        | Radial        | 125°C 5,000 hours +R            | 25 to 100                 |
|                  |                                    | GXM <small>(New!)</small>     | 125°C, high ripple                                      |               | ●                                |       | ●         | ●                |          | Radial        | 125°C 5,000 hours +R            | 400 to 450                |
|                  |                                    | GXF                           | 125°C, high ripple                                      |               | ●                                | ●     |           | ●                | ●        | Radial        | 125°C 3,000 hours +R            | 25 to 400                 |
|                  |                                    | GXL                           | 125°C                                                   |               |                                  | ●     | ●         | ●                | ●        | Radial        | 125°C 5,000 hours +R            | 10 to 50                  |
|                  |                                    | GPD                           | 135/150°C, high ripple (Guaranteed short time at 150°C) |               | ●                                | ●     | ●         | ●                | ●        | Radial        | 135°C 2,000 to 3,000 hours +R   | 25 to 100                 |
|                  |                                    | GVD                           | 135°C, high vibration resistance                        |               | ●                                | ●     | ●         | ●                | ●        | Radial        | 135°C 2,000 to 3,000 hours +R   | 25 to 100                 |
|                  |                                    | GQB                           | 150°C, high ripple                                      |               |                                  | ●     | ●         | ●                | ●        | Radial        | 150°C 1,000 hours +R            | 25 & 35                   |
|                  | Special Application                | LBV                           | For airbag, downsizing                                  |               | ●                                | ●     | ●         |                  | ●        | Radial        | 105°C 5,000 hours +R            | 25 & 35                   |
|                  |                                    | LBG                           | For airbag                                              |               | ●                                | ●     | ●         |                  | ●        | Radial        | 105°C 5,000 hours +R            | 25 & 35                   |

  : Recommendation products

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| Series           |                      | Features                      | Standard Type                         | Miniaturization Low profile type | High ripple | Long life | AEC-Q200 | Terminal type | Endurance (+R=With ripple) | Rated voltage range (Vdc) |
|------------------|----------------------|-------------------------------|---------------------------------------|----------------------------------|-------------|-----------|----------|---------------|----------------------------|---------------------------|
| Snap-in Type     | General Purpose      | SMR                           | 85°C, high ripple, downsizing         | ●                                | ●           |           |          | Pin           | 85°C 2,000 hours +R        | 400 to 450                |
|                  |                      | SMQ                           | 85°C, standard                        | ●                                | ●           |           |          | Pin           | 85°C 2,000 hours +R        | 160 to 450                |
|                  |                      | KHV <small>(New!)</small>     | 105°C, high ripple, downsizing        |                                  | ●           |           |          | Pin           | 105°C 2,000 hours +R       | 350 to 400                |
|                  |                      | KHE                           | 105°C, super downsizing               |                                  | ●           |           |          | Pin           | 105°C 2,000 hours +R       | 400 to 450                |
|                  |                      | KMZ                           | 105°C, super downsizing               |                                  | ●           |           |          | Pin           | 105°C 2,000 hours +R       | 420 & 450                 |
|                  |                      | KMW                           | 105°C, super downsizing               |                                  | ●           |           |          | Pin           | 105°C 2,000 hours +R       | 400 to 450                |
|                  |                      | KMR                           | 105°C, downsizing                     |                                  | ●           | ●         |          | Pin           | 105°C 2,000 hours +R       | 160 to 450                |
|                  |                      | KMQ                           | 105°C, standard                       | ●                                | ●           |           |          | Pin           | 105°C 2,000 hours +R       | 35, 50, 160 to 450        |
|                  |                      | RLB                           | 85°C, 5,000 hours, high ripple        |                                  | ●           | ●         |          | Pin           | 85°C 5,000 hours +R        | 180 to 250                |
|                  |                      | RLA                           | 85°C, high ripple                     |                                  | ●           | ●         |          | Pin           | 85°C 3,000 hours +R        | 180 to 250                |
|                  |                      | KLA                           | 105°C, high ripple                    |                                  | ●           | ●         |          | Pin           | 105°C 3,000 hours +R       | 180 to 250                |
|                  |                      | SMM                           | 85°C, 3,000 hours                     | ●                                | ●           |           |          | Pin           | 85°C 3,000 hours +R        | 160 to 450                |
|                  |                      | KRB                           | High frequency high ripple            |                                  | ●           | ●         |          | Pin           | 105°C 3,000 hours +R       | 400 to 450                |
|                  |                      | KHJ                           | 105°C, high ripple                    |                                  |             | ●         |          | Pin           | 105°C 3,000 hours +R       | 400 to 450                |
|                  |                      | KMT                           | 105°C, high ripple                    |                                  |             | ●         |          | Pin           | 105°C 3,000 hours +R       | 420 & 450                 |
|                  |                      | KHX <small>(New!)</small>     | 105°C, high ripple, downsizing        |                                  | ●           | ●         |          | Pin           | 105°C 3,000 hours +R       | 350 to 400                |
|                  |                      | KHU <small>(Upgrade!)</small> | Long life, downsizing                 |                                  | ●           | ●         |          | Pin           | 105°C 3,000 hours +R       | 400 to 500                |
|                  |                      | KHS                           | 105°C, downsizing                     |                                  | ●           | ●         |          | Pin           | 105°C 3,000 hours +R       | 450 to 500                |
|                  |                      | KMS                           | 105°C, downsizing                     | ●                                | ●           | ●         |          | Pin           | 105°C 3,000 hours +R       | 160 to 600                |
|                  |                      | KMM                           | 105°C, 3,000 hours                    |                                  |             | ●         |          | Pin           | 105°C 3,000 hours +R       | 160 to 450                |
|                  |                      | SMH                           | 85°C, standard                        |                                  |             |           |          | Pin           | 85°C 2,000 hours +R        | 6.3 to 100                |
|                  |                      | KMH                           | 105°C, standard                       |                                  |             |           |          | Pin           | 105°C 2,000 hours +R       | 6.3 to 100                |
|                  | High Temperature     | TXH                           | Long life                             |                                  |             |           | ●        | Pin           | 105°C 10,000 hours +R      | 200 to 450                |
|                  |                      | LXM                           | Long life, downsizing                 |                                  | ●           |           | ●        | Pin           | 105°C 7,000 hours +R       | 160 to 450                |
|                  |                      | LRB                           | High frequency high ripple, long life |                                  | ●           | ●         |          | Pin           | 105°C 5,000 hours +R       | 400 to 450                |
|                  |                      | LHX <small>(New!)</small>     | 105°C, high ripple, downsizing        |                                  | ●           | ●         | ●        | Pin           | 105°C 5,000 hours +R       | 350 to 400                |
|                  |                      | LHJ                           | Long life, high ripple                |                                  |             | ●         | ●        | Pin           | 105°C 5,000 hours +R       | 400 to 450                |
|                  |                      | LHU <small>(Upgrade!)</small> | High ripple, long life, downsizing    |                                  | ●           | ●         | ●        | Pin           | 105°C 5,000 hours +R       | 400 to 500                |
|                  |                      | LHS                           | Long life, downsizing                 |                                  | ●           | ●         | ●        | Pin           | 105°C 5,000 hours +R       | 450 to 500                |
|                  |                      | LXS                           | Long life, downsizing                 | ●                                | ●           | ●         |          | Pin           | 105°C 5,000 hours +R       | 160 to 600                |
|                  |                      | LXQ                           | Long life, downsizing                 |                                  | ●           |           | ●        | Pin           | 105°C 5,000 hours +R       | 160 to 450                |
|                  |                      | LXG                           | Long life                             |                                  |             |           | ●        | Pin           | 105°C 5,000 hours +R       | 10 to 100                 |
|                  | Vibration resistance | LVA                           | Long life, vibration resistance       |                                  | ●           |           | ●        | Pin           | 105°C 5,000 hours +R       | 450                       |
|                  |                      | KVB                           | Vibration resistance                  |                                  | ●           |           | ●        | Pin           | 105°C 3,000 hours +R       | 450                       |
|                  |                      | KVA                           | Vibration resistance                  |                                  | ●           |           | ●        | Pin           | 105°C 2,000 hours +R       | 450                       |
|                  | Special Application  | GXA                           | 125°C, high temperature               |                                  |             |           | ●        | Pin           | 125°C 3,000 hours +R       | 400 & 450                 |
|                  |                      | CHA                           | No sparks with DC overvoltage         |                                  |             | ●         |          | Pin           | 105°C 2,000 hours +R       | 200 to 450                |
|                  |                      | KMV                           | For charge and discharge application  |                                  |             |           |          | Pin           | 105°C 3,000 hours +R       | 350 to 450                |
| Screw-Mount Type | General Purpose      | SME                           | 85°C, standard                        | ●                                |             |           |          | Screw         | 85°C 2,000 hours +R        | 10 to 100                 |
|                  |                      | KMQ                           | 105°C, downsizing                     |                                  | ●           |           |          | Screw         | 105°C 2,000 hours +R       | 315 to 450                |
|                  |                      | KMH                           | 105°C, standard                       | ●                                |             |           |          | Screw         | 105°C 2,000 hours +R       | 10 to 400                 |
|                  | For Inverter         | RWX                           | High capacitance                      |                                  | ●           |           | ●        | Screw         | 85°C 5,000 hours +R        | 400 & 450                 |
|                  |                      | RWK                           | High ripple, long life, downsizing    |                                  | ●           | ●         | ●        | Screw         | 85°C 5,000 hours +R        | 350 to 450                |
|                  |                      | RWH                           | High ripple, downsizing               |                                  | ●           | ●         | ●        | Screw         | 85°C 5,000 hours +R        | 350 to 450                |
|                  |                      | RWF                           | Long life, high ripple                |                                  | ●           | ●         | ●        | Screw         | 85°C 5,000 hours +R        | 350 to 450                |
|                  |                      | RWU                           | High capacitance                      |                                  | ●           |           |          | Screw         | 85°C 2,000 hours +R        | 400 & 450                 |
|                  |                      | RWJ                           | High ripple, downsizing               |                                  | ●           | ●         |          | Screw         | 85°C 2,000 hours +R        | 350 to 450                |
|                  |                      | RWR                           | High ripple, downsizing               |                                  | ●           | ●         |          | Screw         | 85°C 2,000 hours +R        | 350 to 450                |
|                  |                      | RWQ                           | High ripple, downsizing               | ●                                | ●           | ●         |          | Screw         | 85°C 2,000 hours +R        | 350 to 550                |
|                  |                      | RWE                           | High ripple                           | ●                                | ●           | ●         |          | Screw         | 85°C 2,000 hours +R        | 350 to 450                |
|                  |                      | RWL                           | Long life, high ripple                |                                  |             | ●         | ●        | Screw         | 85°C 20,000 hours +R       | 350 to 450                |
|                  |                      | RHB                           | 85°C, high voltage                    |                                  |             |           |          | Screw         | 85°C 2,000 hours +R        | 575 to 700                |
|                  |                      | RHA                           | High voltage, high ripple             |                                  | ●           | ●         | ●        | Screw         | 85°C 5,000 hours +R        | 500 to 650                |
|                  |                      | LXA                           | 105°C, long life                      |                                  | ●           |           | ●        | Screw         | 105°C 2,000/5,000 hours +R | 10 to 525                 |
|                  |                      | LXR                           | 105°C, long life, high ripple         |                                  |             | ●         | ●        | Screw         | 105°C 5,000 hours +R       | 350 to 450                |
|                  |                      | RWV                           | For charge and discharge application  |                                  |             |           |          | Screw         | 85°C 5,000 hours +R        | 350 to 450                |

## ALUMINUM ELECTROLYTIC CAPACITORS (UNITED CHEMI-CON, INC. Products)

| Series           |              | Features | Standard Type                          | Miniaturization Low profile type | High ripple | Long life | Terminal type | Endurance (+R=With ripple) | Rated voltage range (Vdc) |
|------------------|--------------|----------|----------------------------------------|----------------------------------|-------------|-----------|---------------|----------------------------|---------------------------|
| Screw-Mount Type | For Inverter | U37F     | Long life, high ripple                 |                                  | ●           | ●         | Screw         | 85°C 5,000 hours +R        | 350 to 500                |
|                  |              | U37L     | Long life, high ripple                 |                                  |             | ●         | Screw         | 85°C 10,000 hours +R       | 350 to 500                |
|                  |              | U37X     | Long life, high ripple                 |                                  |             | ●         | Screw         | 85°C 15,000 hours +R       | 350 to 500                |
|                  |              | UTOR     | Toroidal shape, long life, high ripple |                                  |             | ●         | Screw         | 105°C 5,000 hours +R       | 350 to 500                |

## ALUMINUM ELECTROLYTIC CAPACITORS FOR AUDIO

| Series    |                            | Features                  | Standard Type | Miniaturization Low profile type | Terminal type | Endurance (+R=With ripple) | Rated voltage range (Vdc) |
|-----------|----------------------------|---------------------------|---------------|----------------------------------|---------------|----------------------------|---------------------------|
| For Audio | MAR <small>MELODIO</small> | Surface mount type        | ●             | ●                                | SMD           | 85°C 2,000 hours           | 6.3 to 50                 |
|           | MAK <small>MELODIO</small> | 105°C, surface mount type |               |                                  | SMD           | 105°C 1,000 hours          | 6.3 to 50                 |
|           | AVH <small>MELODIO</small> | Standard                  |               |                                  | Radial        | 85°C 1,000 hours           | 6.3 to 100                |
|           | AWJ                        | High grade                |               |                                  | Radial        | 85°C 1,000 hours           | 16 to 100                 |

: Recommendation products

AEC-Q200 : AEC-Q200 compliant. Please contact your local Chemi-Con office for more details, test data, information and also non indicated products.



# PART NUMBERING SYSTEM

## Part numbering system

Our part numbering system is common to all of Nippon Chemi-Con's subsidiaries worldwide, and has been switching the conventional part numbering system. The part number uses 18-digit codes to express information of principal product specifications such as product category, series name, rated voltage, capacitance, case size and RoHS compliance.

### ●Categories

|                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |
|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| 1                    | 2                    | 3                    | 4                    | 5                    | 6                    | 7                    | 8                    | 9                    | 10                   | 11                   | 12                   | 13                   | 14                   | 15                   | 16                   | 17                   | 18                   |
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |

| Code | Details                                                            |
|------|--------------------------------------------------------------------|
| A    | Conductive Polymer Aluminum Solid Capacitors (Polar)               |
| H    | Conductive Polymer Hybrid Aluminum Electrolytic Capacitors (Polar) |
| E    | Aluminum Electrolytic Capacitors (Polar)                           |
| K    | Multilayer Ceramic Capacitors                                      |
| F    | Film Capacitors                                                    |
| D    | Electric Double Layer Capacitors                                   |
| T    | Metal Oxide Varistors                                              |
| L    | Amorphous Choke Coils                                              |

\* For digits 2 to 18, please see "Product code guide".

### ●Example

| Product type              | Part number (Example) | Conventional part number (Ref.) |
|---------------------------|-----------------------|---------------------------------|
| Surface mount type        | EMVE160ADA100MD55G    | MVE16VC10MD55E0                 |
| Radial lead type          | EKMQR3ETC102MHB5D     | TC04RKMQR6.3VB1000MF50E0        |
| Snap-in type              | EKMQR201VSN471MP30S   | KMQ200VSSN470M22BE0             |
| Screw mount terminal type | ERWE551LGC821MCD0U    | RWE550LGSN820MCC13EA            |



## Environment friendly capacitors

Nippon Chemi-Con has been taking proactive approaches toward developing and marketing less environmentally-load products in response to the international efforts for reducing hazardous substances and to the regulations. Nippon Chemi-Con had already abolished 4 additional substances, which will be prohibited from July 2019 in accordance with revised RoHS directive (2011/65/EU), by innovating alternative materials of the outer tube.

RoHS2 Compliant : Compliant to the 2011/65/EU and the revisions (2015/863/EU)

ELV Compliant : Compliant to the 2000/53/EC and the revisions (2016/774/EU)

Please contact us for more information about "Halogen-free specification".

### ◆Pb-free and Non-PVC Products

#### 1. Lead wire (Plating)

| Category                                                      |             | Plating material on lead wires |
|---------------------------------------------------------------|-------------|--------------------------------|
| Conductive Polymer<br>Aluminum Solid Capacitors               | Chip        | Sn-Bi                          |
|                                                               | Radial      | Sn                             |
| Conductive Polymer Hybrid<br>Aluminum Electrolytic Capacitors | Chip        | Sn-Bi                          |
|                                                               | Radial      | Sn                             |
| Aluminum Electrolytic Capacitors                              | Chip        | case code : D55 to JA0         |
|                                                               |             | case code : KE0 to MN0         |
|                                                               | Radial      | case dia : to $\phi$ 8         |
|                                                               |             | case dia : $\phi$ 10 to        |
|                                                               | Snap-in     | Sn                             |
|                                                               | Screw-Mount | Originally lead-free           |

\*Please consult with us when you need "Pb-free parts" other than the above mentioned terminal plating materials.

(Note) **Sn** : Tin, **Bi** : Bismuth

#### 2. Sleeve

| Category                                                      |             | Sleeve material           |
|---------------------------------------------------------------|-------------|---------------------------|
| Conductive Polymer<br>Aluminum Solid Capacitors               | Chip        | Sleeveless (Coating case) |
|                                                               | Radial      | Sleeveless (Coating case) |
| Conductive Polymer Hybrid<br>Aluminum Electrolytic Capacitors | Chip        | Sleeveless (Coating case) |
|                                                               | Radial      | Sleeveless (Coating case) |
| Aluminum Electrolytic Capacitors                              | Chip        | Sleeveless (Coating case) |
|                                                               | Radial      | PET                       |
|                                                               | Snap-in     | PET                       |
|                                                               | Screw-Mount | PVC                       |

\*Please consult with us when you need "Non-PVC parts" other than the above mentioned outer sleeve materials.

The colors of a PET sleeve are "Black", "Brown", and "Dark blue".

Standard designs of "Pb-free" Snap-in type are not equipped with a plastic disc.

Please consult with us when you need nonflammable grade for outer sleeve material.

Identification of friendly parts is given by a supplement code (18th digit) of the part number.

For details, please refer to "Product code guide" for each type.



# TAPING SPECIFICATIONS (Applicable standard JIS C 0806-3)

## SURFACE MOUNT TYPE (TAPING)



### ◆CARRIER TAPE [mm]

Fig.1

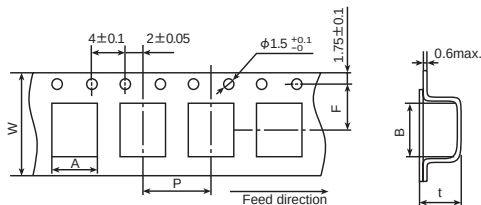


Fig.3

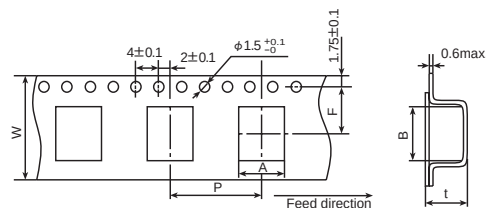


Fig.2

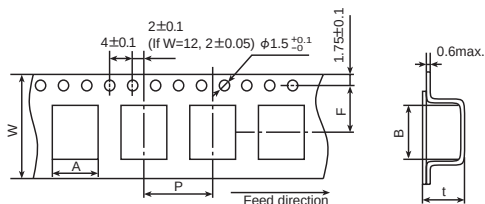
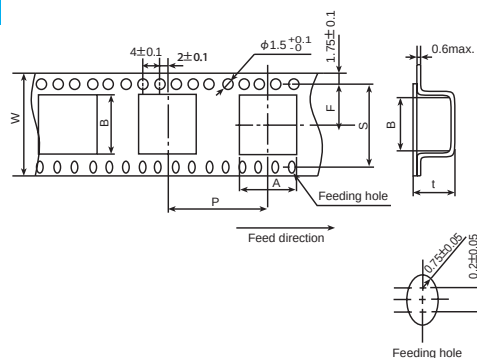


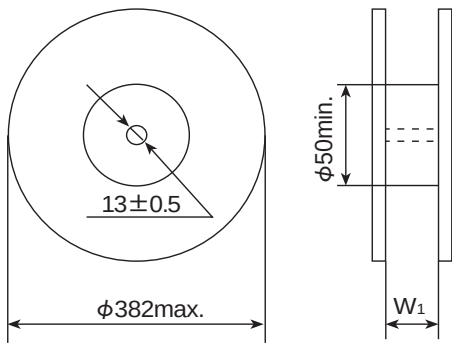
Fig.4



[mm]

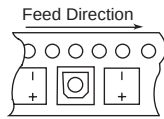
| Series  | Items   | W    | A    | B    | F    | P    | t    | S    | Fig. |
|---------|---------|------|------|------|------|------|------|------|------|
|         |         | ±0.3 | ±0.2 | ±0.2 | ±0.1 | ±0.1 | ±0.2 | ±0.1 |      |
| Alchip™ | D55     | 12.0 | 4.7  | 4.7  | 5.5  | 8.0  | 5.7  | —    | 1    |
|         | D60,D61 | 12.0 | 4.7  | 4.7  | 5.5  | 8.0  | 6.3  | —    | 1    |
|         | D73     | 12.0 | 4.6  | 4.6  | 5.5  | 8.0  | 7.5  | —    | 1    |
|         | E40     | 12.0 | 5.7  | 5.7  | 5.5  | 12.0 | 4.4  | —    | 2    |
|         | E46     | 12.0 | 5.7  | 5.7  | 5.5  | 12.0 | 4.9  | —    | 2    |
|         | E55     | 12.0 | 5.7  | 5.7  | 5.5  | 12.0 | 5.7  | —    | 2    |
|         | E60,E61 | 12.0 | 5.7  | 5.7  | 5.5  | 12.0 | 6.3  | —    | 2    |
|         | E73     | 16.0 | 5.7  | 5.7  | 7.5  | 12.0 | 7.5  | —    | 2    |
|         | F46     | 16.0 | 7.0  | 7.0  | 7.5  | 12.0 | 4.9  | —    | 2    |
|         | F55     | 16.0 | 7.0  | 7.0  | 7.5  | 12.0 | 5.7  | —    | 2    |
|         | F60,F61 | 16.0 | 7.0  | 7.0  | 7.5  | 12.0 | 6.3  | —    | 2    |
|         | F73     | 16.0 | 7.0  | 7.0  | 7.5  | 12.0 | 7.5  | —    | 2    |
|         | F80     | 16.0 | 7.0  | 7.0  | 7.5  | 12.0 | 8.2  | —    | 2    |
|         | F90     | 16.0 | 7.0  | 7.0  | 7.5  | 12.0 | 9.2  | —    | 2    |
|         | FA0     | 16.0 | 7.0  | 7.0  | 7.5  | 12.0 | 10.3 | —    | 2    |
|         | H63     | 16.0 | 8.7  | 8.7  | 7.5  | 12.0 | 6.8  | —    | 2    |
|         | H70     | 24.0 | 8.7  | 8.7  | 11.5 | 12.0 | 7.3  | —    | 2    |
|         | H80     | 24.0 | 8.7  | 8.7  | 11.5 | 12.0 | 8.3  | —    | 2    |
| NPCAP™  | PXN/PXT | 24.0 | 8.7  | 8.7  | 11.5 | 16.0 | 11.0 | —    | 3    |
|         | PXJ/PXG | 24.0 | 8.7  | 8.7  | 11.5 | 16.0 | 12.7 | —    | 3    |
|         | PXK/PXS | 24.0 | 10.7 | 10.7 | 11.5 | 16.0 | 8.3  | —    | 3    |
|         | PXF/PXE | 24.0 | 10.7 | 10.7 | 11.5 | 16.0 | 11.0 | —    | 3    |
|         | PXA/PXD | 24.0 | 10.7 | 10.7 | 11.5 | 16.0 | 12.8 | —    | 3    |
|         | PXH     | 24.0 | 10.7 | 10.7 | 11.5 | 16.0 | 12.8 | —    | 3    |
|         | JC0     | 24.0 | 10.7 | 10.7 | 11.5 | 16.0 | 12.8 | —    | 3    |
|         | JC5     | 24.0 | 10.7 | 10.7 | 11.5 | 16.0 | 12.8 | —    | 3    |
|         | JH0     | 32.0 | 10.7 | 10.7 | 14.2 | 24.0 | 17.1 | 28.4 | 4    |
|         | KE0     | 32.0 | 13.4 | 13.4 | 14.2 | 24.0 | 14.0 | 28.4 | 4    |
| Hybrid  | KG5     | 32.0 | 13.4 | 13.4 | 14.2 | 24.0 | 16.5 | 28.4 | 4    |
|         | KN0     | 32.0 | 13.4 | 13.4 | 14.2 | 24.0 | 22.1 | 28.4 | 4    |
|         | LH0     | 44.0 | 17.5 | 17.5 | 20.2 | 28.0 | 16.8 | 40.4 | 4    |
|         | LN0     | 44.0 | 17.5 | 17.5 | 20.2 | 28.0 | 22.1 | 40.4 | 4    |
|         | MH0     | 44.0 | 19.5 | 19.5 | 20.2 | 32.0 | 17.1 | 40.4 | 4    |
|         | MN0     | 44.0 | 19.5 | 19.5 | 20.2 | 32.0 | 22.1 | 40.4 | 4    |
|         |         |      |      |      |      |      |      |      |      |
|         |         |      |      |      |      |      |      |      |      |

◆ REEL DIMENSIONS [mm]



◆ POLARITY

Alchip™ -MVE/MZT/MZS  
MZL/MZR/MZJ  
MZA/MVY/MZF  
MZE/MZK/MLA  
MLF/MLE/MLK  
MVL/MVJ/MXB  
MHS/MVH/MHL  
MHB/MHJ/MHK  
NP CAP™ -PXN/PXT/PXJ/PXG  
PXK/PXS/PXF/PXE  
PXA/PXD/PXH  
Hybrid -HXF/HXE/HXK  
HXJ/HXC/HXD



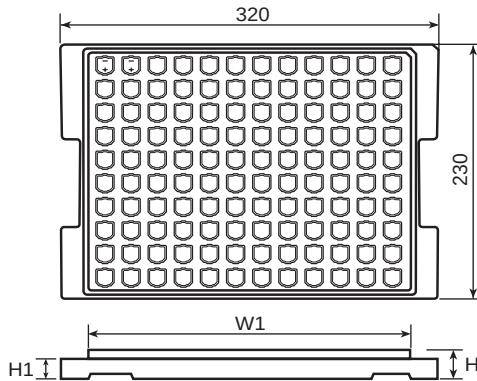
◆ QUANTITY PER REEL/BOX

| Series  | Size code       | Quantity (pcs/reel) | Quantity (pcs/box) | W <sub>1</sub> (mm) |
|---------|-----------------|---------------------|--------------------|---------------------|
| Alchip™ | D55,D60,D61     | 2,000               | 10,000             | 14                  |
|         | D73             | 1,500               | 7,500              | 14                  |
|         | E55,E60,E61     | 1,000               | 5,000              | 14                  |
|         | E73             | 1,000               | 5,000              | 18                  |
|         | F55,F60,F61,F73 | 1,000               | 5,000              | 18                  |
|         | F80             | 900                 | 4,500              | 18                  |
|         | F90             | 800                 | 4,000              | 18                  |
|         | H63             | 1,000               | 5,000              | 18                  |
|         | HA0             | 500                 | 1,500              | 26                  |
|         | JA0             | 500                 | 1,500              | 26                  |
|         | JC5             | 400                 | 1,200              | 26                  |
|         | JH0             | 200                 | 600                | 34                  |
|         | KE0             | 250 <sup>*1</sup>   | 750 <sup>*1</sup>  | 34                  |
|         | KG5             | 200 <sup>*1</sup>   | 600 <sup>*1</sup>  | 34                  |
|         | KN0             | 150                 | 450                | 34                  |
|         | LH0             | 175 <sup>*1</sup>   | 350 <sup>*1</sup>  | 46                  |
|         | LN0             | 125 <sup>*1</sup>   | 250 <sup>*1</sup>  | 46                  |
| Hybrid  | MH0             | 150 <sup>*1</sup>   | 300 <sup>*1</sup>  | 46                  |
|         | MN0             | 100 <sup>*1</sup>   | 200 <sup>*1</sup>  | 46                  |
|         | E40,E46,E61     | 1,000               | 10,000             | 14                  |
|         | F46,F61         | 1,000               | 7,000              | 18                  |
|         | F80             | 900                 | 6,300              | 18                  |
| NPCAP™  | FA0             | 750                 | 5,250              | 18                  |
|         | H70             | 1,000               | 6,000              | 26                  |
|         | H80             | 900                 | 5,400              | 26                  |
|         | HA0             | 500                 | 3,000              | 26                  |
|         | HC0             | 400                 | 1,200              | 26                  |
|         | J80             | 500                 | 3,000              | 26                  |
|         | JA0             | 500                 | 3,000              | 26                  |
|         | JC0             | 400                 | 1,200              | 26                  |
|         | PXN/PXT         |                     |                    |                     |
|         | PXJ/PXG         |                     |                    |                     |
|         | PXK/PXS         |                     |                    |                     |
|         | PXF/PXE         |                     |                    |                     |
|         | PXA/PXD         |                     |                    |                     |
|         | PXH             |                     |                    |                     |

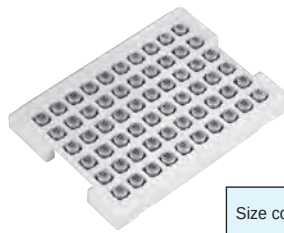
\*1 : Changed the packing quantity. (Size Code : KE0 to MN0)

**SURFACE MOUNT TYPE (TRAY)**

◆ DIMENSIONS [mm]



● TRAY CODE : TR

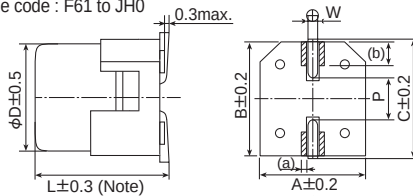


| Size code | H [mm] | W <sub>1</sub> [mm] | H <sub>1</sub> [mm] | Quantity [pcs/tray] | Quantity [pcs/box] |
|-----------|--------|---------------------|---------------------|---------------------|--------------------|
| KE0 & KG5 | 21.0   | 284                 | 18.5                | 120                 | 600                |
| LH0 & LN0 | 28.0   | 284                 | 24.0                | 80                  | 400                |
| MH0 & MN0 | 28.0   | 284                 | 24.0                | 60                  | 300                |

**VIBRATION RESISTANT STRUCTURE (Terminal code : G)**

◆ DIMENSIONS [mm]

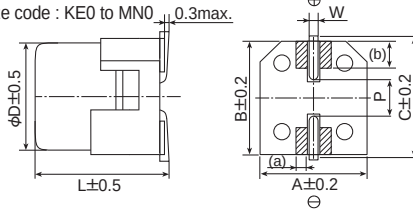
- Terminal code : G
- Size code : F61 to JH0



Note : L±0.5 for HA0 to JH0

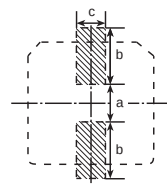
⊗ : Dummy terminals

- Size code : KE0 to MN0



⊗ : Dummy terminals

◆ RECOMMENDED SOLDER LAND



⊗ Solder land on PC board

The vibration resistant model supports the vibration condition of 30G.  
Since vibration is affected by solder thickness and other characteristics and conditions, please contact us for details.

| Size code | Dimensions of products (mm) |      |      |      |      |            |     |       |       | Solder land (mm) |     |     |
|-----------|-----------------------------|------|------|------|------|------------|-----|-------|-------|------------------|-----|-----|
|           | D                           | L    | A    | B    | C    | W          | P   | (a)   | (b)   | a                | b   | c   |
| F61       | 6.3                         | 5.8  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 | (0.7) | (1.4) | 1.9              | 3.5 | 3.3 |
| F80       | 6.3                         | 7.7  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 | (0.7) | (1.4) | 1.9              | 3.5 | 3.3 |
| HA0       | 8.0                         | 10.0 | 8.3  | 8.3  | 9.0  | 0.7 to 1.1 | 3.1 | (0.5) | (1.8) | 3.1              | 4.2 | 3.5 |
| JA0       | 10.0                        | 10.0 | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 | (0.5) | (2.1) | 4.5              | 4.4 | 3.5 |
| JC5       | 10.0                        | 12.5 | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 | (0.5) | (2.1) | 4.5              | 4.4 | 3.5 |
| JH0       | 10.0                        | 16.5 | 10.3 | 10.3 | 11.0 | 1.0 to 1.3 | 4.2 | (0.5) | (2.1) | 4.0              | 4.7 | 3.8 |
| KE0       | 12.5                        | 13.5 | 13.0 | 13.0 | 13.7 | 1.0 to 1.3 | 4.2 | (1.3) | (3.0) | 3.4              | 6.3 | 9.3 |
| KG5       | 12.5                        | 16.0 | 13.0 | 13.0 | 13.7 | 1.0 to 1.3 | 4.2 | (1.3) | (3.0) | 3.4              | 6.3 | 9.3 |
| KN0       | 12.5                        | 21.5 | 13.0 | 13.0 | 13.7 | 1.0 to 1.3 | 4.2 | (1.3) | (3.0) | 3.4              | 6.3 | 9.3 |
| LH0       | 16.0                        | 16.5 | 17.0 | 17.0 | 18.0 | 1.0 to 1.3 | 6.5 | (2.0) | (3.0) | 4.7              | 7.8 | 9.6 |
| LN0       | 16.0                        | 21.5 | 17.0 | 17.0 | 18.0 | 1.0 to 1.3 | 6.5 | (2.0) | (3.0) | 4.7              | 7.8 | 9.6 |
| MH0       | 18.0                        | 16.5 | 19.0 | 19.0 | 20.0 | 1.0 to 1.3 | 6.5 | (2.0) | (4.0) | 4.7              | 8.8 | 9.6 |
| MN0       | 18.0                        | 21.5 | 19.0 | 19.0 | 20.0 | 1.0 to 1.3 | 6.5 | (2.0) | (4.0) | 4.7              | 8.8 | 9.6 |

( ) : Ref.



# RADIAL LEAD TYPE TAPING SPECIFICATIONS (Applicable standard JIS C 0806-2)

## Conductive Polymer Aluminum Solid Capacitors Conductive Polymer Hybrid Aluminum Electrolytic Capacitors

### ◆DIMENSION [mm]

Fig.1

Taping Code : TX  
 $\phi D = \phi 5$

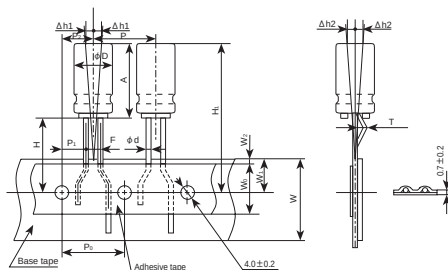
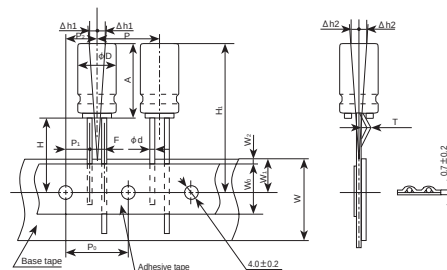


Fig.2

Taping Code : TD  
 $\phi D = \phi 6.3$  to 10



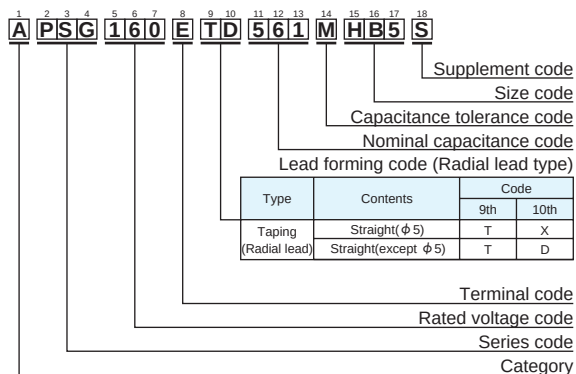
| Code    | Taping Code | Case size |      | $\phi d$   | P         | $P_0$     | $P_1$     | $P_2$     | F                      | W         | $W_0$ | $W_1$     | $W_2$ | H          | $H_1$        | $\phi D_0$ | $\Delta h_1$ | $\Delta h_2$ | t         | T         | Fig |
|---------|-------------|-----------|------|------------|-----------|-----------|-----------|-----------|------------------------|-----------|-------|-----------|-------|------------|--------------|------------|--------------|--------------|-----------|-----------|-----|
| tol.    | ---         | ---       | ---  | $\pm 0.05$ | $\pm 1.0$ | $\pm 0.2$ | $\pm 0.7$ | $\pm 1.0$ | $\pm 0.8$<br>$\pm 0.2$ | $\pm 0.5$ | min.  | $\pm 0.5$ | max.  | $\pm 0.75$ | max.         | $\pm 0.2$  | $\pm 2.0$    | $\pm 2.0$    | $\pm 0.3$ | $\pm 1.0$ |     |
| Nominal | TX          | 5         | 8    | 0.5        | 12.7      | 12.7      | 5.35      | 6.35      | $2.0^{+2}$             | 18        | 10    | 9.0       | 2.5   | 18.5       | 28.25        | 4.0        | 0            | 0            | 0.7       | 0         | 1   |
|         |             | 6.3       | 5    | 0.45       | 12.7      | 12.7      | 5.1       | 6.35      | 2.5                    | 18        | 10    | 9.0       | 2.5   | 18.5       | 28.25        | 4.0        | 0            | 0            | 0.7       | 0         | 2   |
|         |             | 6.3       | 8    | 0.6        | 12.7      | 12.7      | 5.1       | 6.35      | 2.5                    | 18        | 10    | 9.0       | 2.5   | 18.5       | $28.75^{+1}$ | 4.0        | 0            | 0            | 0.7       | 0         | 2   |
|         |             | 8         | 8    | 0.6        | 12.7      | 12.7      | 4.6       | 6.35      | 3.5                    | 18        | 10    | 9.0       | 2.5   | 20.0       | 29.75        | 4.0        | 0            | 0            | 0.7       | 0         | 2   |
|         |             | 8         | 11.5 | $0.6^{+1}$ | 12.7      | 12.7      | 4.6       | 6.35      | 3.5                    | 18        | 10    | 9.0       | 2.5   | 20.0       | 33.75        | 4.0        | 0            | 0            | 0.7       | 0         | 2   |
|         |             | 8         | 16   | 0.6        | 12.7      | 12.7      | 4.6       | 6.35      | 3.5                    | 18        | 10    | 9.0       | 2.5   | 20.0       | 38.25        | 4.0        | 0            | 0            | 0.7       | 0         | 2   |
|         |             | 8         | 20   | 0.6        | 12.7      | 12.7      | 4.6       | 6.35      | 3.5                    | 18        | 10    | 9.0       | 2.5   | 20.0       | 42.25        | 4.0        | 0            | 0            | 0.7       | 0         | 2   |
|         |             | 10        | 10.5 | 0.6        | 12.7      | 12.7      | 3.85      | 6.35      | 5.0                    | 18        | 10    | 9.0       | 2.5   | 18.5       | 30.75        | 4.0        | 0            | 0            | 0.7       | 0         | 2   |
|         |             | 10        | 11.5 | $0.6^{+1}$ | 12.7      | 12.7      | 3.85      | 6.35      | 5.0                    | 18        | 10    | 9.0       | 2.5   | 18.5       | 32.25        | 4.0        | 0            | 0            | 0.7       | 0         | 2   |
|         |             | 10        | 12.5 | 0.6        | 12.7      | 12.7      | 3.85      | 6.35      | 5.0                    | 18        | 10    | 9.0       | 2.5   | 18.5       | 33.25        | 4.0        | 0            | 0            | 0.7       | 0         | 2   |
|         |             | 10        | 16   | 0.6        | 12.7      | 12.7      | 3.85      | 6.35      | 5.0                    | 18        | 10    | 9.0       | 2.5   | 18.5       | 36.75        | 4.0        | 0            | 0            | 0.7       | 0         | 2   |
|         |             | 10        | 20   | 0.6        | 12.7      | 12.7      | 3.85      | 6.35      | 5.0                    | 18        | 10    | 9.0       | 2.5   | 18.5       | 40.75        | 4.0        | 0            | 0            | 0.7       | 0         | 2   |

\* 1 : Each product family has different value. Please refer to each page.

\* 2 : For case size  $\phi 5 \times 8$  (Taping code : TX), H dimension shall be  $2.0^{+0.5/-0.2}$ .

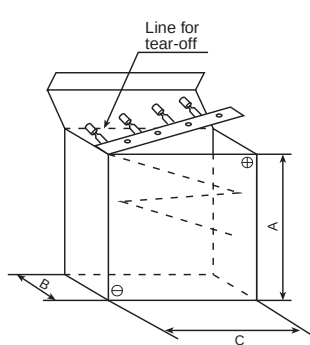
### TAPING CODE

#### Example



### QUANTITY PER AMMO PACK

#### Ammo pack box



#### Typical example

| Case size<br>$\phi D \times L$ (mm) | A<br>(mm) | B<br>(mm) | C<br>(mm) | Quantity<br>(pcs.) |
|-------------------------------------|-----------|-----------|-----------|--------------------|
| $\phi 5$ L=8mm                      | 240       | 51        | 336       | 2,000              |
| $\phi 6.3$ L=5 & 8mm                | 285       | 51        | 336       | 2,000              |
| $\phi 8$ L=8 to 11.5mm              | 240       | 51        | 336       | 1,000              |
| L=16mm                              | 240       | 56        | 336       |                    |
| L=20mm                              | 240       | 62        | 336       |                    |
| $\phi 10$ L=10.5 to 12.5mm          | 190       | 51        | 337       | 500                |
| L=16mm                              | 308       | 56        | 337       | 800                |
| L=20mm                              | 308       | 62        | 337       |                    |

# RADIAL LEAD TYPE TAPING SPECIFICATIONS (Applicable standard JIS C 0806-2)

## Aluminum Electrolytic Capacitors

### ◆DIMENSION [mm]

Fig.1

Taping Code : TC  
 $\phi D = \phi 5$  to 8

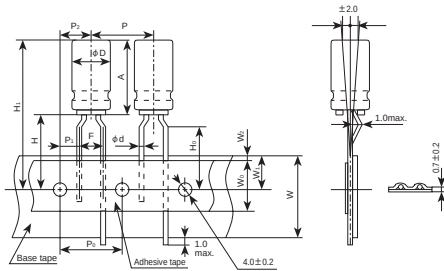


Fig.2

Taping Code : TD  
 $\phi D = \phi 5$

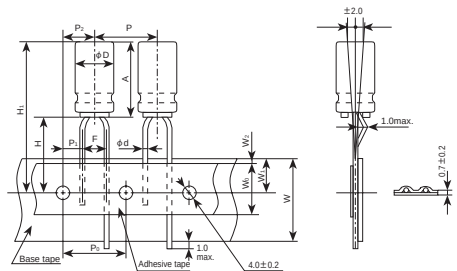


Fig.3

Taping Code : TD  
 $\phi D = \phi 6.3$  to 12.5

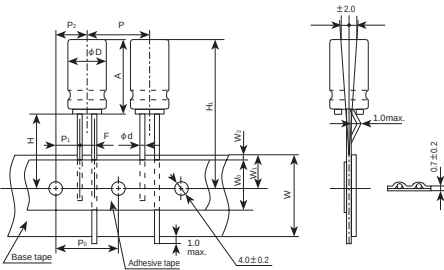
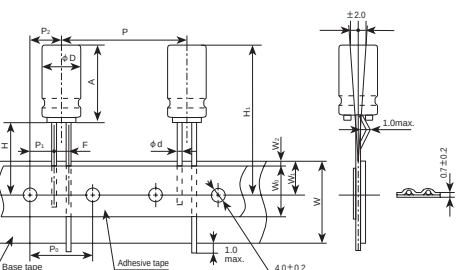


Fig.4

Taping Code : TE  
 $\phi D = \phi 12.5$



| Code    | Taping Code | Case size |            | $\phi d$   | P         | $P_0$     | $P_1$     | $P_2$     | F         | W         | $W_0$ | $W_1$     | $W_2$ | H          | $H_0$     | $H_1$ | Fig |
|---------|-------------|-----------|------------|------------|-----------|-----------|-----------|-----------|-----------|-----------|-------|-----------|-------|------------|-----------|-------|-----|
|         |             | $\phi D$  | A          |            |           |           |           |           |           |           |       |           |       |            |           |       |     |
| tol.    |             | —         | —          | $\pm 0.05$ | $\pm 1.0$ | $\pm 0.2$ | $\pm 0.7$ | $\pm 1.0$ | $\pm 0.8$ | $\pm 0.5$ | min.  | $\pm 0.5$ | max.  | $\pm 0.75$ | $\pm 0.5$ |       |     |
| Nominal | TD          | 5         | 11 to 15   | $0.5^{*1}$ | 12.7      | 12.7      | 5.1       | 6.35      | 2.5       | 18.0      | 10.0  | 9.0       | 1.5   | 18.5       | —         |       | 2   |
|         | TC          | 5         | 11 to 15   | $0.5^{*1}$ | 12.7      | 12.7      | 3.85      | 6.35      | 5         | 18.0      | 10.0  | 9.0       | 1.5   | 18.5       | 16.0      |       | 1   |
|         | TD          | 6.3       | 11 to 15   | 0.5        | 12.7      | 12.7      | 5.1       | 6.35      | 2.5       | 18.0      | 10.0  | 9.0       | 1.5   | 18.5       | —         |       | 3   |
|         | TC          | 6.3       | 11 to 15   | 0.5        | 12.7      | 12.7      | 3.85      | 6.35      | 5         | 18.0      | 10.0  | 9.0       | 1.5   | 18.5       | 16.0      |       | 1   |
| Nominal | TD          | 8         | 11.5 to 20 | 0.6        | 12.7      | 12.7      | 4.6       | 6.35      | 3.5       | 18.0      | 10.0  | 9.0       | 1.5   | 20.0       | —         |       | 3   |
|         | TC          | 8         | 11.5 to 20 | 0.6        | 12.7      | 12.7      | 3.85      | 6.35      | 5         | 18.0      | 10.0  | 9.0       | 1.5   | 20.0       | 16.0      |       | 1   |
| tol.    |             | $\pm 0.5$ | max.       | $\pm 0.05$ | $\pm 1.0$ | $\pm 0.3$ | $\pm 0.7$ | $\pm 1.3$ | $\pm 0.8$ | $\pm 0.5$ | min.  | $\pm 0.5$ | max.  | $\pm 0.75$ | $\pm 0.5$ |       |     |
| Nominal | TD          | 10        | 21         | $0.6^{*1}$ | 12.7      | 12.7      | 3.85      | 6.35      | 5         | 18.0      | 12.5  | 9.0       | 1.5   | 18.0       | —         |       | 3   |
|         | TD          | 10        | 21         | $0.6^{*1}$ | 15        | 15        | 5.0       | 7.5       | 5         | 18.0      | 12.5  | 9.0       | 1.5   | 18.0       | —         |       | 3   |
|         | TE          | 12.5      | 26         | $0.6^{*1}$ | 25.4      | 12.7      | 3.85      | 6.35      | 5         | 18.0      | 12.5  | 9.0       | 1.5   | 18.0       | —         |       | 4   |
|         | TE          | 12.5      | 26         | $0.6^{*1}$ | 25.4      | 12.7      | 3.85      | 6.35      | 5         | 18.0      | 12.5  | 9.0       | 1.5   | 18.0       | —         |       | 4   |

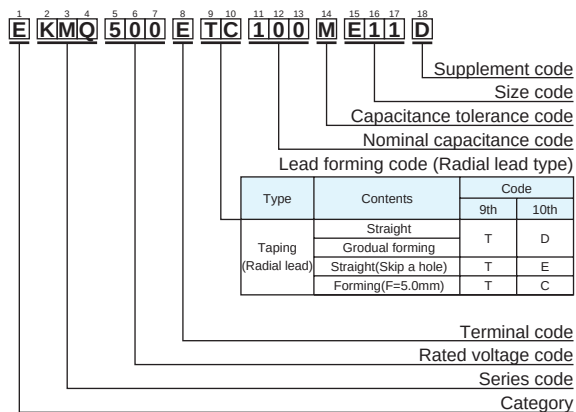
\* 1 : Each product family has different value. Please refer to each page.

\* 2 : The taping for size  $\phi 16$  and  $\phi 18$  is available as a custom design.

\* 3 : For the Taping code TD products with case diameter  $\geq 12.5$ mm, you can also select an option (Taping code: TS) that enhanced taping packaging.

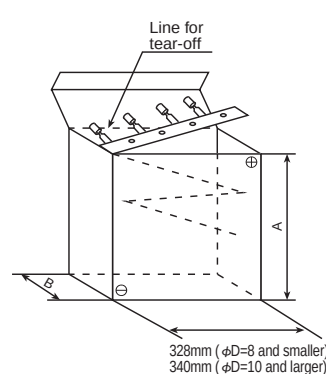
### TAPING CODE

#### Example



### QUANTITY PER AMMO PACK

#### Ammo pack box

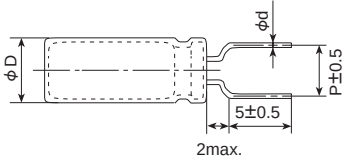
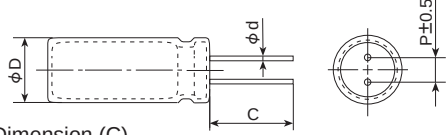
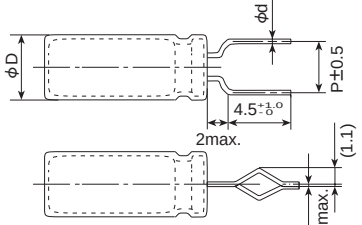
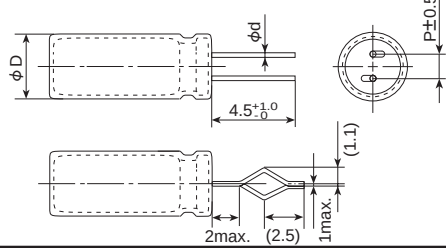
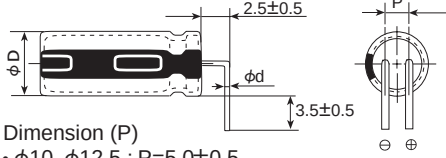
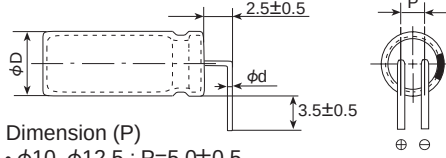
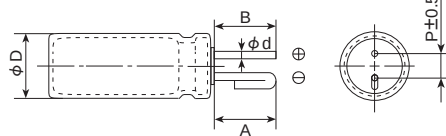


#### Typical example

| Case size<br>$\phi D \times L$ (mm)                   | A<br>(mm)         | B<br>(mm)      | Quantity<br>(pcs.) |
|-------------------------------------------------------|-------------------|----------------|--------------------|
| $\phi 5$<br>L=11 to 15mm<br>L=17mm                    | 232<br>235        | 51<br>60       | 2,000              |
| $\phi 6.3$<br>L=11 to 15mm<br>L=17mm                  | 284<br>284        | 51<br>55       | 2,000              |
| $\phi 8$<br>L=11.5 to 15mm<br>L=17 & 20mm             | 232<br>235        | 51<br>60       | 1,000              |
| $\phi 10$<br>L≤16mm<br>L=17 to 20mm<br>L=21 to 25mm   | 308<br>308<br>308 | 56<br>62<br>67 | 800                |
| $\phi 12.5$<br>L=26 to 30mm<br>L≤16mm<br>L=17 to 25mm | 308<br>308<br>308 | 71<br>62<br>67 | 500                |

## RADIAL LEAD TYPE (CUT/FORMED LEAD)

The following lead configurations are available. When ordering, please indicate the type of lead configurations by using the appropriate supplement code, such as C3, FC, MC or RC in the product part number.

| Terminal type                                                                                                                                                                                                                                                                                                                                                                                                             | Size        | Terminal type                                                                                                                                                                                                                                                                                                           | Size        |   |            |         |     |         |            |         |     |         |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|---|------------|---------|-----|---------|------------|---------|-----|---------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <p>●Lead code : FC (Forming Cut type)</p>                                                                                                                                                                                                                                                                                                | φD=5 to 8   | <p>●Lead code : C3 (Cutting type)</p>  <p>Dimension (C)</p> <ul style="list-style-type: none"> <li>• φD= 5 to 8: C3: 3.5±0.5(Second standard C5: 5.0±0.5)</li> <li>• φD=10 to 18: C3: 3.5±0.5(Second standard C5: 5.0±1.0)</li> </ul> | φD=5 to 18  |   |            |         |     |         |            |         |     |         |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |
| <p>●Lead code : FM (Snap-in type)</p>                                                                                                                                                                                                                                                                                                   | φD=5 to 8   | <p>●Lead code : MC (Snap-in type)</p>                                                                                                                                                                                                | φD=10 to 18 |   |            |         |     |         |            |         |     |         |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |
| <p>●Lead code : BC (Horizontal type)*3</p>  <p>Dimension (P)</p> <ul style="list-style-type: none"> <li>• φ10, φ12.5 : P=5.0±0.5</li> <li>• φ14.5, φ16, φ18 : P=7.5±0.5</li> </ul>                                                                                                                                                     | φD=10 to 18 | <p>●Lead code : BD (Horizontal type)*3</p>  <p>Dimension (P)</p> <ul style="list-style-type: none"> <li>• φ10, φ12.5 : P=5.0±0.5</li> <li>• φ14.5, φ16, φ18 : P=7.5±0.5</li> </ul>                                                  | φD=10 to 18 |   |            |         |     |         |            |         |     |         |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |
| <p>●Lead code : IJ (Forming Cut type)</p>  <p>Dimension</p> <table border="1"> <thead> <tr> <th>φD</th><th>A · B</th><th>φd</th><th>P</th></tr> </thead> <tbody> <tr> <td>10 to 12.5</td><td>3.2±0.5</td><td>0.6</td><td>5.0±0.5</td></tr> <tr> <td>14.5 to 18</td><td>3.2±0.5</td><td>0.8</td><td>7.5±0.5</td></tr> </tbody> </table> | φD          | A · B                                                                                                                                                                                                                                                                                                                   | φd          | P | 10 to 12.5 | 3.2±0.5 | 0.6 | 5.0±0.5 | 14.5 to 18 | 3.2±0.5 | 0.8 | 7.5±0.5 | φD=10 to 18 | <p>*1 Please consult with us about other terminal forming.<br/>           *2 Please refer to dimensions of each series for gas escape end seal style.<br/>           *3 Conventionally, lead forming code is used in common by (BC) for two type of the lead bent directions. We added lead forming code (BD) newly and clarified the lead bent directions. Please place an order after the choice for an appropriate lead forming code depending on condition of use.</p> |  |
| φD                                                                                                                                                                                                                                                                                                                                                                                                                        | A · B       | φd                                                                                                                                                                                                                                                                                                                      | P           |   |            |         |     |         |            |         |     |         |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |
| 10 to 12.5                                                                                                                                                                                                                                                                                                                                                                                                                | 3.2±0.5     | 0.6                                                                                                                                                                                                                                                                                                                     | 5.0±0.5     |   |            |         |     |         |            |         |     |         |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |
| 14.5 to 18                                                                                                                                                                                                                                                                                                                                                                                                                | 3.2±0.5     | 0.8                                                                                                                                                                                                                                                                                                                     | 7.5±0.5     |   |            |         |     |         |            |         |     |         |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |

### ◆DIMENSION (P) [mm]

| Size   | Lead forming | Cutting type |        | Snap-in type |     |
|--------|--------------|--------------|--------|--------------|-----|
|        |              | FC           | C3(C5) | FM           | MC  |
| φ 5    |              | 5.0          | 2.0    | 5.0          | —   |
| φ 6.3  |              | 5.0          | 2.5    | 5.0          | —   |
| φ 8    |              | 5.0          | 3.5    | 5.0          | —   |
| φ 10   |              | —            | 5.0    | —            | 5.0 |
| φ 12.5 |              | —            | 5.0    | —            | 5.0 |
| φ 14.5 |              | —            | 7.5    | —            | 7.5 |
| φ 16   |              | —            | 7.5    | —            | 7.5 |
| φ 18   |              | —            | 7.5    | —            | 7.5 |

\*4 Please refer to dimensions of each series for lead-wire diameter (φd).

## MINIMUM ORDER QUANTITY

Please order by units of minimum order quantity.

### ◆SURFACE MOUNT

#### ●Vertical



| Series                                                                                                                          | Size code                    | Quantity (pcs) |                |
|---------------------------------------------------------------------------------------------------------------------------------|------------------------------|----------------|----------------|
|                                                                                                                                 |                              | Taping         | Tray (pcs/box) |
| Alchip™<br>MVE/MZT/MZS<br>MZL/MZR/MZJ<br>MZA/MVY/MZF<br>MZE/MZK/MLA<br>MLF/MLE/MLK<br>MVL/MVJ/MXB<br>MHS/MVH/MHL<br>MHB/MHJ/MHK | D55, D60, D61                | 2,000          | —              |
|                                                                                                                                 | D73                          | 1,500          | —              |
|                                                                                                                                 | E40, E46, E55, E60, E61, E73 | 1,000          | —              |
|                                                                                                                                 | F46, F55, F60, F61, F73      | 1,000          | —              |
|                                                                                                                                 | F80, H80                     | 900            | —              |
|                                                                                                                                 | F90                          | 800            | —              |
|                                                                                                                                 | FA0                          | 750            | —              |
|                                                                                                                                 | H63, H70                     | 1,000          | —              |
|                                                                                                                                 | HA0                          | 500            | —              |
|                                                                                                                                 | HCO                          | 400            | —              |
|                                                                                                                                 | J80, JA0                     | 500            | —              |
|                                                                                                                                 | JC0, JC5                     | 400            | —              |
|                                                                                                                                 | JH0                          | 200            | —              |
|                                                                                                                                 | KE0                          | 250            | 600            |
|                                                                                                                                 | KG5                          | 200            | 600            |
| NPCAP™<br>PXN/PXT/PXJ<br>PXG/PXK/PXS<br>PXF/PXE/PXA<br>PXD/PXH                                                                  | KN0                          | 150            | —              |
|                                                                                                                                 | LH0                          | 175            | 400            |
|                                                                                                                                 | LN0                          | 125            | 400            |
|                                                                                                                                 | MH0                          | 150            | 300            |
|                                                                                                                                 | MN0                          | 100            | 300            |
| Hybrid<br>HXF/HXE/HXK<br>HXJ/HXC/HXD                                                                                            |                              |                |                |

### ◆RADIAL



| Size   |             | Bagged *1                |                               | Taping (pcs) | Tray (pcs)        |
|--------|-------------|--------------------------|-------------------------------|--------------|-------------------|
|        |             | Long lead type (pcs/box) | Formed lead type *2 (pcs/box) |              | Cut type (C3, C5) |
| φ 5    | 8L          | 1,000                    | 1,000                         | 2,000        | —                 |
|        | 11 to 11.5L | 3,000                    | 1,000                         | 2,000        | —                 |
| φ 6.3  | 5L          | 1,000                    | 1,000                         | 2,000        | —                 |
|        | 8L          | 1,000                    | 1,000                         | 2,000        | —                 |
|        | 10.5 to 15L | 2,000 (1,000) *3         | 1,000                         | 2,000        | —                 |
| φ 8    | 20L max.    | 1,000                    | 1,000                         | 1,000        | —                 |
| φ 10   | 11.5L       | 500                      | 500                           | 500          | —                 |
|        | 12.5L       | 2,000 (500) *3           | 3,000 (500) *3                | 800 (500) *3 | 1,500 (—) *3      |
|        | 16 to 20L   | 2,000                    | 2,000                         | 800          | 1,500             |
|        | 25L         | 1,000                    | 2,000                         | 800          | 1,500             |
|        | 30 to 45L   | 1,000                    | 1,000                         | —            | 750               |
|        | 50L         | 500                      | 1,000                         | —            | —                 |
| φ 12.5 | 16L max.    | 1,000                    | 2,000                         | 500          | 1,500             |
|        | 20 to 25L   | 1,000                    | 1,000                         | 500          | 1,500             |
|        | 30L         | 1,000                    | 1,000                         | —            | 750               |
|        | 35 to 45L   | 500                      | 500                           | —            | 750               |
|        | 50L         | 500                      | 500                           | —            | —                 |
| φ 14.5 | 20L max.    | 500                      | 1,000                         | 250          | 500               |
|        | 25L         | 500                      | 500                           | 250          | 500               |
|        | 30 to 45L   | 500                      | 500                           | —            | 500               |
|        | 50L         | 250                      | 250                           | —            | —                 |
| φ 16   | 15L, 16L    | 500                      | 1,000                         | 250          | 500               |
|        | 20 to 25L   | 500                      | 500                           | 250          | 500               |
|        | 30 to 35.5L | 500                      | 500                           | —            | 500               |
|        | 40L         | 250                      | 500                           | —            | 500               |
|        | 45L         | 250                      | 500                           | —            | —                 |
|        | 50L         | 250                      | 250                           | —            | —                 |
| φ 18   | 25L max.    | 500                      | 500                           | 250          | 500               |
|        | 30 to 50L   | 250                      | 250                           | —            | 500               |

\*1 The GVA, GPD, GVD and GQB series are not compatible with bagging. They are packaged in a box.

\*2 The standard bagged quantity may differ depending on the terminal type or packing style. Please contact us for details.

\*3 Minimum order quantity for conductive polymer aluminum solid capacitors and conductive polymer hybrid aluminum electrolytic capacitors.

| Series                                                 | Case size |            | Boxed (pcs)<br>Long lead type | Case size |            | Boxed (pcs)<br>Long lead type |
|--------------------------------------------------------|-----------|------------|-------------------------------|-----------|------------|-------------------------------|
|                                                        | φ D       | L          |                               | φ D       | L          |                               |
| Aluminum Electrolytic Capacitors<br>GVA/GPD/GVD<br>GQB | 12.5      | 20 to 31.5 | 500                           | 16        | 20 to 31.5 | 250                           |
|                                                        |           | 35 to 40   |                               |           | 35 to 40   |                               |
|                                                        | 14.5      | 20 to 31.5 | 300                           | 18        | 20 to 31.5 | 200                           |
|                                                        |           | 35 to 40   |                               |           | 35 to 40   |                               |

### ◆SNAP-IN

200 pieces



### ◆SCREW-MOUNT TYPE

| Size        | Minimum order quantity (pcs) |
|-------------|------------------------------|
| φ 76.2 max. | 20                           |
| φ 89        | 10                           |
| φ 100       | 4                            |

## AVAILABLE TERMINALS FOR SNAP-IN AND SCREW-MOUNT TYPE

- We can make the following terminal type on custom design.
- There is a restriction for specification of product, please consult with us when the product is required.
- Please consult with us about terminal type other than those following listed.

### Snap-in type

[mm]

|                                                                                                                                                  |                                                                                                                                                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Terminal, Dummy code : VNN</p> <p><b>D=φ22 to φ35</b></p> <p>PC board pin-out<br/>(View from Solder side)</p>                                 | <p>Terminal, Dummy code : LIN</p> <p><b>D=φ30 to φ40</b></p> <p>PC board pin-out<br/>(View from Solder side)</p>                                 |
| <p>Terminal, Dummy code : VEN</p> <p><b>D=φ30, φ35</b></p> <p>PC board pin-out<br/>(View from Solder side)</p>                                   | <p>Terminal, Dummy code : VRD</p> <p><b>D=φ35, φ40</b></p> <p>PC board pin-out<br/>(View from Solder side)</p> <p>B : Positive, A, C : Dummy</p> |
| <p>Terminal, Dummy code : VND</p> <p><b>D=φ35, φ40</b></p> <p>PC board pin-out<br/>(View from Solder side)</p> <p>B : Positive, A, C : Dummy</p> | <p>Terminal, Dummy code : LIS</p> <p><b>D=φ50</b></p> <p>PC board pin-out<br/>(View from Solder side)</p> <p>A : Dummy</p>                       |
| <p>Horizontal mounting</p> <p>Terminal, Dummy code : LCN</p> <p><b>D=φ22×30 to 50L</b></p> <p>PC board pin-out<br/>(View from Solder side)</p>   |                                                                                                                                                  |

\*1 Negative terminal : Mesh marking

\*2 Use the dummy terminals for mechanical support only.

The dummy terminals must not be connected to any circuit trace on PC board, be sure to electrically isolate from the negative and the positive terminals.

### Screw-mount type

[mm]

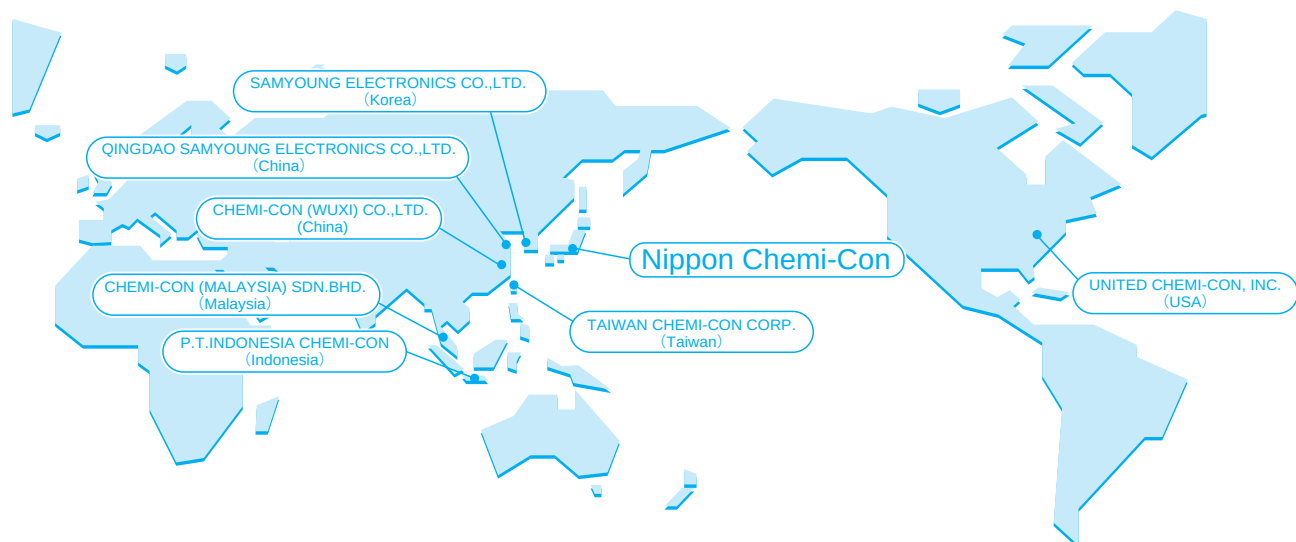
|                                                                                                                                                                                                                                                                                                                                                                                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Stud mounting type</p> <p><b>D=φ63.5 to φ89</b></p> <p>Plastic disk</p> <p>Mounting screw<br/>M12, P=1.75</p> <p>Plastic nut</p> <p>Installation<br/>Recommendation<br/>plate thickness: 3.2mm</p> <p>Recommendation<br/>mounting hole: φ31±0.5</p> <p>Mounting screw and case are same potential as the cathode terminal. Please careful of isolation between chassis.</p> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Please consult with us about other size.

The series in the following table has been deleted from this catalog.  
Since they will be discontinued, please use the recommended replacement series when designing new products.

◆REPLACEMENTS

| Classification                                             | Terminal shape     | Discontinued series | Characteristics                         | Replacements |
|------------------------------------------------------------|--------------------|---------------------|-----------------------------------------|--------------|
| Conductive Polymer Hybrid Aluminum Electrolytic Capacitors | Chip Type          | HXA                 | 125°C, Low ESR, high ripple current     | HXC          |
|                                                            |                    | HXB                 | 105°C, Low ESR                          | HXD          |
| Conductive Polymer Aluminum Solid Capacitors               | Radial lead type   | PSA                 | Super low ESR, high ripple current      | PSE/PSF/PSG  |
|                                                            |                    | PS                  | Super low ESR, high ripple current      |              |
| Aluminum Electrolytic Capacitors                           | Surface mount type | MV                  | 85°C, standard                          | MVE          |
|                                                            |                    | MVA                 | 85°C, standard                          |              |
|                                                            |                    | MVK                 | 105°C, standard                         |              |
|                                                            |                    | MKB                 | 105°C, high voltage                     |              |
|                                                            |                    | MV-BP               | 85°C Bi-polar                           |              |
|                                                            |                    | MVK-BP              | 105°C Bi-polar                          |              |
|                                                            | Radial lead type   | SRM                 | 85°C 5mm height                         | —            |
|                                                            |                    | SRE                 | 85°C 5mm height                         |              |
|                                                            |                    | KRE                 | 105°C 5mm height                        |              |
|                                                            |                    | SRA                 | 85°C 7mm height                         |              |
|                                                            |                    | KMA                 | 105°C 7mm height                        |              |
|                                                            |                    | SRE-BP              | 85°C Bi-polar, 5mm height               |              |
|                                                            |                    | SRA-BP              | 85°C Bi-polar, 7mm height               |              |
|                                                            |                    | KRE-BP              | 105°C Bi-polar, 5mm height              |              |
|                                                            |                    | KMA-BP              | 105°C Bi-polar, 7mm height              |              |
|                                                            |                    | SME-BP              | 85°C Bi-polar, downsizing               |              |
|                                                            |                    | KME-BP              | 105°C Bi-polar, downsizing              |              |
|                                                            |                    | SNX-BP              | For Audio, 85°C Bi-polar                |              |
|                                                            |                    | SMQ                 | 85°C, standard                          | KMQ          |
|                                                            |                    | SMG                 | 85°C, standard                          |              |
|                                                            |                    | KMG                 | 105°C, standard                         |              |
|                                                            |                    | KXG                 | 105°C, long life                        |              |
|                                                            |                    | KXE                 | 105°C, long life                        | KXF          |
|                                                            |                    | GXE                 | 125°C, high temperature                 | GXF          |
|                                                            |                    | KMY                 | Low impedance, Long life                | KYB          |
|                                                            |                    | KLJ                 | No sparks with DC overvoltage           | KLJ          |
|                                                            |                    | LBK                 | For airbag, downsizing                  | LBG/LBV      |
|                                                            |                    | FL                  | 105°C Low Profile, Long life            | —            |
|                                                            |                    | PH                  | For photo flash                         |              |
|                                                            |                    | ARI                 | For Audio, 5/7mm height                 |              |
|                                                            | Snap-in type       | KLM                 | 15mm height, low profile                | CHA          |
|                                                            |                    | LXH                 | No sparks with DC overvoltage           |              |
|                                                            | Screw-mount type   | RWG                 | 85°C, high ripple current, downsizing   | RWH          |
|                                                            |                    | RWY                 | 85°C, high ripple current               |              |
|                                                            |                    | FTP                 | Ovalized can shape, high ripple current | —            |



## ● AVAILABLE ITEMS BY MANUFACTURING LOCATIONS (Production in Japan is excluded)

| Classification                                                         | Series                | SAMYOUNG ELECTRONICS (Korea) | QINGDAO SAMYOUNG ELECTRONICS (China) | CHEMI-CON WUXI (China) | P.T.INDONESIA CHEMI-CON (Indonesia) | TAIWAN CHEMI-CON (Taiwan) | CHEMI-CON MALAYSIA (Malaysia) | UNITED CHEMI-CON (USA) |
|------------------------------------------------------------------------|-----------------------|------------------------------|--------------------------------------|------------------------|-------------------------------------|---------------------------|-------------------------------|------------------------|
| Conductive Polymer Al-Solid Type (SMD)                                 | PXG / PXJ             |                              |                                      |                        |                                     | ●                         |                               |                        |
|                                                                        | PXF / PXE             |                              |                                      |                        |                                     | ●                         |                               |                        |
| Conductive Polymer Al-Solid Type (Radial lead)                         | PSG / PSC             |                              |                                      |                        |                                     | ●                         |                               |                        |
|                                                                        | PSF / PSE             |                              |                                      |                        |                                     | ●                         |                               |                        |
| Conductive Polymer Hybrid (SMD)                                        | HXC / HXD             |                              |                                      |                        |                                     | ●                         |                               |                        |
| Aluminum Electrolytic (SMD)                                            | MVE                   |                              |                                      | ●                      | ●                                   |                           |                               |                        |
|                                                                        | MZS / MZR / MZJ / MZL |                              |                                      |                        | ●                                   |                           |                               |                        |
|                                                                        | MVY / MZA             |                              |                                      | ●                      | ●                                   |                           |                               |                        |
|                                                                        | MLA / MZE / MZF / MZK |                              |                                      |                        | ●                                   |                           |                               |                        |
|                                                                        | MVJ / MLE / MLF       |                              |                                      |                        | ●                                   |                           |                               |                        |
|                                                                        | MVH / MHB             |                              |                                      | ●                      | ●                                   |                           |                               |                        |
|                                                                        | MHJ / MHK / MHL       |                              |                                      |                        | ●                                   |                           |                               |                        |
|                                                                        | MAR                   |                              |                                      |                        | ●                                   |                           |                               |                        |
| Aluminum Electrolytic (Radial lead) Low Profile                        | SRG                   |                              |                                      | ●                      | ●                                   |                           |                               |                        |
|                                                                        | KRG                   |                              |                                      | ●                      | ●                                   |                           |                               |                        |
| Aluminum Electrolytic (Radial lead) General purpose                    | KMQ                   |                              | ●                                    | ●                      | ●                                   |                           |                               |                        |
| Aluminum Electrolytic (Radial lead) Low impedance, High ripple current | KZN / KZM / KZH       |                              |                                      | ●                      | ●                                   |                           |                               |                        |
|                                                                        | KYB                   |                              |                                      | ●                      | ●                                   |                           |                               |                        |
|                                                                        | KYA / KY / KZE        |                              | ●                                    | ●                      | ●                                   |                           |                               |                        |
|                                                                        | KYC                   |                              |                                      |                        | ●                                   |                           |                               |                        |
|                                                                        | LXZ / LXV             |                              |                                      | ●                      | ●                                   |                           |                               |                        |
|                                                                        | LZA                   |                              |                                      | ●                      |                                     |                           |                               |                        |
|                                                                        | KXL                   |                              |                                      | ●                      |                                     |                           |                               |                        |
|                                                                        | KXJ                   |                              |                                      | ●                      | ●                                   |                           |                               |                        |
|                                                                        | PAG                   |                              |                                      | ●                      | ●                                   |                           |                               |                        |
|                                                                        | KWA                   |                              |                                      | ●                      |                                     |                           |                               |                        |
| Aluminum Electrolytic (Radial lead) High temperature Long life         | KHE                   |                              |                                      | ●                      |                                     |                           |                               |                        |
|                                                                        | KXF                   |                              |                                      | ●                      |                                     |                           |                               |                        |
|                                                                        | GPA                   |                              |                                      | ●                      | ●                                   |                           |                               |                        |
|                                                                        | GXL                   |                              |                                      | ●                      | ●                                   |                           |                               |                        |
| Aluminum Electrolytic (Radial lead) Special Application                | GXF/GPD               |                              |                                      | ●                      |                                     |                           |                               |                        |
|                                                                        | LE                    |                              |                                      |                        | ●                                   |                           |                               |                        |
| Aluminum Electrolytic (Radial lead) No Sparks against Over-Voltage     | LBG                   |                              |                                      | ●                      |                                     |                           |                               |                        |
|                                                                        | KLJ 450V              |                              |                                      | ●                      |                                     |                           |                               |                        |
| Aluminum Electrolytic (Snap-in)                                        | SMR                   |                              |                                      |                        |                                     |                           | ●                             |                        |
|                                                                        | SMQ / KMQ / KMR       | ●                            | ●                                    |                        |                                     |                           | ●                             |                        |
|                                                                        | SMM / KMM             | ●                            |                                      |                        |                                     |                           | ●                             |                        |
|                                                                        | KMW / KMZ             |                              |                                      |                        |                                     |                           | ●                             |                        |
|                                                                        | KMS                   | ●                            |                                      |                        |                                     |                           | ●                             |                        |
|                                                                        | LXM                   |                              |                                      |                        |                                     |                           | ●                             |                        |
|                                                                        | LXS / LXQ             | ●                            | ●                                    |                        |                                     |                           | ●                             |                        |
|                                                                        | CHA                   |                              |                                      |                        |                                     |                           | ●                             |                        |
| Aluminum Electrolytic (Screw-mount terminal)                           | KMV                   |                              |                                      |                        |                                     |                           | ●                             |                        |
|                                                                        | KMH                   |                              |                                      | ●                      |                                     |                           |                               | ●                      |
|                                                                        | RWF / RWE / RWL       |                              |                                      | ●                      |                                     |                           |                               | ●                      |
|                                                                        | LXA                   |                              |                                      |                        |                                     |                           |                               | ●                      |
|                                                                        | RWQ                   |                              |                                      | ●                      |                                     |                           |                               |                        |
|                                                                        | RWV                   |                              |                                      | ●                      |                                     |                           |                               |                        |
|                                                                        | RWR / RWH             |                              |                                      | ●                      |                                     |                           |                               |                        |
|                                                                        | U37F / U37L / U37X    |                              |                                      |                        |                                     |                           |                               | ●                      |
|                                                                        | UTOR                  |                              |                                      |                        |                                     |                           |                               | ●                      |

\*1 Please be sure to contact us before ordering as our product range is continuously improved and the product you require may have been superseded.  
 \*2 Refer to our web site for factory address.



## Conductive Polymer Aluminum Solid Capacitors





## PRECAUTIONS AND GUIDELINES (Conductive Polymer)

The NPCAP™ is a Conductive Polymer Solid Aluminum Capacitor that uses highly conductive polymer electrolytic material. Please read the following in order to get the most out of your NPCAP™ capacitor.

The circuits described as examples in this catalog and the "delivery specifications" are featured in order to show the operations and usage of our products, however, this fact does not guarantee that the circuits are available to function in your equipment systems.

We are not in any case responsible for any failures or damage caused by the use of information contained herein.

You should examine our products, of which the characteristics are described in the "delivery specifications" and other documents, and determine whether or not our products suit your requirements according to the specifications of your equipment systems. Therefore, you bear final responsibility regarding the use of our products.

Please make sure that you take appropriate safety measures such as use of redundant design and malfunction prevention measures in order to prevent fatal accidents and/or fires in the event any of our products malfunction.

For Conductive Polymer Hybrid Aluminum Electrolytic Capacitors, see Precautions and Guidelines (Conductive Polymer Hybrid). For Aluminum Electrolytic Capacitors, see Precautions and Guidelines (Aluminum Electrolytic Capacitors).

### 1 Designing Device Circuits

#### 1) Types of Circuits Where NPCAP™ Capacitors are Not to be Used

The leakage current in conductive polymer solid aluminum capacitors (hereafter called capacitors) may vary depending on thermal stresses during soldering. Avoid the use of capacitors in the following types of circuits:

- ① High-impedance circuits that are to sustain voltages.
- ② Coupling circuits
- ③ Time constant circuits

Because the capacitance varies depending on the environment the capacitors are used in, there is a possibility that the capacitor can affect a time constant circuit where sensitivity to variation in capacitance is required.

- ④ Other circuits that are significantly affected by leakage current

#### 2) Circuit Design

Verify the following before designing the circuit:

- ① The electrical characteristics of the capacitor will vary depending on differences in temperature and frequency. You had better design after verifying the scope of these factors.
- ② When connecting two or more capacitors in parallel, ensure that the design takes current balancing into account.
- ③ When two or more capacitors are connected in series, variability in applied voltage may cause over-voltage conditions. Contact Nippon Chemi-Con before using capacitors connected in series.
- ④ Avoid putting heat generating parts either around the capacitor or on the reverse of the circuit board.

#### 3) Use in High Reliable and Critical Applications

Consult with us in advance of usage of our products in the following listed applications. ① Aerospace equipment ② Power generation equipment such as thermal power, nuclear power etc. ③ Medical equipment ④ Transport equipment (automobiles, trains, ships, etc.) ⑤ Transportation control equipment ⑥ Disaster prevention / crime prevention equipment ⑦ Highly publicized information processing equipment ⑧ Submarine equipment ⑨ Other applications that are not considered general-purpose applications.

#### 4) Polarity

The NPCAP™ is a polarized solid aluminum electrolytic capacitor. Do not apply either reverse voltages or AC voltages to the polarized capacitors, using reversed polarity may cause a short circuit. Refer to the catalog, product specifications or capacitor body to confirm the polarity prior to use.

#### 5) Operating Voltage

Do not apply a greater than rated voltage, if a voltage greater than the rated voltage is suddenly applied the leakage current increases causing shorting. The peak voltage of superimposed AC voltages (ripple voltages) on DC voltages must not exceed

the full rated voltage. Capacitors do not require voltage derating within the category temperature. While there are specifications for surge voltages exceeding the rated voltage, usage conditions apply, and continued operation for extended periods of time under such conditions cannot be guaranteed.

#### 6) Ripple Current

Do not apply currents in excess of the rated ripple current. The superimposition of a large ripple current increases the rate of heating within the capacitor. When excessive ripple current is imposed the internal temperature increases which can shorten life and shorting may occur.

#### 7) Operating Temperature

Use within the stated category temperature range, if used outside this range, characteristics can deteriorate potentially leading to problems.

#### 8) Charging and Discharging the Capacitor

Do not use the NPCAP™ capacitor in circuits where the capacitor is repetitively charged and discharged rapidly. Repetitive charging and discharging the capacitor rapidly may reduce the capacitance or may cause damage due to internal heating. Use of a protective circuit to ensure reliability is recommended when rush currents exceed 20A.

#### 9) Leakage current

The leakage current may increase. After that, however, the leakage current will gradually decrease by self-healing action of the dielectric oxide layer when the capacitors are applied with a voltage less than the rated voltage within the Category Temperature range. As the voltage is closer to the rated voltage and the temperature is closer to the upper limit of Category Temperature range, the leakage current decreases faster.

The leakage current will increase by the following factors,

- ① Soldering
- ② Testing of high temperature exposure with no voltage applied, high temperature/humidity storage, temperature cycles, etc.

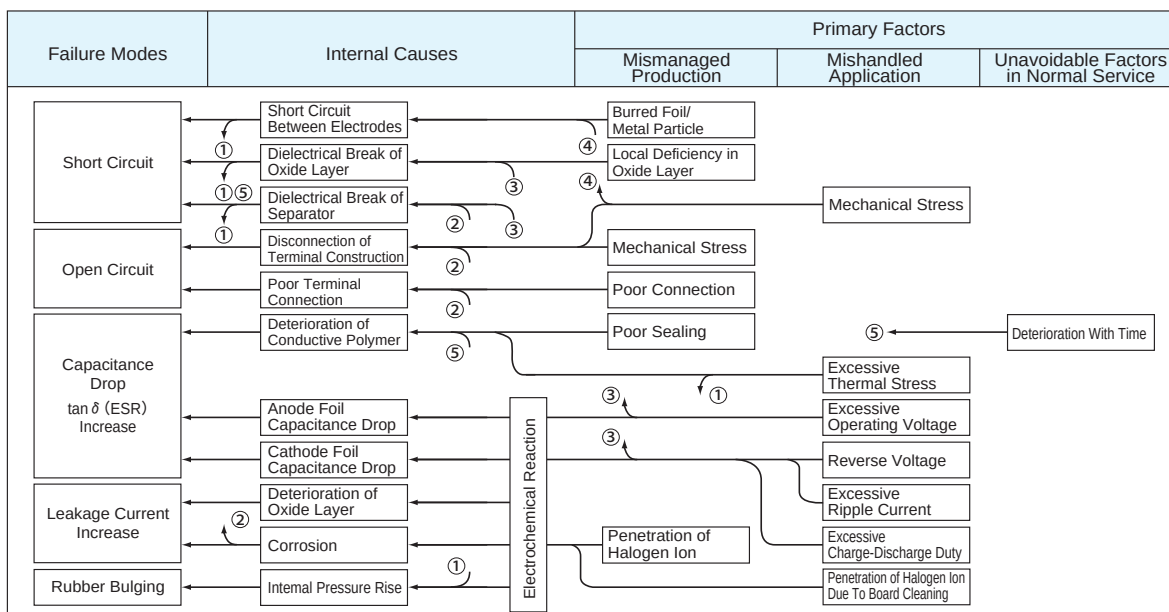
#### 10) Failures and Service Life

The failure rate at the rated voltage application of NPCAP™ and the upper limit of the category temperature is based on 0.5%/1,000 hours (reliability level 60%) compliant with JIS C 5003. The possibility of failures is not zero, however, the actual failure mode is as follows.

## (1) Failure Modes

- The principal failure mode is wear-out failure caused by a decrease in capacitance as a result of an increase in temperature in the product, and an increase in ESR, both of which eventually cause the capacitors to experience open circuit failure. In addition, a short circuit failure may occur due to excessive voltage, excessive current, excessive heat stress, or excessive physical stress applied to the capacitors.
- The failure rate would be reduced by reducing ambient temperatures, ripple current and applying voltage.
- If the short-circuited capacitor, which may be caused by over-voltages higher than the rated voltage or other conditions, has a large amount of current passed through, the aluminum can of the capacitor bulges and might be expelled with odor gas emitted.
- The product contains flammable materials. If the short causes a spark it may ignite.  
Please be careful when installing the product, its position and the layout design.
  - Increase safety by using in conjunction with a protective circuit or protective equipment.
  - Install measures such as redundant circuits so that the failure of a part of the equipment will not cause unstable operation.

Failure modes depend on the application conditions that lead to fail.



## (2) Service Life

SMD (Chip type) and radial lead type use rubber as the sealing material, so the service life depends on the thermal integrity of this rubber.

When long life performance is required in actual use, please use the capacitor at lower temperature within the category temperature.

capacitor. The trace must pass 1 to 2mm to the side of the capacitor.

- Do not pass any via holes underneath a capacitor on double-sided PC board
- In designing double-sided PC boards, do not locate any copper trace under the seal side of a capacitor

## 11) Capacitor Insulation

Insulation of the capacitor's case is not guaranteed. Ensure electrical insulation between the capacitor case, negative electrode, positive electrode and circuit pattern.

## 12) Capacitor Usage Environment

Do not use/expose capacitors to the following conditions.

- Oil, water, salty water, take care to avoid storage in damp locations.
- Direct sunlight
- Toxic gases such as hydrogen, sulfide, sulfurous acids, nitrous acids, chlorine and chlorine compounds, bromine and bromine compounds, ammonia, etc.
- Ozone, ultraviolet rays and radiation.
- Severe vibration or mechanical shock conditions beyond the limits advised in the product specification section of the catalog. The standard vibration condition is applicable to JIS C 5101-4.

## 13) Capacitor mounting

- For the surface mount capacitor, design the solder land on the PC board in accordance with the catalog or the product specification.
- For radial capacitors, design the terminal holes on the PC board to fit the terminal dimension of the capacitor.
- Do not pass any circuit traces beneath the seal side of a

## 2) Installing Capacitors

## 1) Installing

- Do not reuse capacitors already assembled in equipment that have been exposed to power.
- The capacitor may have self charge. If this happens, discharge the capacitor through a resistor of approximately 1kΩ before use.
- If capacitors are stored at a temperature of 35°C or more and more than 75%RH, the leakage current may increase. This may also occur if the capacitors are stored for a longer period than the period which is specified in the catalog or the product specification. In this case, they can be reformed by the voltage treatment through a resistor of approximately 1kΩ.
- Verify the rated capacitance and voltage of the capacitors when installing.
- Verify the polarity of the capacitors.
- Do not use the capacitors if they have been dropped on the floor.
- Do not deform the case of the capacitors.
- Verify that the lead spacing of the capacitor fits the hole spacing in the PC board before installing the capacitors.
- Do not apply any mechanical force in excess of the limits prescribed in the catalog or the product specification of the capacitors. Avoid subjecting the capacitor to strong forces,



## PRECAUTIONS AND GUIDELINES (Conductive Polymer)

as this may break the electrode terminals, bend or deform the capacitor, or damage the packaging, and may also cause short/open circuits, increased leakage current, or damage the appearance. Also, note the capacitors may be damaged by mechanical shocks caused by cut the lead wire, the vacuum/insertion head, component checker or centering operation of an automatic mounting or insertion machine.

### 2) Heat Resistance during Soldering

Ensure that the soldering conditions meet the specifications recommended by Nippon Chemi-Con. Note that the leakage current may increase or capacitance may decrease due to thermal stresses that occur during soldering, etc. Furthermore, the leakage current which rose gradually decreases, when voltage is applied at below the category upper limit temperature. Additionally the self repairing action is faster when voltage near the rated voltage rather than at a higher voltage is applied at below the category's upper temperature limit.

① Verify the following before using a soldering iron:

- That the soldering conditions (temperature and time) are within the ranges specified in the catalog or product specifications.
- That the tip of the soldering iron does not come into contact with the capacitor itself.

② Verify the following when flow soldering:

- Do not dip the body of a capacitor into the solder bath only dip the terminals in. The soldering must be done on the reverse side of PC board.
- Soldering conditions (preheat, solder temperature and dipping time) should be within the limits prescribed in the catalog or the product specifications.
- Do not apply flux to any part of capacitors other than their terminals.
- Make sure the capacitors do not come into contact with any other components while soldering.
- Flow soldering must not be used for the SMD(Chip type) capacitors.

③ Verify the following when reflow soldering:

- Soldering conditions (preheat, solder temperature and soldering time) should be within the limits prescribed in the catalogs or the product specification.
- The heat level should be appropriate. (Note that the thermal stress on the capacitor varies depending on the type and position of the heater in the reflow oven, and the color and material of the capacitor.)
- Please consult us about Vapor phase soldering (VPS).
- Except for the surface mount type, reflow soldering must not be used for the capacitors.

④ Do not reuse a capacitor that has already been soldered to PC board and then removed. When using a new capacitor in the same location, remove the flux, etc. first, and then use a soldering iron to solder on the new capacitor in accordance with the specifications.

### 3) Handling After Soldering

Do not apply any mechanical stress to the capacitor after soldering onto the PC board.

- ① Do not lean or twist the body of the capacitor after soldering the capacitors onto the PC board.
- ② Do not use the capacitors for lifting or carrying the assembly board.
- ③ Do not hit or poke the capacitor after soldering to PC board. When stacking the assembly board, be careful that other components do not touch the aluminum electrolytic capacitors.
- ④ Do not drop the assembled board.

### 4) Cleaning PC boards

- ① Do not wash capacitors by using the following cleaning agents. Solvent resistant capacitors are only suitable for washing using the cleaning conditions prescribed in the

catalog or the product specification. In particular, ultrasonic cleaning will accelerate damage to capacitors.

- Halogenated solvents; cause capacitors to fail due to corrosion.
- Alkali system solvents; corrode (dissolve) an aluminum case.
- Petroleum system solvents; cause the rubber seal material to deteriorate.
- Xylene and toluene; causes the rubber seal material to deteriorate.
- Acetone; erases the markings.

CFC alternatives or the other cleaners above; please consult with us.

② Verify the following points when washing capacitors.

- Monitor conductivity, pH, specific gravity and the water content of cleaning agents. Contamination adversely affects these characteristics.
- Be sure not to expose the capacitors under solvent rich conditions or keep capacitors inside a closed container. In addition, please dry the solvent sufficiently on the PC board and the capacitor with an air knife (temperature should be less than the maximum rated category temperature of the capacitor) for 10 minutes. Aluminum electrolytic capacitors can be characteristically and catastrophically damaged by halogen ions, particularly by chlorine ions, though the degree of the damage mainly depends upon the characteristics of the electrolyte and rubber seal material. When halogen ions come into contact with the capacitors, the foil corrodes when a voltage is applied. This corrosion causes an extremely high leakage current which results venting and an open circuit.

If the new types of cleaning agents mentioned below are used, the following are recommended as cleaning conditions for some of new cleaning agents.

#### -Higher alcohol cleaning agents

Pine Alpha ST-100S (Arakawa Chemical)

Clean Through 750H, 750HS and 750J (Kao)

Cleaning Conditions:

Using these cleaning agents, capacitors are capable of withstanding immersion or ultrasonic cleaning for 10 minutes at a maximum liquid temperature of 60°C. Find optimum condition for washing, rinsing, and drying. Be sure not to rub the marking off the capacitor which can be caused by contact with other components or the PC board. Note that shower cleaning adversely affects the markings on the sleeve.

#### -Non-Halogenated Solvent Cleaning

AK225AES (Asahi Glass)

Cleaning Conditions:

Immersion, ultrasonic or vapor cleaning for 5 minutes. However, from an environmental point of view, these types of solvent will be banned in near future. We would recommend not using them if at all possible.

#### -Isopropyl Alcohol (IPA)

IPA (Isopropyl Alcohol) is one of the most acceptable cleaning agents; it is necessary to maintain a flux content in the cleaning liquid at a maximum limit of 2 Wt.%.

### 5) Precautions for using adhesives and coating materials

- ① Do not use any adhesive and coating materials containing halogenated solvent.
- ② Verify the following before using adhesive and coating material.
  - Remove flux and dust left over between the rubber seal and the PC board before applying adhesive or coating materials to the capacitor.
  - Dry and remove any residual cleaning agents before applying adhesive and coating materials to the capacitors. Do not cover over the whole surface of the rubber seal with the



adhesive or coating materials.

- For permissible heat conditions for curing adhesives or coating materials, please consult with us.
- Covering over the whole surface of the capacitor rubber seal with resin may result in a hazardous condition because the inside pressure cannot be completely released. Also, a large amount of halogen ions in resins will cause the capacitors to fail because the halogen ions penetrate into the rubber seal and the inside of the capacitor.
- Some coating materials, it cannot be implemented to the capacitor.

Please note change on the surface might be caused according to the kind of solvents used for mounting adhesives and coating agents.

## 6) Fumigation

In exporting or importing electronic devices, they may be exposed to fumigation with halide such as methyl bromide. Where aluminum electrolytic capacitors are exposed to halide such as methyl bromide, the capacitors will be damaged with the corrosion reaction with halogen ions in the same way as cleaning agents. For the export and import, Nippon Chemi-Con considers using some packaging method and so forth so that fumigation is not required. For customers to export or import electronic devices, semi-assembly products or capacitor components, confirm if they will be exposed to fumigation and also consider final condition of packaging. (Note that either cardboard or vinyl package has a risk of fumigation gas penetration.)

## 3 The Operation of Devices

- 1) Do not touch the capacitor terminals directly.
- 2) Do not short-circuit the terminal of a capacitor by letting it come into contact with any conductive object. Also, do not spill electric-conductive liquid such as acid or alkaline solution over the capacitor.
- 3) Do not use capacitors in circumstances where they would be subject to exposure to the following materials
  - Oil, water, salty water or damp location.
  - Direct sunlight.
  - Ozone, ultraviolet rays or radiation.
  - Toxic gases such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine or its compounds, and ammonium.
  - Severe vibration or mechanical shock conditions beyond the limits prescribed in the catalog or product specification.

The standard vibration condition is applicable to JIS C 5101-4.

## 4 Maintenance Inspection

- 1) Make periodic inspections of capacitors that have been used in industrial applications. Before inspection, turn off the power supply and carefully discharge the electricity in the capacitors. Verify the polarity when measuring the capacitors with a volt-ohm meter. Do not apply any mechanical stress to the terminals of the capacitors.
- 2) The following items should be checked during the periodic inspections.
  - ① Significant damage in appearance
  - ② Electrical characteristics: Leakage current, capacitance,  $\tan \delta$  and other characteristics prescribed in the catalog or product specification.

We recommend replacing the capacitors if the parts are out of specification.

## 5 Contingencies

- 1) If gas has vented from the capacitor during use, there is a short circuit and burning, or the capacitor discharges an odor or smoke, turn off the main power supply to the equipment or unplug the power cord.
- 2) If there is a problem with the capacitor or a fire breaks out, the capacitor may produce a burning gas or reactive gas

from the outer resin, etc. If this happens, keep your hands and face away from the gas. If vented gas is inhaled or comes into contact with your eyes, flush your eyes immediately with water and/or gargle. If vented gas comes into contact with the skin, wash the affected area thoroughly with soap and water.

## 6 Storage

We recommend the following conditions for storage.

- 1) Store capacitors in a cool, dry place. Store at a temperature between 5 and 35°C, with a humidity of 75% or less. (table-1 Maximum storage term)

|                 | Before the bag is opened           | After the bag is opened                 |
|-----------------|------------------------------------|-----------------------------------------|
| SMD (Chip type) | Within 3 years after manufacturing | Within 6 months after the bag is opened |
| Radial          | Within 3 years after manufacturing | —                                       |

SMD products are sealed in a special laminated aluminum bag. Use all capacitors once the bag is opened. Return unused capacitors to the bag, and seal it with a zipper. Please refer to (Table -1 maximum storage term) for storage conditions. Be sure to follow our recommendations for reflow soldering.

- 2) Store the capacitors in a location free from direct contact with water, salt water, and oil.
- 3) Store in a location where the capacitor is not exposed to toxic gas, such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine or chlorine compounds, bromine or other halogen gases, methyl bromide or other halogen compounds, ammonia, or similar.
- 4) Store in a location where the capacitor is not exposed to ozone, ultraviolet radiation, or other radiation.
- 5) It is recommended to store capacitors in their original packaging wherever possible.
- 6) The JEDEC J-STD-020 standard does not apply.

## 7 Disposal

Please consult with a local industrial waste disposal specialist when disposing of aluminum electrolytic capacitors.

## 8 About AEC-Q200

The Automotive Electronics Council (AEC) was originally established by major American automotive related manufactures. Today, the committees are composed of representatives from the sustaining Members of manufacturing companies in automotive electrical components. It has standardized the criteria for "stress test qualification" and "reliability tests" for electronic components.

AEC-Q200 is the reliability test standard for approval of passive components in Automotive applications. It specifies the test type, parameters and quantity, etc. for each component. The criteria of the reliability tests such as for our main products, "Aluminum Electrolytic Capacitors" are described in this standard.

Pursuant to the customer's specific testing requirements, Chemi-Con submits the test results according to AEC-Q200 for Aluminum Electrolytic Capacitors used in automotive applications on request.

An electronic component manufacturer cannot simply claim that their product is "AEC-Q200 Qualified". It can be claimed "Compliant", "Capable", "Available", etc., however each component must be tested per each users "Qualification Test Plan" in order to claim AEC-Q200 status.

Please contact us for more information.

## 9 Response to the Substances of Concern

- 1) Nippon Chemi-Con aims for developing products that meet laws and regulations concerning substances of concern. (Some products may contain regulated substances for ex-



## PRECAUTIONS AND GUIDELINES (Conductive Polymer)

empted application)

Please contact us for more information about law-compliance status.

- 2) According to the content of REACH handbook (Guidance on requirements for substances in articles which is published on May 2008), our electronic components are “articles without any intended release”. Therefore they are not applicable for “Registration” for EU REACH Regulation Article 7 (1).

Reference: Electrolytic Condenser Investigation Society

“Study of REACH Regulation in EU about Electrolytic Capacitor”

(publicized on 13 March 2008)

### 10 Catalogs

Specifications in the catalogs are subject to change without notice. Test data shown in the catalogs are not assured as the whole performance values, but typical values.

For more details, refer to JEITA RCR-2367D (March 2019) with the title of “Safety Application Guide for fixed aluminum electrolytic capacitors for use in electronic equipment”.

# RECOMMENDED SOLDERING CONDITIONS FOR NPCAP™

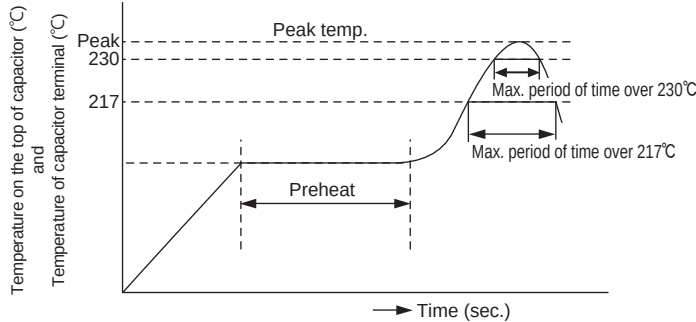
## ◆SURFACE MOUNT TYPE

The following conditions are recommended for air or infrared reflow soldering PXN/PXT/PXJ/PXG/PXK/PXS/PXF/PXE/PXA/PXD/PXH series onto a glass epoxy circuit board of 90×50×0.8mm (with resist) by cream solder. The temperatures shown are the surface temperature values on the top of the can and temperature of capacitor terminal.

Reflow should be performed twice or less.

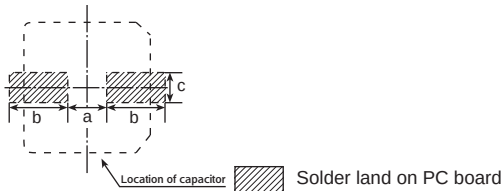
Please ensure that the capacitor became cold enough to the room temperature (5 to 35°C) before the second reflow.

### ● Recommended soldering heat conditions



| Series                                                     | Voltage range (Vdc) | Preheat       | Time maintained above 217°C | Time maintained above 230°C | Peak temp. | Reflow number    |
|------------------------------------------------------------|---------------------|---------------|-----------------------------|-----------------------------|------------|------------------|
| PXN/PXT<br>PXJ/PXG<br>PXK/PXS<br>PXF/PXE<br>PXA/PXD<br>PXH | 2.5 to 16V          | 150 to 180°C  | 50 sec. max.                | 40 sec. max.                | 260°C max. | 1-cycle only     |
|                                                            |                     |               |                             |                             | 250°C max. | 2-cycles allowed |
|                                                            | 20 to 25V           | 120 sec. max. | 50 sec. max.                | 40 sec. max.                | 250°C max. | 1-cycle only     |
|                                                            |                     |               | 40 sec. max.                | 30 sec. max.                |            | 2-cycles allowed |

### ● Recommended Solder Land on PC Board



| Size code          | a   | b   | c   |
|--------------------|-----|-----|-----|
| E40, E46, E61      | 1.4 | 3.0 | 1.6 |
| F46, F61, F80, FA0 | 1.9 | 3.5 | 1.6 |
| H70, H80, HA0, HC0 | 3.1 | 4.2 | 2.2 |
| J80, JA0, JC0      | 4.5 | 4.4 | 2.2 |

## ◆RADIAL LEAD TYPE

### ● Recommended soldering heat conditions

Preheat : 150°C 120 seconds max.

Flow soldering : 260±5°C max. 10+1 seconds max. (Or 380±10°C max. 3±0.5 seconds max.: hand soldering)

### ◆PRECAUTIONS FOR USERS

#### Soldering method

SMD (Chip type) have no capability to withstand such dip or flow soldering as totally immersing components into a solder bath.

#### Reflow soldering

Reflow the capacitors within Recommended Reflow Soldering Conditions. Verify there is no temperature stress to the capacitors because the following differences might degrade capacitors electrically and mechanically. Please consult with us if other reflow conditions are employed.

1. Location of components : Temperature increases at the edge of PC board more than the center.
2. Population of PC board : The lower the component population is, the more temperature rises.
3. Material of PC board : A ceramic-made board needs more heat than a glass epoxy-made board. The heat increase may cause damage to the capacitors.
4. Thickness of PC board : A thicker board needs more heat than a thinner board. The heat may damage the capacitors.
5. Size of PC board : A larger board needs more heat than a smaller board. The heat may damage the capacitors.
6. Solder thickness  
If very thin cream solder paste is to be used for SMD types, please consult with us.
7. Location of infrared ray lamps : IR reflow as well as hot plate reflow heats only on the reverse side of the PC board to lessen heat stress to the capacitors.
8. Case leakage current will increase (~mA) after the reflow process, the leakage current which rose gradually decreases when voltage is applied.
9. Please consult us about vapor phase soldering (VPS).

#### Rework of soldering

Use a soldering iron for rework. Do not exceed an iron tip temperature of 380±10°C and an exposure time of 3±0.5 seconds.

#### Mechanical stress

Do not grab the capacitors to lift the PC board and give stress to the capacitor. Avoid bending the PC board. This may damage the capacitors.

#### Cleaning assembly board

Immediately after solvent cleaning, remove residual solvent with an air knife for at least 10 minutes. If the solvent is insufficiently dry, the capacitors may corrode.

#### Coating on assembly board

1. Before curing coating material, remove the cleaning solvents from the assembly board.
2. Before conformal coating, a chloride free pre-coat material is recommended to decrease the stress on the capacitors.

#### Molding with resin

Internal chemical reaction gradually produces gas in the capacitor; increasing internal pressure. If the end seal of the capacitor is completely covered by resin the gas will be unable to escape causing a potentially dangerous situation. The chlorine in resin will penetrate the end seal, reach the element, and damage of the capacitor.

#### Glue

The followings are requirements for glue.

1. A low curing temperature over a short period of time
2. Strong adhesion and heat resistance after curing
3. Long shelf life
4. No corrosion

#### Others

Refer to PRECAUTIONS AND GUIDELINES (Conductive Polymer).



## Lifetime Estimation of Conductive Polymer Aluminum Solid Capacitors

Subject series : PXN, PXT, PXJ, PXG, PKX, PXS, PXF, PXE, PXA, PXD, PXH, PSW, PSJ, PSG, PSK, PSF, PSE, PSC

Conductive polymer aluminum solid capacitors are finite life electronic components like aluminum electrolytic capacitors.

The lifetime is affected by ambient temperature, humidity, ripple current and surge voltage.

The lifetime of aluminum electrolytic capacitors is affected mainly by the loss of electrolyte as the result of the liquid electrolyte evaporating through the rubber seal materials, resulting in capacitance drop and  $\tan \delta$  rise.

On the other hand, the lifetime of conductive polymer aluminum solid capacitors is affected mainly by oxidation degradation of the conductive polymer caused by osmose of oxygen or the thermal degradation of the conductive polymer by ambient temperature or self-heating, resulting in ESR rise and  $\tan \delta$  rise.

The infiltration rate of the oxygen is depend on the temperature as the liquid electrolyte evaporation and the relationship follows the Arrhenius's Law, too. Similarly, thermal degradation of the conductive polymer by self-heating follows the Arrhenius's Law, too.

Therefore, the lifetime estimation has been using the theory of lifetime reducing by half at every 10°C rise of the ambient temperature.

### 1. Lifetime Estimation

Equation (1) can be used for estimating the lifetime of the conductive polymer aluminum solid capacitors based on the ambient temperature and the rise of internal temperature due to ripple current.

$$L_x = L_o \times 2^{\frac{T_o - T_x}{10}} \times 2^{\frac{-\Delta T}{10}} \dots\dots\dots(1)$$

$L_x$  : Estimation of actual lifetime (hour)

$L_o$  : Specified lifetime with the rated voltage at the upper limit of the category temperature (hour)

$T_o$  : Maximum category temperature (°C)

$T_x$  : Actual ambient temperature of the capacitor (°C)

Use 40°C if the actual ambient temperature is below it.

$\Delta T$  : Rise of internal temperature due to the rated ripple current (°C)

Longer lifetime is expected by lowering the ripple current and the ambient temperature.

An approximate value of ripple current-caused  $\Delta T$  can be calculated using Equation (2)

$$\Delta T = \Delta T_o \times \left( \frac{I_x}{I_o} \right)^2 \dots\dots\dots(2)$$

$\Delta T_o$  : Rise in internal temperature due to the rated ripple current

| Maximum category temperature | $\Delta T_o$                 |                                                  |
|------------------------------|------------------------------|--------------------------------------------------|
|                              | $T_x \leq 105^\circ\text{C}$ | $105^\circ\text{C} < T_x \leq 125^\circ\text{C}$ |
| 105°C                        | 20°C                         | -                                                |
| 125°C                        | 20°C                         | 3°C                                              |

\*Please consult us about  $\Delta T_o$  for F80 size of PXH series.

$I_x$  : Operating ripple current (Arms) actually flowing in the capacitor

$I_o$  : Rated ripple current (Arms), frequency compensated, at the upper limit of the category temperature range

To determine more accurate values of  $\Delta T$ , they can be actually measured using a thermocouple.

### 2. Rated Ripple Current Frequency Multipliers

Self-heat rise is generated by the ripple current even though the conductive polymer aluminum solid capacitors have low ESR compared to liquid based electrolyte aluminum electrolytic capacitor. The ESR value differs depending on the frequency, thus the degree of self-heat rise differs depending on the ripple current frequency. Therefore, if the actual ripple current frequency differs from the specifications stated in the standard ratings, use the value obtained by multiplying the rated ripple current multiplier to convert the rated current.

Conductive polymer aluminum solid capacitors have super low ESR characteristic in high-frequency range. On the whole, ESR in low-frequency range relatively rises. Therefore, they can use only small ripple current in low-frequency range.

Please ensure that excessive ripple current is not applied to the capacitors in all frequency range.

### 3. Restriction of estimated lifetime calculation

The result calculated by the estimated lifetime formula, it is not guaranteed lifetime by Nippon Chemi-Con Corporation.

When designer calculate the lifetime of apparatus, please include an ample margin in consideration to the estimated lifetime of a capacitor.

When calculated lifetime result are over 15 years by using the estimated lifetime formula, please consider 15 years to be a maximum in considering that the sealing rubber characteristics vary during the lifetime.

If 15 years or more may be required as an expected lifetime, please consult us.

## Product code guide (Conductive polymer Surface mount type)

(Example : PXJ series, 6.3V-390μF, φ6.3×5.8L)



Please refer to the following table

|                    |  |      |  |        |  |      |  |      |  |      |  |         |  |      |  |                           |  |      |  |
|--------------------|--|------|--|--------|--|------|--|------|--|------|--|---------|--|------|--|---------------------------|--|------|--|
| Contents           |  | Code |  | Series |  | Code |  | Type |  | Code |  | Tol.(%) |  | Code |  | Terminal plating material |  | Code |  |
| Conductive Polymer |  | A    |  | PXJ    |  | PXJ  |  | SMD  |  | A    |  | ±20     |  | M    |  | Sn-Bi                     |  | G    |  |

1

A

Category

234

PXJ

Series code

567

6R3

Voltage code

8

A

Terminal code

910

RA

Taping・Tray code

111213

391

Capacitance code

14

M

Capacitance tolerance

151617

F61

Size code

18

G

Supplement code

| Voltage(V) | Code |
|------------|------|
| 2          | 2R0  |
| 2.5        | 2R5  |
| 4          | 4R0  |
| 6.3        | 6R3  |
| 10         | 100  |
| 16         | 160  |
| 20         | 200  |
| 25         | 250  |

| Type         | Reel dia.<br>φ (mm) | Application size<br>φ D(mm) | Code |
|--------------|---------------------|-----------------------------|------|
| Plastic Reel | 380                 | φ D=5 to 10                 | RA   |
|              | 330                 | φ D=8 to 10                 | RB   |

Refer to product guide for taping specifications.

| Cap.(μF) | Code |
|----------|------|
| 10       | 100  |
| 47       | 470  |
| 100      | 101  |
| 470      | 471  |
| 1,000    | 102  |
| ⋮        | ⋮    |

| φ D(mm) | Code |
|---------|------|
| 5       | E    |
| 6.3     | F    |
| 8       | H    |
| 10      | J    |

| L(mm) | Code |
|-------|------|
| 3.9   | 40   |
| 4.5   | 46   |
| 5.8   | 61   |
| 6.7   | 70   |
| 7.7   | 80   |
| 9.7   | A0   |
| 10    | A0   |
| 12    | C0   |
| 12.2  | C0   |

\*Refer to the appendix (Part number) for codes not listed here.

## Product code guide (Conductive polymer Radial lead type)

(Example : PSK series, 6.3V-330μF, φ5×8L, Long Lead with bulk)

Please refer to the following table



|                    |  |      |  |        |  |      |  |             |  |      |  |         |  |      |  |                           |  |      |  |
|--------------------|--|------|--|--------|--|------|--|-------------|--|------|--|---------|--|------|--|---------------------------|--|------|--|
| Contents           |  | Code |  | Series |  | Code |  | Type        |  | Code |  | Tol.(%) |  | Code |  | Terminal plating material |  | Code |  |
| Conductive Polymer |  | A    |  | PSK    |  | PSK  |  | Radial lead |  | E    |  | ± 20    |  | M    |  | Sn                        |  | S    |  |

1

A

Category

234

PSK

Series code

567

6R3

Voltage code

8

E

Terminal code

910

LL

Taping・Tray code

111213

331

Capacitance code

14

M

Capacitance tolerance

151617

E08

Size code

18

S

Supplement code

| Voltage(V) | Code |
|------------|------|
| 2          | 2R0  |
| 2.5        | 2R5  |
| 4          | 4R0  |
| 6.3        | 6R3  |
| 10         | 100  |
| 16         | 160  |
| 20         | 200  |
| 25         | 250  |
| 35         | 350  |

| Type                | Contents   | Code |
|---------------------|------------|------|
| Lead forming (Bulk) | Long Lead  | LL   |
|                     | Cut(3.5mm) | C3   |
|                     | Cut(5.0mm) | C5   |
| Taping              | Straight   | TD   |

Refer to product guide for taping specifications.

| Cap.(μF) | Code |
|----------|------|
| 56       | 560  |
| 100      | 101  |
| 470      | 471  |
| 1,000    | 102  |
| ⋮        | ⋮    |

| φ D(mm) | Code |
|---------|------|
| 5       | E    |
| 5.4     | E    |
| 6.3     | F    |
| 8       | H    |
| 10      | J    |

| L(mm) | Code |
|-------|------|
| 5     | 05   |
| 6     | 06   |
| 8     | 08   |
| 10.5  | A5   |
| 11.5  | B5   |
| 12.5  | C5   |
| 16    | 16   |
| 20    | 20   |

\*Refer to the appendix (Part number) for codes not listed here.



# CONDUCTIVE POLYMER ALUMINUM SOLID CAPACITORS

## Product List

### ◆SURFACE MOUNT (CHIP) TYPE (2 to 10V<sub>dc</sub>)

\*1 ESR(mΩ max.)20℃, 100k to 300kHz \*2 Rated ripple current(mArms)105℃, 100kHz

| Cap<br>(μF) | 2V <sub>dc</sub> |                                |                   |                                 | 2.5V <sub>dc</sub> |                                |                   |                                 | 4V <sub>dc</sub> |                                |                   |                                 | 6.3V <sub>dc</sub> |                                |                   |                                 | 10V <sub>dc</sub> |                                |                   |                                 |
|-------------|------------------|--------------------------------|-------------------|---------------------------------|--------------------|--------------------------------|-------------------|---------------------------------|------------------|--------------------------------|-------------------|---------------------------------|--------------------|--------------------------------|-------------------|---------------------------------|-------------------|--------------------------------|-------------------|---------------------------------|
|             | Series           | Nominal<br>Case size<br>(φD×L) | ESR* <sup>1</sup> | Ripple<br>current* <sup>2</sup> | Series             | Nominal<br>Case size<br>(φD×L) | ESR* <sup>1</sup> | Ripple<br>current* <sup>2</sup> | Series           | Nominal<br>Case size<br>(φD×L) | ESR* <sup>1</sup> | Ripple<br>current* <sup>2</sup> | Series             | Nominal<br>Case size<br>(φD×L) | ESR* <sup>1</sup> | Ripple<br>current* <sup>2</sup> | Series            | Nominal<br>Case size<br>(φD×L) | ESR* <sup>1</sup> | Ripple<br>current* <sup>2</sup> |
| 33          |                  |                                |                   |                                 |                    |                                |                   |                                 |                  |                                |                   |                                 | PXA                | 5×5.8                          | 40                | 1270                            | PXA               | 5×5.8                          | 40                | 1270                            |
| 47          |                  |                                |                   |                                 |                    |                                |                   |                                 |                  |                                |                   |                                 | PXA                | 5×5.8                          | 35                | 1380                            | PXE               | 5×5.8                          | 28                | 2310                            |
|             |                  |                                |                   |                                 |                    |                                |                   |                                 |                  |                                |                   |                                 |                    |                                |                   |                                 | PXA               | 5×5.8                          | 40                | 1270                            |
|             |                  |                                |                   |                                 |                    |                                |                   |                                 |                  |                                |                   |                                 |                    |                                |                   |                                 | PXA               | 6.3×4.5                        | 41                | 1560                            |
|             |                  |                                |                   |                                 |                    |                                |                   |                                 |                  |                                |                   |                                 |                    |                                |                   |                                 | PXA               | 6.3×5.8                        | 31                | 2250                            |
|             |                  |                                |                   |                                 |                    |                                |                   |                                 |                  |                                |                   |                                 |                    |                                |                   |                                 | PXD               | 5×5.8                          | 50                | 1270                            |
| 56          |                  |                                |                   |                                 |                    |                                |                   |                                 |                  |                                |                   |                                 | PXD                | 5×5.8                          | 45                | 1380                            | PXE               | 5×5.8                          | 28                | 2310                            |
|             |                  |                                |                   |                                 |                    |                                |                   |                                 |                  |                                |                   |                                 |                    |                                |                   |                                 | PXA               | 6.3×5.8                        | 31                | 2250                            |
|             |                  |                                |                   |                                 |                    |                                |                   |                                 |                  |                                |                   |                                 |                    |                                |                   |                                 | PXD               | 6.3×5.8                        | 40                | 2250                            |
|             |                  |                                |                   |                                 |                    |                                |                   |                                 |                  |                                |                   |                                 |                    |                                |                   |                                 | PXH               | 6.3×5.8                        | 45                | 2250                            |
| 68          |                  |                                |                   |                                 |                    |                                |                   |                                 |                  |                                |                   |                                 | PXA                | 6.3×5.8                        | 27                | 2400                            | PXE               | 5×5.8                          | 28                | 2310                            |
| 82          |                  |                                |                   |                                 |                    |                                |                   |                                 |                  |                                |                   |                                 | PXA                | 6.3×4.5                        | 40                | 1670                            |                   |                                |                   |                                 |
|             |                  |                                |                   |                                 |                    |                                |                   |                                 |                  |                                |                   |                                 | PXA                | 6.3×5.8                        | 27                | 2400                            |                   |                                |                   |                                 |
|             |                  |                                |                   |                                 |                    |                                |                   |                                 |                  |                                |                   |                                 | PXH                | 6.3×5.8                        | 40                | 2400                            |                   |                                |                   |                                 |
| 100         |                  |                                |                   |                                 |                    |                                |                   |                                 | PXE              | 5×5.8                          | 22                | 2610                            | PXE                | 5×5.8                          | 24                | 2500                            |                   |                                |                   |                                 |
|             |                  |                                |                   |                                 |                    |                                |                   |                                 | PXA              | 6.3×5.8                        | 26                | 2450                            | PXA                | 5×5.8                          | 35                | 1380                            |                   |                                |                   |                                 |
|             |                  |                                |                   |                                 |                    |                                |                   |                                 |                  |                                |                   |                                 | PXA                | 6.3×4.5                        | 40                | 1670                            |                   |                                |                   |                                 |
|             |                  |                                |                   |                                 |                    |                                |                   |                                 |                  |                                |                   |                                 | PXA                | 6.3×5.8                        | 27                | 2400                            |                   |                                |                   |                                 |
|             |                  |                                |                   |                                 |                    |                                |                   |                                 |                  |                                |                   |                                 | PXD                | 6.3×5.8                        | 35                | 2400                            |                   |                                |                   |                                 |
|             |                  |                                |                   |                                 |                    |                                |                   |                                 |                  |                                |                   |                                 | PXH                | 6.3×5.8                        | 40                | 2400                            |                   |                                |                   |                                 |
| 120         |                  |                                |                   |                                 | PXD                | 5×5.8                          | 40                | 1450                            | PXA              | 6.3×4.5                        | 38                | 1710                            | PXS                | 6.3×5.8                        | 22                | 2570                            | PXN               | 5×5.8                          | 35                | 2000                            |
|             |                  |                                |                   |                                 |                    |                                |                   |                                 |                  |                                |                   |                                 | PXE                | 5×5.8                          | 24                | 2500                            | PXT               | 5×5.8                          | 45                | 2000                            |
|             |                  |                                |                   |                                 |                    |                                |                   |                                 |                  |                                |                   |                                 | PXA                | 6.3×5.8                        | 27                | 2400                            | PXS               | 6.3×5.8                        | 27                | 2320                            |
|             |                  |                                |                   |                                 |                    |                                |                   |                                 |                  |                                |                   |                                 |                    |                                |                   |                                 | PXF               | 5×5.8                          | 22                | 2600                            |
|             |                  |                                |                   |                                 |                    |                                |                   |                                 |                  |                                |                   |                                 |                    |                                |                   |                                 | PXE               | 6.3×5.8                        | 25                | 2530                            |
|             |                  |                                |                   |                                 |                    |                                |                   |                                 |                  |                                |                   |                                 |                    |                                |                   |                                 | PXA               | 8×6.7                          | 27                | 2800                            |
|             |                  |                                |                   |                                 |                    |                                |                   |                                 |                  |                                |                   |                                 |                    |                                |                   |                                 | PXH               | 8×6.7                          | 35                | 2800                            |
| 150         |                  |                                |                   |                                 |                    |                                |                   |                                 | PXE              | 5×5.8                          | 22                | 2610                            | PXT                | 5×5.8                          | 26                | 2350                            | PXS               | 8×6.7                          | 30                | 2760                            |
|             |                  |                                |                   |                                 |                    |                                |                   |                                 | PXA              | 5×5.8                          | 30                | 1490                            | PXK                | 6.3×4.5                        | 19                | 2780                            | PXE               | 6.3×7.7                        | 21                | 2880                            |
|             |                  |                                |                   |                                 |                    |                                |                   |                                 | PXA              | 6.3×5.8                        | 26                | 2450                            | PXF                | 5×3.9                          | 20                | 2700                            | PXA               | 8×6.7                          | 27                | 2800                            |
|             |                  |                                |                   |                                 |                    |                                |                   |                                 | PXH              | 6.3×5.8                        | 35                | 2450                            | PXF                | 5×4.5                          | 25                | 2100                            | PXD               | 8×6.7                          | 35                | 2800                            |
|             |                  |                                |                   |                                 |                    |                                |                   |                                 |                  |                                |                   |                                 | PXF                | 5×5.8                          | 12                | 3500                            |                   |                                |                   |                                 |
|             |                  |                                |                   |                                 |                    |                                |                   |                                 |                  |                                |                   |                                 | PXA                | 8×6.7                          | 25                | 3020                            |                   |                                |                   |                                 |
|             |                  |                                |                   |                                 |                    |                                |                   |                                 |                  |                                |                   |                                 | PXH                | 8×6.7                          | 30                | 3020                            |                   |                                |                   |                                 |
| 180         |                  |                                |                   |                                 | PXE                | 5×5.8                          | 21                | 2670                            | PXK              | 6.3×4.5                        | 19                | 2780                            | PXK                | 5×5.8                          | 17                | 3390                            | PXN               | 6.3×5.8                        | 30                | 2500                            |
| 220         |                  |                                |                   |                                 | PXK                | 6.3×4.5                        | 19                | 2780                            | PXK              | 5×5.8                          | 17                | 3390                            | PXN                | 5×5.8                          | 30                | 2500                            | PXT               | 6.3×5.8                        | 40                | 2200                            |
|             |                  |                                |                   |                                 | PXF                | 5×3.9                          | 12                | 3300                            | PXA              | 8×6.7                          | 25                | 3020                            | PXT                | 5×5.8                          | 26                | 2350                            | PXE               | 8×6.7                          | 21                | 3220                            |
|             |                  |                                |                   |                                 | PXF                | 5×4.5                          | 25                | 2100                            | PXH              | 8×6.7                          | 30                | 3020                            | PXT                | 6.3×5.8                        | 26                | 2600                            |                   |                                |                   |                                 |
|             |                  |                                |                   |                                 | PXA                | 6.3×5.8                        | 25                | 2500                            |                  |                                |                   |                                 | PXK                | 6.3×4.5                        | 18                | 3200                            |                   |                                |                   |                                 |
|             |                  |                                |                   |                                 | PXD                | 6.3×5.8                        | 30                | 2500                            |                  |                                |                   |                                 | PXS                | 6.3×5.8                        | 22                | 2570                            |                   |                                |                   |                                 |
|             |                  |                                |                   |                                 | PXH                | 6.3×5.8                        | 35                | 2500                            |                  |                                |                   |                                 | PXF                | 5×5.8                          | 12                | 3500                            |                   |                                |                   |                                 |
|             |                  |                                |                   |                                 |                    |                                |                   |                                 |                  |                                |                   |                                 | PXF                | 6.3×5.8                        | 10                | 3900                            |                   |                                |                   |                                 |
|             |                  |                                |                   |                                 |                    |                                |                   |                                 |                  |                                |                   |                                 | PXE                | 6.3×5.8                        | 15                | 3160                            |                   |                                |                   |                                 |
|             |                  |                                |                   |                                 |                    |                                |                   |                                 |                  |                                |                   |                                 | PXA                | 8×6.7                          | 25                | 3020                            |                   |                                |                   |                                 |
|             |                  |                                |                   |                                 |                    |                                |                   |                                 |                  |                                |                   |                                 | PXD                | 8×6.7                          | 30                | 3020                            |                   |                                |                   |                                 |
|             |                  |                                |                   |                                 |                    |                                |                   |                                 |                  |                                |                   |                                 | PXH                | 8×6.7                          | 30                | 3020                            |                   |                                |                   |                                 |
| 270         |                  |                                |                   |                                 |                    |                                |                   |                                 | PXT              | 5×5.8                          | 26                | 2350                            | PXF                | 6.3×7.7                        | 9                 | 4200                            | PXN               | 8×6.7                          | 25                | 3300                            |
|             |                  |                                |                   |                                 |                    |                                |                   |                                 | PXE              | 6.3×5.8                        | 15                | 3160                            | PXE                | 6.3×7.7                        | 14                | 3470                            | PXJ               | 6.3×5.8                        | 15                | 4000                            |
|             |                  |                                |                   |                                 |                    |                                |                   |                                 |                  |                                |                   |                                 |                    |                                |                   |                                 | PXF               | 6.3×5.8                        | 20                | 2800                            |
|             |                  |                                |                   |                                 |                    |                                |                   |                                 |                  |                                |                   |                                 |                    |                                |                   |                                 | PXE               | 8×6.7                          | 21                | 3220                            |
|             |                  |                                |                   |                                 |                    |                                |                   |                                 |                  |                                |                   |                                 |                    |                                |                   |                                 | PXA               | 8×12                           | 14                | 4420                            |
|             |                  |                                |                   |                                 |                    |                                |                   |                                 |                  |                                |                   |                                 |                    |                                |                   |                                 | PXA               | 10×7.7                         | 24                | 3770                            |
| 330         |                  |                                |                   |                                 | PXN                | 5×5.8                          | 30                | 2500                            | PXT              | 6.3×5.8                        | 26                | 2600                            | PXN                | 6.3×5.8                        | 25                | 2800                            | PXE               | 8×7.7                          | 19                | 3390                            |
|             |                  |                                |                   |                                 | PXT                | 5×5.8                          | 26                | 2350                            | PXF              | 6.3×5.8                        | 10                | 3900                            | PXT                | 6.3×5.8                        | 26                | 2600                            | PXA               | 8×12                           | 14                | 4420                            |
|             |                  |                                |                   |                                 | PXK                | 5×5.8                          | 16                | 3500                            | PXE              | 6.3×5.8                        | 15                | 3160                            | PXK                | 6.3×5.8                        | 17                | 3390                            | PXA               | 10×7.7                         | 24                | 3770                            |
|             |                  |                                |                   |                                 | PXK                | 6.3×4.5                        | 16                | 3500                            | PXA              | 8×6.7                          | 25                | 3020                            | PXF                | 6.3×5.8                        | 10                | 3900                            | PXD               | 10×7.7                         | 25                | 3500                            |
|             |                  |                                |                   |                                 | PXF                | 5×5.8                          | 10                | 3900                            |                  |                                |                   |                                 | PXF                | 6.3×7.7                        | 9                 | 4200                            | PXH               | 10×7.7                         | 30                | 3700                            |
|             |                  |                                |                   |                                 | PXF                | 6.3×4.5                        | 12                | 3500                            |                  |                                |                   |                                 | PXF                | 8×6.7                          | 10                | 4500                            |                   |                                |                   |                                 |
|             |                  |                                |                   |                                 |                    |                                |                   |                                 |                  |                                |                   |                                 | PXE                | 6.3×7.7                        | 14                | 3470                            |                   |                                |                   |                                 |
|             |                  |                                |                   |                                 |                    |                                |                   |                                 |                  |                                |                   |                                 | PXE                | 8×6.7                          | 14                | 3950                            |                   |                                |                   |                                 |
|             |                  |                                |                   |                                 |                    |                                |                   |                                 |                  |                                |                   |                                 | PXA                | 10×7.7                         | 20                | 4130                            |                   |                                |                   |                                 |
| 390         |                  |                                |                   |                                 | PXT                | 5×5.8                          | 26                | 2350                            | PXT              | 6.3×5.8                        | 26                | 2600                            | PXJ                | 6.3×5.8                        | 10                | 4900                            | PXT               | 6.3×7.7                        | 22                | 2850                            |
|             |                  |                                |                   |                                 | PXT                | 6.3×5.8                        | 26                | 2600                            | PXK              | 6.3×5.8                        | 17                | 3390                            | PXS                | 8×6.7                          | 22                | 3220                            | PXJ               | 6.3×7.7                        | 13                | 4460                            |
|             |                  |                                |                   |                                 | PXF                | 5×5.8                          | 10                | 3900                            | PXF              | 6.3×7.7                        | 9                 | 4200                            | PXF                | 8×6.7                          | 10                | 4500                            | PXJ               | 6.3×9.7                        | 13                | 4000                            |
|             |                  |                                |                   |                                 | PXF                | 6.3×5.8                        | 10                | 3900                            | PXE              | 6.3×7.7                        | 14                | 3470                            | PXE                | 8×6.7                          | 14                | 3950                            | PXE               | 8×10                           | 17                | 4000                            |
|             |                  |                                |                   |                                 | PXE                | 6.3×5.8                        | 15                | 3160                            |                  |                                |                   |                                 | PXA                | 8×12                           | 12                | 4770                            |                   |                                |                   |                                 |
| 470         |                  |                                |                   |                                 | PXF                | 6.3×7.7                        | 9                 | 4200                            | PXF              | 8×6.7                          | 10                | 4500                            | PXF                | 8×7.7                          | 9                 | 4500                            | PXJ               | 8×6.7                          | 15                | 4000                            |
|             |                  |                                |                   |                                 | PXE                | 6.3×7.7                        | 13                | 3600                            | PXE              | 8×6.7                          | 14                | 3950                            | PXE                | 8×7.7                          | 13                | 3950                            | PXE               | 10×7.7                         | 19                | 3800                            |
|             |                  |                                |                   |                                 |                    |                                |                   |                                 | PXA              | 10×7.7                         | 20                | 4130                            | PXA                | 8×12                           | 12                | 4770                            | PXA               | 10×12.2                        | 12                | 5300                            |
|             |                  |                                |                   |                                 |                    |                                |                   |                                 |                  |                                |                   |                                 | PXA                | 10×7.7                         | 20                | 4130                            |                   |                                |                   |                                 |
|             |                  |                                |                   |                                 |                    |                                |                   |                                 |                  |                                |                   |                                 | PXD                | 10×7.7                         | 25                | 3500                            |                   |                                |                   |                                 |
|             |                  |                                |                   |                                 |                    |                                |                   |                                 |                  |                                |                   |                                 | PXH                | 10×7.7                         | 25                | 3700                            |                   |                                |                   |                                 |
| 560         |                  |                                |                   |                                 | PXN                | 6.3×5.8                        | 25                | 2800                            | PXS              | 8×6.7                          | 22                | 3220                            | PXN                | 8×6.7                          | 20                | 3500                            | PXN               | 10×7.7                         | 25                | 3400                            |
|             |                  |                                |                   |                                 | PXT                | 6.3×5.8                        | 26                | 2600                            | PXF              | 8×6.7                          | 10                | 4500                            | PXT                | 6.3×7.7                        | 22                | 2850                            | PXA               | 10×12.2                        | 12                | 5300                            |
|             |                  |                                |                   |                                 | PXK                | 6.3×5.8                        | 16                | 3500                            | PXE              | 8×6.7                          | 14                | 3950                            | PXJ                | 6.3×7.7                        | 8                 | 5000                            |                   |                                |                   |                                 |
|             |                  |                                |                   |                                 | PXF                | 6.3×5.8                        | 10                | 3900                            | PXA              | 8×12                           | 12                | 4770                            | PXJ                | 6.3×9.7                        | 10                | 4300                            |                   |                                |                   |                                 |
|             |                  |                                |                   |                                 | PXF                | 6.3×7.7                        | 9                 | 4200                            |                  |                                |                   |                                 | PXF                | 8×7.7                          | 9                 | 4500                            |                   |                                |                   |                                 |
|             |                  |                                |                   |                                 | PXF                | 8×6.7                          | 10                | 4500                            |                  |                                |                   |                                 |                    |                                |                   |                                 |                   |                                |                   |                                 |
|             |                  |                                |                   |                                 | PXE                | 6.3×7.7                        | 13                | 3600                            |                  |                                |                   |                                 |                    |                                |                   |                                 |                   |                                |                   |                                 |
|             |                  |                                |                   |                                 | PXE                | 8×6.7                          | 13                | 4100                            |                  |                                |                   |                                 |                    |                                |                   |                                 |                   |                                |                   |                                 |
|             |                  |                                |                   |                                 | PXA                | 8×6.7                          | 23                | 3100                            |                  |                                |                   |                                 |                    |                                |                   |                                 |                   |                                |                   |                                 |
|             |                  |                                |                   |                                 | PXH                | 8×6.7                          | 30                | 3100                            |                  |                                |                   |                                 |                    |                                |                   |                                 |                   |                                |                   |                                 |
| 680         | PXF              | 6.3×5.8                        | 12                | 3500                            | PXF                | 8×6.7                          | 10                | 4500                            | PXT              | 6.3×7.7                        | 22                | 2850                            | PXJ                | 8×6.7                          | 10                | 4500                            | PXE               | 10×10                          | 13                | 4820                            |
|             |                  |                                |                   |                                 | PXE                | 8×6.7                          | 13                | 4100                            | PXF              | 8×7.7                          | 9                 | 4500                            | PXA                | 10×12.2                        | 10                | 5500                            |                   |                                |                   |                                 |
|             |                  |                                |                   |                                 | PXA                | 8×12                           | 12                | 4770                            | PXE              | 8×7.7                          | 13                | 3950                            |                    |                                |                   |                                 |                   |                                |                   |                                 |
|             |                  |                                |                   |                                 |                    |                                |                   |                                 | PXA              | 10×7.7                         | 20                | 4130                            |                    |                                |                   |                                 |                   |                                |                   |                                 |
|             |                  |                                |                   |                                 |                    |                                |                   |                                 | PXH              | 10×7.7                         | 25                | 3700                            |                    |                                |                   |                                 |                   |                                |                   |                                 |



# CONDUCTIVE POLYMER ALUMINUM SOLID CAPACITORS

## Product List

### ◆SURFACE MOUNT (CHIP) TYPE (2.5 to 6.3V<sub>dc</sub>)

\*<sup>1</sup> ESR(mΩ max.)20℃, 100k to 300kHz \*<sup>2</sup> Rated ripple current(mArms)105℃, 100kHz

| Cap<br>(μF) | 2.5V <sub>dc</sub> |                                |                   |                                 | 4V <sub>dc</sub> |                                |                   |                                 | 6.3V <sub>dc</sub> |                                |                   |                                 |
|-------------|--------------------|--------------------------------|-------------------|---------------------------------|------------------|--------------------------------|-------------------|---------------------------------|--------------------|--------------------------------|-------------------|---------------------------------|
|             | Series             | Nominal<br>Case size<br>(φD×L) | ESR* <sup>1</sup> | Ripple<br>current* <sup>2</sup> | Series           | Nominal<br>Case size<br>(φD×L) | ESR* <sup>1</sup> | Ripple<br>current* <sup>2</sup> | Series             | Nominal<br>Case size<br>(φD×L) | ESR* <sup>1</sup> | Ripple<br>current* <sup>2</sup> |
| 820         | PXT                | 6.3×7.7                        | 22                | 2850                            | PXA              | 10×12.2                        | 10                | 5500                            | PXE                | 8×10                           | 12                | 4770                            |
|             | PXJ                | 6.3×5.8                        | 10                | 4900                            |                  |                                |                   |                                 | PXE                | 8×12                           | 10                | 5150                            |
|             | PXH                | 6.3×7.7                        | 7                 | 5000                            |                  |                                |                   |                                 | PXE                | 10×7.7                         | 14                | 4300                            |
|             | PXJ                | 6.3×7.7                        | 7                 | 5000                            |                  |                                |                   |                                 | PXA                | 10×12.2                        | 10                | 5500                            |
|             | PXJ                | 6.3×9.7                        | 10                | 4300                            |                  |                                |                   |                                 |                    |                                |                   |                                 |
|             | PXE                | 8×7.7                          | 12                | 4260                            |                  |                                |                   |                                 |                    |                                |                   |                                 |
|             | PXE                | 8×12                           | 9                 | 5400                            |                  |                                |                   |                                 |                    |                                |                   |                                 |
| 1000        | PXJ                | 6.3×9.7                        | 10                | 4300                            | PXE              | 8×10                           | 10                | 5220                            |                    |                                |                   |                                 |
|             | PXF                | 8×7.7                          | 9                 | 4500                            | PXE              | 10×7.7                         | 14                | 4300                            |                    |                                |                   |                                 |
|             | PXE                | 8×7.7                          | 12                | 4260                            |                  |                                |                   |                                 |                    |                                |                   |                                 |
|             | PXA                | 10×7.7                         | 19                | 4240                            |                  |                                |                   |                                 |                    |                                |                   |                                 |
|             | PXH                | 10×7.7                         | 25                | 3700                            |                  |                                |                   |                                 |                    |                                |                   |                                 |
| 1200        | PXJ                | 6.3×9.7                        | 10                | 4300                            | PXE              | 8×12                           | 9                 | 5400                            | PXN                | 10×7.7                         | 20                | 3500                            |
|             | PXJ                | 8×6.7                          | 10                | 4500                            | PXE              | 10×10                          | 10                | 5500                            | PXE                | 10×10                          | 12                | 5025                            |
|             | PXE                | 10×7.7                         | 13                | 4450                            | PXA              | 10×12.2                        | 10                | 5500                            |                    |                                |                   |                                 |
| 1500        | PXE                | 8×10                           | 10                | 5220                            | PXE              | 10×10                          | 10                | 5500                            | PXE                | 10×10                          | 12                | 5025                            |
|             | PXE                | 8×12                           | 9                 | 5400                            |                  |                                |                   |                                 | PXE                | 10×12.2                        | 10                | 5500                            |
|             | PXA                | 10×12.2                        | 10                | 5500                            |                  |                                |                   |                                 |                    |                                |                   |                                 |
| 1800        |                    |                                |                   |                                 | PXE              | 10×10                          | 10                | 5500                            |                    |                                |                   |                                 |
|             |                    |                                |                   |                                 | PXE              | 10×12.2                        | 9                 | 5600                            |                    |                                |                   |                                 |
| 2200        | PXE                | 10×10                          | 10                | 5500                            |                  |                                |                   |                                 |                    |                                |                   |                                 |
| 2700        | PXE                | 10×12.2                        | 9                 | 5600                            |                  |                                |                   |                                 |                    |                                |                   |                                 |

### ◆SURFACE MOUNT (CHIP) TYPE (16 to 25V<sub>dc</sub>)

| Cap<br>(μF) | 16V <sub>dc</sub> |                                |                   |                                 | 20V <sub>dc</sub> |                                |                   |                                 | 23V <sub>dc</sub> |                                |                   |                                 | 25V <sub>dc</sub> |                                |                   |                                 |
|-------------|-------------------|--------------------------------|-------------------|---------------------------------|-------------------|--------------------------------|-------------------|---------------------------------|-------------------|--------------------------------|-------------------|---------------------------------|-------------------|--------------------------------|-------------------|---------------------------------|
|             | Series            | Nominal<br>Case size<br>(φD×L) | ESR* <sup>1</sup> | Ripple<br>current* <sup>2</sup> | Series            | Nominal<br>Case size<br>(φD×L) | ESR* <sup>1</sup> | Ripple<br>current* <sup>2</sup> | Series            | Nominal<br>Case size<br>(φD×L) | ESR* <sup>1</sup> | Ripple<br>current* <sup>2</sup> | Series            | Nominal<br>Case size<br>(φD×L) | ESR* <sup>1</sup> | Ripple<br>current* <sup>2</sup> |
| 10          |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 | PXG               | 5×4.5                          | 60                | 1700                            |
| 15          |                   |                                |                   |                                 | PXA               | 6.3×4.5                        | 57                | 1300                            | PXA               | 6.3×4.5                        | 57                | 1300                            | PXA               | 6.3×5.8                        | 65                | 1500                            |
| 22          | PXA               | 5×5.8                          | 45                | 1210                            | PXA               | 6.3×5.8                        | 50                | 1650                            |                   |                                |                   |                                 | PXG               | 5×5.8                          | 40                | 2450                            |
|             | PXA               | 6.3×4.5                        | 45                | 1490                            | PXH               | 6.3×5.8                        | 60                | 1650                            |                   |                                |                   |                                 | PXG               | 6.3×4.5                        | 45                | 2350                            |
| 27          |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 | PXA               | 8×6.7                          | 50                | 1800                            |
|             |                   |                                |                   |                                 | PXG               | 5×4.5                          | 55                | 1770                            |                   |                                |                   |                                 | PXG               | 5×5.8                          | 40                | 2450                            |
| 33          | PXE               | 5×5.8                          | 35                | 2070                            |                   |                                |                   |                                 |                   |                                |                   |                                 | PXG               | 6.3×4.5                        | 45                | 2350                            |
|             | PXA               | 6.3×5.8                        | 37                | 2050                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
| 39          | PXG               | 5×4.5                          | 50                | 1860                            | PXA               | 8×6.7                          | 45                | 2000                            |                   |                                |                   |                                 | PXG               | 6.3×5.8                        | 30                | 2800                            |
|             | PXS               | 6.3×5.8                        | 37                | 2050                            |                   |                                |                   |                                 |                   |                                |                   |                                 | PXA               | 10×7.7                         | 45                | 2100                            |
|             | PXE               | 5×5.8                          | 35                | 2070                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
|             | PXA               | 6.3×5.8                        | 37                | 2050                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
|             | PXH               | 6.3×5.8                        | 50                | 2050                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
| 47          |                   |                                |                   |                                 | PXG               | 5×5.8                          | 30                | 2800                            |                   |                                |                   |                                 | PXG               | 6.3×5.8                        | 30                | 2800                            |
|             |                   |                                |                   |                                 | PXG               | 6.3×4.5                        | 42                | 2400                            |                   |                                |                   |                                 |                   |                                |                   |                                 |
|             |                   |                                |                   |                                 | PXA               | 8×6.7                          | 45                | 2000                            |                   |                                |                   |                                 |                   |                                |                   |                                 |
|             |                   |                                |                   |                                 | PXH               | 8×6.7                          | 45                | 2000                            |                   |                                |                   |                                 |                   |                                |                   |                                 |
| 56          | PXN               | 5×5.8                          | 35                | 2000                            | PXG               | 5×5.8                          | 30                | 2800                            |                   |                                |                   |                                 | PXJ               | 6.3×5.8                        | 28                | 3000                            |
| 68          |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 | PXG               | 6.3×5.8                        | 30                | 2800                            |
|             | PXG               | 6.3×4.5                        | 40                | 2450                            |                   |                                |                   |                                 |                   |                                |                   |                                 | PXG               | 6.3×7.7                        | 28                | 2800                            |
|             | PXS               | 6.3×5.8                        | 30                | 2200                            |                   |                                |                   |                                 |                   |                                |                   |                                 | PXG               | 6.3×5.8                        | 30                | 2800                            |
|             | PXE               | 6.3×5.8                        | 28                | 2390                            |                   |                                |                   |                                 |                   |                                |                   |                                 | PXG               | 8×6.7                          | 28                | 3000                            |
| 82          | PXS               | 8×6.7                          | 30                | 2760                            | PXA               | 10×7.7                         | 40                | 2500                            |                   |                                |                   |                                 | PXJ               | 6.3×7.7                        | 28                | 3040                            |
|             | PXE               | 6.3×7.7                        | 24                | 2700                            | PXH               | 10×7.7                         | 45                | 2400                            |                   |                                |                   |                                 | PXJ               | 6.3×9.7                        | 28                | 3000                            |
|             | PXA               | 8×6.7                          | 30                | 2700                            |                   |                                |                   |                                 |                   |                                |                   |                                 | PXG               | 8×7.7                          | 26                | 3100                            |
|             | PXH               | 8×6.7                          | 40                | 2700                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
|             | PXE               | 6.3×7.7                        | 24                | 2700                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
| 100         | PXN               | 6.3×5.8                        | 30                | 2500                            |                   |                                |                   |                                 |                   |                                |                   |                                 | PXG               | 8×10                           | 24                | 3300                            |
|             | PXT               | 5×5.8                          | 45                | 2000                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
|             | PXG               | 5×5.8                          | 27                | 3000                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
|             | PXK               | 6.3×5.8                        | 24                | 2490                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
|             | PXE               | 6.3×7.7                        | 24                | 2700                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
|             | PXE               | 8×6.7                          | 24                | 3010                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
| 120         | PXS               | 8×6.7                          | 27                | 2900                            | PXG               | 6.3×5.8                        | 25                | 3200                            |                   |                                |                   |                                 | PXG               | 6.3×7.7                        | 28                | 2800                            |
|             | PXE               | 8×6.7                          | 24                | 3010                            |                   |                                |                   |                                 |                   |                                |                   |                                 | PXJ               | 8×6.7                          | 38                | 3200                            |
| 150         |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 | PXG               | 8×10                           | 22                | 3500                            |
|             | PXN               | 8×6.7                          | 25                | 3300                            | PXJ               | 6.3×5.8                        | 23                | 3300                            |                   |                                |                   |                                 | PXG               | 8×7.7                          | 28                | 3000                            |
|             | PXE               | 8×7.7                          | 22                | 3150                            | PXJ               | 6.3×7.7                        | 18                | 3790                            |                   |                                |                   |                                 | PXG               | 10×7.7                         | 25                | 3400                            |
|             | PXA               | 10×7.7                         | 26                | 3430                            | PXJ               | 6.3×9.7                        | 18                | 3200                            |                   |                                |                   |                                 |                   |                                |                   |                                 |
|             | PXH               | 10×7.7                         | 35                | 3020                            | PXG               | 6.3×7.7                        | 25                | 3200                            |                   |                                |                   |                                 |                   |                                |                   |                                 |
| 180         |                   |                                |                   |                                 | PXA               | 10×12.2                        | 20                | 4320                            |                   |                                |                   |                                 |                   |                                |                   |                                 |
|             | PXT               | 6.3×5.8                        | 40                | 2200                            | PXG               | 8×6.7                          | 25                | 3200                            |                   |                                |                   |                                 | PXG               | 10×7.7                         | 25                | 3400                            |
|             | PXG               | 6.3×5.8                        | 22                | 3300                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
|             | PXE               | 8×10                           | 18                | 3890                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
|             | PXA               | 8×12                           | 16                | 4360                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
|             | PXA               | 10×7.7                         | 26                | 3430                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
| 220         | PXH               | 10×7.7                         | 35                | 3020                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
|             | PXJ               | 6.3×5.8                        | 20                | 3500                            | PXJ               | 8×6.7                          | 28                | 3300                            |                   |                                |                   |                                 | PXG               | 10×10                          | 20                | 3800                            |
|             | PXG               | 6.3×7.7                        | 22                | 3300                            | PXG               | 8×7.7                          | 23                | 3300                            |                   |                                |                   |                                 |                   |                                |                   |                                 |
|             | PXE               | 8×10                           | 18                | 3890                            | PXG               | 8×10                           | 23                | 3400                            |                   |                                |                   |                                 |                   |                                |                   |                                 |
|             | PXE               | 10×7.7                         | 22                | 3450                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
| 270         | PXA               | 10×12.2                        | 14                | 5050                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
|             | PXH               | 6.3×7.7                        | 13                | 4460                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
|             | PXT               | 6.3×7.7                        | 22                | 2850                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
|             | PXJ               | 6.3×7.7                        | 10                | 5080                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
|             | PXJ               | 6.3×7.7                        | 13                | 4460                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
|             | PXJ               | 6.3×9.7                        | 16                | 3500                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
| 330         | PXG               | 8×6.7                          | 22                | 3300                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
|             | PXN               | 10×7.7                         | 25                | 3400                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
|             | PXG               | 8×6.7                          | 22                | 3300                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
|             | PXG               | 8×7.7                          | 21                | 3400                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
|             | PXG               | 8×10                           | 21                | 3400                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
|             | PXE               | 10×10                          | 16                | 4350                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
| 390         | PXA               | 10×12.2                        | 14                | 5050                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
|             | PXJ               | 8×6.7                          | 25                | 3600                            | PXG               | 8×10                           | 20                | 3700                            |                   |                                |                   |                                 |                   |                                |                   |                                 |
| 560         |                   |                                |                   |                                 | PXG               | 10×7.7                         | 22                | 3650                            |                   |                                |                   |                                 |                   |                                |                   |                                 |
|             | PXG               | 8×10                           | 18                | 3900                            | PXG               | 10×10                          | 18                | 4100                            |                   |                                |                   |                                 |                   |                                |                   |                                 |
| 820         | PXG               | 10×7.7                         | 20                | 3800                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
|             | PXG               | 10×10                          | 16                | 4200                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
| 1000        | PXG               | 10×12.2                        | 12                | 5400                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
|             | PXG               | 10×10                          | 18                | 4100                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
|             | PXG               | 10×12.2                        | 12                | 5400                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |

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# CONDUCTIVE POLYMER ALUMINUM SOLID CAPACITORS

## Product List

### ◆RADIAL LEAD TYPE (2 to 10V<sub>dc</sub>)

\*1 ESR(mΩ max.)20°C, 100k to 300kHz(PSJ series : 300kHz) \*2 Rated ripple current(mArms)105°C, 100kHz

| Cap<br>(μF) | 2V <sub>dc</sub> |                                |                   |                                 | 2.5V <sub>dc</sub> |                                |                   |                                 | 4V <sub>dc</sub> |                                |                   |                                 | 6.3V <sub>dc</sub> |                                |                   |                                 | 10V <sub>dc</sub> |                                |                   |                                 |
|-------------|------------------|--------------------------------|-------------------|---------------------------------|--------------------|--------------------------------|-------------------|---------------------------------|------------------|--------------------------------|-------------------|---------------------------------|--------------------|--------------------------------|-------------------|---------------------------------|-------------------|--------------------------------|-------------------|---------------------------------|
|             | Series           | Nominal<br>Case size<br>(φD×L) | ESR* <sup>1</sup> | Ripple<br>current* <sup>2</sup> | Series             | Nominal<br>Case size<br>(φD×L) | ESR* <sup>1</sup> | Ripple<br>current* <sup>2</sup> | Series           | Nominal<br>Case size<br>(φD×L) | ESR* <sup>1</sup> | Ripple<br>current* <sup>2</sup> | Series             | Nominal<br>Case size<br>(φD×L) | ESR* <sup>1</sup> | Ripple<br>current* <sup>2</sup> | Series            | Nominal<br>Case size<br>(φD×L) | ESR* <sup>1</sup> | Ripple<br>current* <sup>2</sup> |
| 220         |                  |                                |                   |                                 | PSK                | 5×8                            | 7                 | 4350                            |                  |                                |                   |                                 |                    |                                |                   |                                 |                   |                                |                   |                                 |
| 270         |                  |                                |                   |                                 |                    |                                |                   |                                 |                  |                                |                   |                                 | PSK                | 5×8                            | 10                | 3700                            |                   |                                |                   |                                 |
| 330         |                  |                                |                   |                                 | PSK                | 5×8                            | 7                 | 4350                            | PSK              | 5×8                            | 8                 | 4050                            | PSK                | 5×8                            | 8                 | 4050                            |                   |                                |                   |                                 |
|             |                  |                                |                   |                                 | PSF                | 6.3×8                          | 5                 | 5900                            |                  |                                |                   |                                 |                    |                                |                   |                                 |                   |                                |                   |                                 |
| 390         |                  |                                |                   |                                 | PSJ                | 5.4×8                          | 4                 | 5600                            |                  |                                |                   |                                 |                    |                                |                   |                                 | PSC               | 8×11.5                         | 9                 | 5650                            |
| 470         |                  |                                |                   |                                 | PSJ                | 5.4×8                          | 4.5               | 5200                            | PSF              | 6.3×8                          | 5                 | 5900                            | PSE                | 6.3×8                          | 8                 | 4700                            |                   |                                |                   |                                 |
|             |                  |                                |                   |                                 | PSK                | 5×8                            | 7                 | 4350                            |                  |                                |                   |                                 | PSC                | 8×8                            | 8                 | 5700                            |                   |                                |                   |                                 |
|             |                  |                                |                   |                                 | PSF                | 6.3×8                          | 5                 | 5900                            |                  |                                |                   |                                 |                    |                                |                   |                                 |                   |                                |                   |                                 |
| 560         |                  |                                |                   |                                 | PSJ                | 6.3×8                          | 4                 | 6500                            | PSF              | 6.3×8                          | 5                 | 5900                            | PSE                | 6.3×8                          | 8                 | 4700                            |                   |                                |                   |                                 |
|             |                  |                                |                   |                                 | PSJ                | 6.3×8                          | 4.5               | 6200                            | PSE              | 6.3×8                          | 7                 | 5000                            | PSC                | 8×8                            | 8                 | 5700                            |                   |                                |                   |                                 |
|             |                  |                                |                   |                                 | PSK                | 5×8                            | 7                 | 4350                            | PSC              | 8×8                            | 7                 | 6100                            |                    |                                |                   |                                 |                   |                                |                   |                                 |
|             |                  |                                |                   |                                 | PSF                | 6.3×8                          | 5                 | 5900                            |                  |                                |                   |                                 |                    |                                |                   |                                 |                   |                                |                   |                                 |
|             |                  |                                |                   |                                 | PSC                | 8×8                            | 7                 | 6100                            |                  |                                |                   |                                 |                    |                                |                   |                                 |                   |                                |                   |                                 |
| 680         |                  |                                |                   |                                 |                    |                                |                   |                                 | PSC              | 8×11.5                         | 7                 | 6100                            |                    |                                |                   |                                 | PSC               | 10×11.5                        | 7                 | 6100                            |
| 820         |                  |                                |                   |                                 | PSF                | 6.3×8                          | 5                 | 5900                            |                  |                                |                   |                                 | PSF                | 6.3×8                          | 8                 | 4700                            |                   |                                |                   |                                 |
|             |                  |                                |                   |                                 | PSE                | 6.3×8                          | 7                 | 5000                            |                  |                                |                   |                                 | PSC                | 10×11.5                        | 7                 | 6640                            |                   |                                |                   |                                 |
|             |                  |                                |                   |                                 | PSC                | 8×8                            | 5                 | 6100                            |                  |                                |                   |                                 |                    |                                |                   |                                 |                   |                                |                   |                                 |
|             |                  |                                |                   |                                 | PSC                | 8×8                            | 7                 | 6100                            |                  |                                |                   |                                 |                    |                                |                   |                                 |                   |                                |                   |                                 |
| 1000        | PSF              | 6.3×8                          | 5                 | 5900                            | PSC                | 8×8                            | 7                 | 6100                            | PSC              | 10×11.5                        | 6                 | 6640                            |                    |                                |                   |                                 |                   |                                |                   |                                 |
|             |                  |                                |                   |                                 | PSC                | 8×11.5                         | 7                 | 6100                            |                  |                                |                   |                                 |                    |                                |                   |                                 |                   |                                |                   |                                 |
| 1200        |                  |                                |                   |                                 | PSF                | 6.3×8                          | 5                 | 5900                            |                  |                                |                   |                                 |                    |                                |                   |                                 |                   |                                |                   |                                 |
| 1500        |                  |                                |                   |                                 | PSC                | 8×11.5                         | 7                 | 6100                            |                  |                                |                   |                                 | PSC                | 10×11.5                        | 10                | 5560                            |                   |                                |                   |                                 |
| 1600        |                  |                                |                   |                                 | PSF                | 8×8                            | 5                 | 6100                            |                  |                                |                   |                                 |                    |                                |                   |                                 |                   |                                |                   |                                 |
| 2700        |                  |                                |                   |                                 | PSC                | 10×11.5                        | 8                 | 5560                            |                  |                                |                   |                                 |                    |                                |                   |                                 |                   |                                |                   |                                 |

### ◆RADIAL LEAD TYPE (16 to 35V<sub>dc</sub>)

| Cap<br>(μF) | 16V <sub>dc</sub> |                                |                   |                                 | 20V <sub>dc</sub> |                                |                   |                                 | 25V <sub>dc</sub> |                                |                   |                                 | 35V <sub>dc</sub> |                                |                   |                                 |
|-------------|-------------------|--------------------------------|-------------------|---------------------------------|-------------------|--------------------------------|-------------------|---------------------------------|-------------------|--------------------------------|-------------------|---------------------------------|-------------------|--------------------------------|-------------------|---------------------------------|
|             | Series            | Nominal<br>Case size<br>(φD×L) | ESR* <sup>1</sup> | Ripple<br>current* <sup>2</sup> | Series            | Nominal<br>Case size<br>(φD×L) | ESR* <sup>1</sup> | Ripple<br>current* <sup>2</sup> | Series            | Nominal<br>Case size<br>(φD×L) | ESR* <sup>1</sup> | Ripple<br>current* <sup>2</sup> | Series            | Nominal<br>Case size<br>(φD×L) | ESR* <sup>1</sup> | Ripple<br>current* <sup>2</sup> |
| 56          |                   |                                |                   |                                 |                   |                                |                   |                                 | PSG               | 6.3×5                          | 30                | 2600                            |                   |                                |                   |                                 |
| 68          |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 | PSG               | 8×11.5                         | 18                | 4380                            |
| 82          |                   |                                |                   |                                 |                   |                                |                   |                                 | PSG               | 6.3×8                          | 28                | 2780                            |                   |                                |                   |                                 |
| 100         | PSF               | 6.3×5                          | 24                | 2490                            |                   |                                |                   |                                 | PSG               | 6.3×8                          | 28                | 2780                            |                   |                                |                   |                                 |
| 120         |                   |                                |                   |                                 | PSG               | 6.3×5                          | 20                | 3200                            | PSG               | 6.3×8                          | 28                | 2780                            | PSG               | 10×11.5                        | 16                | 4670                            |
| 150         | PSG               | 6.3×5                          | 20                | 3200                            |                   |                                |                   |                                 | PSG               | 6.3×8                          | 28                | 2780                            |                   |                                |                   |                                 |
| 180         |                   |                                |                   |                                 | PSG               | 6.3×8                          | 18                | 3460                            | PSW               | 6.3×8                          | 28                | 2780                            |                   |                                |                   |                                 |
|             |                   |                                |                   |                                 |                   |                                |                   |                                 | PSG               | 8×8                            | 18                | 3770                            |                   |                                |                   |                                 |
|             |                   |                                |                   |                                 |                   |                                |                   |                                 | PSG               | 8×11.5                         | 16                | 4650                            |                   |                                |                   |                                 |
| 220         |                   |                                |                   |                                 |                   |                                |                   |                                 | PSG               | 8×8                            | 18                | 3770                            |                   |                                |                   |                                 |
|             |                   |                                |                   |                                 |                   |                                |                   |                                 | PSG               | 8×11.5                         | 16                | 4650                            |                   |                                |                   |                                 |
| 270         | PSG               | 6.3×8                          | 10                | 5080                            |                   |                                |                   |                                 | PSG               | 8×8                            | 18                | 3770                            |                   |                                |                   |                                 |
|             | PSG               | 6.3×8                          | 15                | 3800                            |                   |                                |                   |                                 | PSG               | 8×11.5                         | 16                | 4650                            |                   |                                |                   |                                 |
|             | PSF               | 8×8                            | 10                | 5000                            |                   |                                |                   |                                 | PSG               | 8×11.5                         | 16                | 4650                            |                   |                                |                   |                                 |
|             | PSF               | 8×11.5                         | 11                | 5080                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
|             | PSC               | 8×11.5                         | 11                | 5080                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
| 330         | PSG               | 6.3×8                          | 10                | 5080                            | PSG               | 8×8                            | 17                | 3880                            | PSW               | 8×8                            | 18                | 3770                            |                   |                                |                   |                                 |
|             | PSG               | 6.3×8                          | 15                | 3800                            |                   |                                |                   |                                 | PSG               | 8×11.5                         | 16                | 4650                            |                   |                                |                   |                                 |
|             | PSF               | 8×8                            | 13                | 4700                            |                   |                                |                   |                                 | PSG               | 10×11.5                        | 14                | 5000                            |                   |                                |                   |                                 |
|             | PSC               | 10×11.5                        | 10                | 6100                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
|             | PSC               | 10×12.5                        | 10                | 6100                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
| 390         |                   |                                |                   |                                 | PSG               | 8×11.5                         | 14                | 4970                            | PSG               | 8×11.5                         | 16                | 4650                            |                   |                                |                   |                                 |
|             |                   |                                |                   |                                 |                   |                                |                   |                                 | PSG               | 10×11.5                        | 14                | 5000                            |                   |                                |                   |                                 |
| 470         | PSG               | 8×8                            | 8                 | 5400                            |                   |                                |                   |                                 | PSW               | 8×11.5                         | 16                | 4650                            |                   |                                |                   |                                 |
|             | PSG               | 8×8                            | 16                | 4000                            |                   |                                |                   |                                 | PSG               | 10×11.5                        | 14                | 5000                            |                   |                                |                   |                                 |
|             | PSF               | 8×11.5                         | 11                | 5400                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
|             | PSF               | 10×11.5                        | 10                | 6100                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
|             | PSC               | 10×11.5                        | 10                | 6100                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
| 560         | PSG               | 8×8                            | 8                 | 5400                            |                   |                                |                   |                                 | PSG               | 8×16                           | 14                | 5400                            |                   |                                |                   |                                 |
|             | PSG               | 8×8                            | 16                | 4000                            |                   |                                |                   |                                 | PSG               | 10×11.5                        | 14                | 5000                            |                   |                                |                   |                                 |
|             | PSG               | 8×11.5                         | 8                 | 6100                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
|             | PSG               | 8×11.5                         | 14                | 4970                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
| 680         | PSG               | 8×11.5                         | 8                 | 6100                            | PSG               | 8×16                           | 10                | 6260                            | PSG               | 10×11.5                        | 14                | 5000                            |                   |                                |                   |                                 |
|             | PSG               | 8×11.5                         | 14                | 4970                            | PSG               | 10×11.5                        | 12                | 5400                            |                   |                                |                   |                                 |                   |                                |                   |                                 |
| 820         | PSG               | 8×16                           | 8                 | 7000                            |                   |                                |                   |                                 | PSW               | 10×11.5                        | 14                | 5000                            |                   |                                |                   |                                 |
|             | PSG               | 10×11.5                        | 12                | 5400                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
| 1000        | PSG               | 8×16                           | 8                 | 7000                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
|             | PSG               | 8×20                           | 8                 | 7500                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
|             | PSG               | 10×11.5                        | 12                | 5400                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
| 1200        | PSG               | 8×20                           | 8                 | 7500                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
|             | PSG               | 10×11.5                        | 12                | 5400                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
| 1500        | PSG               | 8×20                           | 8                 | 7500                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
|             | PSG               | 10×16                          | 8                 | 7700                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
| 1800        | PSG               | 10×16                          | 8                 | 7700                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
|             | PSG               | 10×20                          | 8                 | 8100                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
| 2200        | PSG               | 10×20                          | 8                 | 8100                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |
| 2700        | PSG               | 10×20                          | 8                 | 8100                            |                   |                                |                   |                                 |                   |                                |                   |                                 |                   |                                |                   |                                 |

## NPCAP™-PXN Series

- Super low ESR, impedance and high heat resistance have been obtained by using conductive polymer as electrolyte.
- High moisture resistance, Bias Humidity: 1,000 hours at 85°C, 85%RH
- Rated voltage range: 2.5 to 16V<sub>dc</sub>, Capacitance range: 56~1,200μF
- Suitable for DC-DC converters, voltage regulators and decoupling applications used on computer motherboards etc.
- Solvent resistant type (see PRECAUTIONS AND GUIDELINES)
- RoHS2 Compliant
- Halogen Free
- AEC-Q200 compliant : Please contact Chemi-Con for more details, test data, information.

PXN

Higher ripple

PXT



## ◆SPECIFICATIONS

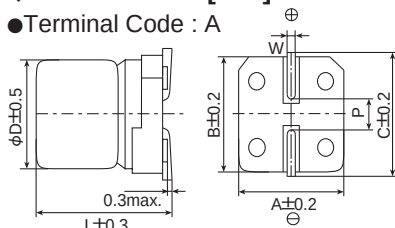
| Items                                                  | Characteristics                                                                                                                                                                                                  |                                                                                                                                                                                   |     |    |                          |
|--------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|----|--------------------------|
| Category                                               | -55 to +105℃                                                                                                                                                                                                     |                                                                                                                                                                                   |     |    |                          |
| Temperature Range                                      |                                                                                                                                                                                                                  |                                                                                                                                                                                   |     |    |                          |
| Rated Voltage Range                                    | 2.5 to 16V <sub>dc</sub>                                                                                                                                                                                         |                                                                                                                                                                                   |     |    |                          |
| Capacitance Tolerance                                  | ±20% (M)                                                                                                                                                                                                         |                                                                                                                                                                                   |     |    | (at 20℃, 120Hz)          |
| Leakage Current                                        | Shall not exceed values shown in STANDARD RATINGS.                                                                                                                                                               |                                                                                                                                                                                   |     |    | (at 20℃ after 2 minutes) |
| *Note                                                  |                                                                                                                                                                                                                  |                                                                                                                                                                                   |     |    | (at 20℃, 120Hz)          |
| Dissipation Factor (tan δ)                             | 0.12 max.                                                                                                                                                                                                        |                                                                                                                                                                                   |     |    |                          |
| Low Temperature Characteristics (Max. Impedance Ratio) | Z(-25℃)/Z(+20℃)≤1.15<br>Z(-55℃)/Z(+20℃)≤1.25                                                                                                                                                                     |                                                                                                                                                                                   |     |    | (at 100kHz)              |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 5,000 hours at 105℃.                                                              |                                                                                                                                                                                   |     |    |                          |
|                                                        | Appearance                                                                                                                                                                                                       | No significant damage                                                                                                                                                             |     |    |                          |
|                                                        | Capacitance change                                                                                                                                                                                               | ≤ ±20% of the initial value                                                                                                                                                       |     |    |                          |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                     | ≤150% of the initial specified value                                                                                                                                              |     |    |                          |
|                                                        | ESR                                                                                                                                                                                                              | ≤150% of the initial specified value                                                                                                                                              |     |    |                          |
|                                                        | Leakage current                                                                                                                                                                                                  | ≤The initial specified value                                                                                                                                                      |     |    |                          |
| Bias Humidity                                          | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjecting them to the DC rated voltage at 85℃85% RH for 1,000 hours.                                              |                                                                                                                                                                                   |     |    |                          |
|                                                        | Appearance                                                                                                                                                                                                       | No significant damage                                                                                                                                                             |     |    |                          |
|                                                        | Capacitance change                                                                                                                                                                                               | ≤ ±30% of the initial value                                                                                                                                                       |     |    |                          |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                     | ≤200% of the initial specified value                                                                                                                                              |     |    |                          |
|                                                        | ESR                                                                                                                                                                                                              | ≤200% of the initial specified value                                                                                                                                              |     |    |                          |
|                                                        | Leakage current                                                                                                                                                                                                  | ≤The initial specified value                                                                                                                                                      |     |    |                          |
| Surge Voltage                                          | The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltage specified at 105℃ for 30 seconds through a protective resistor(R=1kΩ) and discharge for 5 minutes 30 seconds. |                                                                                                                                                                                   |     |    |                          |
|                                                        | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                 | 2.5                                                                                                                                                                               | 6.3 | 10 | 16                       |
|                                                        | Surge voltage (V <sub>dc</sub> )                                                                                                                                                                                 | 2.9                                                                                                                                                                               | 7.2 | 12 | 18                       |
|                                                        |                                                                                                                                                                                                                  |                                                                                                                                                                                   |     |    |                          |
|                                                        | Appearance                                                                                                                                                                                                       | No significant damage                                                                                                                                                             |     |    |                          |
|                                                        | Capacitance change                                                                                                                                                                                               | ≤ ±20% of the initial value                                                                                                                                                       |     |    |                          |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                     | ≤150% of the initial specified value                                                                                                                                              |     |    |                          |
|                                                        | ESR                                                                                                                                                                                                              | ≤150% of the initial specified value                                                                                                                                              |     |    |                          |
|                                                        | Leakage current                                                                                                                                                                                                  | ≤The initial specified value                                                                                                                                                      |     |    |                          |
|                                                        | Soldering Heat                                                                                                                                                                                                   | The following specifications shall be satisfied when the solder temperature is reduced back to 20℃ after soldering has been performed under the recommended soldering conditions. |     |    |                          |
| Appearance                                             |                                                                                                                                                                                                                  | No significant damage                                                                                                                                                             |     |    |                          |
| Capacitance value                                      |                                                                                                                                                                                                                  | Within the specified tolerance range                                                                                                                                              |     |    |                          |
| D.F. (tan δ)                                           |                                                                                                                                                                                                                  | ≤The initial specified value                                                                                                                                                      |     |    |                          |
| ESR                                                    |                                                                                                                                                                                                                  | ≤The initial specified value                                                                                                                                                      |     |    |                          |
| Leakage current                                        |                                                                                                                                                                                                                  | ≤The initial specified value (Voltage treatment)                                                                                                                                  |     |    |                          |

\*Note : If any doubt exists, measure the leakage current after the following voltage treatment.

Voltage treatment : DC rated voltage is applied to the capacitors for 120 minutes at 105°C.

## ◆DIMENSIONS [mm]

● Terminal Code : A



| Size Code | φD  | L   | A    | B    | C    | W          | P   |
|-----------|-----|-----|------|------|------|------------|-----|
| E61       | 5   | 5.8 | 5.3  | 5.3  | 5.9  | 0.5 to 0.8 | 1.4 |
| F61       | 6.3 | 5.8 | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| H70       | 8   | 6.7 | 8.3  | 8.3  | 9.0  | 0.7 to 1.1 | 3.1 |
| J80       | 10  | 7.7 | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |

## ◆MARKING

EX) 6.3V220μF



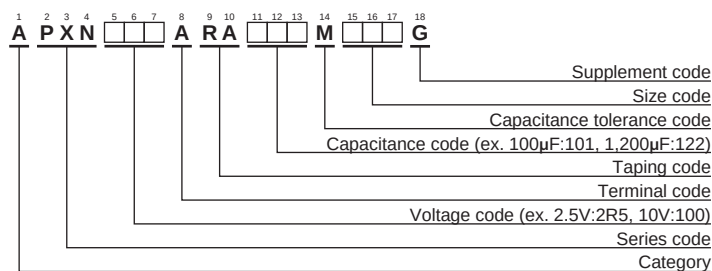
PXN series is a conductive polymer aluminum solid capacitor. All conductive polymer aluminum solid capacitors, including the PXN series may temporarily exhibit increased leakage current due to heat stress during the reflow soldering process. However, applying stepped voltage under the category temperature range gradually decreases the increased leakage current to normal levels. The speed or recovery time that leakage current decreases by self-healing depends on the temperature and voltage: (The closer to category upper limit temperature and rated voltage, the more rapid the leakage current decrease). Conductive polymer aluminum solid capacitors do not utilize liquid electrolyte. Therefore it takes a longer period of time to accomplish self-healing than aluminum electrolytic capacitors that have liquid electrolyte impregnation.





## NPCAP™-PXN Series

## ◆PART NUMBERING SYSTEM



Please refer to "Product code guide (conductive polymer type)"

## ◆STANDARD RATINGS

| WV (V <sub>dc</sub> ) | Cap (μF) | Size code | Leakage current (μA max./after 2min.) | ESR (mΩ max./20°C, 100k to 300kHz) | Rated ripple current (mA <sub>rms</sub> /105°C, 100kHz) | Part No.           |
|-----------------------|----------|-----------|---------------------------------------|------------------------------------|---------------------------------------------------------|--------------------|
| 2.5                   | 330      | E61       | 700                                   | 30                                 | 2,500                                                   | APXN2R5ARA331ME61G |
|                       | 560      | F61       | 700                                   | 25                                 | 2,800                                                   | APXN2R5ARA561MF61G |
| 6.3                   | 220      | E61       | 700                                   | 30                                 | 2,500                                                   | APXN6R3ARA221ME61G |
|                       | 330      | F61       | 700                                   | 25                                 | 2,800                                                   | APXN6R3ARA331MF61G |
|                       | 560      | H70       | 705                                   | 20                                 | 3,500                                                   | APXN6R3ARA561MH70G |
|                       | 1,200    | J80       | 1,510                                 | 20                                 | 3,500                                                   | APXN6R3ARA122MJ80G |
| 10                    | 120      | E61       | 700                                   | 35                                 | 2,000                                                   | APXN100ARA121ME61G |
|                       | 180      | F61       | 700                                   | 30                                 | 2,500                                                   | APXN100ARA181MF61G |
|                       | 270      | H70       | 700                                   | 25                                 | 3,300                                                   | APXN100ARA271MH70G |
|                       | 560      | J80       | 1,120                                 | 25                                 | 3,400                                                   | APXN100ARA561MJ80G |
| 16                    | 56       | E61       | 700                                   | 35                                 | 2,000                                                   | APXN160ARA560ME61G |
|                       | 100      | F61       | 700                                   | 30                                 | 2,500                                                   | APXN160ARA101MF61G |
|                       | 150      | H70       | 700                                   | 25                                 | 3,300                                                   | APXN160ARA151MH70G |
|                       | 330      | J80       | 1,050                                 | 25                                 | 3,400                                                   | APXN160ARA331MJ80G |

## ◆RATED RIPPLE CURRENT MULTIPLIERS

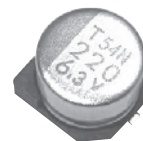
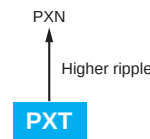
## ● Frequency Multipliers

| Frequency(Hz) | 120  | 1k   | 10k  | 50k  | 100k to 500k |
|---------------|------|------|------|------|--------------|
| SMD type      | 0.05 | 0.30 | 0.55 | 0.70 | 1.00         |

PXN series is a conductive polymer aluminum solid capacitor. All conductive polymer aluminum solid capacitors, including the PXN series may temporarily exhibit increased leakage current due to heat stress during the reflow soldering process. However, applying stepped voltage under the category temperature range gradually decreases the increased leakage current to normal levels. The speed or recovery time that leakage current decreases by self-healing depends on the temperature and voltage: (The closer to category upper limit temperature and rated voltage, the more rapid the leakage current decrease). Conductive polymer aluminum solid capacitors do not utilize liquid electrolyte. Therefore it takes a longer period of time to accomplish self-healing than aluminum electrolytic capacitors that have liquid electrolyte impregnation.

## NPCAP™-PXT Series

- Super low ESR, impedance and high heat resistance have been obtained by using conductive polymer as electrolyte.
- High moisture resistance, Bias Humidity: 1,000 hours at 85°C, 85%RH
- Rated voltage range: 2.5 to 16V<sub>dc</sub>, Capacitance range: 100 to 820μF
- Case size range : φ5×5.8L to φ6.3×7.7L
- Suitable for DC-DC converters, voltage regulators and decoupling applications used on computer motherboards etc.
- Solvent resistant type (see PRECAUTIONS AND GUIDELINES)
- RoHS2 Compliant
- Halogen Free



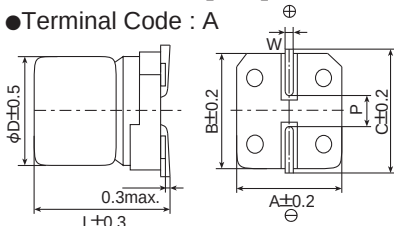
## ◆SPECIFICATIONS

| Items                                                        | Characteristics                                                                                                                                                                                                   |  |  |  |  |  |
|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|
| Category                                                     |                                                                                                                                                                                                                   |  |  |  |  |  |
| Temperature Range                                            | -55 to +105°C                                                                                                                                                                                                     |  |  |  |  |  |
| Rated Voltage Range                                          | 2.5 to 16V <sub>dc</sub>                                                                                                                                                                                          |  |  |  |  |  |
| Capacitance Tolerance                                        | ±20% (M) (at 20°C, 120Hz)                                                                                                                                                                                         |  |  |  |  |  |
| Leakage Current<br>*Note                                     | Shall not exceed values shown in STANDARD RATINGS. (at 20°C after 2 minutes)                                                                                                                                      |  |  |  |  |  |
| Dissipation Factor<br>(tan δ)                                | 0.12 max. (at 20°C, 120Hz)                                                                                                                                                                                        |  |  |  |  |  |
| Low Temperature<br>Characteristics<br>(Max. Impedance Ratio) | $Z(-25^{\circ}\text{C})/Z(+20^{\circ}\text{C}) \leq 1.15$<br>$Z(-55^{\circ}\text{C})/Z(+20^{\circ}\text{C}) \leq 1.25$ (at 100kHz)                                                                                |  |  |  |  |  |
| Endurance                                                    | The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 15,000 hours at 105°C.                                                            |  |  |  |  |  |
|                                                              |                                                                                                                                                                                                                   |  |  |  |  |  |
|                                                              |                                                                                                                                                                                                                   |  |  |  |  |  |
|                                                              |                                                                                                                                                                                                                   |  |  |  |  |  |
|                                                              |                                                                                                                                                                                                                   |  |  |  |  |  |
|                                                              |                                                                                                                                                                                                                   |  |  |  |  |  |
| Bias Humidity                                                | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to the DC rated voltage at 85°C85% RH for 1,000 hours.                                             |  |  |  |  |  |
|                                                              |                                                                                                                                                                                                                   |  |  |  |  |  |
|                                                              |                                                                                                                                                                                                                   |  |  |  |  |  |
|                                                              |                                                                                                                                                                                                                   |  |  |  |  |  |
|                                                              |                                                                                                                                                                                                                   |  |  |  |  |  |
|                                                              |                                                                                                                                                                                                                   |  |  |  |  |  |
| Surge Voltage                                                | The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltage specified at 105°C for 30 seconds through a protective resistor(R=1kΩ) and discharge for 5 minutes 30 seconds. |  |  |  |  |  |
|                                                              |                                                                                                                                                                                                                   |  |  |  |  |  |
|                                                              |                                                                                                                                                                                                                   |  |  |  |  |  |
|                                                              |                                                                                                                                                                                                                   |  |  |  |  |  |
|                                                              |                                                                                                                                                                                                                   |  |  |  |  |  |
|                                                              |                                                                                                                                                                                                                   |  |  |  |  |  |
| Soldering Heat                                               | The following specifications shall be satisfied when the solder temperature is reduced back to 20°C after soldering has been performed under the recommended soldering conditions.                                |  |  |  |  |  |
|                                                              |                                                                                                                                                                                                                   |  |  |  |  |  |
|                                                              |                                                                                                                                                                                                                   |  |  |  |  |  |
|                                                              |                                                                                                                                                                                                                   |  |  |  |  |  |
|                                                              |                                                                                                                                                                                                                   |  |  |  |  |  |
|                                                              |                                                                                                                                                                                                                   |  |  |  |  |  |

\*Note : If any doubt arises, measure the leakage current after the following voltage treatment.  
Voltage treatment : DC rated voltage is applied to the capacitors for 120 minutes at 105°C.

## ◆DIMENSIONS [mm]

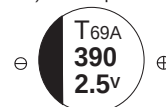
- Terminal Code : A



| Size Code | φD  | L   | A   | B   | C   | W          | P   |
|-----------|-----|-----|-----|-----|-----|------------|-----|
| E61       | 5   | 5.8 | 5.3 | 5.3 | 5.9 | 0.5 to 0.8 | 1.4 |
| F61       | 6.3 | 5.8 | 6.6 | 6.6 | 7.2 | 0.5 to 0.8 | 1.9 |
| F80       | 6.3 | 7.7 | 6.6 | 6.6 | 7.2 | 0.5 to 0.8 | 1.9 |

## ◆MARKING

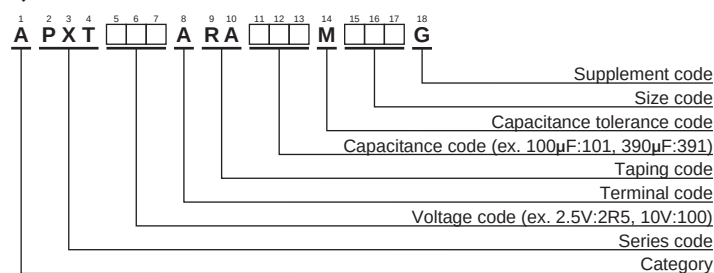
EX) 2.5V390μF





## NPCAP™-PXT Series

## ◆PART NUMBERING SYSTEM



Please refer to "Product code guide (conductive polymer type)"

## ◆STANDARD RATINGS

| WV (V <sub>dc</sub> ) | Cap (μF) | Size code | Leakage current (μA max./after 2min.) | ESR (mΩ max./20°C, 100k to 300kHz) | Rated ripple current (mA rms/105°C, 100kHz) | Part No.           |
|-----------------------|----------|-----------|---------------------------------------|------------------------------------|---------------------------------------------|--------------------|
| 2.5                   | 330      | E61       | 700                                   | 26                                 | 2,350                                       | APXT2R5ARA331ME61G |
|                       | 390      | E61       | 700                                   | 26                                 | 2,350                                       | APXT2R5ARA391ME61G |
|                       | 390      | F61       | 700                                   | 26                                 | 2,600                                       | APXT2R5ARA391MF61G |
|                       | 560      | F61       | 700                                   | 26                                 | 2,600                                       | APXT2R5ARA561MF61G |
|                       | 820      | F80       | 1,020                                 | 22                                 | 2,850                                       | APXT2R5ARA821MF80G |
| 4                     | 270      | E61       | 700                                   | 26                                 | 2,350                                       | APXT4R0ARA271ME61G |
|                       | 330      | F61       | 700                                   | 26                                 | 2,600                                       | APXT4R0ARA331MF61G |
|                       | 390      | F61       | 780                                   | 26                                 | 2,600                                       | APXT4R0ARA391MF61G |
|                       | 680      | F80       | 1,360                                 | 22                                 | 2,850                                       | APXT4R0ARA681MF80G |
| 6.3                   | 150      | E61       | 700                                   | 26                                 | 2,350                                       | APXT6R3ARA151ME61G |
|                       | 220      | E61       | 700                                   | 26                                 | 2,350                                       | APXT6R3ARA221ME61G |
|                       | 220      | F61       | 700                                   | 26                                 | 2,600                                       | APXT6R3ARA221MF61G |
|                       | 330      | F61       | 1,030                                 | 26                                 | 2,600                                       | APXT6R3ARA331MF61G |
|                       | 560      | F80       | 1,760                                 | 22                                 | 2,850                                       | APXT6R3ARA561MF80G |
| 10                    | 120      | E61       | 700                                   | 45                                 | 2,000                                       | APXT100ARA121ME61G |
|                       | 220      | F61       | 1,100                                 | 40                                 | 2,200                                       | APXT100ARA221MF61G |
|                       | 390      | F80       | 1,950                                 | 22                                 | 2,850                                       | APXT100ARA391MF80G |
| 16                    | 100      | E61       | 800                                   | 45                                 | 2,000                                       | APXT160ARA101ME61G |
|                       | 180      | F61       | 1,440                                 | 40                                 | 2,200                                       | APXT160ARA181MF61G |
|                       | 270      | F80       | 2,160                                 | 22                                 | 2,850                                       | APXT160ARA271MF80G |

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ● Frequency Multipliers

| Frequency(Hz) | 120  | 1k   | 10k  | 50k  | 100k to 500k |
|---------------|------|------|------|------|--------------|
| SMD type      | 0.05 | 0.30 | 0.55 | 0.70 | 1.00         |

## NPCAP™-PXJ Series

- Super low ESR, impedance and high heat resistance have been obtained by using conductive polymer as electrolyte.
- Rated voltage range : 2.5 to 25V<sub>dc</sub>, Capacitance range : 56 to 1,200μF
- Case size range : φ6.3×5.8L to φ8×6.7L
- Suitable for DC-DC converters, voltage regulators and decoupling applications used on computer motherboards etc.
- Solvent resistant type (see PRECAUTIONS AND GUIDELINES)
- RoHS2 Compliant
- Halogen Free

PXJ

Downsized

PXG



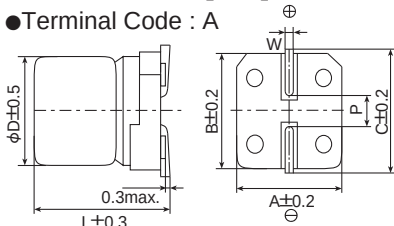
## ◆SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                   |                                                  |
|--------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|
| Category                                               |                                                                                                                                                                                                                   |                                                  |
| Temperature Range                                      | -55 to +105°C                                                                                                                                                                                                     |                                                  |
| Rated Voltage Range                                    | 2.5 to 25V <sub>dc</sub>                                                                                                                                                                                          |                                                  |
| Capacitance Tolerance                                  | ±20% (M)                                                                                                                                                                                                          |                                                  |
| Leakage Current                                        | Shall not exceed values shown in STANDARD RATINGS.                                                                                                                                                                |                                                  |
| *Note                                                  | (at 20°C, 120Hz)                                                                                                                                                                                                  |                                                  |
| Dissipation Factor (tan δ)                             | 0.12 max.                                                                                                                                                                                                         |                                                  |
|                                                        | (at 20°C, 120Hz)                                                                                                                                                                                                  |                                                  |
| Low Temperature Characteristics (Max. Impedance Ratio) | $Z(-25^{\circ}\text{C})/Z(+20^{\circ}\text{C}) \leq 1.15$<br>$Z(-55^{\circ}\text{C})/Z(+20^{\circ}\text{C}) \leq 1.25$                                                                                            |                                                  |
|                                                        | (at 100kHz)                                                                                                                                                                                                       |                                                  |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 15,000 hours at 105°C.                                                            |                                                  |
|                                                        | Appearance                                                                                                                                                                                                        | No significant damage                            |
|                                                        | Capacitance change                                                                                                                                                                                                | ≤ ±20% of the initial value                      |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                      | ≤150% of the initial specified value             |
|                                                        | ESR                                                                                                                                                                                                               | ≤150% of the initial specified value             |
|                                                        | Leakage current                                                                                                                                                                                                   | ≤The initial specified value                     |
| Bias Humidity                                          | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to the DC rated voltage at 60°C, 90 to 95% RH for 1,000 hours.                                     |                                                  |
|                                                        | Appearance                                                                                                                                                                                                        | No significant damage                            |
|                                                        | Capacitance change                                                                                                                                                                                                | ≤ ±20% of the initial value                      |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                      | ≤150% of the initial specified value             |
|                                                        | ESR                                                                                                                                                                                                               | ≤150% of the initial specified value             |
|                                                        | Leakage current                                                                                                                                                                                                   | ≤The initial specified value                     |
| Surge Voltage                                          | The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltage specified at 105°C for 30 seconds through a protective resistor(R=1kΩ) and discharge for 5 minutes 30 seconds. |                                                  |
|                                                        | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                  | 2.5    6.3    10    16    20    25               |
|                                                        | Surge voltage (V <sub>dc</sub> )                                                                                                                                                                                  | 2.9    7.2    12    18    23    29               |
|                                                        | Appearance                                                                                                                                                                                                        | No significant damage                            |
|                                                        | Capacitance change                                                                                                                                                                                                | ≤ ±20% of the initial value                      |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                      | ≤150% of the initial specified value             |
|                                                        | ESR                                                                                                                                                                                                               | ≤150% of the initial specified value             |
|                                                        | Leakage current                                                                                                                                                                                                   | ≤The initial specified value                     |
| Soldering Heat                                         | The following specifications shall be satisfied when the solder temperature is reduced back to 20°C after soldering has been performed under the recommended soldering conditions.                                |                                                  |
|                                                        | Appearance                                                                                                                                                                                                        | No significant damage                            |
|                                                        | Capacitance value                                                                                                                                                                                                 | Within the specified tolerance range             |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                      | ≤The initial specified value                     |
|                                                        | ESR                                                                                                                                                                                                               | ≤The initial specified value                     |
|                                                        | Leakage current                                                                                                                                                                                                   | ≤The initial specified value (Voltage treatment) |

\*Note : If any doubt arises, measure the leakage current after the following voltage treatment.  
Voltage treatment : DC rated voltage is applied to the capacitors for 120 minutes at 105°C.

## ◆DIMENSIONS [mm]

- Terminal Code : A



| Size Code | φD  | L   | A   | B   | C   | W          | P   |
|-----------|-----|-----|-----|-----|-----|------------|-----|
| F61       | 6.3 | 5.8 | 6.6 | 6.6 | 7.2 | 0.5 to 0.8 | 1.9 |
| F80       | 6.3 | 7.7 | 6.6 | 6.6 | 7.2 | 0.5 to 0.8 | 1.9 |
| FA0       | 6.3 | 9.7 | 6.6 | 6.6 | 7.2 | 0.5 to 0.8 | 1.9 |
| H70       | 8   | 6.7 | 8.3 | 8.3 | 9.0 | 0.7 to 1.1 | 3.1 |

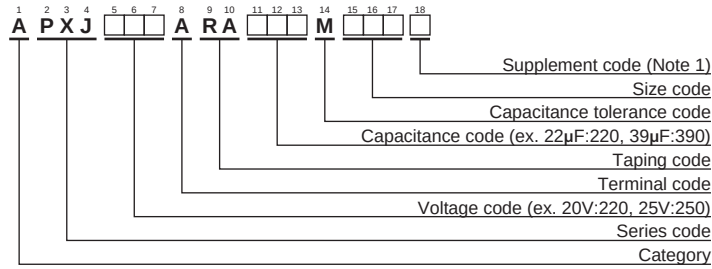
## ◆MARKING

EX) 2.5V820μF



## NPCAP™-PXJ Series

### ◆PART NUMBERING SYSTEM



Please refer to "Product code guide (conductive polymer type)"

(Note1) :PXJ series, 16V270  $\mu$ F (Rated ripple current 5,080mArms) have supplement code "J". Terminal and terminal plating are the same as all other in PXJ series.

### ◆STANDARD RATINGS

| WV (V <sub>dc</sub> ) | Cap (µF) | Size code | Leakage current (µA max./after 2min.) | ESR (mΩ max./20°C, 100k to 300kHz) | Rated ripple current (mArms/105°C, 100kHz) | Part No.           |
|-----------------------|----------|-----------|---------------------------------------|------------------------------------|--------------------------------------------|--------------------|
| 2.5                   | 820      | F61       | 1,020                                 | 10                                 | 4,900                                      | APXJ2R5ARA821MF61G |
|                       | 820      | F80       | 1,020                                 | 7                                  | 5,000                                      | APXJ2R5ARA821MF80G |
|                       | 820      | FA0       | 1,020                                 | 10                                 | 4,300                                      | APXJ2R5ARA821MFA0G |
|                       | 1,000    | FA0       | 1,250                                 | 10                                 | 4,300                                      | APXJ2R5ARA102MFA0G |
|                       | 1,200    | FA0       | 1,500                                 | 10                                 | 4,300                                      | APXJ2R5ARA122MFA0G |
|                       | 1,200    | H70       | 1,500                                 | 10                                 | 4,500                                      | APXJ2R5ARA122MH70G |
| 6.3                   | 390      | F61       | 1,220                                 | 10                                 | 4,900                                      | APXJ6R3ARA391MF61G |
|                       | 560      | F80       | 1,760                                 | 8                                  | 5,000                                      | APXJ6R3ARA561MF80G |
|                       | 560      | FA0       | 1,760                                 | 10                                 | 4,300                                      | APXJ6R3ARA561MFA0G |
|                       | 680      | H70       | 2,140                                 | 10                                 | 4,500                                      | APXJ6R3ARA681MH70G |
| 10                    | 270      | F61       | 1,350                                 | 15                                 | 4,000                                      | APXJ100ARA271MF61G |
|                       | 390      | F80       | 1,950                                 | 13                                 | 4,460                                      | APXJ100ARA391MF80G |
|                       | 390      | FA0       | 1,950                                 | 13                                 | 4,000                                      | APXJ100ARA391MFA0G |
|                       | 470      | H70       | 2,350                                 | 15                                 | 4,000                                      | APXJ100ARA471MH70G |
| 16                    | 220      | F61       | 704                                   | 20                                 | 3,500                                      | APXJ160ARA221MF61G |
|                       | 270      | F80       | 864                                   | 10                                 | 5,080                                      | APXJ160ARA271MF80J |
|                       | 270      | F80       | 864                                   | 13                                 | 4,460                                      | APXJ160ARA271MF80G |
|                       | 270      | FA0       | 864                                   | 16                                 | 3,500                                      | APXJ160ARA271MFA0G |
|                       | 390      | H70       | 1,240                                 | 25                                 | 3,600                                      | APXJ160ARA391MH70G |
| 20                    | 150      | F61       | 600                                   | 23                                 | 3,300                                      | APXJ200ARA151MF61G |
|                       | 150      | F80       | 600                                   | 18                                 | 3,790                                      | APXJ200ARA151MF80G |
|                       | 150      | FA0       | 600                                   | 18                                 | 3,200                                      | APXJ200ARA151MFA0G |
|                       | 220      | H70       | 880                                   | 28                                 | 3,300                                      | APXJ200ARA221MH70G |
| 25                    | 56       | F61       | 280                                   | 28                                 | 3,000                                      | APXJ250ARA560MF61G |
|                       | 82       | F80       | 410                                   | 28                                 | 3,040                                      | APXJ250ARA820MF80G |
|                       | 82       | FA0       | 410                                   | 28                                 | 3,000                                      | APXJ250ARA820MFA0G |
|                       | 120      | H70       | 600                                   | 38                                 | 3,200                                      | APXJ250ARA121MH70G |

Production of the products shown in   is scheduled to be discontinued.

### ◆RATED RIPPLE CURRENT MULTIPLIERS

#### ●Frequency Multipliers

| Frequency(Hz) | 120  | 1k   | 10k  | 50k  | 100k to 500k |
|---------------|------|------|------|------|--------------|
| SMD type      | 0.05 | 0.30 | 0.55 | 0.70 | 1.00         |



## NPCAP™-PXG Series Upgrade!

- Super low ESR, high ripple current capability
- Rated voltage range : 16 to 25V<sub>dc</sub>, Capacitance range : 10 to 1,000μF
- Case size : φ5×4.5L to φ10×12.2L
- Solvent resistant type (see PRECAUTIONS AND GUIDELINES)
- RoHS2 Compliant
- Halogen Free

PXG

↓  
Downsized  
PXE



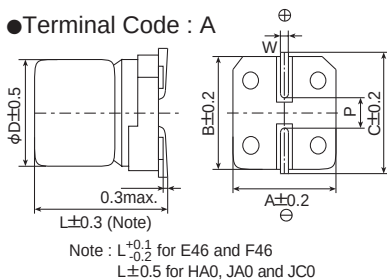
### SPECIFICATIONS

| Items                                                     | Characteristics                                                                                                                                                                                                 |                                                                                                                                                                                   |    |    |
|-----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----|
| Category                                                  |                                                                                                                                                                                                                 |                                                                                                                                                                                   |    |    |
| Temperature Range                                         | -55 to +105℃                                                                                                                                                                                                    |                                                                                                                                                                                   |    |    |
| Rated Voltage Range                                       | 16 to 25V <sub>dc</sub>                                                                                                                                                                                         |                                                                                                                                                                                   |    |    |
| Capacitance Tolerance                                     | ±20% (M) (at 20℃, 120Hz)                                                                                                                                                                                        |                                                                                                                                                                                   |    |    |
| Leakage Current<br>*Note                                  | Shall not exceed values shown in STANDARD RATINGS. (at 20℃ after 2 minutes)                                                                                                                                     |                                                                                                                                                                                   |    |    |
| Dissipation Factor<br>(tan δ )                            | 0.12 max. (at 20℃, 120Hz)                                                                                                                                                                                       |                                                                                                                                                                                   |    |    |
| Low Temperature Characteristics<br>(Max. Impedance Ratio) | Z(-25℃)/Z(+20℃)≤1.15<br>Z(-55℃)/Z(+20℃)≤1.25 (at 100kHz)                                                                                                                                                        |                                                                                                                                                                                   |    |    |
| Endurance                                                 | The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 15,000 hours (E46,F46 : 3,000 hours) at 105℃.                                    |                                                                                                                                                                                   |    |    |
|                                                           | Appearance                                                                                                                                                                                                      | No significant damage                                                                                                                                                             |    |    |
|                                                           | Capacitance change                                                                                                                                                                                              | ≤ ±20% of the initial value                                                                                                                                                       |    |    |
|                                                           | D.F. (tan δ )                                                                                                                                                                                                   | ≤150% of the initial specified value                                                                                                                                              |    |    |
|                                                           | ESR                                                                                                                                                                                                             | ≤150% of the initial specified value                                                                                                                                              |    |    |
|                                                           | Leakage current                                                                                                                                                                                                 | ≤The initial specified value                                                                                                                                                      |    |    |
| Bias Humidity                                             | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjecting them to the DC rated voltage at 60℃, 90 to 95% RH for 1,000 hours (E46,F46 : 500 hours).               |                                                                                                                                                                                   |    |    |
|                                                           | Appearance                                                                                                                                                                                                      | No significant damage                                                                                                                                                             |    |    |
|                                                           | Capacitance change                                                                                                                                                                                              | ≤ ±20% of the initial value                                                                                                                                                       |    |    |
|                                                           | D.F. (tan δ )                                                                                                                                                                                                   | ≤150% of the initial specified value                                                                                                                                              |    |    |
|                                                           | ESR                                                                                                                                                                                                             | ≤150% of the initial specified value                                                                                                                                              |    |    |
|                                                           | Leakage current                                                                                                                                                                                                 | ≤The initial specified value                                                                                                                                                      |    |    |
| Surge Voltage                                             | The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltage specified at 105℃ for 30 seconds through a protective resistor(R=1kΩ)and discharge for 5 minutes 30 seconds. |                                                                                                                                                                                   |    |    |
|                                                           | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                | 16                                                                                                                                                                                | 20 | 25 |
|                                                           | Surge voltage (V <sub>dc</sub> )                                                                                                                                                                                | 18                                                                                                                                                                                | 23 | 29 |
|                                                           |                                                                                                                                                                                                                 |                                                                                                                                                                                   |    |    |
|                                                           | Appearance                                                                                                                                                                                                      | No significant damage                                                                                                                                                             |    |    |
|                                                           | Capacitance change                                                                                                                                                                                              | ≤ ±20% of the initial value                                                                                                                                                       |    |    |
|                                                           | D.F. (tan δ )                                                                                                                                                                                                   | ≤150% of the initial specified value                                                                                                                                              |    |    |
|                                                           | ESR                                                                                                                                                                                                             | ≤150% of the initial specified value                                                                                                                                              |    |    |
|                                                           | Leakage current                                                                                                                                                                                                 | ≤The initial specified value                                                                                                                                                      |    |    |
|                                                           | Soldering Heat                                                                                                                                                                                                  | The following specifications shall be satisfied when the solder temperature is reduced back to 20℃ after soldering has been performed under the recommended soldering conditions. |    |    |
| Appearance                                                |                                                                                                                                                                                                                 | No significant damage                                                                                                                                                             |    |    |
| Capacitance value                                         |                                                                                                                                                                                                                 | Within the specified tolerance range                                                                                                                                              |    |    |
| D.F. (tan δ )                                             |                                                                                                                                                                                                                 | ≤The initial specified value                                                                                                                                                      |    |    |
| ESR                                                       |                                                                                                                                                                                                                 | ≤The initial specified value                                                                                                                                                      |    |    |
| Leakage current                                           |                                                                                                                                                                                                                 | ≤The initial specified value (Voltage treatment)                                                                                                                                  |    |    |

\*Note : If any doubt arises, measure the leakage current after the following voltage treatment.  
Voltage treatment : DC rated voltage is applied to the capacitors for 120 minutes at 105°C.

### DIMENSIONS [mm]

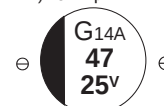
#### Terminal Code : A



| Size Code | φD  | L    | A    | B    | C    | W          | P   |
|-----------|-----|------|------|------|------|------------|-----|
| E46       | 5   | 4.5  | 5.3  | 5.3  | 5.9  | 0.5 to 0.8 | 1.4 |
| E61       | 5   | 5.8  | 5.3  | 5.3  | 5.9  | 0.5 to 0.8 | 1.4 |
| F46       | 6.3 | 4.5  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| F61       | 6.3 | 5.8  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| F80       | 6.3 | 7.7  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| H70       | 8   | 6.7  | 8.3  | 8.3  | 9.0  | 0.7 to 1.1 | 3.1 |
| H80       | 8   | 7.7  | 8.3  | 8.3  | 9.0  | 0.7 to 1.1 | 3.1 |
| HA0       | 8   | 10.0 | 8.3  | 8.3  | 9.0  | 0.7 to 1.1 | 3.1 |
| J80       | 10  | 7.7  | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |
| JA0       | 10  | 10.0 | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |
| JC0       | 10  | 12.2 | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |

### MARKING

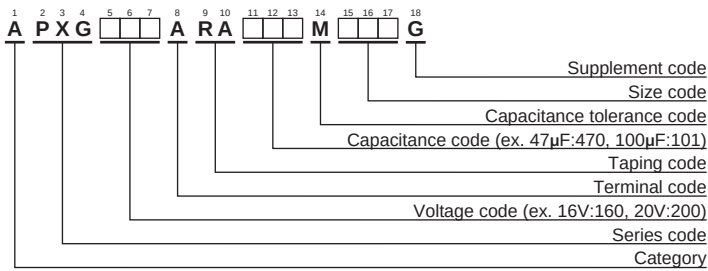
EX) 25V47μF





NPCAP™-PXXG<sup>Upgrade!</sup> Series

## ◆PART NUMBERING SYSTEM



Please refer to "Product code guide (conductive polymer type)"

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Size<br>code | Leakage current<br>(μA max./after 2min.) | ESR<br>(mΩ max./20°C, 100k to 300kHz) | Rated ripple current<br>(mA rms/105°C, 100kHz) | Part No.           |
|--------------------------|-------------|--------------|------------------------------------------|---------------------------------------|------------------------------------------------|--------------------|
| 16                       | 39          | E46          | 312                                      | 50                                    | 1,860                                          | APXG160ARA390ME46G |
|                          | 68          | F46          | 544                                      | 40                                    | 2,450                                          | APXG160ARA680MF46G |
|                          | 100         | E61          | 320                                      | 27                                    | 3,000                                          | APXG160ARA101ME61G |
|                          | 180         | F61          | 576                                      | 22                                    | 3,300                                          | APXG160ARA181MF61G |
|                          | 220         | F80          | 704                                      | 22                                    | 3,300                                          | APXG160ARA221MF80G |
|                          | 270         | H70          | 864                                      | 22                                    | 3,300                                          | APXG160ARA271MH70G |
|                          | 330         | H70          | 1,050                                    | 22                                    | 3,300                                          | APXG160ARA331MH70G |
|                          | 330         | H80          | 1,050                                    | 21                                    | 3,400                                          | APXG160ARA331MH80G |
|                          | 330         | HA0          | 1,050                                    | 21                                    | 3,400                                          | APXG160ARA331MHA0G |
|                          | 560         | HA0          | 1,790                                    | 18                                    | 3,900                                          | APXG160ARA561MHA0G |
|                          | 560         | J80          | 1,790                                    | 20                                    | 3,800                                          | APXG160ARA561MJ80G |
|                          | 820         | JA0          | 2,620                                    | 16                                    | 4,200                                          | APXG160ARA821MJA0G |
|                          | 820         | JC0          | 2,620                                    | 12                                    | 5,400                                          | APXG160ARA821MJC0G |
| 20                       | 1,000       | JA0          | 3,200                                    | 18                                    | 4,100                                          | APXG160ARA102MJA0G |
|                          | 1,000       | JC0          | 3,200                                    | 12                                    | 5,400                                          | APXG160ARA102MJC0G |
|                          | 27          | E46          | 270                                      | 55                                    | 1,770                                          | APXG200ARA270ME46G |
|                          | 47          | E61          | 188                                      | 30                                    | 2,800                                          | APXG200ARA470ME61G |
|                          | 47          | F46          | 470                                      | 42                                    | 2,400                                          | APXG200ARA470MF46G |
|                          | 56          | E61          | 224                                      | 30                                    | 2,800                                          | APXG200ARA560ME61G |
|                          | 120         | F61          | 480                                      | 25                                    | 3,200                                          | APXG200ARA121MF61G |
|                          | 150         | F80          | 600                                      | 25                                    | 3,200                                          | APXG200ARA151MF80G |
|                          | 180         | H70          | 720                                      | 25                                    | 3,200                                          | APXG200ARA181MH70G |
|                          | 220         | H80          | 880                                      | 23                                    | 3,300                                          | APXG200ARA221MH80G |
|                          | 220         | HA0          | 880                                      | 23                                    | 3,400                                          | APXG200ARA221MHA0G |
| 25                       | 390         | HA0          | 1,560                                    | 20                                    | 3,700                                          | APXG200ARA391MHA0G |
|                          | 390         | J80          | 1,560                                    | 22                                    | 3,650                                          | APXG200ARA391MJ80G |
|                          | 560         | JA0          | 2,240                                    | 18                                    | 4,100                                          | APXG200ARA561MJA0G |
|                          | 10          | E46          | 125                                      | 60                                    | 1,700                                          | APXG250ARA100ME46G |
|                          | 22          | E61          | 110                                      | 40                                    | 2,450                                          | APXG250ARA220ME61G |
|                          | 22          | F46          | 275                                      | 45                                    | 2,350                                          | APXG250ARA220MF46G |
|                          | 27          | E61          | 135                                      | 40                                    | 2,450                                          | APXG250ARA270ME61G |
|                          | 27          | F46          | 337                                      | 45                                    | 2,350                                          | APXG250ARA270MF46G |
|                          | 39          | F61          | 195                                      | 30                                    | 2,800                                          | APXG250ARA390MF61G |
|                          | 47          | F61          | 235                                      | 30                                    | 2,800                                          | APXG250ARA470MF61G |
|                          | 56          | F61          | 280                                      | 30                                    | 2,800                                          | APXG250ARA560MF61G |
|                          | 56          | F80          | 280                                      | 28                                    | 2,800                                          | APXG250ARA560MF80G |
|                          | 68          | F61          | 340                                      | 30                                    | 2,800                                          | APXG250ARA680MF61G |
|                          | 68          | H70          | 340                                      | 28                                    | 3,000                                          | APXG250ARA680MH70G |
|                          | 82          | H80          | 410                                      | 26                                    | 3,100                                          | APXG250ARA820MH80G |
|                          | 100         | HA0          | 500                                      | 24                                    | 3,300                                          | APXG250ARA101MHA0G |
|                          | 120         | F80          | 600                                      | 28                                    | 2,800                                          | APXG250ARA121MF80G |
|                          | 120         | HA0          | 600                                      | 22                                    | 3,500                                          | APXG250ARA121MHA0G |
|                          | 150         | H70          | 750                                      | 28                                    | 3,000                                          | APXG250ARA151MH70G |
|                          | 150         | J80          | 750                                      | 25                                    | 3,400                                          | APXG250ARA151MJ80G |
|                          | 180         | J80          | 900                                      | 25                                    | 3,400                                          | APXG250ARA181MJ80G |
|                          | 220         | JA0          | 1,100                                    | 20                                    | 3,800                                          | APXG250ARA221MJA0G |

Production of the products shown in [ ] is scheduled to be discontinued.

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ● Frequency Multipliers

| Frequency (Hz) | 120  | 1k   | 10k  | 50k  | 100k to 500k |
|----------------|------|------|------|------|--------------|
| SMD type       | 0.05 | 0.30 | 0.55 | 0.70 | 1.00         |

Product specifications in this catalog are subject to change without notice. Request our product specifications before purchase and/or use. Please use our products based on the information contained in this catalog and product specifications.



## NPCAP™-P XK Series

- Super low ESR, impedance and high heat resistance have been obtained by using conductive polymer as electrolyte.
- Rated voltage range : 2.5 to 16V<sub>dc</sub>, Capacitance range : 100 to 560μF
- Suitable for DC-DC converters, voltage regulators and decoupling applications used to computer motherboards etc.
- Solvent resistant type (see PRECAUTIONS AND GUIDELINES)
- RoHS2 Compliant
- Halogen Free

PXK

↓  
Downsized  
PXE



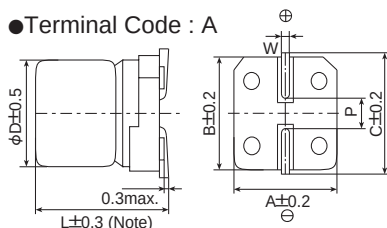
### SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                  |  |                                                  |     |        |
|--------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--------------------------------------------------|-----|--------|
| Category                                               |                                                                                                                                                                                                                  |  |                                                  |     |        |
| Temperature Range                                      | -55 to +105℃                                                                                                                                                                                                     |  |                                                  |     |        |
| Rated Voltage Range                                    | 2.5 to 16V <sub>dc</sub>                                                                                                                                                                                         |  |                                                  |     |        |
| Capacitance Tolerance                                  | ±20% (M) (at 20℃, 120Hz)                                                                                                                                                                                         |  |                                                  |     |        |
| Leakage Current                                        | Shall not exceed values shown in STANDARD RATINGS. (at 20℃ after 2 minutes)                                                                                                                                      |  |                                                  |     |        |
| *Note                                                  |                                                                                                                                                                                                                  |  |                                                  |     |        |
| Dissipation Factor (tan δ)                             | 0.12 max. (at 20℃, 120Hz)                                                                                                                                                                                        |  |                                                  |     |        |
| Low Temperature Characteristics (Max. Impedance Ratio) | Z(-25℃)/Z(+20℃)≤1.15<br>Z(-55℃)/Z(+20℃)≤1.25 (at 100kHz)                                                                                                                                                         |  |                                                  |     |        |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 15,000 hours (F46 : 3,000 hours) at 105℃.                                         |  |                                                  |     |        |
|                                                        | Appearance                                                                                                                                                                                                       |  | No significant damage                            |     |        |
|                                                        | Capacitance change                                                                                                                                                                                               |  | ≤ ±20% of the initial value                      |     |        |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                     |  | ≤150% of the initial specified value             |     |        |
|                                                        | ESR                                                                                                                                                                                                              |  | ≤150% of the initial specified value             |     |        |
|                                                        | Leakage current                                                                                                                                                                                                  |  | ≤The initial specified value                     |     |        |
| Bias Humidity                                          | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjecting them to the DC rated voltage at 60℃, 90 to 95% RH for 1,000 hours (F46 : 500hours).                     |  |                                                  |     |        |
|                                                        | Appearance                                                                                                                                                                                                       |  | No significant damage                            |     |        |
|                                                        | Capacitance change                                                                                                                                                                                               |  | ≤ ±20% of the initial value                      |     |        |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                     |  | ≤150% of the initial specified value             |     |        |
|                                                        | ESR                                                                                                                                                                                                              |  | ≤150% of the initial specified value             |     |        |
|                                                        | Leakage current                                                                                                                                                                                                  |  | ≤The initial specified value                     |     |        |
| Surge Voltage                                          | The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltage specified at 105℃ for 30 seconds through a protective resistor(R=1kΩ) and discharge for 5 minutes 30 seconds. |  |                                                  |     |        |
|                                                        | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                 |  | 2.5                                              | 4.0 | 6.3 16 |
|                                                        | Surge voltage (V <sub>dc</sub> )                                                                                                                                                                                 |  | 2.9                                              | 4.6 | 7.2 18 |
|                                                        |                                                                                                                                                                                                                  |  |                                                  |     |        |
|                                                        | Appearance                                                                                                                                                                                                       |  | No significant damage                            |     |        |
|                                                        | Capacitance change                                                                                                                                                                                               |  | ≤ ±20% of the initial value                      |     |        |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                     |  | ≤150% of the initial specified value             |     |        |
|                                                        | ESR                                                                                                                                                                                                              |  | ≤150% of the initial specified value             |     |        |
|                                                        | Leakage current                                                                                                                                                                                                  |  | ≤The initial specified value                     |     |        |
| Soldering Heat                                         | The following specifications shall be satisfied when the solder temperature is reduced back to 20℃ after soldering has been performed under the recommended soldering conditions.                                |  |                                                  |     |        |
|                                                        | Appearance                                                                                                                                                                                                       |  | No significant damage                            |     |        |
|                                                        | Capacitance value                                                                                                                                                                                                |  | Within the specified tolerance range             |     |        |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                     |  | ≤The initial specified value                     |     |        |
|                                                        | ESR                                                                                                                                                                                                              |  | ≤The initial specified value                     |     |        |
|                                                        | Leakage current                                                                                                                                                                                                  |  | ≤The initial specified value (Voltage treatment) |     |        |

\*Note : If any doubt arises, measure the leakage current after following voltage treatment.  
Voltage treatment : DC rated voltage are applied to the capacitors for 120 minutes at 105°C.

### DIMENSIONS [mm]

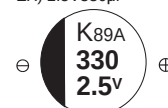
- Terminal Code : A



| Size Code | φD  | L   | A   | B   | C   | W          | P   |
|-----------|-----|-----|-----|-----|-----|------------|-----|
| E61       | 5   | 5.8 | 5.3 | 5.3 | 5.9 | 0.5 to 0.8 | 1.4 |
| F46       | 6.3 | 4.5 | 6.6 | 6.6 | 7.2 | 0.5 to 0.8 | 1.9 |
| F61       | 6.3 | 5.8 | 6.6 | 6.6 | 7.2 | 0.5 to 0.8 | 1.9 |

### MARKING

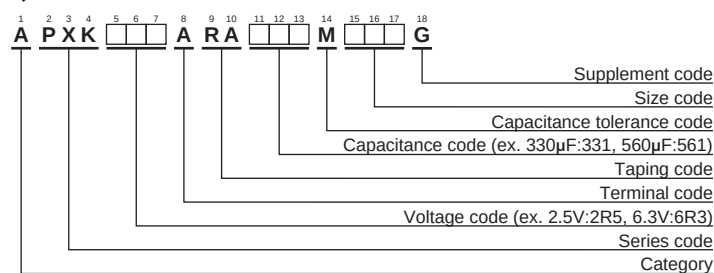
EX) 2.5V330μF





## NPCAP™-P XK Series

## ◆PART NUMBERING SYSTEM



Please refer to "Product code guide (conductive polymer type)"

## ◆STANDARD RATINGS

| WV (V <sub>dc</sub> ) | Cap (μF) | Size code | Leakage current (μA max./after 2min.) | ESR (mΩ max./20°C, 100k to 300kHz) | Rated ripple current (mA <sub>rms</sub> /105°C, 100kHz) | Part No.           |
|-----------------------|----------|-----------|---------------------------------------|------------------------------------|---------------------------------------------------------|--------------------|
| 2.5                   | 220      | F46       | 300                                   | 19                                 | 2,780                                                   | APXK2R5ARA221MF46G |
|                       | 330      | E61       | 412                                   | 16                                 | 3,500                                                   | APXK2R5ARA331ME61G |
|                       | 330      | F46       | 700                                   | 16                                 | 3,500                                                   | APXK2R5ARA331MF46G |
|                       | 560      | F61       | 700                                   | 16                                 | 3,500                                                   | APXK2R5ARA561MF61G |
| 4                     | 180      | F46       | 360                                   | 19                                 | 2,780                                                   | APXK4R0ARA181MF46G |
|                       | 220      | E61       | 440                                   | 17                                 | 3,390                                                   | APXK4R0ARA221ME61G |
|                       | 390      | F61       | 780                                   | 17                                 | 3,390                                                   | APXK4R0ARA391MF61G |
| 6.3                   | 150      | F46       | 472                                   | 19                                 | 2,780                                                   | APXK6R3ARA151MF46G |
|                       | 180      | E61       | 567                                   | 17                                 | 3,390                                                   | APXK6R3ARA181ME61G |
|                       | 220      | F46       | 700                                   | 18                                 | 3,200                                                   | APXK6R3ARA221MF46G |
|                       | 330      | F61       | 1,040                                 | 17                                 | 3,390                                                   | APXK6R3ARA331MF61G |
| 16                    | 100      | F61       | 320                                   | 24                                 | 2,490                                                   | APXK160ARA101MF61G |

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ● Frequency Multipliers

| Frequency (Hz) | 120  | 1k   | 10k  | 50k  | 100k to 500k |
|----------------|------|------|------|------|--------------|
| SMD type       | 0.05 | 0.30 | 0.55 | 0.70 | 1.00         |



## NPCAP™-PXS Series

- Super low ESR, high ripple current capability
- Longer life (20,000 hours at 105°C)
- Rated voltage range : 4 to 16V<sub>dc</sub>, Capacitance range : 39 to 560μF
- Suitable for DC-DC converters, voltage regulators and decoupling applications for computer motherboards etc.
- Solvent resistant type (see PRECAUTIONS AND GUIDELINES)
- RoHS2 Compliant
- Halogen Free



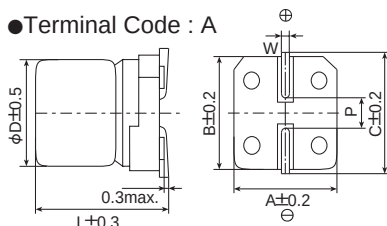
### SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                 |                                                                                                                                                                                   |     |    |    |
|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|----|----|
| Category                                               | -55 to +105℃                                                                                                                                                                                                    |                                                                                                                                                                                   |     |    |    |
| Temperature Range                                      |                                                                                                                                                                                                                 |                                                                                                                                                                                   |     |    |    |
| Rated Voltage Range                                    | 4 to 16V <sub>dc</sub>                                                                                                                                                                                          |                                                                                                                                                                                   |     |    |    |
| Capacitance Tolerance                                  | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                       |                                                                                                                                                                                   |     |    |    |
| Leakage Current                                        | I=0.2CV                                                                                                                                                                                                         |                                                                                                                                                                                   |     |    |    |
| *Note                                                  | Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V <sub>ac</sub> ) (at 20℃ after 2 minutes)                                                                               |                                                                                                                                                                                   |     |    |    |
| Dissipation Factor (tan δ )                            | 0.12 max. (at 20℃, 120Hz)                                                                                                                                                                                       |                                                                                                                                                                                   |     |    |    |
| Low Temperature Characteristics (Max. Impedance Ratio) | Z(-25℃)/Z(+20℃)≤1.15<br>Z(-55℃)/Z(+20℃)≤1.25 (at 100kHz)                                                                                                                                                        |                                                                                                                                                                                   |     |    |    |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 20,000 hours at 105℃.                                                            |                                                                                                                                                                                   |     |    |    |
|                                                        | Appearance                                                                                                                                                                                                      | No significant damage                                                                                                                                                             |     |    |    |
|                                                        | Capacitance change                                                                                                                                                                                              | ≤ ± 20% of the initial value                                                                                                                                                      |     |    |    |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                   | ≤150% of the initial specified value                                                                                                                                              |     |    |    |
|                                                        | ESR                                                                                                                                                                                                             | ≤150% of the initial specified value                                                                                                                                              |     |    |    |
|                                                        | Leakage current                                                                                                                                                                                                 | ≤The initial specified value                                                                                                                                                      |     |    |    |
| Bias Humidity                                          | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjecting them to the DC rated voltage at 60℃, 90 to 95% RH for 1,000 hours.                                     |                                                                                                                                                                                   |     |    |    |
|                                                        | Appearance                                                                                                                                                                                                      | No significant damage                                                                                                                                                             |     |    |    |
|                                                        | Capacitance change                                                                                                                                                                                              | ≤ ± 20% of the initial value                                                                                                                                                      |     |    |    |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                   | ≤150% of the initial specified value                                                                                                                                              |     |    |    |
|                                                        | ESR                                                                                                                                                                                                             | ≤150% of the initial specified value                                                                                                                                              |     |    |    |
|                                                        | Leakage current                                                                                                                                                                                                 | ≤The initial specified value                                                                                                                                                      |     |    |    |
| Surge Voltage                                          | The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltage specified at 105℃ for 30 seconds through a protective resistor(R=1kΩ)and discharge for 5 minutes 30 seconds. |                                                                                                                                                                                   |     |    |    |
|                                                        | Rated voltage (V <sub>ac</sub> )                                                                                                                                                                                | 4.0                                                                                                                                                                               | 6.3 | 10 | 16 |
|                                                        | Surge voltage (V <sub>ac</sub> )                                                                                                                                                                                | 4.6                                                                                                                                                                               | 7.2 | 12 | 18 |
|                                                        |                                                                                                                                                                                                                 |                                                                                                                                                                                   |     |    |    |
|                                                        | Appearance                                                                                                                                                                                                      | No significant damage                                                                                                                                                             |     |    |    |
|                                                        | Capacitance change                                                                                                                                                                                              | ≤ ± 20% of the initial value                                                                                                                                                      |     |    |    |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                   | ≤150% of the initial specified value                                                                                                                                              |     |    |    |
|                                                        | ESR                                                                                                                                                                                                             | ≤150% of the initial specified value                                                                                                                                              |     |    |    |
|                                                        | Leakage current                                                                                                                                                                                                 | ≤The initial specified value                                                                                                                                                      |     |    |    |
|                                                        | Soldering Heat                                                                                                                                                                                                  | The following specifications shall be satisfied when the solder temperature is reduced back to 20℃ after soldering has been performed under the recommended soldering conditions. |     |    |    |
| Appearance                                             |                                                                                                                                                                                                                 | No significant damage                                                                                                                                                             |     |    |    |
| Capacitance value                                      |                                                                                                                                                                                                                 | Within the specified tolerance range                                                                                                                                              |     |    |    |
| D.F. (tan δ )                                          |                                                                                                                                                                                                                 | ≤The initial specified value                                                                                                                                                      |     |    |    |
| ESR                                                    |                                                                                                                                                                                                                 | ≤The initial specified value                                                                                                                                                      |     |    |    |
| Leakage current                                        |                                                                                                                                                                                                                 | ≤The initial specified value (Voltage treatment)                                                                                                                                  |     |    |    |

\*Note : If any doubt arises, measure the leakage current after the following voltage treatment.  
Voltage treatment : DC rated voltage is applied to the capacitors for 120 minutes at 105°C.

### DIMENSIONS [mm]<sup>°</sup>

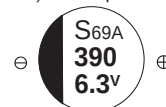
• Terminal Code : A



| Size Code | φD  | L   | A   | B   | C   | W          | P   |
|-----------|-----|-----|-----|-----|-----|------------|-----|
| F61       | 6.3 | 5.8 | 6.6 | 6.6 | 7.2 | 0.5 to 0.8 | 1.9 |
| H70       | 8.0 | 6.7 | 8.3 | 8.3 | 9.0 | 0.7 to 1.1 | 3.1 |

### MARKING

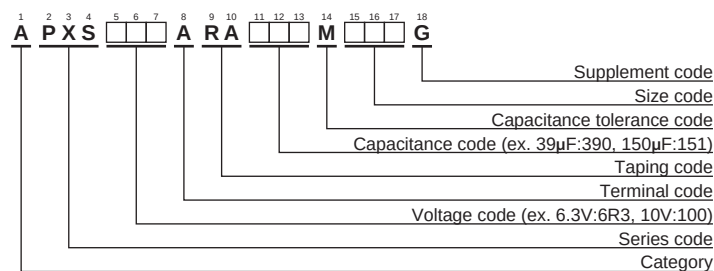
EX) 6.3V390μF





## NPCAP™-PXS Series

## ◆PART NUMBERING SYSTEM



Please refer to "Product code guide (conductive polymer type)"

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Size<br>code | ESR<br>(mΩ max./20°C, 100k to 300kHz) | Rated ripple current<br>(mA <sub>rms</sub> /105°C, 100kHz) | Part No.           |
|--------------------------|-------------|--------------|---------------------------------------|------------------------------------------------------------|--------------------|
| 4                        | 560         | H70          | 22                                    | 3,220                                                      | APXS4R0ARA561MH70G |
| 6.3                      | 120         | F61          | 22                                    | 2,570                                                      | APXS6R3ARA121MF61G |
|                          | 220         | F61          | 22                                    | 2,570                                                      | APXS6R3ARA221MF61G |
|                          | 390         | H70          | 22                                    | 3,220                                                      | APXS6R3ARA391MH70G |
| 10                       | 120         | F61          | 27                                    | 2,320                                                      | APXS100ARA121MF61G |
|                          | 150         | H70          | 30                                    | 2,760                                                      | APXS100ARA151MH70G |
| 16                       | 39          | F61          | 37                                    | 2,050                                                      | APXS160ARA390MF61G |
|                          | 68          | F61          | 30                                    | 2,200                                                      | APXS160ARA680MF61G |
|                          | 82          | H70          | 30                                    | 2,760                                                      | APXS160ARA820MH70G |
|                          | 120         | H70          | 27                                    | 2,900                                                      | APXS160ARA121MH70G |

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

| Frequency(Hz) | 120  | 1k   | 10k  | 50k  | 100k to 500k |
|---------------|------|------|------|------|--------------|
| SMD type      | 0.05 | 0.30 | 0.55 | 0.70 | 1.00         |

## NPCAP™-PXF Series

- Super low ESR, impedance and high heat resistance have been obtained by using conductive polymer as electrolyte.
- Rated voltage range : 2 to 10V<sub>dc</sub>, Capacitance range : 120 to 1,000μF
- Case size range : φ5×3.9L to φ8×7.7L
- Suitable for DC-DC converters, voltage regulators and decoupling applications used on computer motherboards etc.
- Solvent resistant type (see PRECAUTIONS AND GUIDELINES)
- RoHS2 Compliant
- Halogen Free

PXF

Lower ESR

PXE



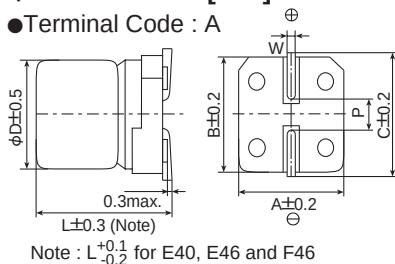
## ◆SPECIFICATIONS

| Items                                                        | Characteristics                                                                                                                                                                                                  |                                                                                                                                                                                   |     |     |     |                          |
|--------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|--------------------------|
| Category                                                     | -55 to +105℃                                                                                                                                                                                                     |                                                                                                                                                                                   |     |     |     |                          |
| Temperature Range                                            |                                                                                                                                                                                                                  |                                                                                                                                                                                   |     |     |     |                          |
| Rated Voltage Range                                          | 2 to 10V <sub>dc</sub>                                                                                                                                                                                           |                                                                                                                                                                                   |     |     |     |                          |
| Capacitance Tolerance                                        | ± 20% (M)                                                                                                                                                                                                        |                                                                                                                                                                                   |     |     |     | (at 20℃, 120Hz)          |
| Leakage Current                                              | Shall not exceed values shown in STANDARD RATINGS.                                                                                                                                                               |                                                                                                                                                                                   |     |     |     | (at 20℃ after 2 minutes) |
| *Note                                                        |                                                                                                                                                                                                                  |                                                                                                                                                                                   |     |     |     |                          |
| Dissipation Factor<br>(tan δ )                               | 0.12 max.                                                                                                                                                                                                        |                                                                                                                                                                                   |     |     |     | (at 20℃, 120Hz)          |
| Low Temperature<br>Characteristics<br>(Max. Impedance Ratio) | Z(-25℃)/Z(+20℃)≤1.15<br>Z(-55℃)/Z(+20℃)≤1.25                                                                                                                                                                     |                                                                                                                                                                                   |     |     |     | (at 100kHz)              |
| Endurance                                                    | The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 15,000 hours (E40, E46, F46 : 3,000 hours ) at 105℃.                              |                                                                                                                                                                                   |     |     |     |                          |
|                                                              | Appearance                                                                                                                                                                                                       | No significant damage                                                                                                                                                             |     |     |     |                          |
|                                                              | Capacitance change                                                                                                                                                                                               | ≤ ±20% of the initial value                                                                                                                                                       |     |     |     |                          |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                    | ≤150% of the initial specified value                                                                                                                                              |     |     |     |                          |
|                                                              | ESR                                                                                                                                                                                                              | ≤150% of the initial specified value                                                                                                                                              |     |     |     |                          |
|                                                              | Leakage current                                                                                                                                                                                                  | ≤The initial specified value                                                                                                                                                      |     |     |     |                          |
| Bias Humidity                                                | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjecting them to the DC rated voltage at 60℃, 90 to 95% RH for 1,000 hours (E40, E46, F46 : 500 hours ) .        |                                                                                                                                                                                   |     |     |     |                          |
|                                                              | Appearance                                                                                                                                                                                                       | No significant damage                                                                                                                                                             |     |     |     |                          |
|                                                              | Capacitance change                                                                                                                                                                                               | ≤ ±20% of the initial value                                                                                                                                                       |     |     |     |                          |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                    | ≤150% of the initial specified value                                                                                                                                              |     |     |     |                          |
|                                                              | ESR                                                                                                                                                                                                              | ≤150% of the initial specified value                                                                                                                                              |     |     |     |                          |
|                                                              | Leakage current                                                                                                                                                                                                  | ≤The initial specified value                                                                                                                                                      |     |     |     |                          |
| Surge Voltage                                                | The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltage specified at 105℃ for 30 seconds through a protective resistor(R=1kΩ) and discharge for 5 minutes 30 seconds. |                                                                                                                                                                                   |     |     |     |                          |
|                                                              | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                 | 2.0                                                                                                                                                                               | 2.5 | 4.0 | 6.3 | 10                       |
|                                                              | Surge voltage (V <sub>dc</sub> )                                                                                                                                                                                 | 2.3                                                                                                                                                                               | 2.9 | 4.6 | 7.2 | 12                       |
|                                                              |                                                                                                                                                                                                                  |                                                                                                                                                                                   |     |     |     |                          |
|                                                              | Appearance                                                                                                                                                                                                       | No significant damage                                                                                                                                                             |     |     |     |                          |
|                                                              | Capacitance change                                                                                                                                                                                               | ≤ ±20% of the initial value                                                                                                                                                       |     |     |     |                          |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                    | ≤150% of the initial specified value                                                                                                                                              |     |     |     |                          |
|                                                              | ESR                                                                                                                                                                                                              | ≤150% of the initial specified value                                                                                                                                              |     |     |     |                          |
|                                                              | Leakage current                                                                                                                                                                                                  | ≤The initial specified value                                                                                                                                                      |     |     |     |                          |
|                                                              | Soldering Heat                                                                                                                                                                                                   | The following specifications shall be satisfied when the solder temperature is reduced back to 20℃ after soldering has been performed under the recommended soldering conditions. |     |     |     |                          |
| Appearance                                                   |                                                                                                                                                                                                                  | No significant damage                                                                                                                                                             |     |     |     |                          |
| Capacitance value                                            |                                                                                                                                                                                                                  | Within the specified tolerance range                                                                                                                                              |     |     |     |                          |
| D.F. (tan δ )                                                |                                                                                                                                                                                                                  | ≤The initial specified value                                                                                                                                                      |     |     |     |                          |
| ESR                                                          |                                                                                                                                                                                                                  | ≤The initial specified value                                                                                                                                                      |     |     |     |                          |
| Leakage current                                              |                                                                                                                                                                                                                  | ≤The initial specified value (Voltage treatment)                                                                                                                                  |     |     |     |                          |

\*Note : If any doubt arises, measure the leakage current after the following voltage treatment.  
Voltage treatment : DC rated voltage is applied to the capacitors for 120 minutes at 105°C.

## ◆DIMENSIONS [mm]

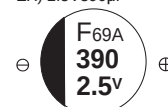
- Terminal Code : A



| Size Code | φD  | L   | A   | B   | C   | W          | P   |
|-----------|-----|-----|-----|-----|-----|------------|-----|
| E40       | 5   | 3.9 | 5.3 | 5.3 | 5.9 | 0.5 to 0.8 | 1.4 |
| E46       | 5   | 4.5 | 5.3 | 5.3 | 5.9 | 0.5 to 0.8 | 1.4 |
| E61       | 5   | 5.8 | 5.3 | 5.3 | 5.9 | 0.5 to 0.8 | 1.4 |
| F46       | 6.3 | 4.5 | 6.6 | 6.6 | 7.2 | 0.5 to 0.8 | 1.9 |
| F61       | 6.3 | 5.8 | 6.6 | 6.6 | 7.2 | 0.5 to 0.8 | 1.9 |
| F80       | 6.3 | 7.7 | 6.6 | 6.6 | 7.2 | 0.5 to 0.8 | 1.9 |
| H70       | 8   | 6.7 | 8.3 | 8.3 | 9.0 | 0.7 to 1.1 | 3.1 |
| H80       | 8   | 7.7 | 8.3 | 8.3 | 9.0 | 0.7 to 1.1 | 3.1 |

## ◆MARKING

EX) 2.5V390μF

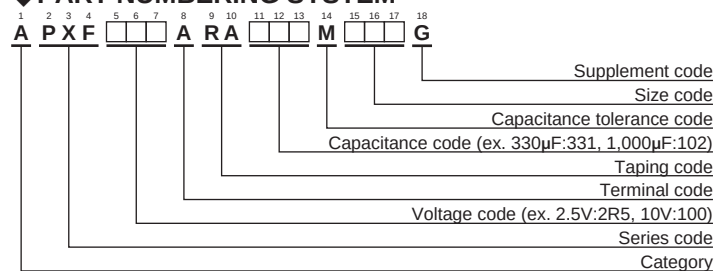






## NPCAP™-PXF Series

## ◆PART NUMBERING SYSTEM



Please refer to "Product code guide (conductive polymer type)"

## ◆STANDARD RATINGS

| WV (V <sub>ac</sub> ) | Cap (μF) | Size code | Leakage current (μA max./after 2min.) | ESR (mΩ max./20°C, 100k to 300kHz) | Rated ripple current (mA rms/105°C, 100kHz) | Part No.           |
|-----------------------|----------|-----------|---------------------------------------|------------------------------------|---------------------------------------------|--------------------|
| 2                     | 680      | F61       | 700                                   | 12                                 | 3,500                                       | APXF2R0ARA681MF61G |
| 2.5                   | 220      | E40       | 700                                   | 12                                 | 3,300                                       | APXF2R5ARA221ME40G |
|                       | 220      | E46       | 700                                   | 25                                 | 2,100                                       | APXF2R5ARA221ME46G |
|                       | 330      | E61       | 700                                   | 10                                 | 3,900                                       | APXF2R5ARA331ME61G |
|                       | 330      | F46       | 700                                   | 12                                 | 3,500                                       | APXF2R5ARA331MF46G |
|                       | 390      | E61       | 700                                   | 10                                 | 3,900                                       | APXF2R5ARA391ME61G |
|                       | 390      | F61       | 292                                   | 10                                 | 3,900                                       | APXF2R5ARA391MF61G |
|                       | 470      | F80       | 352                                   | 9                                  | 4,200                                       | APXF2R5ARA471MF80G |
|                       | 560      | F61       | 700                                   | 10                                 | 3,900                                       | APXF2R5ARA561MF61G |
|                       | 560      | F80       | 420                                   | 9                                  | 4,200                                       | APXF2R5ARA561MF80G |
|                       | 560      | H70       | 420                                   | 10                                 | 4,500                                       | APXF2R5ARA561MH70G |
| 4                     | 680      | H70       | 510                                   | 10                                 | 4,500                                       | APXF2R5ARA681MH70G |
|                       | 1,000    | H80       | 750                                   | 9                                  | 4,500                                       | APXF2R5ARA102MH80G |
|                       | 330      | F61       | 396                                   | 10                                 | 3,900                                       | APXF4R0ARA331MF61G |
|                       | 390      | F80       | 468                                   | 9                                  | 4,200                                       | APXF4R0ARA391MF80G |
|                       | 470      | H70       | 564                                   | 10                                 | 4,500                                       | APXF4R0ARA471MH70G |
| 6.3                   | 560      | H70       | 672                                   | 10                                 | 4,500                                       | APXF4R0ARA561MH70G |
|                       | 680      | H80       | 816                                   | 9                                  | 4,500                                       | APXF4R0ARA681MH80G |
|                       | 150      | E40       | 700                                   | 20                                 | 2,700                                       | APXF6R3ARA151ME40G |
|                       | 150      | E46       | 700                                   | 25                                 | 2,100                                       | APXF6R3ARA151ME46G |
|                       | 150      | E61       | 700                                   | 12                                 | 3,500                                       | APXF6R3ARA151ME61G |
|                       | 220      | E61       | 700                                   | 12                                 | 3,500                                       | APXF6R3ARA221ME61G |
|                       | 220      | F61       | 415                                   | 10                                 | 3,900                                       | APXF6R3ARA221MF61G |
|                       | 270      | F80       | 510                                   | 9                                  | 4,200                                       | APXF6R3ARA271MF80G |
|                       | 330      | F61       | 700                                   | 10                                 | 3,900                                       | APXF6R3ARA331MF61G |
|                       | 330      | F80       | 623                                   | 9                                  | 4,200                                       | APXF6R3ARA331MF80G |
| 10                    | 330      | H70       | 623                                   | 10                                 | 4,500                                       | APXF6R3ARA331MH70G |
|                       | 390      | H70       | 737                                   | 10                                 | 4,500                                       | APXF6R3ARA391MH70G |
|                       | 470      | H80       | 888                                   | 9                                  | 4,500                                       | APXF6R3ARA471MH80G |
|                       | 560      | H80       | 1,050                                 | 9                                  | 4,500                                       | APXF6R3ARA561MH80G |
|                       | 120      | E61       | 240                                   | 22                                 | 2,600                                       | APXF100ARA121ME61G |
|                       | 270      | F61       | 540                                   | 20                                 | 2,800                                       | APXF100ARA271MF61G |

Production of the products shown in [ ] is scheduled to be discontinued.

## ◆RATED RIPPLE CURRENT MULTIPLIERS

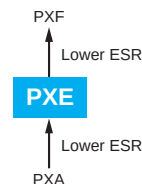
## ● Frequency Multipliers

| Frequency(Hz) | 120  | 1k   | 10k  | 50k  | 100k to 500k |
|---------------|------|------|------|------|--------------|
| SMD type      | 0.05 | 0.30 | 0.55 | 0.70 | 1.00         |



## NPCAP™-PXE Series

- Super low ESR, impedance and high heat resistance have been obtained by using conductive polymer as electrolyte.  
(ESR and rated ripple current values are improved from PXA series.)
- Rated voltage range : 2.5 to 16V<sub>dc</sub>, Capacitance range : 33 to 2,700μF
- Suitable for DC-DC converters, voltage regulators and decoupling applications used on computer motherboards etc.
- Solvent resistant type (see PRECAUTIONS AND GUIDELINES)
- RoHS2 Compliant
- Halogen Free



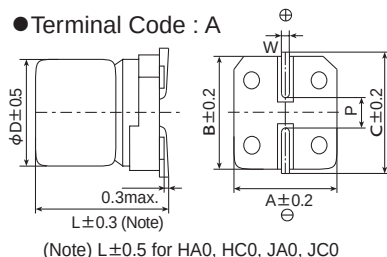
### SPECIFICATIONS

| Items                                                        | Characteristics                                                                                                                                                                                                   |                                                                                                                                                        |  |  |  |  |
|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|
| Category                                                     |                                                                                                                                                                                                                   |                                                                                                                                                        |  |  |  |  |
| Temperature Range                                            | -55 to +105°C                                                                                                                                                                                                     |                                                                                                                                                        |  |  |  |  |
| Rated Voltage Range                                          | 2.5 to 16V <sub>dc</sub>                                                                                                                                                                                          |                                                                                                                                                        |  |  |  |  |
| Capacitance Tolerance                                        | ±20% (M) (at 20°C, 120Hz)                                                                                                                                                                                         |                                                                                                                                                        |  |  |  |  |
| Leakage Current<br>*Note                                     | Shall not exceed values shown in STANDARD RATINGS. (at 20°C after 2 minutes)                                                                                                                                      |                                                                                                                                                        |  |  |  |  |
| Dissipation Factor<br>(tan δ)                                | 0.12 max. (at 20°C, 120Hz)                                                                                                                                                                                        |                                                                                                                                                        |  |  |  |  |
| Low Temperature<br>Characteristics<br>(Max. Impedance Ratio) | Z(-25°C)/Z(+20°C) ≤ 1.15<br>Z(-55°C)/Z(+20°C) ≤ 1.25 (at 100kHz)                                                                                                                                                  |                                                                                                                                                        |  |  |  |  |
| Endurance                                                    | The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 15,000 hours at 105°C.                                                            | Appearance                                                                                                                                             |  |  |  |  |
|                                                              |                                                                                                                                                                                                                   | No significant damage                                                                                                                                  |  |  |  |  |
|                                                              |                                                                                                                                                                                                                   | Capacitance change                                                                                                                                     |  |  |  |  |
|                                                              |                                                                                                                                                                                                                   | ≤ ±20% of the initial value                                                                                                                            |  |  |  |  |
|                                                              |                                                                                                                                                                                                                   | D.F. (tan δ)                                                                                                                                           |  |  |  |  |
|                                                              |                                                                                                                                                                                                                   | ≤ 150% of the initial specified value                                                                                                                  |  |  |  |  |
| Bias Humidity                                                | The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 15,000 hours at 105°C.                                                            | ESR                                                                                                                                                    |  |  |  |  |
|                                                              |                                                                                                                                                                                                                   | ≤ 150% of the initial specified value                                                                                                                  |  |  |  |  |
|                                                              |                                                                                                                                                                                                                   | Leakage current                                                                                                                                        |  |  |  |  |
|                                                              |                                                                                                                                                                                                                   | ≤ The initial specified value                                                                                                                          |  |  |  |  |
|                                                              |                                                                                                                                                                                                                   | The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 15,000 hours at 105°C. |  |  |  |  |
|                                                              |                                                                                                                                                                                                                   | No significant damage                                                                                                                                  |  |  |  |  |
| Surge Voltage                                                | The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltage specified at 105°C for 30 seconds through a protective resistor(R=1kΩ) and discharge for 5 minutes 30 seconds. | Capacitance change                                                                                                                                     |  |  |  |  |
|                                                              |                                                                                                                                                                                                                   | ≤ ±20% of the initial value                                                                                                                            |  |  |  |  |
|                                                              |                                                                                                                                                                                                                   | D.F. (tan δ)                                                                                                                                           |  |  |  |  |
|                                                              |                                                                                                                                                                                                                   | ≤ 150% of the initial specified value                                                                                                                  |  |  |  |  |
|                                                              |                                                                                                                                                                                                                   | ESR                                                                                                                                                    |  |  |  |  |
|                                                              |                                                                                                                                                                                                                   | ≤ 150% of the initial specified value                                                                                                                  |  |  |  |  |
| Soldering Heat                                               | The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltage specified at 105°C for 30 seconds through a protective resistor(R=1kΩ) and discharge for 5 minutes 30 seconds. | Leakage current                                                                                                                                        |  |  |  |  |
|                                                              |                                                                                                                                                                                                                   | ≤ The initial specified value                                                                                                                          |  |  |  |  |
|                                                              |                                                                                                                                                                                                                   | The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 15,000 hours at 105°C. |  |  |  |  |
|                                                              |                                                                                                                                                                                                                   | No significant damage                                                                                                                                  |  |  |  |  |
|                                                              |                                                                                                                                                                                                                   | Capacitance value                                                                                                                                      |  |  |  |  |
|                                                              |                                                                                                                                                                                                                   | Within the specified tolerance range                                                                                                                   |  |  |  |  |

\*Note : If any doubt arises, measure the leakage current after the following voltage treatment.  
Voltage treatment : DC rated voltage is applied to the capacitors for 120 minutes at 105°C.

### DIMENSIONS [mm]

- Terminal Code : A



| Size Code | φD  | L    | A    | B    | C    | W          | P   |
|-----------|-----|------|------|------|------|------------|-----|
| E61       | 5   | 5.8  | 5.3  | 5.3  | 5.9  | 0.5 to 0.8 | 1.4 |
| F61       | 6.3 | 5.8  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| F80       | 6.3 | 7.7  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| H70       | 8   | 6.7  | 8.3  | 8.3  | 9.0  | 0.7 to 1.1 | 3.1 |
| H80       | 8   | 7.7  | 8.3  | 8.3  | 9.0  | 0.7 to 1.1 | 3.1 |
| HA0       | 8   | 10.0 | 8.3  | 8.3  | 9.0  | 0.7 to 1.1 | 3.1 |
| HC0       | 8   | 12.0 | 8.3  | 8.3  | 9.0  | 0.7 to 1.1 | 3.1 |
| J80       | 10  | 7.7  | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |
| JA0       | 10  | 10.0 | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |
| JC0       | 10  | 12.2 | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |

### MARKING

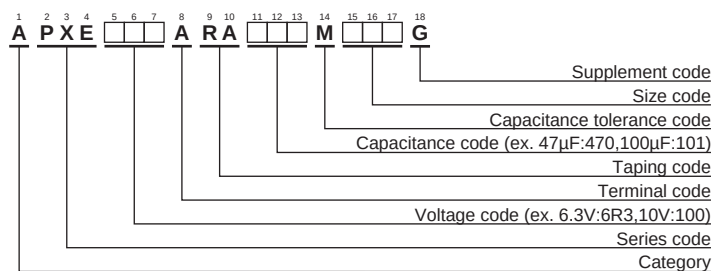
EX) 2.5V390μF





## NPCAP™-PXE Series

## ◆PART NUMBERING SYSTEM



Please refer to "Product code guide (conductive polymer type)"

## ◆STANDARD RATINGS

| WV (V <sub>dc</sub> ) | Cap (μF) | Size code | Leakage current (μA max./after 2min.) | ESR (mΩ max./20°C, 100k to 300kHz) | Rated ripple current (mA <sub>rms</sub> /105°C, 100kHz) | Part No.           |
|-----------------------|----------|-----------|---------------------------------------|------------------------------------|---------------------------------------------------------|--------------------|
| 2.5                   | 180      | E61       | 90.0                                  | 21                                 | 2,670                                                   | APXE2R5ARA181ME61G |
|                       | 390      | F61       | 195                                   | 15                                 | 3,160                                                   | APXE2R5ARA391MF61G |
|                       | 470      | F80       | 235                                   | 13                                 | 3,600                                                   | APXE2R5ARA471MF80G |
|                       | 560      | F80       | 280                                   | 13                                 | 3,600                                                   | APXE2R5ARA561MF80G |
|                       | 560      | H70       | 280                                   | 13                                 | 4,100                                                   | APXE2R5ARA561MH70G |
|                       | 680      | H70       | 340                                   | 13                                 | 4,100                                                   | APXE2R5ARA681MH70G |
|                       | 820      | H80       | 410                                   | 12                                 | 4,260                                                   | APXE2R5ARA821MH80G |
|                       | 820      | HC0       | 410                                   | 9                                  | 5,400                                                   | APXE2R5ARA821MHC0G |
|                       | 1,000    | H80       | 500                                   | 12                                 | 4,260                                                   | APXE2R5ARA102MH80G |
|                       | 1,200    | J80       | 600                                   | 13                                 | 4,450                                                   | APXE2R5ARA122MJ80G |
|                       | 1,500    | HA0       | 750                                   | 10                                 | 5,220                                                   | APXE2R5ARA152MHA0G |
|                       | 1,500    | HC0       | 750                                   | 9                                  | 5,400                                                   | APXE2R5ARA152MHC0G |
| 4                     | 2,200    | JA0       | 1,100                                 | 10                                 | 5,500                                                   | APXE2R5ARA222MJA0G |
|                       | 2,700    | JC0       | 1,350                                 | 9                                  | 5,600                                                   | APXE2R5ARA272MJC0G |
|                       | 100      | E61       | 80.0                                  | 22                                 | 2,610                                                   | APXE4R0ARA101ME61G |
|                       | 150      | E61       | 120                                   | 22                                 | 2,610                                                   | APXE4R0ARA151ME61G |
|                       | 270      | F61       | 216                                   | 15                                 | 3,160                                                   | APXE4R0ARA271MF61G |
|                       | 330      | F61       | 264                                   | 15                                 | 3,160                                                   | APXE4R0ARA331MF61G |
|                       | 390      | F80       | 312                                   | 14                                 | 3,470                                                   | APXE4R0ARA391MF80G |
|                       | 470      | H70       | 376                                   | 14                                 | 3,950                                                   | APXE4R0ARA471MH70G |
|                       | 560      | H70       | 448                                   | 14                                 | 3,950                                                   | APXE4R0ARA561MH70G |
|                       | 680      | H80       | 544                                   | 13                                 | 3,950                                                   | APXE4R0ARA681MH80G |
|                       | 1,000    | HA0       | 800                                   | 10                                 | 5,220                                                   | APXE4R0ARA102MHA0G |
|                       | 1,000    | J80       | 800                                   | 14                                 | 4,300                                                   | APXE4R0ARA102MJ80G |
|                       | 1,200    | HC0       | 960                                   | 9                                  | 5,400                                                   | APXE4R0ARA122MHC0G |
|                       | 1,200    | JA0       | 960                                   | 10                                 | 5,500                                                   | APXE4R0ARA122MJA0G |
| 6.3                   | 1,500    | JA0       | 1,200                                 | 10                                 | 5,500                                                   | APXE4R0ARA152MJA0G |
|                       | 1,800    | JA0       | 1,440                                 | 10                                 | 5,500                                                   | APXE4R0ARA182MJA0G |
|                       | 1,800    | JC0       | 1,440                                 | 9                                  | 5,600                                                   | APXE4R0ARA182MJC0G |
|                       | 100      | E61       | 126                                   | 24                                 | 2,500                                                   | APXE6R3ARA101ME61G |
|                       | 120      | E61       | 151                                   | 24                                 | 2,500                                                   | APXE6R3ARA121ME61G |
|                       | 220      | F61       | 277                                   | 15                                 | 3,160                                                   | APXE6R3ARA221MF61G |
|                       | 270      | F80       | 340                                   | 14                                 | 3,470                                                   | APXE6R3ARA271MF80G |
|                       | 330      | F80       | 415                                   | 14                                 | 3,470                                                   | APXE6R3ARA331MF80G |
|                       | 330      | H70       | 415                                   | 14                                 | 3,950                                                   | APXE6R3ARA331MH70G |
|                       | 390      | H70       | 491                                   | 14                                 | 3,950                                                   | APXE6R3ARA391MH70G |
|                       | 470      | H80       | 592                                   | 13                                 | 3,950                                                   | APXE6R3ARA471MH80G |
|                       | 820      | HA0       | 1,030                                 | 12                                 | 4,770                                                   | APXE6R3ARA821MHA0G |
|                       | 820      | HC0       | 1,030                                 | 10                                 | 5,150                                                   | APXE6R3ARA821MHC0G |
|                       | 820      | J80       | 1,030                                 | 14                                 | 4,300                                                   | APXE6R3ARA821MJ80G |
|                       | 1,200    | JA0       | 1,510                                 | 12                                 | 5,025                                                   | APXE6R3ARA122MJA0G |
|                       | 1,500    | JA0       | 1,890                                 | 12                                 | 5,025                                                   | APXE6R3ARA152MJA0G |
|                       | 1,500    | JC0       | 1,890                                 | 10                                 | 5,500                                                   | APXE6R3ARA152MJC0G |

Production of the products shown in [ ] is scheduled to be discontinued.

◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Size<br>code | Leakage current<br>(μA max./after 2min.) | ESR<br>(mΩ max./20°C, 100k to 300kHz) | Rated ripple current<br>(mA <sub>rms</sub> /105°C, 100kHz) | Part No.           |
|--------------------------|-------------|--------------|------------------------------------------|---------------------------------------|------------------------------------------------------------|--------------------|
| 10                       | 47          | E61          | 94.0                                     | 28                                    | 2,310                                                      | APXE100ARA470ME61G |
|                          | 56          | E61          | 112                                      | 28                                    | 2,310                                                      | APXE100ARA560ME61G |
|                          | 68          | E61          | 136                                      | 28                                    | 2,310                                                      | APXE100ARA680ME61G |
|                          | 120         | F61          | 240                                      | 25                                    | 2,530                                                      | APXE100ARA121MF61G |
|                          | 150         | F80          | 300                                      | 21                                    | 2,880                                                      | APXE100ARA151MF80G |
|                          | 220         | H70          | 440                                      | 21                                    | 3,220                                                      | APXE100ARA221MH70G |
|                          | 270         | H70          | 540                                      | 21                                    | 3,220                                                      | APXE100ARA271MH70G |
|                          | 330         | H80          | 660                                      | 19                                    | 3,390                                                      | APXE100ARA331MH80G |
|                          | 390         | HA0          | 780                                      | 17                                    | 4,000                                                      | APXE100ARA391MHA0G |
|                          | 470         | J80          | 940                                      | 19                                    | 3,800                                                      | APXE100ARA471MJ80G |
| 16                       | 680         | JA0          | 1,360                                    | 13                                    | 4,820                                                      | APXE100ARA681MJA0G |
|                          | 33          | E61          | 105                                      | 35                                    | 2,070                                                      | APXE160ARA330ME61G |
|                          | 39          | E61          | 124                                      | 35                                    | 2,070                                                      | APXE160ARA390ME61G |
|                          | 68          | F61          | 217                                      | 28                                    | 2,390                                                      | APXE160ARA680MF61G |
|                          | 82          | F80          | 262                                      | 24                                    | 2,700                                                      | APXE160ARA820MF80G |
|                          | 100         | F80          | 320                                      | 24                                    | 2,700                                                      | APXE160ARA101MF80G |
|                          | 100         | H70          | 320                                      | 24                                    | 3,010                                                      | APXE160ARA101MH70G |
|                          | 120         | H70          | 384                                      | 24                                    | 3,010                                                      | APXE160ARA121MH70G |
|                          | 150         | H80          | 480                                      | 22                                    | 3,150                                                      | APXE160ARA151MH80G |
|                          | 180         | HA0          | 576                                      | 18                                    | 3,890                                                      | APXE160ARA181MHA0G |
|                          | 220         | HA0          | 704                                      | 18                                    | 3,890                                                      | APXE160ARA221MHA0G |
|                          | 220         | J80          | 704                                      | 22                                    | 3,450                                                      | APXE160ARA221MJ80G |
|                          | 330         | JA0          | 1,050                                    | 16                                    | 4,350                                                      | APXE160ARA331MJA0G |

Production of the products shown in  is scheduled to be discontinued.

◆RATED RIPPLE CURRENT MULTIPLIERS

Frequency Multipliers

| Frequency(Hz) | 120  | 1k   | 10k  | 50k  | 100k to 500k |
|---------------|------|------|------|------|--------------|
| SMD type      | 0.05 | 0.30 | 0.55 | 0.70 | 1.00         |



## NPCAP™-PXA Series

- Super low ESR, impedance and high heat resistance have been obtained by using conductive polymer as electrolyte
- Rated voltage range : 2.5 to 25V<sub>dc</sub>, case size range :  $\phi 5 \times 5.8L$  to  $\phi 10 \times 12.2L$
- Suitable for DC-DC converters, voltage regulators and decoupling applications used on computer motherboards etc.
- Solvent resistant type (see PRECAUTIONS AND GUIDELINES)
- RoHS2 Compliant
- Halogen Free



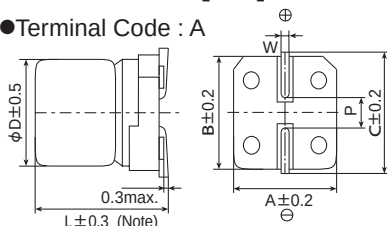
### SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                   |  |                                                  |     |     |    |    |    |    |    |
|--------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--------------------------------------------------|-----|-----|----|----|----|----|----|
| Category                                               |                                                                                                                                                                                                                   |  |                                                  |     |     |    |    |    |    |    |
| Temperature Range                                      | -55 to +105°C                                                                                                                                                                                                     |  |                                                  |     |     |    |    |    |    |    |
| Rated Voltage Range                                    | 2.5 to 25V <sub>dc</sub>                                                                                                                                                                                          |  |                                                  |     |     |    |    |    |    |    |
| Capacitance Tolerance                                  | ± 20% (M) (at 20°C, 120Hz)                                                                                                                                                                                        |  |                                                  |     |     |    |    |    |    |    |
| Leakage Current                                        | Shall not exceed values shown in STANDARD RATINGS. (at 20°C after 2 minutes)                                                                                                                                      |  |                                                  |     |     |    |    |    |    |    |
| *Note                                                  |                                                                                                                                                                                                                   |  |                                                  |     |     |    |    |    |    |    |
| Dissipation Factor (tan δ )                            | 0.12 max. (at 20°C, 120Hz)                                                                                                                                                                                        |  |                                                  |     |     |    |    |    |    |    |
| Low Temperature Characteristics (Max. Impedance Ratio) | Z(-25°C)/Z(+20°C)≤1.15<br>Z(-55°C)/Z(+20°C)≤1.25 (at 100kHz)                                                                                                                                                      |  |                                                  |     |     |    |    |    |    |    |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 15,000 hours (F46 : 3,000 hours) at 105°C.                                        |  |                                                  |     |     |    |    |    |    |    |
|                                                        | Appearance                                                                                                                                                                                                        |  | No significant damage                            |     |     |    |    |    |    |    |
|                                                        | Capacitance change                                                                                                                                                                                                |  | ≤ ± 20% of the initial value                     |     |     |    |    |    |    |    |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                     |  | ≤150% of the initial specified value             |     |     |    |    |    |    |    |
|                                                        | ESR                                                                                                                                                                                                               |  | ≤150% of the initial specified value             |     |     |    |    |    |    |    |
|                                                        | Leakage current                                                                                                                                                                                                   |  | ≤The initial specified value                     |     |     |    |    |    |    |    |
| Bias Humidity                                          | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to the DC rated voltage at 60°C, 90 to 95% RH for 1,000 hours(F46 : 500 hours).                    |  |                                                  |     |     |    |    |    |    |    |
|                                                        | Appearance                                                                                                                                                                                                        |  | No significant damage                            |     |     |    |    |    |    |    |
|                                                        | Capacitance change                                                                                                                                                                                                |  | ≤ ± 20% of the initial value                     |     |     |    |    |    |    |    |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                     |  | ≤150% of the initial specified value             |     |     |    |    |    |    |    |
|                                                        | ESR                                                                                                                                                                                                               |  | ≤150% of the initial specified value             |     |     |    |    |    |    |    |
|                                                        | Leakage current                                                                                                                                                                                                   |  | ≤The initial specified value                     |     |     |    |    |    |    |    |
| Surge Voltage                                          | The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltage specified at 105°C for 30 seconds through a protective resistor(R=1kΩ) and discharge for 5 minutes 30 seconds. |  |                                                  |     |     |    |    |    |    |    |
|                                                        | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                  |  | 2.5                                              | 4.0 | 6.3 | 10 | 16 | 20 | 23 | 25 |
|                                                        | Surge voltage (V <sub>dc</sub> )                                                                                                                                                                                  |  | 2.9                                              | 4.6 | 7.2 | 12 | 18 | 23 | 23 | 29 |
|                                                        |                                                                                                                                                                                                                   |  |                                                  |     |     |    |    |    |    |    |
|                                                        | Appearance                                                                                                                                                                                                        |  | No significant damage                            |     |     |    |    |    |    |    |
|                                                        | Capacitance change                                                                                                                                                                                                |  | ≤ ± 20% of the initial value                     |     |     |    |    |    |    |    |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                     |  | ≤150% of the initial specified value             |     |     |    |    |    |    |    |
|                                                        | ESR                                                                                                                                                                                                               |  | ≤150% of the initial specified value             |     |     |    |    |    |    |    |
|                                                        | Leakage current                                                                                                                                                                                                   |  | ≤The initial specified value                     |     |     |    |    |    |    |    |
| Soldering Heat                                         | The following specifications shall be satisfied when the solder temperature is reduced back to 20°C after soldering has been performed under the recommended soldering conditions.                                |  |                                                  |     |     |    |    |    |    |    |
|                                                        | Appearance                                                                                                                                                                                                        |  | No significant damage                            |     |     |    |    |    |    |    |
|                                                        | Capacitance value                                                                                                                                                                                                 |  | Within the specified tolerance range             |     |     |    |    |    |    |    |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                     |  | ≤The initial specified value                     |     |     |    |    |    |    |    |
|                                                        | ESR                                                                                                                                                                                                               |  | ≤The initial specified value                     |     |     |    |    |    |    |    |
|                                                        | Leakage current                                                                                                                                                                                                   |  | ≤The initial specified value (Voltage treatment) |     |     |    |    |    |    |    |

\*Note : If any doubt arises, measure the leakage current after the following voltage treatment.  
Voltage treatment : DC rated voltage is applied to the capacitors for 120 minutes at 105°C.

### DIMENSIONS [mm]

#### Terminal Code : A



Note :  $L +0.1/-0.2$  for F46  
 $L \pm 0.5$  for HC0 and JC0

| Size code | $\phi D$ | L    | A    | B    | C    | W          | P   |
|-----------|----------|------|------|------|------|------------|-----|
| E61       | 5        | 5.8  | 5.3  | 5.3  | 5.9  | 0.5 to 0.8 | 1.4 |
| F46       | 6.3      | 4.5  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| F61       | 6.3      | 5.8  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| H70       | 8        | 6.7  | 8.3  | 8.3  | 9.0  | 0.7 to 1.1 | 3.1 |
| HC0       | 8        | 12.0 | 8.3  | 8.3  | 9.0  | 0.7 to 1.1 | 3.1 |
| J80       | 10       | 7.7  | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |
| JC0       | 10       | 12.2 | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |

### MARKING

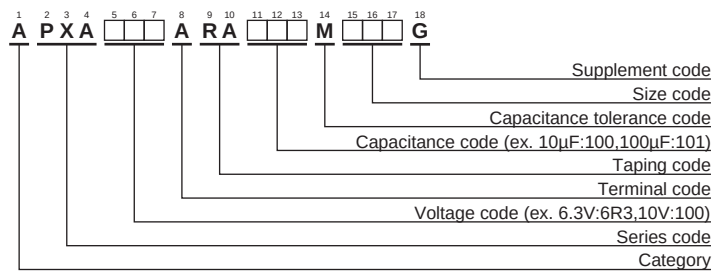
EX) 16V39 $\mu$ F





## NPCAP™-PXA Series

## ◆PART NUMBERING SYSTEM



Please refer to "Product code guide (conductive polymer type)"

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Size<br>code | Leakage<br>current<br>(μA max./<br>after<br>2 min.) | ESR<br>(mΩ max./ 20°C,<br>100k to 300kHz) | Rated ripple<br>current<br>(mA rms/105°C,<br>100kHz) | Part No.           |
|--------------------------|-------------|--------------|-----------------------------------------------------|-------------------------------------------|------------------------------------------------------|--------------------|
| 2.5                      | 220         | F61          | 110                                                 | 25                                        | 2,500                                                | APXA2R5ARA221MF61G |
|                          | 560         | H70          | 280                                                 | 23                                        | 3,100                                                | APXA2R5ARA561MH70G |
|                          | 680         | HC0          | 340                                                 | 12                                        | 4,770                                                | APXA2R5ARA681MHC0G |
|                          | 1,000       | J80          | 500                                                 | 19                                        | 4,240                                                | APXA2R5ARA102MJ80G |
|                          | 1,500       | JC0          | 750                                                 | 10                                        | 5,500                                                | APXA2R5ARA152MJC0G |
| 4                        | 100         | F61          | 80.0                                                | 26                                        | 2,450                                                | APXA4R0ARA101MF61G |
|                          | 120         | F46          | 240                                                 | 38                                        | 1,710                                                | APXA4R0ARA121MF46G |
|                          | 150         | E61          | 120                                                 | 30                                        | 1,490                                                | APXA4R0ARA151ME61G |
|                          | 150         | F61          | 120                                                 | 26                                        | 2,450                                                | APXA4R0ARA151MF61G |
|                          | 220         | H70          | 176                                                 | 25                                        | 3,020                                                | APXA4R0ARA221MH70G |
|                          | 330         | H70          | 264                                                 | 25                                        | 3,020                                                | APXA4R0ARA331MH70G |
|                          | 470         | J80          | 376                                                 | 20                                        | 4,130                                                | APXA4R0ARA471MJ80G |
|                          | 560         | HC0          | 448                                                 | 12                                        | 4,770                                                | APXA4R0ARA561MHC0G |
|                          | 680         | J80          | 544                                                 | 20                                        | 4,130                                                | APXA4R0ARA681MJ80G |
|                          | 820         | JC0          | 656                                                 | 10                                        | 5,500                                                | APXA4R0ARA821MJC0G |
| 6.3                      | 1,200       | JC0          | 960                                                 | 10                                        | 5,500                                                | APXA4R0ARA122MJC0G |
|                          | 47          | E61          | 59.2                                                | 35                                        | 1,380                                                | APXA6R3ARA470ME61G |
|                          | 68          | F61          | 85.6                                                | 27                                        | 2,400                                                | APXA6R3ARA680MF61G |
|                          | 82          | F46          | 258                                                 | 40                                        | 1,670                                                | APXA6R3ARA820MF46G |
|                          | 82          | F61          | 103                                                 | 27                                        | 2,400                                                | APXA6R3ARA820MF61G |
|                          | 100         | E61          | 126                                                 | 35                                        | 1,380                                                | APXA6R3ARA101ME61G |
|                          | 100         | F46          | 315                                                 | 40                                        | 1,670                                                | APXA6R3ARA101MF46G |
|                          | 100         | F61          | 126                                                 | 27                                        | 2,400                                                | APXA6R3ARA101MF61G |
|                          | 120         | F61          | 151                                                 | 27                                        | 2,400                                                | APXA6R3ARA121MF61G |
|                          | 150         | H70          | 189                                                 | 25                                        | 3,020                                                | APXA6R3ARA151MH70G |
|                          | 220         | H70          | 277                                                 | 25                                        | 3,020                                                | APXA6R3ARA221MH70G |
|                          | 330         | J80          | 415                                                 | 20                                        | 4,130                                                | APXA6R3ARA331MJ80G |
|                          | 390         | HC0          | 491                                                 | 12                                        | 4,770                                                | APXA6R3ARA391MHC0G |
|                          | 470         | HC0          | 592                                                 | 12                                        | 4,770                                                | APXA6R3ARA471MHC0G |
|                          | 470         | J80          | 592                                                 | 20                                        | 4,130                                                | APXA6R3ARA471MJ80G |
| 680                      | JC0         | 856          | 10                                                  | 5,500                                     | APXA6R3ARA681MJC0G                                   |                    |
| 820                      | JC0         | 1,030        | 10                                                  | 5,500                                     | APXA6R3ARA821MJC0G                                   |                    |

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Size<br>code | Leakage<br>current<br>(μA max./<br>after<br>2 min.) | ESR<br>(mΩ max./ 20°C,<br>100k to 300kHz) | Rated ripple<br>current<br>(mA rms/105°C,<br>100kHz) | Part No.           |
|--------------------------|-------------|--------------|-----------------------------------------------------|-------------------------------------------|------------------------------------------------------|--------------------|
| 10                       | 33          | E61          | 66.0                                                | 40                                        | 1,270                                                | APXA100ARA330ME61G |
|                          | 47          | E61          | 94.0                                                | 40                                        | 1,270                                                | APXA100ARA470ME61G |
|                          | 47          | F46          | 235                                                 | 41                                        | 1,560                                                | APXA100ARA470MF46G |
|                          | 47          | F61          | 94.0                                                | 31                                        | 2,250                                                | APXA100ARA470MF61G |
|                          | 56          | F61          | 112                                                 | 31                                        | 2,250                                                | APXA100ARA560MF61G |
|                          | 120         | H70          | 240                                                 | 27                                        | 2,800                                                | APXA100ARA121MH70G |
|                          | 150         | H70          | 300                                                 | 27                                        | 2,800                                                | APXA100ARA151MH70G |
|                          | 270         | HC0          | 540                                                 | 14                                        | 4,420                                                | APXA100ARA271MHC0G |
|                          | 270         | J80          | 540                                                 | 24                                        | 3,770                                                | APXA100ARA271MJ80G |
|                          | 330         | HC0          | 660                                                 | 14                                        | 4,420                                                | APXA100ARA331MHC0G |
|                          | 330         | J80          | 660                                                 | 24                                        | 3,770                                                | APXA100ARA331MJ80G |
|                          | 470         | JC0          | 940                                                 | 12                                        | 5,300                                                | APXA100ARA471MJC0G |
|                          | 560         | JC0          | 1,120                                               | 12                                        | 5,300                                                | APXA100ARA561MJC0G |
| 16                       | 22          | E61          | 70.4                                                | 45                                        | 1,210                                                | APXA160ARA220ME61G |
|                          | 22          | F46          | 176                                                 | 45                                        | 1,490                                                | APXA160ARA220MF46G |
|                          | 33          | F61          | 105                                                 | 37                                        | 2,050                                                | APXA160ARA330MF61G |
|                          | 39          | F61          | 124                                                 | 37                                        | 2,050                                                | APXA160ARA390MF61G |
|                          | 82          | H70          | 262                                                 | 30                                        | 2,700                                                | APXA160ARA820MH70G |
|                          | 150         | J80          | 480                                                 | 26                                        | 3,430                                                | APXA160ARA151MJ80G |
|                          | 180         | HC0          | 576                                                 | 16                                        | 4,360                                                | APXA160ARA181MHC0G |
|                          | 180         | J80          | 576                                                 | 26                                        | 3,430                                                | APXA160ARA181MJ80G |
|                          | 220         | JC0          | 704                                                 | 14                                        | 5,050                                                | APXA160ARA221MJC0G |
|                          | 330         | JC0          | 1,050                                               | 14                                        | 5,050                                                | APXA160ARA331MJC0G |
| 20                       | 15          | F46          | 150                                                 | 57                                        | 1,300                                                | APXA200ARA150MF46G |
|                          | 22          | F61          | 88.0                                                | 50                                        | 1,650                                                | APXA200ARA220MF61G |
|                          | 39          | H70          | 156                                                 | 45                                        | 2,000                                                | APXA200ARA390MH70G |
|                          | 47          | H70          | 188                                                 | 45                                        | 2,000                                                | APXA200ARA470MH70G |
|                          | 82          | J80          | 328                                                 | 40                                        | 2,500                                                | APXA200ARA820MJ80G |
|                          | 150         | JC0          | 600                                                 | 20                                        | 4,320                                                | APXA200ARA151MJC0G |
| 23                       | 15          | F46          | 172                                                 | 57                                        | 1,300                                                | APXA230ARA150MF46G |
| 25                       | 10          | F61          | 125                                                 | 65                                        | 1,500                                                | APXA250ARA100MF61G |
|                          | 22          | H70          | 275                                                 | 50                                        | 1,800                                                | APXA250ARA220MH70G |
|                          | 39          | J80          | 487                                                 | 45                                        | 2,100                                                | APXA250ARA390MJ80G |

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

| Frequency (Hz) | 120  | 1k   | 10k  | 50k  | 100k to 500k |
|----------------|------|------|------|------|--------------|
| SMD type       | 0.05 | 0.30 | 0.55 | 0.70 | 1.00         |



## NPCAP™-PXD Series

- Super low ESR, impedance and high heat resistance have been obtained by using conductive polymer as electrolyte.
- For automobile modules and other high temperature applications
- Endurance : 125°C 2,000 hours
- Rated voltage range : 2.5 to 10V<sub>dc</sub>, Capacitance range : 47 to 470μF
- Solvent resistant type (see PRECAUTIONS AND GUIDELINES)
- RoHS2 Compliant
- Halogen Free
- AEC-Q200 compliant : Please contact Chemi-Con for more details, test data, information.

PXD

Longer life

PXH



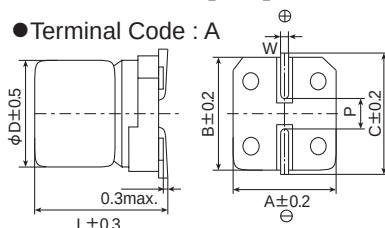
### SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                   |                                                                                                                                                                                    |     |    |
|--------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|----|
| Category                                               |                                                                                                                                                                                                                   |                                                                                                                                                                                    |     |    |
| Temperature Range                                      | -55 to +125°C                                                                                                                                                                                                     |                                                                                                                                                                                    |     |    |
| Rated Voltage Range                                    | 2.5 to 10V <sub>dc</sub>                                                                                                                                                                                          |                                                                                                                                                                                    |     |    |
| Capacitance Tolerance                                  | ± 20% (M) (at 20°C, 120Hz)                                                                                                                                                                                        |                                                                                                                                                                                    |     |    |
| Leakage Current                                        | Shall not exceed values shown in STANDARD RATINGS. (at 20°C after 2 minutes)                                                                                                                                      |                                                                                                                                                                                    |     |    |
| *Note                                                  |                                                                                                                                                                                                                   |                                                                                                                                                                                    |     |    |
| Dissipation Factor (tan δ )                            | 0.12 max. (at 20°C, 120Hz)                                                                                                                                                                                        |                                                                                                                                                                                    |     |    |
| Low Temperature Characteristics (Max. Impedance Ratio) | Z(-25°C)/Z(+20°C)≤1.15<br>Z(-55°C)/Z(+20°C)≤1.25 (at 100kHz)                                                                                                                                                      |                                                                                                                                                                                    |     |    |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 2,000 hours at 125°C.                                                             |                                                                                                                                                                                    |     |    |
|                                                        | Appearance                                                                                                                                                                                                        | No significant damage                                                                                                                                                              |     |    |
|                                                        | Capacitance change                                                                                                                                                                                                | ≤ ±20% of the initial value                                                                                                                                                        |     |    |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                     | ≤200% of the initial specified value                                                                                                                                               |     |    |
|                                                        | ESR                                                                                                                                                                                                               | ≤200% of the initial specified value                                                                                                                                               |     |    |
|                                                        | Leakage current                                                                                                                                                                                                   | ≤The initial specified value                                                                                                                                                       |     |    |
| Bias Humidity                                          | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to the DC rated voltage at 60°C, 90 to 95% RH for 1,000 hours.                                     |                                                                                                                                                                                    |     |    |
|                                                        | Appearance                                                                                                                                                                                                        | No significant damage                                                                                                                                                              |     |    |
|                                                        | Capacitance change                                                                                                                                                                                                | ≤ ±20% of the initial value                                                                                                                                                        |     |    |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                     | ≤150% of the initial specified value                                                                                                                                               |     |    |
|                                                        | ESR                                                                                                                                                                                                               | ≤150% of the initial specified value                                                                                                                                               |     |    |
|                                                        | Leakage current                                                                                                                                                                                                   | ≤The initial specified value                                                                                                                                                       |     |    |
| Surge Voltage                                          | The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltage specified at 125°C for 30 seconds through a protective resistor(R=1kΩ) and discharge for 5 minutes 30 seconds. |                                                                                                                                                                                    |     |    |
|                                                        | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                  | 2.5                                                                                                                                                                                | 6.3 | 10 |
|                                                        | Surge voltage (V <sub>dc</sub> )                                                                                                                                                                                  | 2.9                                                                                                                                                                                | 7.2 | 12 |
|                                                        |                                                                                                                                                                                                                   |                                                                                                                                                                                    |     |    |
|                                                        | Appearance                                                                                                                                                                                                        | No significant damage                                                                                                                                                              |     |    |
|                                                        | Capacitance change                                                                                                                                                                                                | ≤ ±20% of the initial value                                                                                                                                                        |     |    |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                     | ≤150% of the initial specified value                                                                                                                                               |     |    |
|                                                        | ESR                                                                                                                                                                                                               | ≤150% of the initial specified value                                                                                                                                               |     |    |
|                                                        | Leakage current                                                                                                                                                                                                   | ≤The initial specified value                                                                                                                                                       |     |    |
|                                                        | Soldering Heat                                                                                                                                                                                                    | The following specifications shall be satisfied when the solder temperature is reduced back to 20°C after soldering has been performed under the recommended soldering conditions. |     |    |
| Appearance                                             |                                                                                                                                                                                                                   | No significant damage                                                                                                                                                              |     |    |
| Capacitance value                                      |                                                                                                                                                                                                                   | Within the specified tolerance range                                                                                                                                               |     |    |
| D.F. (tan δ )                                          |                                                                                                                                                                                                                   | ≤The initial specified value                                                                                                                                                       |     |    |
| ESR                                                    |                                                                                                                                                                                                                   | ≤The initial specified value                                                                                                                                                       |     |    |
| Leakage current                                        |                                                                                                                                                                                                                   | ≤The initial specified value (Voltage treatment)                                                                                                                                   |     |    |
|                                                        |                                                                                                                                                                                                                   |                                                                                                                                                                                    |     |    |

\*Note : If any doubt arises, measure the leakage current after the following voltage treatment.  
Voltage treatment : DC rated voltage is applied to the capacitors for 120 minutes at 125°C.

### DIMENSIONS [mm]

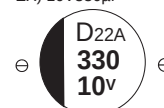
● Terminal Code : A



| Size code | φD  | L   | A    | B    | C    | W          | P   |
|-----------|-----|-----|------|------|------|------------|-----|
| E61       | 5   | 5.8 | 5.3  | 5.3  | 5.9  | 0.5 to 0.8 | 1.4 |
| F61       | 6.3 | 5.8 | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| H70       | 8   | 6.7 | 8.3  | 8.3  | 9.0  | 0.7 to 1.1 | 3.1 |
| J80       | 10  | 7.7 | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |

### MARKING

EX) 10V330μF

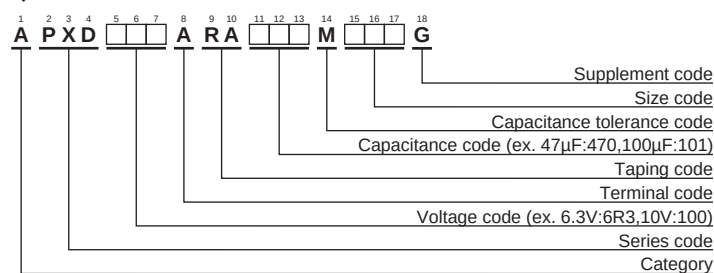






## NPCAP™-PXD Series

## ◆PART NUMBERING SYSTEM



Please refer to "Product code guide (conductive polymer type)"

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Size code | Leakage current<br>(μA max./after 2min.) | ESR<br>(mΩ max./20°C, 100k to 300kHz) | Rated ripple current<br>(mArms/100kHz)        |                                                | Part No.           |
|--------------------------|-------------|-----------|------------------------------------------|---------------------------------------|-----------------------------------------------|------------------------------------------------|--------------------|
|                          |             |           |                                          |                                       | -55°C ≤ T <sub>x</sub> ≤ +105°C <sup>*1</sup> | +105°C < T <sub>x</sub> ≤ +125°C <sup>*1</sup> |                    |
| 2.5                      | 120         | E61       | 60.0                                     | 40                                    | 1,450                                         | 650                                            | APXD2R5ARA121ME61G |
|                          | 220         | F61       | 110                                      | 30                                    | 2,500                                         | 770                                            | APXD2R5ARA221MF61G |
| 6.3                      | 56          | E61       | 70.5                                     | 45                                    | 1,380                                         | 600                                            | APXD6R3ARA560ME61G |
|                          | 100         | F61       | 126                                      | 35                                    | 2,400                                         | 720                                            | APXD6R3ARA101MF61G |
|                          | 220         | H70       | 277                                      | 30                                    | 3,020                                         | 960                                            | APXD6R3ARA221MH70G |
|                          | 470         | J80       | 592                                      | 25                                    | 3,500                                         | 1,100                                          | APXD6R3ARA471MJ80G |
| 10                       | 47          | E61       | 94.0                                     | 50                                    | 1,270                                         | 550                                            | APXD100ARA470ME61G |
|                          | 56          | F61       | 112                                      | 40                                    | 2,250                                         | 680                                            | APXD100ARA560MF61G |
|                          | 150         | H70       | 300                                      | 35                                    | 2,800                                         | 880                                            | APXD100ARA151MH70G |
|                          | 330         | J80       | 660                                      | 25                                    | 3,500                                         | 1,100                                          | APXD100ARA331MJ80G |

\*1 T<sub>x</sub> : Ambient temperature (°C)

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ● Frequency Multipliers

| Frequency(Hz) | 120  | 1k   | 10k  | 50k  | 100k to 500k |
|---------------|------|------|------|------|--------------|
| SMD type      | 0.05 | 0.30 | 0.55 | 0.70 | 1.00         |

# NPCAP™-PXH Series

Upgrade!

- Super low ESR, impedance and high heat resistance have been obtained by using conductive polymer as electrolyte.
- For AI servers, GPU computing, and other high temperature applications.
- Suitable for DC-DC converters, voltage regulators and decoupling applications.
- Endurance : 125°C 1,000 to 3,000 hours
- Rated voltage range : 2.5 to 20V<sub>dc</sub>, Capacitance range : 22 to 1,000μF
- Case size range : φ 6.3×5.8L to φ 10×7.7L
- Solvent resistant type (see PRECAUTIONS AND GUIDELINES)
- RoHS2 Compliant
- Halogen Free

PXH

Higher temperature  
PXH  
PXA



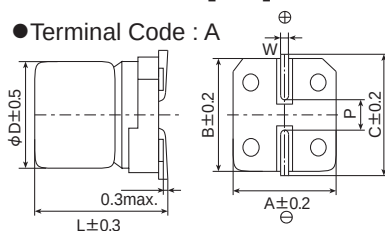
## SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                    |                                                                                                                                                                                   |                                       |     |     |    |                          |    |
|--------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-----|-----|----|--------------------------|----|
| Category                                               | -55 to +125℃                                                                                                                                                                                                                       |                                                                                                                                                                                   |                                       |     |     |    |                          |    |
| Temperature Range                                      |                                                                                                                                                                                                                                    |                                                                                                                                                                                   |                                       |     |     |    |                          |    |
| Rated Voltage Range                                    | 2.5 to 20V <sub>dc</sub>                                                                                                                                                                                                           |                                                                                                                                                                                   |                                       |     |     |    |                          |    |
| Capacitance Tolerance                                  | ± 20% (M)                                                                                                                                                                                                                          |                                                                                                                                                                                   |                                       |     |     |    | (at 20℃, 120Hz)          |    |
| Leakage Current                                        | Shall not exceed values shown in STANDARD RATINGS.                                                                                                                                                                                 |                                                                                                                                                                                   |                                       |     |     |    | (at 20℃ after 2 minutes) |    |
| *Note                                                  |                                                                                                                                                                                                                                    |                                                                                                                                                                                   |                                       |     |     |    |                          |    |
| Dissipation Factor (tan δ )                            | 0.12 max.                                                                                                                                                                                                                          |                                                                                                                                                                                   |                                       |     |     |    | (at 20℃, 120Hz)          |    |
| Low Temperature Characteristics (Max. Impedance Ratio) | Z(-25℃)/Z(+20℃)≤1.15<br>Z(-55℃)/Z(+20℃)≤1.25                                                                                                                                                                                       |                                                                                                                                                                                   |                                       |     |     |    | (at 100kHz)              |    |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 1,000 hours (F80 : 3,000 hours) at 125℃.                                                            |                                                                                                                                                                                   |                                       |     |     |    |                          |    |
|                                                        | Appearance                                                                                                                                                                                                                         |                                                                                                                                                                                   | No significant damage                 |     |     |    |                          |    |
|                                                        | Capacitance change                                                                                                                                                                                                                 |                                                                                                                                                                                   | ≤ ± 20% of the initial value          |     |     |    |                          |    |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                      |                                                                                                                                                                                   | ≤ 200% of the initial specified value |     |     |    |                          |    |
|                                                        | ESR                                                                                                                                                                                                                                |                                                                                                                                                                                   | ≤ 200% of the initial specified value |     |     |    |                          |    |
|                                                        | Leakage current                                                                                                                                                                                                                    |                                                                                                                                                                                   | ≤ The initial specified value         |     |     |    |                          |    |
| Bias Humidity                                          | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjecting them to the DC rated voltage at 60℃, 90 to 95% RH for 1,000 hours.                                                        |                                                                                                                                                                                   |                                       |     |     |    |                          |    |
|                                                        | Appearance                                                                                                                                                                                                                         |                                                                                                                                                                                   | No significant damage                 |     |     |    |                          |    |
|                                                        | Capacitance change                                                                                                                                                                                                                 |                                                                                                                                                                                   | ≤ ± 20% of the initial value          |     |     |    |                          |    |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                      |                                                                                                                                                                                   | ≤ 150% of the initial specified value |     |     |    |                          |    |
|                                                        | ESR                                                                                                                                                                                                                                |                                                                                                                                                                                   | ≤ 150% of the initial specified value |     |     |    |                          |    |
|                                                        | Leakage current                                                                                                                                                                                                                    |                                                                                                                                                                                   | ≤ The initial specified value         |     |     |    |                          |    |
| Surge Voltage                                          | The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltage specified at 125℃ (F80 : 105℃) for 30 seconds through a protective resistor (R=1kΩ) and discharge for 5 minutes and 30 seconds. |                                                                                                                                                                                   |                                       |     |     |    |                          |    |
|                                                        | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                   |                                                                                                                                                                                   | 2.5                                   | 4.0 | 6.3 | 10 | 16                       | 20 |
|                                                        | Surge voltage (V <sub>dc</sub> )                                                                                                                                                                                                   |                                                                                                                                                                                   | 2.9                                   | 4.6 | 7.2 | 12 | 18                       | 23 |
|                                                        |                                                                                                                                                                                                                                    |                                                                                                                                                                                   |                                       |     |     |    |                          |    |
|                                                        | Appearance                                                                                                                                                                                                                         |                                                                                                                                                                                   | No significant damage                 |     |     |    |                          |    |
|                                                        | Capacitance change                                                                                                                                                                                                                 |                                                                                                                                                                                   | ≤ ± 20% of the initial value          |     |     |    |                          |    |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                      |                                                                                                                                                                                   | ≤ 150% of the initial specified value |     |     |    |                          |    |
|                                                        | ESR                                                                                                                                                                                                                                |                                                                                                                                                                                   | ≤ 150% of the initial specified value |     |     |    |                          |    |
|                                                        | Leakage current                                                                                                                                                                                                                    |                                                                                                                                                                                   | ≤ The initial specified value         |     |     |    |                          |    |
|                                                        | Soldering Heat                                                                                                                                                                                                                     | The following specifications shall be satisfied when the solder temperature is reduced back to 20℃ after soldering has been performed under the recommended soldering conditions. |                                       |     |     |    |                          |    |
| Appearance                                             |                                                                                                                                                                                                                                    | No significant damage                                                                                                                                                             |                                       |     |     |    |                          |    |
| Capacitance value                                      |                                                                                                                                                                                                                                    | Within the specified tolerance range                                                                                                                                              |                                       |     |     |    |                          |    |
| D.F. (tan δ )                                          |                                                                                                                                                                                                                                    | ≤ The initial specified value                                                                                                                                                     |                                       |     |     |    |                          |    |
| ESR                                                    |                                                                                                                                                                                                                                    | ≤ The initial specified value                                                                                                                                                     |                                       |     |     |    |                          |    |
| Leakage current                                        |                                                                                                                                                                                                                                    | ≤ The initial specified value (Voltage treatment)                                                                                                                                 |                                       |     |     |    |                          |    |

\*Note : If any doubt arises, measure the leakage current after the following voltage treatment.  
Voltage treatment : DC rated voltage is applied to the capacitors for 120 minutes at 125°C.

## DIMENSIONS [mm]

### Terminal Code : A

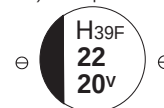


| Size code | φD  | L   | A    | B    | C    | W          | P   |
|-----------|-----|-----|------|------|------|------------|-----|
| F61       | 6.3 | 5.8 | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| F80       | 6.3 | 7.7 | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| H70       | 8   | 6.7 | 8.3  | 8.3  | 9.0  | 0.7 to 1.1 | 3.1 |
| J80       | 10  | 7.7 | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |

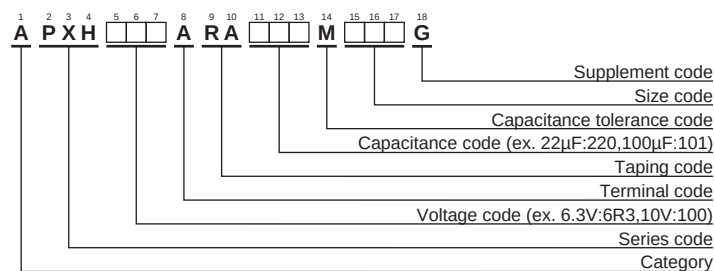
\* Please inquire about the vibration resistant structure.

## MARKING

EX) 20V22μF



## ◆PART NUMBERING SYSTEM



Please refer to "Product code guide (conductive polymer type)"

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Size code | Leakage current<br>(μA max./after 2min.) | ESR<br>(mΩ max./20°C, 100k to 300kHz) | Rated ripple current<br>(mArms/100kHz)        |                                                | Part No.           |
|--------------------------|-------------|-----------|------------------------------------------|---------------------------------------|-----------------------------------------------|------------------------------------------------|--------------------|
|                          |             |           |                                          |                                       | -55°C ≤ T <sub>x</sub> ≤ +105°C <sup>*1</sup> | +105°C < T <sub>x</sub> ≤ +125°C <sup>*1</sup> |                    |
| 2.5                      | 220         | F61       | 110                                      | 35                                    | 2,500                                         | 770                                            | APXH2R5ARA221MF61G |
|                          | 560         | H70       | 280                                      | 30                                    | 3,100                                         | 960                                            | APXH2R5ARA561MH70G |
|                          | 820         | F80       | 1,020                                    | 7                                     | 5,000                                         | 2,400                                          | APXH2R5ARA821MF80G |
|                          | 1,000       | J80       | 500                                      | 25                                    | 3,700                                         | 1,100                                          | APXH2R5ARA102MJ80G |
| 4                        | 150         | F61       | 120                                      | 35                                    | 2,450                                         | 770                                            | APXH4R0ARA151MF61G |
|                          | 220         | H70       | 176                                      | 30                                    | 3,020                                         | 960                                            | APXH4R0ARA221MH70G |
|                          | 680         | J80       | 544                                      | 25                                    | 3,700                                         | 1,100                                          | APXH4R0ARA681MJ80G |
|                          |             |           |                                          |                                       |                                               |                                                |                    |
| 6.3                      | 82          | F61       | 103                                      | 40                                    | 2,400                                         | 720                                            | APXH6R3ARA820MF61G |
|                          | 100         | F61       | 126                                      | 40                                    | 2,400                                         | 720                                            | APXH6R3ARA101MF61G |
|                          | 150         | H70       | 189                                      | 30                                    | 3,020                                         | 960                                            | APXH6R3ARA151MH70G |
|                          | 220         | H70       | 277                                      | 30                                    | 3,020                                         | 960                                            | APXH6R3ARA221MH70G |
|                          | 470         | J80       | 592                                      | 25                                    | 3,700                                         | 1,100                                          | APXH6R3ARA471MJ80G |
| 10                       | 56          | F61       | 112                                      | 45                                    | 2,250                                         | 680                                            | APXH100ARA560MF61G |
|                          | 120         | H70       | 240                                      | 35                                    | 2,800                                         | 880                                            | APXH100ARA121MH70G |
|                          | 150         | H70       | 300                                      | 35                                    | 2,800                                         | 880                                            | APXH100ARA151MH70G |
|                          | 330         | J80       | 660                                      | 30                                    | 3,700                                         | 1,010                                          | APXH100ARA331MJ80G |
| 16                       | 39          | F61       | 124                                      | 50                                    | 2,050                                         | 650                                            | APXH160ARA390MF61G |
|                          | 82          | H70       | 262                                      | 40                                    | 2,700                                         | 830                                            | APXH160ARA820MH70G |
|                          | 150         | J80       | 480                                      | 35                                    | 3,020                                         | 930                                            | APXH160ARA151MJ80G |
|                          | 180         | J80       | 576                                      | 35                                    | 3,020                                         | 930                                            | APXH160ARA181MJ80G |
|                          | 270         | F80       | 864                                      | 13                                    | 4,460                                         | 2,200                                          | APXH160ARA271MF80G |
| 20                       | 22          | F61       | 88.0                                     | 60                                    | 1,650                                         | 590                                            | APXH200ARA220MF61G |
|                          | 47          | H70       | 188                                      | 45                                    | 2,000                                         | 780                                            | APXH200ARA470MH70G |
|                          | 82          | J80       | 328                                      | 45                                    | 2,400                                         | 820                                            | APXH200ARA820MJ80G |

\*1 T<sub>x</sub> : Ambient temperature (°C)

New products are indicated in red text.

## ◆RATED RIPPLE CURRENT MULTIPLIERS

### ● Frequency Multipliers

| Frequency(Hz)             | 120  | 1k   | 10k  | 50k  | 100k to 500k |
|---------------------------|------|------|------|------|--------------|
| 2.5 to 6.3V <sub>dc</sub> | 0.05 | 0.30 | 0.55 | 0.70 | 1.00         |
| 10 to 20V <sub>dc</sub>   | 0.05 | 0.25 | 0.55 | 0.55 | 1.00         |



## NPCAP™-PSW Series

- Super low ESR, high ripple current capability
- Endurance: 5,000 hours at 105°C
- Rated voltage : 25V<sub>dc</sub>, Capacitance range : 180 to 820μF
- RoHS2 Compliant
- Halogen Free

PSW

↓  
Downsized

PSG



### ◆SPECIFICATIONS

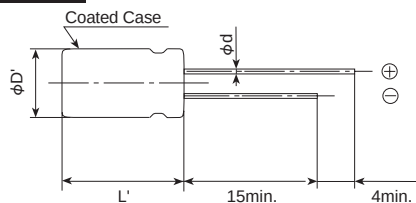
| Items                                                 | Characteristics                                                                                                                                                                                                   |                                       |
|-------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| Category                                              | -55 to +105°C                                                                                                                                                                                                     |                                       |
| Temperature Range                                     |                                                                                                                                                                                                                   |                                       |
| Rated Voltage                                         | 25V <sub>dc</sub>                                                                                                                                                                                                 |                                       |
| Capacitance Tolerance                                 | ±20% (M) (at 20°C, 120Hz)                                                                                                                                                                                         |                                       |
| Leakage Current                                       | I=0.2CV<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C after 2 minutes)                                                                                    |                                       |
| *Note                                                 |                                                                                                                                                                                                                   |                                       |
| Dissipation Factor (tan δ)                            | 0.12 max. (at 20°C, 120Hz)                                                                                                                                                                                        |                                       |
| Low Temperature Characteristics (Max.Impedance Ratio) | Z(-25°C)/Z(+20°C) ≤ 1.15<br>Z(-55°C)/Z(+20°C) ≤ 1.25 (at 100kHz)                                                                                                                                                  |                                       |
| Endurance                                             | The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 5,000 hours at 105°C.                                                             |                                       |
|                                                       | Appearance                                                                                                                                                                                                        | No significant damage                 |
|                                                       | Capacitance change                                                                                                                                                                                                | ≤ ±20% of the initial value           |
|                                                       | D.F. (tan δ)                                                                                                                                                                                                      | ≤ 150% of the initial specified value |
|                                                       | ESR                                                                                                                                                                                                               | ≤ 150% of the initial specified value |
|                                                       | Leakage current                                                                                                                                                                                                   | ≤ The initial specified value         |
| Bias Humidity Test                                    | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to DC voltage at 60°C, 90 to 95% RH for 1,000 hours.                                               |                                       |
|                                                       | Appearance                                                                                                                                                                                                        | No significant damage                 |
|                                                       | Capacitance change                                                                                                                                                                                                | ≤ ±20% of the initial value           |
|                                                       | D.F. (tan δ)                                                                                                                                                                                                      | ≤ The initial specified value         |
|                                                       | ESR                                                                                                                                                                                                               | ≤ 150% of the initial specified value |
|                                                       | Leakage current                                                                                                                                                                                                   | ≤ The initial specified value         |
| Surge Voltage Test                                    | The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltage specified at 105°C for 30 seconds through a protective resistor(R=1kΩ) and discharge for 5 minutes 30 seconds. |                                       |
|                                                       | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                  | 25                                    |
|                                                       | Surge voltage (V <sub>dc</sub> )                                                                                                                                                                                  | 29                                    |
|                                                       | Appearance                                                                                                                                                                                                        | No significant damage                 |
|                                                       | Capacitance change                                                                                                                                                                                                | ≤ ±20% of the initial value           |
|                                                       | D.F. (tan δ)                                                                                                                                                                                                      | ≤ The initial specified value         |
|                                                       | ESR                                                                                                                                                                                                               | ≤ 150% of the initial specified value |
|                                                       | Leakage current                                                                                                                                                                                                   | ≤ The initial specified value         |

\*Note : If any doubt arises, measure the leakage current after the following voltage treatment.  
Voltage treatment : DC rated voltage is applied to the capacitors for 120 minutes at 105°C.

### ◆DIMENSIONS [mm]

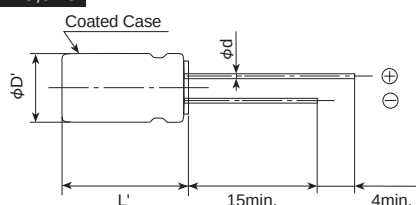
●Terminal Code : E

F08,H08



| Size code | F08        | H08 | HB5       | JB5 |
|-----------|------------|-----|-----------|-----|
| φD        | 6.3        | 8.0 | 10.0      |     |
| φd        | 0.6        |     |           |     |
| F         | 2.5        | 3.5 | 5.0       |     |
| φD'       | φD+0.5max. |     |           |     |
| L'        | L+1.0max.  |     | L+1.5max. |     |

HB5,JB5



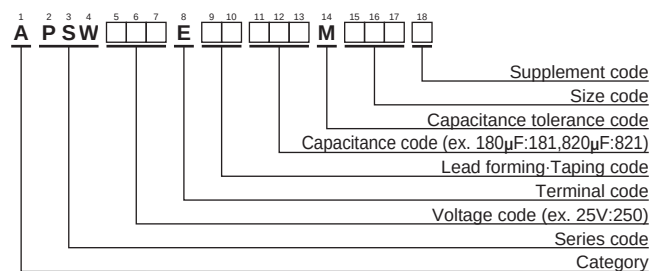
### ◆MARKING

EX) 25V180μF





## ◆PART NUMBERING SYSTEM



Please refer to "Product code guide (conductive polymer type)"

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L (mm) | ESR<br>(mΩ max./20°C, 100k to 300kHz) | Rated ripple current<br>(mA <sub>rms</sub> /105°C, 100kHz) | Part No.           |
|--------------------------|-------------|------------------------|---------------------------------------|------------------------------------------------------------|--------------------|
| 25                       | 180         | 6.3×8                  | 28                                    | 2,780                                                      | APSW250E□□181MF08S |
|                          | 330         | 8×8                    | 18                                    | 3,770                                                      | APSW250E□□331MH08S |
|                          | 470         | 8×11.5                 | 16                                    | 4,650                                                      | APSW250E□□471MHB5S |
|                          | 820         | 10×11.5                | 14                                    | 5,000                                                      | APSW250E□□821MJB5S |

□□ : Enter the appropriate lead forming or taping code.

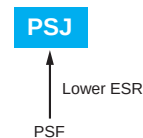
## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ● Frequency Multipliers

| Frequency(Hz)    | 120  | 1k   | 10k  | 50k  | 100k to 500k |
|------------------|------|------|------|------|--------------|
| Radial lead type | 0.10 | 0.35 | 0.60 | 0.80 | 1.00         |

# NPCAP™-PSJ Series

- Super low ESR, high ripple current capability
- ESR 4mΩ max. lineup
- Endurance : 2,000 to 5,000 hours at 105°C
- Solvent resistant type (see PRECAUTIONS AND GUIDELINES)
- RoHS2 Compliant
- Halogen Free



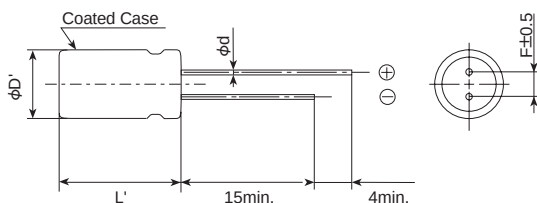
## SPECIFICATIONS

| Items                                                 | Characteristics                                                                                                                                                                                                   |
|-------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Category                                              | -55 to +105°C                                                                                                                                                                                                     |
| Temperature Range                                     |                                                                                                                                                                                                                   |
| Rated Voltage Range                                   | 2.5V <sub>dc</sub>                                                                                                                                                                                                |
| Capacitance Tolerance                                 | ±20% (M) (at 20°C, 120Hz)                                                                                                                                                                                         |
| Leakage Current                                       | 500μA max. (at 20°C after 2 minutes)                                                                                                                                                                              |
| *Note                                                 |                                                                                                                                                                                                                   |
| Dissipation Factor (tan δ)                            | 0.10 max. (at 20°C, 120Hz)                                                                                                                                                                                        |
| Low Temperature Characteristics (Max.Impedance Ratio) | Z(-25°C)/Z(+20°C) ≤ 1.15<br>Z(-55°C)/Z(+20°C) ≤ 1.25 (at 100kHz)                                                                                                                                                  |
| Endurance                                             | The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 5,000 hours (φ 5.4×8L : 2,000 hours) at 105°C.                                    |
|                                                       | Appearance No significant damage                                                                                                                                                                                  |
|                                                       | Capacitance change ≤ ±20% of the initial value                                                                                                                                                                    |
|                                                       | D.F. (tan δ) ≤ 150% of the initial specified value                                                                                                                                                                |
|                                                       | ESR ≤ 150% of the initial specified value                                                                                                                                                                         |
|                                                       | Leakage current ≤ The initial specified value                                                                                                                                                                     |
| Bias Humidity Test                                    | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to DC voltage at 60°C, 90 to 95% RH for 1,000 hours.                                               |
|                                                       | Appearance No significant damage                                                                                                                                                                                  |
|                                                       | Capacitance change ≤ ±20% of the initial value                                                                                                                                                                    |
|                                                       | D.F. (tan δ) ≤ 150% of the initial specified value                                                                                                                                                                |
|                                                       | ESR ≤ 150% of the initial specified value                                                                                                                                                                         |
|                                                       | Leakage current ≤ The initial specified value                                                                                                                                                                     |
| Surge Voltage Test                                    | The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltage specified at 105°C for 30 seconds through a protective resistor(R=1kΩ) and discharge for 5 minutes 30 seconds. |
|                                                       | Rated voltage (V <sub>dc</sub> ) 2.5                                                                                                                                                                              |
|                                                       | Surge voltage (V <sub>dc</sub> ) 2.9                                                                                                                                                                              |
|                                                       | Appearance No significant damage                                                                                                                                                                                  |
|                                                       | Capacitance change ≤ ±20% of the initial value                                                                                                                                                                    |
|                                                       | D.F. (tan δ) ≤ 150% of the initial specified value                                                                                                                                                                |
|                                                       | ESR ≤ 150% of the initial specified value                                                                                                                                                                         |
|                                                       | Leakage current ≤ The initial specified value                                                                                                                                                                     |

\*Note : If any doubt arises, measure the leakage current after the following voltage treatment.  
Voltage treatment : DC rated voltage is applied to the capacitors for 120 minutes at 105°C.

## DIMENSIONS [mm]

Terminal Code : E



| Size code | E08        | F08 |
|-----------|------------|-----|
| φD        | 5.4        | 6.3 |
| φd        | 0.6        | 0.6 |
| F         | 2.0        | 2.5 |
| φD'       | φD+0.5max. |     |
| L'        | L+1.5max.  |     |

## MARKING

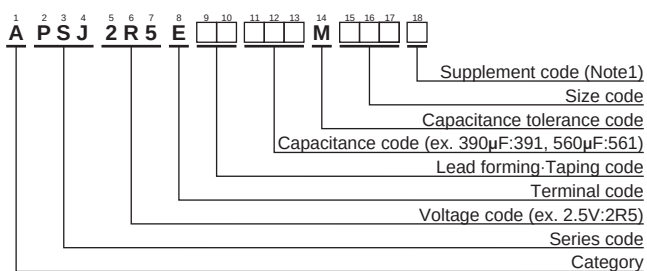
EX) 2.5V560μF





## NPCAP™-PSJ Series

## ◆PART NUMBERING SYSTEM



(Note1) : PSJ series, 2.5V560μF (ESR 4mΩ max.) has supplement code "J".  
Terminal and terminal plating are the same as all other in PSJ series.

Please refer to "Product code guide (conductive polymer type)"

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | ESR<br>(mΩ max./20°C, 300kHz) | Rated ripple current<br>(mA <sub>rms</sub> /105°C, 100kHz) | Part No.               |
|--------------------------|-------------|-----------------------|-------------------------------|------------------------------------------------------------|------------------------|
| 2.5                      | 390         | 5.4×8                 | 4                             | 5,600                                                      | APSJ2R5E[ ][ ]391ME08S |
|                          | 470         | 5.4×8                 | 4.5                           | 5,200                                                      | APSJ2R5E[ ][ ]471ME08S |
|                          | 560         | 6.3×8                 | 4                             | 6,500                                                      | APSJ2R5E[ ][ ]561MF08J |
|                          | 560         | 6.3×8                 | 4.5                           | 6,200                                                      | APSJ2R5E[ ][ ]561MF08S |

[ ][ ] : Enter the appropriate lead forming or taping code.

## ◆RATED RIPPLE CURRENT MULTIPLIERS

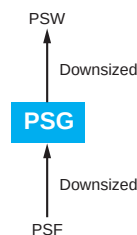
## ⊙ Frequency Multipliers

| Frequency(Hz)    | 120  | 1k   | 10k  | 50k  | 100k to 500k |
|------------------|------|------|------|------|--------------|
| Radial lead type | 0.10 | 0.35 | 0.60 | 0.80 | 1.00         |



## NPCAP™-PSG Series

- High capacitance model has been introduced to the product range.
- Super low ESR, high ripple current capability
- Endurance: 15,000 to 20,000 hours at 105°C
- Rated voltage : 16 to 35V<sub>dc</sub>
- RoHS2 Compliant
- Halogen Free



## ◆ SPECIFICATIONS

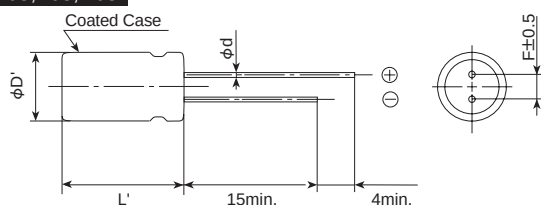
| Items                                                 | Characteristics                                                                                                                                                                                                  |  |                                      |    |    |    |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--------------------------------------|----|----|----|
| Category                                              |                                                                                                                                                                                                                  |  |                                      |    |    |    |
| Temperature Range                                     | -55 to +105℃                                                                                                                                                                                                     |  |                                      |    |    |    |
| Rated Voltage                                         | 16 to 35V <sub>dc</sub>                                                                                                                                                                                          |  |                                      |    |    |    |
| Capacitance Tolerance                                 | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                        |  |                                      |    |    |    |
| Leakage Current<br>*Note                              | I=0.2CV or 500μA, whichever is greater<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 2 minutes)                                                     |  |                                      |    |    |    |
| Dissipation Factor (tan δ)                            | 0.12 max. (at 20℃, 120Hz)                                                                                                                                                                                        |  |                                      |    |    |    |
| Low Temperature Characteristics (Max.Impedance Ratio) | Z(-25℃)/Z(+20℃)≤1.15<br>Z(-55℃)/Z(+20℃)≤1.25 (at 100kHz)                                                                                                                                                         |  |                                      |    |    |    |
| Endurance                                             | The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 20,000 hours (20 to 35V : 15,000 hours) at 105℃.                                  |  |                                      |    |    |    |
|                                                       | Appearance                                                                                                                                                                                                       |  | No significant damage                |    |    |    |
|                                                       | Capacitance change                                                                                                                                                                                               |  | ≤ ±20% of the initial value          |    |    |    |
|                                                       | D.F. (tan δ)                                                                                                                                                                                                     |  | ≤150% of the initial specified value |    |    |    |
|                                                       | ESR                                                                                                                                                                                                              |  | ≤150% of the initial specified value |    |    |    |
|                                                       | Leakage current                                                                                                                                                                                                  |  | ≤The initial specified value         |    |    |    |
| Bias Humidity Test                                    | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjecting them to DC voltage at 60℃, 90 to 95% RH for 1,000 hours.                                                |  |                                      |    |    |    |
|                                                       | Appearance                                                                                                                                                                                                       |  | No significant damage                |    |    |    |
|                                                       | Capacitance change                                                                                                                                                                                               |  | ≤ ±20% of the initial value          |    |    |    |
|                                                       | D.F. (tan δ)                                                                                                                                                                                                     |  | ≤The initial specified value         |    |    |    |
|                                                       | ESR                                                                                                                                                                                                              |  | ≤150% of the initial specified value |    |    |    |
|                                                       | Leakage current                                                                                                                                                                                                  |  | ≤The initial specified value         |    |    |    |
| Surge Voltage Test                                    | The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltage specified at 105℃ for 30 seconds through a protective resistor(R=1kΩ) and discharge for 5 minutes 30 seconds. |  |                                      |    |    |    |
|                                                       | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                 |  | 16                                   | 20 | 25 | 35 |
|                                                       | Surge voltage (V <sub>dc</sub> )                                                                                                                                                                                 |  | 18                                   | 23 | 29 | 40 |
|                                                       |                                                                                                                                                                                                                  |  |                                      |    |    |    |
|                                                       | Appearance                                                                                                                                                                                                       |  | No significant damage                |    |    |    |
|                                                       | Capacitance change                                                                                                                                                                                               |  | ≤ ±20% of the initial value          |    |    |    |
|                                                       | D.F. (tan δ)                                                                                                                                                                                                     |  | ≤The initial specified value         |    |    |    |
|                                                       | ESR                                                                                                                                                                                                              |  | ≤150% of the initial specified value |    |    |    |
|                                                       | Leakage current                                                                                                                                                                                                  |  | ≤The initial specified value         |    |    |    |
|                                                       |                                                                                                                                                                                                                  |  |                                      |    |    |    |

\*Note : If any doubt arises, measure the leakage current after the following voltage treatment.  
Voltage treatment : DC rated voltage is applied to the capacitors for 120 minutes at 105°C.

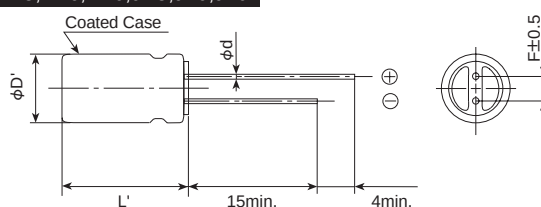
## ◆ DIMENSIONS [mm]

● Terminal Code : E

F05, F08, H08



HB5, H16, H20, JB5, J16, J20



| Size code | F05               | F08 | H08 | HB5 | H16        | H20 | JB5 | J16  | J20 |
|-----------|-------------------|-----|-----|-----|------------|-----|-----|------|-----|
| φD        | 6.3               |     |     |     | 8.0        |     |     | 10.0 |     |
| φd        | 0.45              |     |     |     | 0.6        |     |     |      |     |
| F         | 2.5               |     |     |     | 3.5        |     |     | 5.0  |     |
| φD'       |                   |     |     |     | φD+0.5max. |     |     |      |     |
| L'        | L+1.0max. (Note1) |     |     |     | L+1.5max.  |     |     |      |     |

Note1: L+1.2 max. for 16V270 μF (Rated ripple current 5,080mArms), for 16V330 μF (Rated ripple current 5,080mArms).

## ◆ MARKING

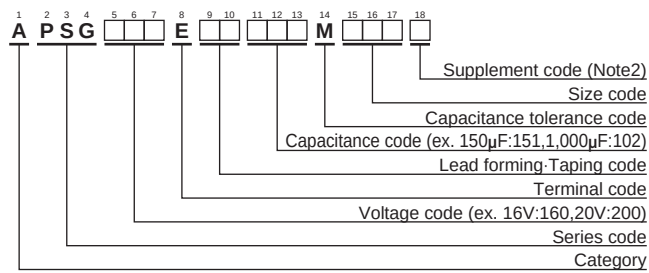
EX) 16V150μF





## NPCAP™-PSG Series

## ◆PART NUMBERING SYSTEM



Please refer to "Product code guide (conductive polymer type)"

(Note2) : PSG series, 16V270μF (Rated ripple current 5,080mArms), 16V330μF (Rated ripple current 5,080mArms), 16V470μF (Rated ripple current 5,400mArms), 16V560μF (Rated ripple current 5,400mArms), 16V560μF (Rated ripple current 6,100mArms), and 16V680μF (Rated ripple current 6,100mArms) have supplement code "J". Terminal and terminal plating are the same as all others in the PSG series.

## ◆STANDARD RATINGS

| WV (V <sub>dc</sub> ) | Cap (μF) | Case size φD×L (mm) | ESR (mΩ max./20°C, 100k to 300kHz) | Rated ripple current (mArms/105°C, 100kHz) | Part No.           |
|-----------------------|----------|---------------------|------------------------------------|--------------------------------------------|--------------------|
| 16                    | 150      | 6.3×5               | 20                                 | 3,200                                      | APSG160E□□151MF05S |
|                       | 270      | 6.3×8               | 10                                 | 5,080                                      | APSG160E□□271MF08J |
|                       | 270      | 6.3×8               | 15                                 | 3,800                                      | APSG160E□□271MF08S |
|                       | 330      | 6.3×8               | 10                                 | 5,080                                      | APSG160E□□331MF08J |
|                       | 330      | 6.3×8               | 15                                 | 3,800                                      | APSG160E□□331MF08S |
|                       | 470      | 8×8                 | 8                                  | 5,400                                      | APSG160E□□471MH08J |
|                       | 470      | 8×8                 | 16                                 | 4,000                                      | APSG160E□□471MH08S |
|                       | 560      | 8×8                 | 8                                  | 5,400                                      | APSG160E□□561MH08J |
|                       | 560      | 8×8                 | 16                                 | 4,000                                      | APSG160E□□561MH08S |
|                       | 560      | 8×11.5              | 8                                  | 6,100                                      | APSG160E□□561MHB5J |
|                       | 560      | 8×11.5              | 14                                 | 4,970                                      | APSG160E□□561MHB5S |
|                       | 680      | 8×11.5              | 8                                  | 6,100                                      | APSG160E□□681MHB5J |
|                       | 680      | 8×11.5              | 14                                 | 4,970                                      | APSG160E□□681MHB5S |
|                       | 820      | 8×16                | 8                                  | 7,000                                      | APSG160E□□821MH16S |
|                       | 820      | 10×11.5             | 12                                 | 5,400                                      | APSG160E□□821MJB5S |
|                       | 1,000    | 8×16                | 8                                  | 7,000                                      | APSG160E□□102MH16S |
|                       | 1,000    | 8×20                | 8                                  | 7,500                                      | APSG160E□□102MH20S |
|                       | 1,000    | 10×11.5             | 12                                 | 5,400                                      | APSG160E□□102MJB5S |
|                       | 1,200    | 8×20                | 8                                  | 7,500                                      | APSG160E□□122MH20S |
|                       | 1,200    | 10×11.5             | 12                                 | 5,400                                      | APSG160E□□122MJB5S |
| 20                    | 150      | 8×20                | 8                                  | 7,500                                      | APSG160E□□152MH20S |
|                       | 1,500    | 10×16               | 8                                  | 7,700                                      | APSG160E□□152MJ16S |
|                       | 1,800    | 10×16               | 8                                  | 7,700                                      | APSG160E□□182MJ16S |
|                       | 1,800    | 10×20               | 8                                  | 8,100                                      | APSG160E□□182MJ20S |
|                       | 2,200    | 10×20               | 8                                  | 8,100                                      | APSG160E□□222MJ20S |
|                       | 2,700    | 10×20               | 8                                  | 8,100                                      | APSG160E□□272MJ20S |
|                       | 120      | 6.3×5               | 20                                 | 3,200                                      | APSG200E□□121MF05S |
|                       | 180      | 6.3×8               | 18                                 | 3,460                                      | APSG200E□□181MF08S |
| 25                    | 330      | 8×8                 | 17                                 | 3,880                                      | APSG200E□□331MH08S |
|                       | 390      | 8×11.5              | 14                                 | 4,970                                      | APSG200E□□391MHB5S |
|                       | 680      | 8×16                | 10                                 | 6,260                                      | APSG200E□□681MH16S |
|                       | 680      | 10×11.5             | 12                                 | 5,400                                      | APSG200E□□681MJB5S |
|                       | 56       | 6.3×5               | 30                                 | 2,600                                      | APSG250E□□560MF05S |
|                       | 82       | 6.3×8               | 28                                 | 2,780                                      | APSG250E□□820MF08S |
|                       | 100      | 6.3×8               | 28                                 | 2,780                                      | APSG250E□□101MF08S |
|                       | 120      | 6.3×8               | 28                                 | 2,780                                      | APSG250E□□121MF08S |
|                       | 150      | 6.3×8               | 28                                 | 2,780                                      | APSG250E□□151MF08S |
|                       | 180      | 8×8                 | 18                                 | 3,770                                      | APSG250E□□181MH08S |
|                       | 180      | 8×11.5              | 16                                 | 4,650                                      | APSG250E□□181MHB5S |
|                       | 220      | 8×8                 | 18                                 | 3,770                                      | APSG250E□□221MH08S |
|                       | 220      | 8×11.5              | 16                                 | 4,650                                      | APSG250E□□221MHB5S |
|                       | 270      | 8×8                 | 18                                 | 3,770                                      | APSG250E□□271MH08S |
|                       | 270      | 8×11.5              | 16                                 | 4,650                                      | APSG250E□□271MHB5S |
|                       | 330      | 8×11.5              | 16                                 | 4,650                                      | APSG250E□□331MHB5S |
|                       | 330      | 10×11.5             | 14                                 | 5,000                                      | APSG250E□□331MJB5S |
|                       | 390      | 8×11.5              | 16                                 | 4,650                                      | APSG250E□□391MHB5S |
|                       | 390      | 10×11.5             | 14                                 | 5,000                                      | APSG250E□□391MJB5S |
| 35                    | 470      | 10×11.5             | 14                                 | 5,000                                      | APSG250E□□471MJB5S |
|                       | 560      | 8×16                | 14                                 | 5,400                                      | APSG250E□□561MH16S |
|                       | 560      | 10×11.5             | 14                                 | 5,000                                      | APSG250E□□561MJB5S |
|                       | 680      | 10×11.5             | 14                                 | 5,000                                      | APSG250E□□681MJB5S |
|                       | 68       | 8×11.5              | 18                                 | 4,380                                      | APSG350E□□680MHB5S |
|                       | 120      | 10×11.5             | 16                                 | 4,670                                      | APSG350E□□121MJB5S |

□□ : Enter the appropriate lead forming or taping code.

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

| Frequency(Hz)    | 120  | 1k   | 10k  | 50k  | 100k to 500k |
|------------------|------|------|------|------|--------------|
| Radial lead type | 0.10 | 0.35 | 0.60 | 0.80 | 1.00         |

## NPCAP™-PSK Series

- Super low ESR, high ripple current capability
- Downsized from PSE series ( $\phi 6.3 \times 8L$  to  $\phi 5 \times 8L$ )
- Long life (20,000 hours at 105°C)
- Solvent resistant type (see PRECAUTIONS AND GUIDELINES)
- RoHS2 Compliant
- Halogen Free

PSK

↑ Downsized  
Longer life  
PSE



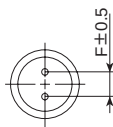
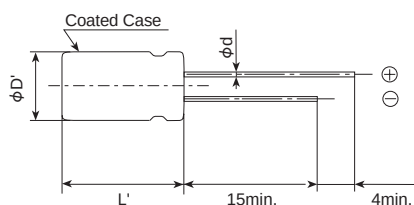
## ◆ SPECIFICATIONS

| Items                                                 | Characteristics                                                                                                                                                                                                   |  |                                      |     |     |
|-------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--------------------------------------|-----|-----|
| Category                                              | -55 to +105℃                                                                                                                                                                                                      |  |                                      |     |     |
| Temperature Range                                     |                                                                                                                                                                                                                   |  |                                      |     |     |
| Rated Voltage Range                                   | 2.5 to 6.3 V <sub>dc</sub>                                                                                                                                                                                        |  |                                      |     |     |
| Capacitance Tolerance                                 | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                         |  |                                      |     |     |
| Leakage Current*Note                                  | 500μA max. (at 20℃ after 2 minutes)                                                                                                                                                                               |  |                                      |     |     |
| Dissipation Factor (tan δ )                           | 0.10 max. (at 20℃, 120Hz)                                                                                                                                                                                         |  |                                      |     |     |
| Low Temperature Characteristics (Max.Impedance Ratio) | Z(-25℃)/Z(+20℃)≤1.15<br>Z(-55℃)/Z(+20℃)≤1.25 (at 100kHz)                                                                                                                                                          |  |                                      |     |     |
| Endurance                                             | The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 20,000 hours at 105℃.                                                              |  |                                      |     |     |
|                                                       | Appearance                                                                                                                                                                                                        |  | No significant damage                |     |     |
|                                                       | Capacitance change                                                                                                                                                                                                |  | ≤ ±20% of the initial value          |     |     |
|                                                       | D.F. (tan δ )                                                                                                                                                                                                     |  | ≤150% of the initial specified value |     |     |
|                                                       | ESR                                                                                                                                                                                                               |  | ≤150% of the initial specified value |     |     |
|                                                       | Leakage current                                                                                                                                                                                                   |  | ≤The initial specified value         |     |     |
| Bias Humidity Test                                    | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjecting them to DC voltage at 60℃, 90 to 95% RH for 1,000 hours.                                                 |  |                                      |     |     |
|                                                       | Appearance                                                                                                                                                                                                        |  | No significant damage                |     |     |
|                                                       | Capacitance change                                                                                                                                                                                                |  | ≤ ±20% of the initial value          |     |     |
|                                                       | D.F. (tan δ )                                                                                                                                                                                                     |  | ≤The initial specified value         |     |     |
|                                                       | ESR                                                                                                                                                                                                               |  | ≤The initial specified value         |     |     |
|                                                       | Leakage current                                                                                                                                                                                                   |  | ≤The initial specified value         |     |     |
| Surge Voltage Test                                    | The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltage specified at 105℃ for 30 seconds through a protective resistor(R=1kΩ ) and discharge for 5 minutes 30 seconds. |  |                                      |     |     |
|                                                       | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                  |  | 2.5                                  | 4.0 | 6.3 |
|                                                       | Surge voltage (V <sub>dc</sub> )                                                                                                                                                                                  |  | 2.9                                  | 4.6 | 7.2 |
|                                                       |                                                                                                                                                                                                                   |  |                                      |     |     |
|                                                       | Appearance                                                                                                                                                                                                        |  | No significant damage                |     |     |
|                                                       | Capacitance change                                                                                                                                                                                                |  | ≤ ±20% of the initial value          |     |     |
|                                                       | D.F. (tan δ )                                                                                                                                                                                                     |  | ≤The initial specified value         |     |     |
|                                                       | ESR                                                                                                                                                                                                               |  | ≤The initial specified value         |     |     |
|                                                       | Leakage current                                                                                                                                                                                                   |  | ≤The initial specified value         |     |     |

\*Note : If any doubt arises, measure the leakage current after the following voltage treatment.  
Voltage treatment : DC rated voltage is applied to the capacitors for 120 minutes at 105°C.

## ◆ DIMENSIONS [mm]

● Terminal Code : E



| Size code | E08        |
|-----------|------------|
| φD        | 5.0        |
| φd        | 0.5        |
| F         | 2.0        |
| φD'       | φD+0.5max. |
| L'        | L+1.0max.  |

## ◆ MARKING

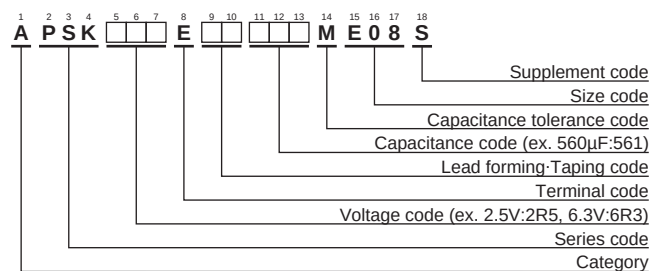
EX) 2.5V560μF





## NPCAP™-PSK Series

## ◆PART NUMBERING SYSTEM



Please refer to "Product code guide (conductive polymer type)"

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L (mm) | ESR<br>(mΩ max./20°C, 100k to 300kHz) | Rated ripple current<br>(mA <sub>rms</sub> /105°C, 100kHz) | Part No.                                                    |
|--------------------------|-------------|------------------------|---------------------------------------|------------------------------------------------------------|-------------------------------------------------------------|
| 2.5                      | 220         | 5×8                    | 7                                     | 4,350                                                      | APSK2R5E <input type="text"/> <input type="text"/> 221ME08S |
|                          | 330         | 5×8                    | 7                                     | 4,350                                                      | APSK2R5E <input type="text"/> <input type="text"/> 331ME08S |
|                          | 470         | 5×8                    | 7                                     | 4,350                                                      | APSK2R5E <input type="text"/> <input type="text"/> 471ME08S |
|                          | 560         | 5×8                    | 7                                     | 4,350                                                      | APSK2R5E <input type="text"/> <input type="text"/> 561ME08S |
| 4                        | 330         | 5×8                    | 8                                     | 4,050                                                      | APSK4R0E <input type="text"/> <input type="text"/> 331ME08S |
| 6.3                      | 270         | 5×8                    | 10                                    | 3,700                                                      | APSK6R3E <input type="text"/> <input type="text"/> 271ME08S |
|                          | 330         | 5×8                    | 8                                     | 4,050                                                      | APSK6R3E <input type="text"/> <input type="text"/> 331ME08S |

: Enter the appropriate lead forming or taping code.

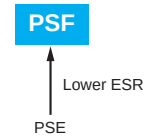
## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ● Frequency Multipliers

| Frequency(Hz)    | 120  | 1k   | 10k  | 50k  | 100k to 500k |
|------------------|------|------|------|------|--------------|
| Radial lead type | 0.10 | 0.35 | 0.60 | 0.80 | 1.00         |

## NPCAP™-PSF Series

- Super low ESR, high ripple current capability
- ESR 5mΩmax. (2 to 4V<sub>dc</sub>)
- Longer life (20,000 hours at 105°C)
- Rated voltage range : 2 to 16V<sub>dc</sub>
- Solvent resistant type (see PRECAUTIONS AND GUIDELINES)
- RoHS2 Compliant
- Halogen Free



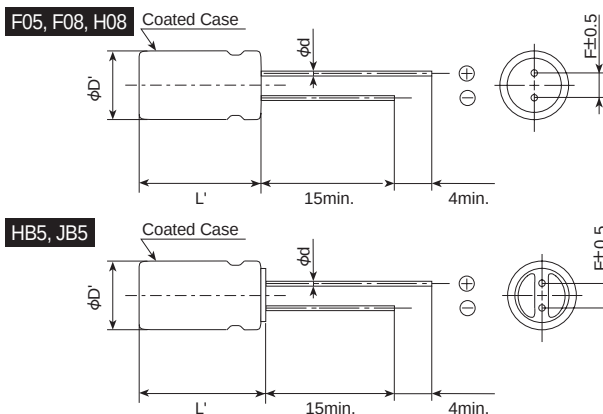
## ◆ SPECIFICATIONS

| Items                                                 | Characteristics                                                                                                                                                                                                   |  |                                                          |     |     |     |    |
|-------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------------------------------------------------|-----|-----|-----|----|
| Category                                              | -55 to +105°C                                                                                                                                                                                                     |  |                                                          |     |     |     |    |
| Temperature Range                                     |                                                                                                                                                                                                                   |  |                                                          |     |     |     |    |
| Rated Voltage Range                                   | 2 to 16V <sub>dc</sub>                                                                                                                                                                                            |  |                                                          |     |     |     |    |
| Capacitance Tolerance                                 | ± 20%(M) (at 20°C, 120Hz)                                                                                                                                                                                         |  |                                                          |     |     |     |    |
| Leakage Current                                       | Shall not exceed values shown in STANDARD RATINGS. (at 20°C after 2 minutes)                                                                                                                                      |  |                                                          |     |     |     |    |
| *Note                                                 |                                                                                                                                                                                                                   |  |                                                          |     |     |     |    |
| Dissipation Factor (tan δ )                           | 0.10 max. (at 20°C, 120Hz)                                                                                                                                                                                        |  |                                                          |     |     |     |    |
| Low Temperature Characteristics (Max.Impedance Ratio) | Z(-25°C)/Z(+20°C)≤1.15<br>Z(-55°C)/Z(+20°C)≤1.25 (at 100kHz)                                                                                                                                                      |  |                                                          |     |     |     |    |
| Endurance                                             | The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 20,000 hours at 105°C.                                                            |  |                                                          |     |     |     |    |
|                                                       | Appearance                                                                                                                                                                                                        |  | No significant damage                                    |     |     |     |    |
|                                                       | Capacitance change                                                                                                                                                                                                |  | ≤ ± 20% of the initial value                             |     |     |     |    |
|                                                       | D.F. (tan δ )                                                                                                                                                                                                     |  | ≤150% of the initial specified value                     |     |     |     |    |
|                                                       | ESR                                                                                                                                                                                                               |  | ≤150% of the initial specified value                     |     |     |     |    |
|                                                       | Leakage current                                                                                                                                                                                                   |  | ≤The initial specified value                             |     |     |     |    |
| Bias Humidity Test                                    | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to DC voltage at 60°C, 90 to 95% RH for 1,000 hours.                                               |  |                                                          |     |     |     |    |
|                                                       | Appearance                                                                                                                                                                                                        |  | No significant damage                                    |     |     |     |    |
|                                                       | Capacitance change                                                                                                                                                                                                |  | ≤ ± 20% of the initial value                             |     |     |     |    |
|                                                       | D.F. (tan δ )                                                                                                                                                                                                     |  | ≤The initial specified value                             |     |     |     |    |
|                                                       | ESR                                                                                                                                                                                                               |  | 2 to 6.3V <sub>dc</sub> : ≤The initial specified value   |     |     |     |    |
|                                                       |                                                                                                                                                                                                                   |  | 16V <sub>dc</sub> : ≤150% of the initial specified value |     |     |     |    |
|                                                       | Leakage current                                                                                                                                                                                                   |  | ≤The initial specified value                             |     |     |     |    |
| Surge Voltage Test                                    | The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltage specified at 105°C for 30 seconds through a protective resistor(R=1kΩ) and discharge for 5 minutes 30 seconds. |  |                                                          |     |     |     |    |
|                                                       | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                  |  | 2.0                                                      | 2.5 | 4.0 | 6.3 | 16 |
|                                                       | Surge voltage (V <sub>dc</sub> )                                                                                                                                                                                  |  | 2.3                                                      | 2.9 | 4.6 | 7.2 | 18 |
|                                                       |                                                                                                                                                                                                                   |  |                                                          |     |     |     |    |
|                                                       | Appearance                                                                                                                                                                                                        |  | No significant damage                                    |     |     |     |    |
|                                                       | Capacitance change                                                                                                                                                                                                |  | ≤ ± 20% of the initial value                             |     |     |     |    |
|                                                       | D.F. (tan δ )                                                                                                                                                                                                     |  | ≤The initial specified value                             |     |     |     |    |
|                                                       | ESR                                                                                                                                                                                                               |  | 2 to 6.3V <sub>dc</sub> : ≤The initial specified value   |     |     |     |    |
|                                                       |                                                                                                                                                                                                                   |  | 16V <sub>dc</sub> : ≤150% of the initial specified value |     |     |     |    |
|                                                       | Leakage current                                                                                                                                                                                                   |  | ≤The initial specified value                             |     |     |     |    |
|                                                       |                                                                                                                                                                                                                   |  |                                                          |     |     |     |    |

\*Note : If any doubt arises, measure the leakage current after the following voltage treatment.  
Voltage treatment : DC rated voltage is applied to the capacitors for 120 minutes at 105°C.

## ◆ DIMENSIONS [mm]

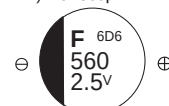
## ● Terminal Code : E



| Size code                                               | F05        | F08 | H08 | HB5 | JB5  |
|---------------------------------------------------------|------------|-----|-----|-----|------|
| φD                                                      | 6.3        |     | 8.0 |     | 10.0 |
| φd                                                      | 0.45       |     | 0.6 |     |      |
| F                                                       | 2.5        |     | 3.5 |     | 5.0  |
| φD'                                                     | φD+0.5max. |     |     |     |      |
| Note1 : L+1.2max. for 6.3V820μF. 1.5max. for 6.3V560μF. |            |     |     |     |      |

## ◆ MARKING

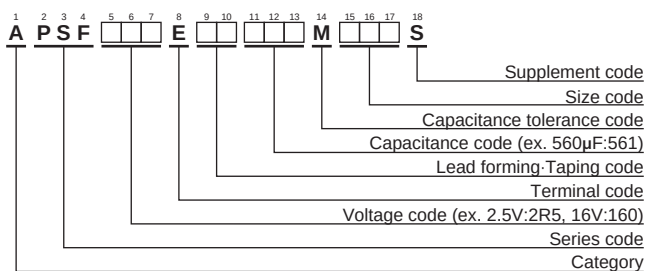
EX) 2.5V560μF





## NPCAP™-PSF Series

## ◆PART NUMBERING SYSTEM



Please refer to "Product code guide (conductive polymer type)"

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φ D×L(mm) | Leakage current<br>(μA max./after 2min.) | ESR<br>(mΩ max./20°C,<br>100k to 300kHz) | Rated ripple current<br>(mA <sub>rms</sub> /105°C, 100kHz) | Part No.           |
|--------------------------|-------------|------------------------|------------------------------------------|------------------------------------------|------------------------------------------------------------|--------------------|
| 2                        | 1,000       | 6.3×8                  | 500                                      | 5                                        | 5,900                                                      | APSF2R0E□□102MF08S |
| 2.5                      | 330         | 6.3×8                  | 500                                      | 5                                        | 5,900                                                      | APSF2R5E□□331MF08S |
|                          | 470         | 6.3×8                  | 500                                      | 5                                        | 5,900                                                      | APSF2R5E□□471MF08S |
|                          | 560         | 6.3×8                  | 500                                      | 5                                        | 5,900                                                      | APSF2R5E□□561MF08S |
|                          | 820         | 6.3×8                  | 500                                      | 5                                        | 5,900                                                      | APSF2R5E□□821MF08S |
|                          | 1,200       | 6.3×8                  | 1,200                                    | 5                                        | 5,900                                                      | APSF2R5E□□122MF08S |
|                          | 1,600       | 8×8                    | 800                                      | 5                                        | 6,100                                                      | APSF2R5E□□162MH08S |
| 4                        | 470         | 6.3×8                  | 500                                      | 5                                        | 5,900                                                      | APSF4R0E□□471MF08S |
|                          | 560         | 6.3×8                  | 500                                      | 5                                        | 5,900                                                      | APSF4R0E□□561MF08S |
| 6.3                      | 820         | 6.3×8                  | 1,030                                    | 8                                        | 4,700                                                      | APSF6R3E□□821MF08S |
| 16                       | 100         | 6.3×5                  | 500                                      | 24                                       | 2,490                                                      | APSF160E□□101MF05S |
|                          | 270         | 8×8                    | 864                                      | 10                                       | 5,000                                                      | APSF160E□□271MH08S |
|                          | 270         | 8×11.5                 | 864                                      | 11                                       | 5,080                                                      | APSF160E□□271MHB5S |
|                          | 330         | 8×8                    | 1,050                                    | 13                                       | 4,700                                                      | APSF160E□□331MH08S |
|                          | 470         | 8×11.5                 | 1,500                                    | 11                                       | 5,400                                                      | APSF160E□□471MHB5S |
|                          | 470         | 10×11.5                | 1,500                                    | 10                                       | 6,100                                                      | APSF160E□□471MJB5S |

□□ : Enter the appropriate lead forming or taping code.

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

| Frequency(Hz)    | 120  | 1k   | 10k  | 50k  | 100k to 500k |
|------------------|------|------|------|------|--------------|
| Radial lead type | 0.10 | 0.35 | 0.60 | 0.80 | 1.00         |



## NPCAP™-PSE Series

- Super low ESR, high ripple current capability
- Endurance : 20,000 hours at 105°C
- Rated voltage range : 2.5 to 6.3V<sub>dc</sub>
- Solvent resistant type (see PRECAUTIONS AND GUIDELINES)
- RoHS2 Compliant
- Halogen Free

PSE

Longer life  
Downsized  
PSC



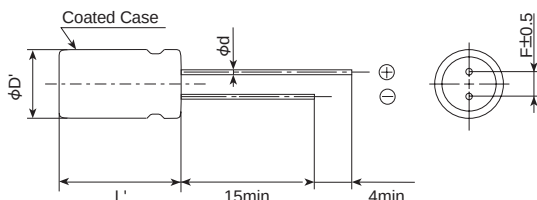
### SPECIFICATIONS

| Items                                                 | Characteristics                                                                                                                                                                                                  |                                      |     |     |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-----|-----|
| Category                                              | -55 to +105℃                                                                                                                                                                                                     |                                      |     |     |
| Temperature Range                                     |                                                                                                                                                                                                                  |                                      |     |     |
| Rated Voltage Range                                   | 2.5 to 6.3V <sub>dc</sub>                                                                                                                                                                                        |                                      |     |     |
| Capacitance Tolerance                                 | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                        |                                      |     |     |
| Leakage Current                                       | I=0.2CV or 500μA, whichever is greater                                                                                                                                                                           |                                      |     |     |
| *Note                                                 | Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 2 minutes)                                                                                               |                                      |     |     |
| Dissipation Factor (tan δ)                            | 0.10 max. (at 20℃, 120Hz)                                                                                                                                                                                        |                                      |     |     |
| Low Temperature Characteristics (Max.Impedance Ratio) | Z(-25℃)/Z(+20℃)≤1.15<br>Z(-55℃)/Z(+20℃)≤1.25 (at 100kHz)                                                                                                                                                         |                                      |     |     |
| Endurance                                             | The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 20,000 hours at 105℃.                                                             |                                      |     |     |
|                                                       | Appearance                                                                                                                                                                                                       | No significant damage                |     |     |
|                                                       | Capacitance change                                                                                                                                                                                               | ≤ ± 20% of the initial value         |     |     |
|                                                       | D.F. (tan δ )                                                                                                                                                                                                    | ≤150% of the initial specified value |     |     |
|                                                       | ESR                                                                                                                                                                                                              | ≤200% of the initial specified value |     |     |
|                                                       | Leakage current                                                                                                                                                                                                  | ≤The initial specified value         |     |     |
| Bias Humidity Test                                    | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjecting them to DC voltage at 60℃, 90 to 95% RH for 1,000 hours.                                                |                                      |     |     |
|                                                       | Appearance                                                                                                                                                                                                       | No significant damage                |     |     |
|                                                       | Capacitance change                                                                                                                                                                                               | ≤ ± 20% of the initial value         |     |     |
|                                                       | D.F. (tan δ )                                                                                                                                                                                                    | ≤The initial specified value         |     |     |
|                                                       | ESR                                                                                                                                                                                                              | ≤The initial specified value         |     |     |
|                                                       | Leakage current                                                                                                                                                                                                  | ≤The initial specified value         |     |     |
| Surge Voltage Test                                    | The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltage specified at 105℃ for 30 seconds through a protective resistor(R=1kΩ) and discharge for 5 minutes 30 seconds. |                                      |     |     |
|                                                       | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                 | 2.5                                  | 4.0 | 6.3 |
|                                                       | Surge voltage (V <sub>dc</sub> )                                                                                                                                                                                 | 2.9                                  | 4.6 | 7.2 |
|                                                       |                                                                                                                                                                                                                  |                                      |     |     |
|                                                       | Appearance                                                                                                                                                                                                       | No significant damage                |     |     |
|                                                       | Capacitance change                                                                                                                                                                                               | ≤ ± 20% of the initial value         |     |     |
|                                                       | D.F. (tan δ )                                                                                                                                                                                                    | ≤The initial specified value         |     |     |
|                                                       | ESR                                                                                                                                                                                                              | ≤The initial specified value         |     |     |
|                                                       | Leakage current                                                                                                                                                                                                  | ≤The initial specified value         |     |     |
|                                                       |                                                                                                                                                                                                                  |                                      |     |     |

\*Note : If any doubt arises, measure the leakage current after the following voltage treatment.  
Voltage treatment : DC rated voltage is applied to the capacitors for 120 minutes at 105°C.

### DIMENSIONS [mm]

- Terminal Code : E



| Size code | F08        |
|-----------|------------|
| φD        | 6.3        |
| φd        | 0.6        |
| F         | 2.5        |
| φD'       | φD+0.5max. |
| L'        | L+1.5max.  |

### MARKING

EX) 2.5V820μF

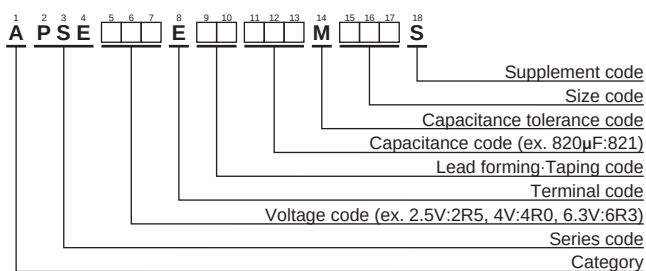






## NPCAP™-PSE Series

## ◆PART NUMBERING SYSTEM



Please refer to "Product code guide (conductive polymer type)"

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | ESR<br>(mΩ max./20°C, 100k to 300kHz) | Rated ripple current<br>(mA <sub>rms</sub> /105°C, 100kHz) | Part No.           |
|--------------------------|-------------|-----------------------|---------------------------------------|------------------------------------------------------------|--------------------|
| 2.5                      | 820         | 6.3×8                 | 7                                     | 5,000                                                      | APSE2R5E□□821MF08S |
| 4                        | 560         | 6.3×8                 | 7                                     | 5,000                                                      | APSE4R0E□□561MF08S |
| 6.3                      | 470         | 6.3×8                 | 8                                     | 4,700                                                      | APSE6R3E□□471MF08S |
|                          | 560         | 6.3×8                 | 8                                     | 4,700                                                      | APSE6R3E□□561MF08S |

□□ : Enter the appropriate lead forming or taping code.

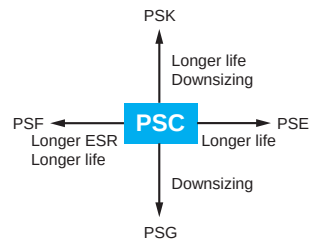
## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ⊙ Frequency Multipliers

| Frequency(Hz)    | 120  | 1k   | 10k  | 50k  | 100k to 500k |
|------------------|------|------|------|------|--------------|
| Radial lead type | 0.10 | 0.35 | 0.60 | 0.80 | 1.00         |

## NPCAP™-PSC Series

- Super low ESR, high ripple current capability
- Rated voltage range : 2.5 to 16V<sub>dc</sub>
- Nominal capacitance range : 270 to 2,700μF
- Endurance : 15,000 hours at 105°C
- Suitable for DC-DC converters, voltage regulators and decoupling applications for computer motherboards
- Added 2.5V 820μF (ESR 5mΩ max.)
- Solvent resistant type (see PRECAUTIONS AND GUIDELINES)
- RoHS2 Compliant
- Halogen Free



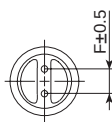
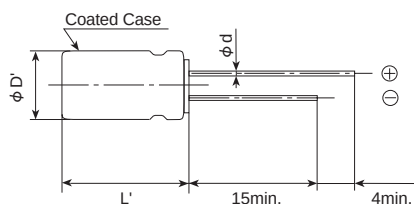
## ◆ SPECIFICATIONS

| Items                                                 | Characteristics                                                                                                                                                                                                  |  |                                      |     |     |    |    |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--------------------------------------|-----|-----|----|----|
| Category                                              |                                                                                                                                                                                                                  |  |                                      |     |     |    |    |
| Temperature Range                                     | -55 to +105℃                                                                                                                                                                                                     |  |                                      |     |     |    |    |
| Rated Voltage Range                                   | 2.5 to 16V <sub>dc</sub>                                                                                                                                                                                         |  |                                      |     |     |    |    |
| Capacitance Tolerance                                 | ±20% (M) (at 20℃, 120Hz)                                                                                                                                                                                         |  |                                      |     |     |    |    |
| Leakage Current                                       | I=0.2CV or 500μA, whichever is greater.                                                                                                                                                                          |  |                                      |     |     |    |    |
| <sup>*Note</sup>                                      | Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V <sub>dc</sub> ) (at 20℃ after 2 minutes)                                                                                |  |                                      |     |     |    |    |
| Dissipation Factor (tan δ)                            | 0.10 max. (at 20℃, 120Hz)                                                                                                                                                                                        |  |                                      |     |     |    |    |
| Low Temperature Characteristics (Max.Impedance Ratio) | Z(-25℃)/Z(+20℃)≤1.15<br>Z(-55℃)/Z(+20℃)≤1.25 (at 100kHz)                                                                                                                                                         |  |                                      |     |     |    |    |
| Endurance                                             | The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 15,000 hours at 105℃.                                                             |  |                                      |     |     |    |    |
|                                                       | Appearance                                                                                                                                                                                                       |  | No significant damage                |     |     |    |    |
|                                                       | Capacitance change                                                                                                                                                                                               |  | ≤ ±20% of the initial value          |     |     |    |    |
|                                                       | D.F. (tan δ )                                                                                                                                                                                                    |  | ≤150% of the initial specified value |     |     |    |    |
|                                                       | ESR                                                                                                                                                                                                              |  | ≤150% of the initial specified value |     |     |    |    |
|                                                       | Leakage current                                                                                                                                                                                                  |  | ≤The initial specified value         |     |     |    |    |
| Bias Humidity Test                                    | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjecting them to DC voltage at 60℃, 90 to 95% RH for 1,000 hours.                                                |  |                                      |     |     |    |    |
|                                                       | Appearance                                                                                                                                                                                                       |  | No significant damage                |     |     |    |    |
|                                                       | Capacitance change                                                                                                                                                                                               |  | ≤ ±20% of the initial value          |     |     |    |    |
|                                                       | D.F. (tan δ )                                                                                                                                                                                                    |  | ≤150% of the initial specified value |     |     |    |    |
|                                                       | ESR                                                                                                                                                                                                              |  | ≤150% of the initial specified value |     |     |    |    |
|                                                       | Leakage current                                                                                                                                                                                                  |  | ≤The initial specified value         |     |     |    |    |
| Surge Voltage Test                                    | The capacitors shall be subjected to 1,000 cycles each consisting of charge with the surge voltage specified at 105℃ for 30 seconds through a protective resistor(R=1kΩ) and discharge for 5 minutes 30 seconds. |  |                                      |     |     |    |    |
|                                                       | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                 |  | 2.5                                  | 4.0 | 6.3 | 10 | 16 |
|                                                       | Surge voltage (V <sub>dc</sub> )                                                                                                                                                                                 |  | 2.9                                  | 4.6 | 7.2 | 12 | 18 |
|                                                       |                                                                                                                                                                                                                  |  |                                      |     |     |    |    |
|                                                       | Appearance                                                                                                                                                                                                       |  | No significant damage                |     |     |    |    |
|                                                       | Capacitance change                                                                                                                                                                                               |  | ≤ ±20% of the initial value          |     |     |    |    |
|                                                       | D.F. (tan δ )                                                                                                                                                                                                    |  | ≤150% of the initial specified value |     |     |    |    |
|                                                       | ESR                                                                                                                                                                                                              |  | ≤150% of the initial specified value |     |     |    |    |
|                                                       | Leakage current                                                                                                                                                                                                  |  | ≤The initial specified value         |     |     |    |    |
|                                                       |                                                                                                                                                                                                                  |  |                                      |     |     |    |    |

\*Note : If any doubt arises, measure the leakage current after the following voltage treatment.  
Voltage treatment : DC rated voltage is applied to the capacitors for 120 minutes at 105°C.

## ◆ DIMENSIONS [mm]

## ● Terminal Code : E

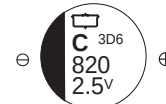


| Size code | H08        | HB5        | JB5        | JC5  |
|-----------|------------|------------|------------|------|
| φD        | 8.0        | 8.0        | 10.0       | 10.0 |
| φd        | 0.6        | 0.8(Note1) | 0.8(Note1) | 0.6  |
| F         | 3.5        | 3.5        | 5.0        | 5.0  |
| φD'       | φD+0.5max. |            |            |      |
| L'        | L+1.0max.  | L+1.5max.  |            |      |

Note1 : 0.6 for rated volt 16V.

## ◆ MARKING

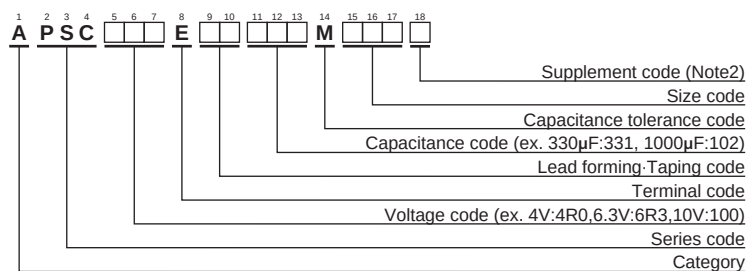
EX) 2.5V820μF





## NPCAP™-PSC Series

## ◆PART NUMBERING SYSTEM



(Note2) PSC series, 2.5V820μF(ESR 5mΩ max.) has supplement code "J".  
Can case, terminal and terminal plating are the same as all others in PSC series.

Please refer to "Product code guide (conductive polymer type)"

## ◆STANDARD RATINGS

| WV (V <sub>dc</sub> ) | Cap (μF) | Case size φD×L(mm) | ESR (mΩ max./20°C, 100k to 300kHz) | Rated ripple current (mA <sub>rms</sub> /105°C, 100kHz) | Part No.           |
|-----------------------|----------|--------------------|------------------------------------|---------------------------------------------------------|--------------------|
| 2.5                   | 560      | 8×8                | 7                                  | 6,100                                                   | APSC2R5E□□561MH08S |
|                       | 820      | 8×8                | 5                                  | 6,100                                                   | APSC2R5E□□821MH08J |
|                       | 820      | 8×8                | 7                                  | 6,100                                                   | APSC2R5E□□821MH08S |
|                       | 1,000    | 8×8                | 7                                  | 6,100                                                   | APSC2R5E□□102MH08S |
|                       | 1,000    | 8×11.5             | 7                                  | 6,100                                                   | APSC2R5E□□102MHB5S |
|                       | 1,500    | 8×11.5             | 7                                  | 6,100                                                   | APSC2R5E□□152MHB5S |
|                       | 2,700    | 10×11.5            | 8                                  | 5,560                                                   | APSC2R5E□□272MJB5S |
| 4                     | 560      | 8×8                | 7                                  | 6,100                                                   | APSC4R0E□□561MH08S |
|                       | 680      | 8×11.5             | 7                                  | 6,100                                                   | APSC4R0E□□681MHB5S |
|                       | 1,000    | 10×11.5            | 6                                  | 6,640                                                   | APSC4R0E□□102MJB5S |
| 6.3                   | 470      | 8×8                | 8                                  | 5,700                                                   | APSC6R3E□□471MH08S |
|                       | 560      | 8×8                | 8                                  | 5,700                                                   | APSC6R3E□□561MH08S |
|                       | 820      | 10×11.5            | 7                                  | 6,640                                                   | APSC6R3E□□821MJB5S |
|                       | 1,500    | 10×11.5            | 10                                 | 5,560                                                   | APSC6R3E□□152MJB5S |
| 10                    | 390      | 8×11.5             | 9                                  | 5,650                                                   | APSC100E□□391MHB5S |
|                       | 680      | 10×11.5            | 7                                  | 6,100                                                   | APSC100E□□681MJB5S |
| 16                    | 270      | 8×11.5             | 11                                 | 5,080                                                   | APSC160E□□271MHB5S |
|                       | 330      | 10×11.5            | 10                                 | 6,100                                                   | APSC160E□□331MJB5S |
|                       | 330      | 10×12.5            | 10                                 | 6,100                                                   | APSC160E□□331MJC5S |
|                       | 470      | 10×11.5            | 10                                 | 6,100                                                   | APSC160E□□471MJB5S |

□□ : Enter the appropriate lead forming or taping code.

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

| Frequency(Hz)    | 120  | 1k   | 10k  | 50k  | 100k to 500k |
|------------------|------|------|------|------|--------------|
| Radial lead type | 0.10 | 0.35 | 0.60 | 0.80 | 1.00         |

## Conductive Polymer Hybrid Aluminum Electrolytic Capacitors





## PRECAUTIONS AND GUIDELINES (Conductive Polymer Hybrid)

Conductive Polymer Hybrid Aluminum Electrolytic Capacitors (Hereinafter called capacitor) that uses highly conductive polymer electrolytic materials and electrolyte. Please read the following in order to get the most out of your capacitor. The circuits described as examples in this catalog and the "delivery specifications" are featured in order to show the operations and usage of our products, however, this fact does not guarantee that the circuits are available to function in your equipment systems.

We are not in any case responsible for any failures or damage caused by the use of information contained herein.

You should examine our products, of which the characteristics are described in the "delivery specifications" and other documents, and determine whether or not our products suit your requirements according to the specifications of your equipment systems. Therefore, you bear final responsibility regarding the use of our products.

Please make sure that you take appropriate safety measures such as use of redundant design and malfunction prevention measures in order to prevent fatal accidents and/or fires in the event any of our products malfunction.

For Conductive Polymer Aluminum Solid Capacitors, see Precautions and Guidelines (Conductive Polymer).

For Aluminum Electrolytic Capacitors, see Precautions and Guidelines (Aluminum Electrolytic Capacitors).

### 1) Device circuits design considerations

1) Confirm installation and operating requirements for the capacitors, then use them within the performance limits prescribed in this catalog or product specifications.

#### 2) Polarity

Capacitors are polarized.

Never apply a reverse voltage or AC voltage. Connecting with wrong polarity will short-circuit or damage the capacitor with the pressure relief vent opening early on. To identify the polarity of a capacitor, see the relevant diagram in the catalogs or product specifications, or the polarity marking on the body of the capacitors.

#### 3) Operating voltage

Do not apply an over-voltage that exceeds a rated voltage specified for the capacitors.

The total peak value of the ripple voltage plus the DC voltage must not exceed the rated voltage of the capacitors. Capacitors do not require voltage derating within the category temperature. Although capacitors specify a surge voltage that exceeds the full rated voltage, it does not assure long-term use but limited use under specific conditions.

#### 4) Ripple current

Do not apply an over current that exceeds the rated ripple current specified for the capacitors. Excessive ripple current will increase heat production within the capacitors, causing the capacitors to be damaged as follows:

- Shorten lifetime
- Open pressure relief vent
- Short circuit

At the time of low DC bias voltage, reverse voltage may be applied if uses with less than rated ripple current. Please use it as far as the reverse voltage is not applied. The rated ripple current is specified along with a specific ripple frequency. Where using the capacitors at any ripple frequency other than the specified frequency, calculate the allowable ripple current by multiplying the rated ripple current by a frequency compensation factor (Frequency Multiplier) specified for each product series.

#### 5) Operating temperature (Category temperature)

Do not apply high temperatures that exceed the upper limit of the category temperature range specified for the capacitors.

Using the capacitors at temperatures higher than the upper limit will considerably shorten the lifetime of the capacitors and make the pressure relief vent open. The temperature, please confirm the temperature of the capacitors which included the ambient temperature of the device, not only the temperature in the device but also radiant heat of the heating element (power transistor, resistance) in the apparatus, self heating caused by the ripple current. Additionally, please do not place heating ele-

ment on the back side of the capacitors. In addition, please use the capacitors within category temperature range because the life of the capacitors are affected by the operating temperature. In other words, lowering ambient temperatures will extend the expected lifetime of the capacitors.

#### 6) Lifetime

Select the capacitors to meet the service life requirements of device.

#### 7) Charging and discharging

Do not use capacitors in circuits intended for rapid charge and discharge cycle operations.

If capacitors are used in the circuits that repeat a charge and discharge with a large voltage drop or a rapid charge and discharge at short interval cycle, capacitance will decrease and/or the capacitors will be damaged by internal heat generation.

Please consult us the capacitors to use for the circuit where rapid charge and discharge is repeated.

Please be careful about rush currents. Recommend to install protective circuit.

#### 8) Leakage current

The leakage current may increase due to thermal stress such as reflow soldering. After that, however, the leakage current will gradually decrease by self-healing action of the dielectric oxide layer when the capacitors are applied with a voltage less than the rated voltage within the Category Temperature range. As the voltage is closer to the rated voltage and the temperature is closer to the upper limit of Category Temperature range, the leakage current decreases faster.

The leakage current will increase by the following factors,

- ① Soldering
- ② Testing of high temperature exposure with no voltage applied, high temperature/humidity storage, temperature cycles, etc.

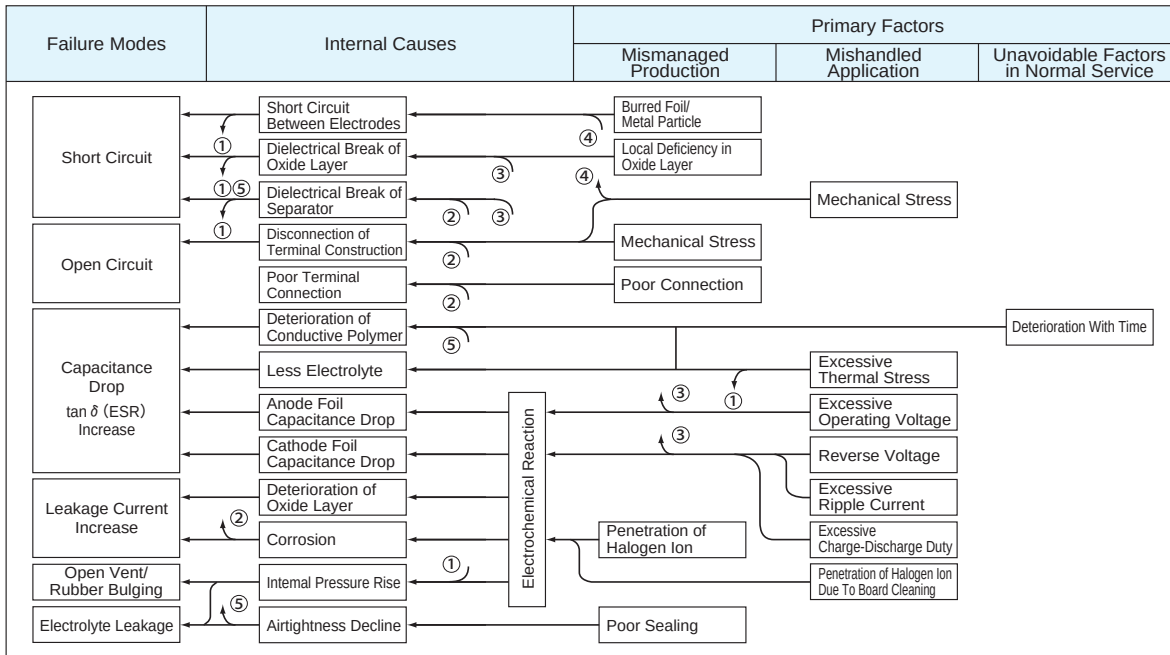
#### 9) Failure mode of capacitors

Non-solid aluminum electrolytic capacitors have a limited lifetime which ends in an open circuit failure mode, in general.

Depending on the product type and operating conditions, the failure mode may involve in opening of the pressure relief vent.

But it may lead to shot circuit mode failure when capacitor is used in the overload more than the guarantee ranges including over voltage and the over current.

Failure modes depend on the application conditions that lead to fail.



### 10) Capacitor insulation

The can case of capacitor does not assure electrical insulation. The outer coating on can case is aimed for indication and does not assure function of the electrical insulation. Electrically isolate the outer can case of a capacitor from the negative terminal, the positive terminal and circuit patterns.

### 11) Operating conditions

Do not use/expose capacitors to the following conditions:

- ① Direct contact with water, salt water or oil, or high condensation environment.
- ② Direct sunlight
- ③ Toxic gases such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine and its compounds, bromine and its compounds and ammonium.
- ④ Ozone, ultraviolet rays or radiation.
- ⑤ Extreme vibration or mechanical shock that exceeds limits in the catalogs or product specifications.

The standard vibration condition is applicable to JIS C 5101-4.

### 12) Mounting

Capacitors contain paper separators and electric-conductive electrolyte that contains organic solvent as main solvent material, both of which are flammable. If the electrolyte leaks onto a printed circuit board, it can erode the device circuit pattern, may short-circuit the copper traces, smoke and burn. Make sure of designing a PC board as follows:

- ① Provide clearance space (2mm minimum) over the pressure relief vent of a capacitor to avoid blocking the correct opening of the pressure relief vent for 10mm case diameter of capacitor.
- ② Do not locate any wire or circuit pattern over the pressure relief vent of a capacitor.
- ③ Avoid locating any heat source components near capacitors or on the opposite side of the PC board under capacitors.
- ④ Design the solder land on the PC board in accordance with the catalog or the product specification.
- ⑤ For radial capacitors, design the terminal holes on the PC board to fit the terminal dimension of the capacitor.
- ⑥ Do not print any copper trace under the seal (terminal) side of a capacitor. When the electrolyte leaks out, it may occur circuit pattern short-circuit, and tracking or migration. Copper traces should be 1 mm (preferably 2mm or more) spaced apart from the side of the capacitor body.
- ⑦ In designing a double-sided PC board, do not locate any through-hole via or unnecessary hole underneath a capacitor.

- ⑧ In designing a double-sided PC board, do not print any circuit pattern underneath a capacitor.

### 13) Using capacitors for significantly safety-oriented applications

Consult with us in advance of usage of our products in the following listed applications. ① Aerospace equipment ② Power generation equipment such as thermal power, nuclear power etc. ③ Medical equipment ④ Transport equipment (automobiles, trains, ships, etc.) ⑤ Transportation control equipment ⑥ Disaster prevention / crime prevention equipment ⑦ Highly publicized information processing equipment ⑧ Submarine equipment ⑨ Other applications that are not considered general-purpose applications.

### 14) Others

Design device circuits taking into consideration the following conditions:

- ① Electrical characteristics of a capacitor depend on the temperature and frequency. In designing the device circuits, consider the change in the characteristics.
- ② If using more than one capacitor connected in parallel, design the device circuits to balance the current flow in individual capacitors.
- ③ If using more than one capacitor connected in series, connect shunting resistors in parallel with the individual capacitors to balance the voltage.

## 2) Installation

### 1) Assembling

- ① Do not try to reuse the capacitors once assembled and electrified
- ② Capacitors may have been spontaneously recharged with time by a recovery voltage phenomenon. Capacitors may produce recovery voltage higher than aluminum electrolytic capacitors and conductive polymer aluminum solid capacitors. In this case, discharge electricity through approximately 1kΩ before use.
- ③ If capacitors have been stored at any conditions more than 35°C and 75%RH for long storage periods of time more than the limits specified in the catalogs or product specifications, they may have high leakage current. In this case, make pre-conditioning by applying the rated voltage through a resistor of approximately 1kΩ.
- ④ Confirm the rated capacitance and voltage of capacitors



before installation.

- ⑤ Confirm the polarity of capacitors before installation.
- ⑥ Do not try to use the capacitors that were dropped to the floor and so forth.
- ⑦ Do not deform the can case of a capacitor.
- ⑧ Verify that the lead spacing of the capacitor fits the hole spacing in the PC board before installing the capacitors.
- ⑨ Do not apply excessive mechanical force to capacitors more than the limits prescribed in the catalogs or product specifications. Avoid excessive mechanical force while the capacitors are in the process of vacuum-picking, placing and positioning by automatic mounting machines or cutting the lead wires by automatic insertion machines.

## 2) Soldering and heat resistance

- ① For soldering using a soldering iron, consider the following conditions:  
Soldering conditions (temperature and time) should be ( $380 \pm 10^{\circ}\text{C}$ ,  $3 \pm 0.5\text{second}$ ).  
Do not touch the body of a capacitor with the hot tip of the soldering iron.
- ② Verify the following when flow soldering:
  - Do not dip the body of a capacitor into the solder bath only dip the terminals in. The soldering must be done on the reverse side of PC board.
  - Soldering conditions (preheat, solder temperature and dipping time) should be within the limits prescribed in the catalog or the product specifications.
  - Do not apply flux to any part of capacitors other than their terminals.
  - Make sure the capacitors do not come into contact with any other components while soldering.
- ③ For reflow soldering, consider the following conditions:  
Soldering conditions (preheat, reflow temperature and time) should be within the limits prescribed in the catalogs or product specifications.
  - When using the infrared heater and setting its temperatures, adjust the heating levels taking into consideration that the color and materials of a capacitor vary in their infrared absorbance.
  - The allowable number of reflow passes is specified in the catalogs or product specifications.
  - Please consult us about vapor phase soldering (VPS).
- ④ Do not try to reuse the capacitors once assembled.
- ⑤ Only use radial lead type capacitors for flow soldering. The other type capacitors are not designed for the flow soldering.
- ⑥ Only use chip type capacitors for reflow soldering. The other type capacitors are not designed for the reflow soldering.

## 3) Handling after soldering

After soldering the PC board, do not apply the following mechanical stress to the capacitor:

- ① Do not tilt, push down or twist the body of the capacitor.
- ② Do not grab the body of the capacitor to carry the assembly board.
- ③ Do not hit anything against the capacitor. When stacking the assembled boards, do not put any of the PC boards or other components against the capacitor.
- ④ Do not drop the assembled board.

## 4) Cleaning assembly boards

- ① Do not clean capacitors with the following cleaning agents:
  - Halogenated solvents: cause capacitor failures due to corrosion.
  - Alkali system solvents: corrode (dissolve) the aluminum can case.
  - Terpene and petroleum system solvents: deteriorate the rubber seal materials.
  - Xylene and toluene: deteriorates the rubber seal materials as well.
  - Acetone: erases the markings printed on a capacitor.

Where cleaning is necessary, use only solvent resistant type capacitors that have been assured for the cleaning within the specific cleaning conditions prescriber in the catalogs or product specifications. In particular, carefully set up the conditions for ultrasonic cleaning system. Consult us regarding alternative

CFCs or other cleaners before use.

- ② Where cleaning the capacitors, confirm the following conditions:

- Control the contamination (the conductivity, pH, specific gravity, water content, etc.) of the cleaning agents.
- After the cleaning, do not leave the capacitors (assembly boards) in an environment of cleaning agent-rich or in a closed container. Sufficiently evaporate the residual cleaning agent from the assembly boards and the capacitors by forced hot air at temperatures less than the upper limit of category temperature range for more than 10 minutes.

In general, aluminum electrolytic capacitors are sensitive to contamination of halogen ions (particularly to chlorine ions). Depending on the properties of the electrolyte and rubber seal materials used in a capacitor, the halogen ions lead up to catastrophic failures on the capacitor. Where the inside of a capacitor has been contaminated with more than a certain amount of halogen ions and the capacitor is in use, the corrosion reaction of aluminum occurs. The corrosion causes the capacitor to have a significant increase in leakage current with heat produced, open the pressure relief vent and become open circuit mode failure.

Due to global environmental issues (greenhouse effects and other environmental destruction by depletion of the ozone layer), the conventional cleaning solvents of CFC 113, Trichloroethylene and 1,1,1-trichloroethylene were replaced by substitutes. The following are some substitute cleaning agents and allowable cleaning conditions:

### a) Fatty-alcohol cleaning agents

Pine Alpha ST-100S (Arakawa Chemical)  
Clean Through 750H, 750HS and 750J (Kao)

[Cleaning conditions]

Either of immersion or ultrasonic cleaning, for a maximum of 10 minutes and at a maximum liquid temperature of  $60^{\circ}\text{C}$  is acceptable. Make sure that the markings on the capacitor are not rubbed against any other component or the PC board during cleaning. Note that shower cleaning affects the markings on the capacitor.

### b) Alternative CFCs

AK225AES (Asahi Glass)

[Cleaning conditions]

Solvent resistant type capacitors, which were originally developed to intend to resist Freon TE or Freon TES, are also capable of withstanding any one of immersion, ultrasonic or vapor cleaning, for a maximum of 5 minutes.

However, this type of cleaning agent is not recommended to use, as the cleaning materials may be banned in near future in view of global environmental issues

### c) IPA (Isopropyl Alcohol)

Immersion cleaning with a maximum flux concentration of 2 wt% is acceptable.

## 5) Adhesives and coating materials

- ① Do not use any adhesive or coating materials containing halogenated solvents.
- ② Make sure of the following conditions before applying adhesive or coating materials to a capacitor,
  - No flux residue nor stain is left between the rubber seal of a capacitor and PC board.
  - Dry the capacitor to remove residual cleaning agents before applying adhesive and coating materials. Do not cover up the entire surface of the rubber seal of the capacitor with adhesives or coating materials.
  - Consult us Heating and curing conditions for adhesives and coating materials.
  - Covering up the entire surface of the rubber seal with resin mold materials will obstruct the normal diffusion of internal



hydrogen gas from a capacitor and result in serious failures. Also, where the adhesive and coating materials contain a large amount of halogen ions, the halogen ions will contaminate the inside of the capacitor through the rubber seal materials, causing the capacitor to become a failure.

- Depending on solvent materials that the adhesive or coating materials contains, note that the surface of a capacitor may change in appearance.

## 6) Fumigation

In exporting or importing electronic devices, they may be exposed to fumigation with halide such as methyl bromide. Where the capacitors are exposed to halide such as methyl bromide, the capacitors will be damaged with the corrosion reaction with halogen ions in the same way as cleaning agents. For the export and import, Nippon Chemi-Con considers using some packaging method and so forth so that fumigation is not required. For customers to export or import electronic devices, semi-assembly products or capacitor components, confirm if they will be exposed to fumigation and also consider final condition of packaging. (Note that either cardboard or vinyl package has a risk of fumigation gas penetration.)

## 3) Precautions during operation of devices

- Never touch the terminals of a capacitor directly with bare hands.
- Do not short-circuit between the capacitor terminals with anything conductive. Also, do not spill any conductive liquid such as acid or alkaline solution over a capacitor.
- Confirm environmental conditions where the device will be placed. Do not use the device in the following environmental conditions:
  - Water or oil spatters, or high condensation environment.
  - Direct sunlight.
  - Ozone, ultraviolet rays or radiation.
  - Toxic gases such as hydrogen sulfide, sulfuric acid, nitrous acid, chlorine and its compounds, bromine and its compounds and ammonium.
  - Severe vibration or mechanical shock conditions beyond the limits prescribed in the catalog or product specification. The standard vibration condition is applicable to JIS C 5101-4.

## 4) Maintenance inspections

- For industrial use capacitors, make periodic inspections of the capacitors. Before the inspections, turn off the power supply of the device and discharge the electricity of the capacitors. When checking it by a volt-ohm meter, confirm the polarity beforehand. Do not apply mechanical stress to the terminals of the capacitors during inspection.
- Characteristics to be inspected
  - Significant damage in appearance: vent opening, electrolyte leakage, etc.
  - Electrical characteristics: Leakage current, capacitance,  $\tan \delta$  and other characteristics prescribed in the catalogs or product specifications. If finding anything abnormal on the characteristics above, check the specifications of the capacitor and take appropriate actions such as replacement.

## 5) Contingencies

- A capacitor with more than a certain case size has the pressure relief vent functioning to escape abnormal gas pressure increase. If gas expels from a venting capacitor, disconnect the power supply of the device or unplug the power supply cord. If not disconnecting the power supply, the device circuit may be damaged due to the short circuit failure of the capacitor or short-circuited with the liquid that the gas was condensed to. It may cause secondary damages

such as device burnout in the worst case scenario. The gas that comes out of the open vent is vaporized electrolyte not smoke.

- The gas expelled from a venting capacitor is more than 100°C. Never expose your face to the capacitor. If your eyes are exposed to the gas or you inhale it, immediately flush your eyes and/or gargle with water. If the electrolyte comes in contact with the skin, wash with soap and water.

## 6) Storage

- Do not store capacitors at high temperature or high humidity. Store the capacitors indoors at temperatures of 5 to 35°C and humidities of less than 75%RH. In principle, conductive polymer hybrid aluminum electrolytic capacitors should be used within 2 years after production.
- Keep capacitors packed in the original packaging material whenever possible.
- Avoid the following storage environmental conditions:
  - Water spattering, high temperatures, high humidity or condensation environment.
  - Oil spattering or oil mist filled.
  - Salt water spattering or salt filled.
  - Acidic toxic gases such as hydrogen sulfide, sulfuric acid, nitrous acid, chlorine, bromine and methyl bromide filled.
  - Alkaline toxic gases such as ammonium filled.
  - Acid or alkaline solutions spattering.
  - Direct sunlight, ozone, ultraviolet rays or radiation.
  - Extreme vibration or shock loading.
- JEDEC J-STD-020 is not applicable.

## 7) Capacitor disposal

Please consult with a local organization for the proper disposal of industrial waste. For incinerating capacitors, apply a high temperature incineration (over 800°C). Incinerating them at temperatures lower than that may produce toxic gases such as chlorine. To prevent capacitors from explosion, punch holes in or sufficiently crush the can cases of the capacitors, then incinerate.

## 8) About AEC-Q200

The Automotive Electronics Council (AEC) was originally established by major American automotive related manufactures. Today, the committees are composed of representatives from the sustaining Members of manufacturing companies in automotive electrical components. It has standardized the criteria for "stress test qualification" and "reliability tests" for electronic components.

AEC-Q200 is the reliability test standard for approval of passive components in Automotive applications. It specifies the test type, parameters and quantity, etc. for each component. The criteria of the reliability tests such as for our main products, "Aluminum Electrolytic Capacitors" are described in this standard.

Pursuant to the customer's specific testing requirements, Chemi-Con submits the test results according to AEC-Q200 for Aluminum Electrolytic Capacitors used in automotive applications on request.

An electronic component manufacturer cannot simply claim that their product is "AEC-Q200 Qualified". It can be claimed "Compliant", "Capable", "Available", etc., however each component must be tested per each users "Qualification Test Plan" in order to claim AEC-Q200 status.

Please contact us for more information.

## 9) Response to the Substances of Concern

- Nippon Chemi-Con aims for developing products that meet laws and regulations concerning substances of concern. (Some products may contain regulated substances for ex-



## PRECAUTIONS AND GUIDELINES (Conductive Polymer Hybrid)

empted application)

Please contact us for more information about law-compliance status.

- 2 ) According to the content of REACH handbook (Guidance on requirements for substances in articles which is published on May 2008), our electronic components are “articles without any intended release”. Therefore they are not applicable for “Registration” for EU REACH Regulation Article 7 (1). Reference: Electrolytic Condenser Investigation Society Study of REACH Regulation in EU about Electrolytic Capacitor (publicized on 13 March 2008)

### 10 Catalogs

Specifications in the catalogs are subject to change without notice. Test data shown in the catalogs are not assured as the whole performance values, but typical values. For more details, refer to JEITA RCR-2367D (March 2019) with the title of “Safety Application Guide for fixed aluminum electrolytic capacitors for use in electronic equipment”.

## RECOMMENDED SOLDERING CONDITIONS

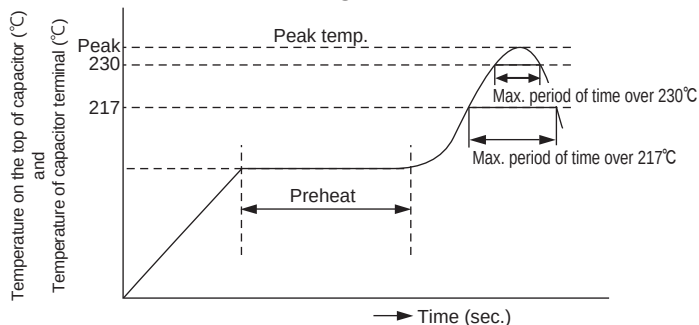
### ◆SURFACE MOUNT TYPE

The following conditions are recommended for air or infrared reflow soldering on the SMD products onto a glass epoxy circuit board of 90×50×0.8mm (with resist) by cream solder. The temperatures shown are the surface temperature values on the top of the can and temperature of capacitor terminal.

Reflow should be performed twice or less.

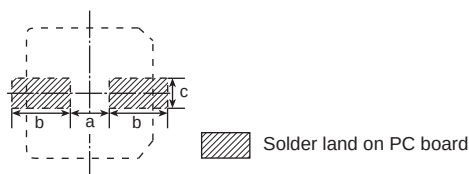
Please ensure that the capacitor became cold enough to the room temperature (5 to 35°C) before the second reflow.

#### ● Recommended soldering heat conditions



| Size Code     | Preheat       | Time maintained above 217°C | Time maintained above 230°C | Peak temp.               | Reflow number                    |
|---------------|---------------|-----------------------------|-----------------------------|--------------------------|----------------------------------|
| E61, F61, F80 | 150 to 180°C  | 50 sec. max.                | 40 sec. max.                | 260°C max.               | 2-cycles allowed                 |
| HA0 to JH0    | 120 sec. max. | 50 sec. max.                | 40 sec. max.                | 260°C max.<br>245°C max. | 1-cycle only<br>2-cycles allowed |

#### ● Recommended Solder Land on PC Board



| Size code | Terminal code : A |     |     | Terminal code : G |     |     |
|-----------|-------------------|-----|-----|-------------------|-----|-----|
|           | a                 | b   | c   | a                 | b   | c   |
| E61       | 1.4               | 3.0 | 1.6 |                   |     |     |
| F61, F80  | 1.9               | 3.5 | 1.6 | 1.9               | 3.5 | 3.3 |
| HA0       | 3.1               | 4.2 | 2.2 | 3.1               | 4.2 | 3.5 |
| JA0       | 4.5               | 4.4 | 2.2 | 4.5               | 4.4 | 3.5 |
| JC5       | 4.5               | 4.4 | 2.2 | 4.5               | 4.4 | 3.5 |
| JH0       | 4.0               | 4.7 | 2.5 | 4.0               | 4.7 | 3.8 |

### ◆RADIAL LEAD TYPE

#### ● Recommended soldering heat conditions

Preheat : 150°C 120 seconds max.

Flow soldering : 260±5°C max. 10+1 seconds max. (Or 380±10°C max. 3±0.5 seconds max.: hand soldering)

#### ◆PRECAUTIONS FOR USERS

##### Soldering method

SMD type have no capability to withstand such dip or wave soldering as totally immersing components into a solder bath.

##### Reflow soldering

Reflow the capacitors within Recommended Reflow Soldering Conditions. Verify there is no temperature stress to the capacitors because the following differences might degrade capacitors electrically and mechanically. Please consult with us if other reflow conditions are employed.

1. Location of components : Temperature increases at the edge of PC board more than the center.
2. Population of PC board : The lower the component population is, the more temperature rises.
3. Material of PC board : A ceramic-made board needs more heat than a glass epoxy-made board. The heat increase may cause damage to the capacitors.
4. Thickness of PC board : A thicker board needs more heat than a thinner board. The heat may damage the capacitors.
5. Size of PC board : A larger board needs more heat than a smaller board. The heat may damage the capacitors.
6. Solder thickness  
If very thin cream solder paste is to be used for SMD types, please consult with us.
7. Location of infrared ray lamps : IR reflow as well as hot plate reflow heats only on the reverse side of the PC board to lessen heat stress to the capacitors.
8. Case leakage current will increase (~mA) after the reflow process, the leakage current which rose gradually decreases when voltage is applied.
9. Please consult us about vapor phase soldering (VPS).

##### Rework of soldering

Use a soldering iron for rework. Do not exceed an iron tip temperature of 380±10°C and an exposure time of 3±0.5 seconds.

##### Mechanical stress

Do not grab the capacitors to lift the PC board and give stress to the capacitor. Avoid bending the PC board. This may damage the capacitors.

##### Cleaning assembly board

Immediately after solvent cleaning, remove residual solvent with an air knife for at least 10 minutes. If the solvent is insufficiently dry, the capacitors may corrode.

##### Coating on assembly board

1. Before curing coating material, remove the cleaning solvents from the assembly board.
2. Before conformal coating, a chloride free pre-coat material is recommended to decrease the stress on the capacitors.

##### Molding with resin

Internal chemical reaction gradually produces gas in the capacitor; increasing internal pressure. If the end seal of the capacitor is completely covered by resin the gas will be unable to escape causing a potentially dangerous situation. The chlorine in resin will penetrate the end seal, reach the element, and damage of the capacitor.

##### Glue

The followings are requirements for glue.

1. A low curing temperature over a short period of time
2. Strong adhesion and heat resistance after curing
3. Long shelf life
4. No corrosion

##### Others

Refer to PRECAUTIONS AND GUIDELINES (Conductive Polymer Hybrid).



## Lifetime Estimation of Conductive Polymer Hybrid Aluminum Electrolytic Capacitors

Subject series : HXC/HXD/HXJ/HXK/HXE/HSC/HSD/HSE

Please consult us about lifetime equations for HXF series.

Conductive polymer hybrid aluminum electrolytic capacitors, in common with other aluminum electrolytic capacitors, are electronic components with a finite lifespan. The lifetime of these capacitors is influenced by ambient temperatures, environmental conditions such as humidity, and operating conditions such as the level of ripple current and surge voltage, all of which can reduce capacitance and increase ESR as a result.

### 1. Lifetime Estimation

Estimation of lifetime can be expressed by the following equations (1) to (3), which take the effects of ambient temperatures and self-heat rise resulting from ripple current into account.

Subject series : HXC/HXD/HXJ/HXK/HSC/HSD

$$Lx=Lr \times Bt^{\frac{Kt(To-Tx)}{10}} \times Bt^{\frac{\Delta To-\Delta T}{10}} \dots\dots\dots(1)$$

Subject series : HXE/HSE

125 °C<Tx≤135 °C

$$Lx=Lr \times Bt^{\frac{To-Tx}{10}} \times Bt^{\frac{\Delta To-\Delta T}{10}} \dots\dots\dots(2)$$

Tx≤125 °C

$$Lx=Lr \times Bt^{\frac{Kt(125-Tx)}{10}} \times Bt^{\frac{\Delta To-\Delta T}{10}} \dots\dots\dots(3)$$

Lx : Estimation of actual lifetime (hour)

Lr : Stated lifetime under the rated ripple current superimposition at the upper limit of the category temperature (hours)

Bt : Temperature acceleration factor ..... (Table-1)

Kt : Correction factor of ambient temperature acceleration factor..... (Table-2)

To : Maximum category temperature (°C)

Tx : Actual ambient temperature of the capacitor (°C)

Use 40°C if the actual ambient temperature is below it.

ΔTo : Rise of internal temperature due to the rated ripple current (°C) ..... (Table-3)

ΔT : Rise of internal temperature due to actual ripple current (°C)

Table-1 Bt : Temperature acceleration factor

| Subject series          |                      | φ 5, 6.3 | φ 8, 10 |
|-------------------------|----------------------|----------|---------|
| HXC/HXD/HXJ/HXK/HSC/HSD |                      | 1.7      | 2       |
| HXE/HSE                 | Tx ≤ 125 °C          | 1.7      | 2       |
|                         | 125 °C < Tx ≤ 135 °C | 1.7      | 1.7     |

Table-2 Kt : Correction factor of ambient temperature acceleration factor

| Actual ambient temperature of the capacitor | Tx ≤ 65 °C | 65 °C < Tx ≤ 105 °C | 105 °C < Tx ≤ 125 °C |
|---------------------------------------------|------------|---------------------|----------------------|
| Bt=1.7                                      | 1.06       | 1.03                | 1                    |
| Bt=2                                        | 1          |                     |                      |

Table-3 ΔTo : Rise in internal temperature due to the rated ripple current (°C)

| Subject series | HXC                   |            | HSC | HXD/HSD/HXK | HXJ        |            |                   |            |
|----------------|-----------------------|------------|-----|-------------|------------|------------|-------------------|------------|
| Case size      | φ 6.3×5.8 to φ 10×10L | φ 10×12.5L | —   | —           | φ 6.3×5.8L | φ 6.3×7.7L | φ 8×10L, φ 10×10L | φ 10×12.5L |
| ΔTo            | 5°C                   |            | 5°C | 15°C        | 5°C        | 8°C        | 10°C              | 11°C       |

| Subject series | HXE                                        |  | HSE                                        |
|----------------|--------------------------------------------|--|--------------------------------------------|
| Case size      | φ 6.3×5.8L to φ 10×10L, φ 10×16.5L         |  | φ 10×12.5L                                 |
| ΔTo            | 15°C (Tx≤125 °C)<br>5°C (125 °C<Tx≤135 °C) |  | 16°C (Tx≤125 °C)<br>6°C (125 °C<Tx≤135 °C) |

An approximate value of ripple current-caused ΔT can be calculated using Equation (4)

$$\Delta T=\Delta To \times \left( \frac{Ix}{Io} \right)^2 \dots\dots\dots(4)$$

ΔTo : Rise in internal temperature due to the rated ripple current ..... (Table-3)

Ix : Operating ripple current (Arms) actually flowing in the capacitor

Io : Rated ripple current (Arms), frequency compensated, at the upper limit of the category temperature range

To determine more accurate values of ΔT, they can be actually measured using a thermocouple.



### 2. Rated Ripple Current Frequency Multipliers

Self-heat rise is generated by the ripple current even though the conductive polymer hybrid aluminum electrolytic capacitors have low ESR compared to liquid based electrolyte aluminum electrolytic capacitor. The ESR value differs depending on the frequency, thus the degree of self-heat rise differs depending on the ripple current frequency. Therefore, if the actual ripple current frequency differs from the specifications stated in the standard ratings, use the value obtained by multiplying the rated ripple current multiplier to convert the rated current.

Conductive polymer hybrid aluminum electrolytic capacitors have super low ESR characteristic in high-frequency range. On the whole, ESR in low-frequency range relatively rises. Therefore, they can use only small ripple current in low-frequency range. Please ensure that excessive ripple current is not applied to the capacitors in all frequency range.

### 3. Restriction of estimated lifetime calculation

The result calculated by the estimated lifetime formula, it is not guaranteed lifetime by Nippon Chemi-Con Corporation.

When designer calculate the lifetime of apparatus, please include an ample margin in consideration to the estimated lifetime of a capacitor.

When calculated lifetime result are over 15 years by using the estimated lifetime formula, please consider 15 years to be a maximum in considering that the sealing rubber characteristics vary during the lifetime.

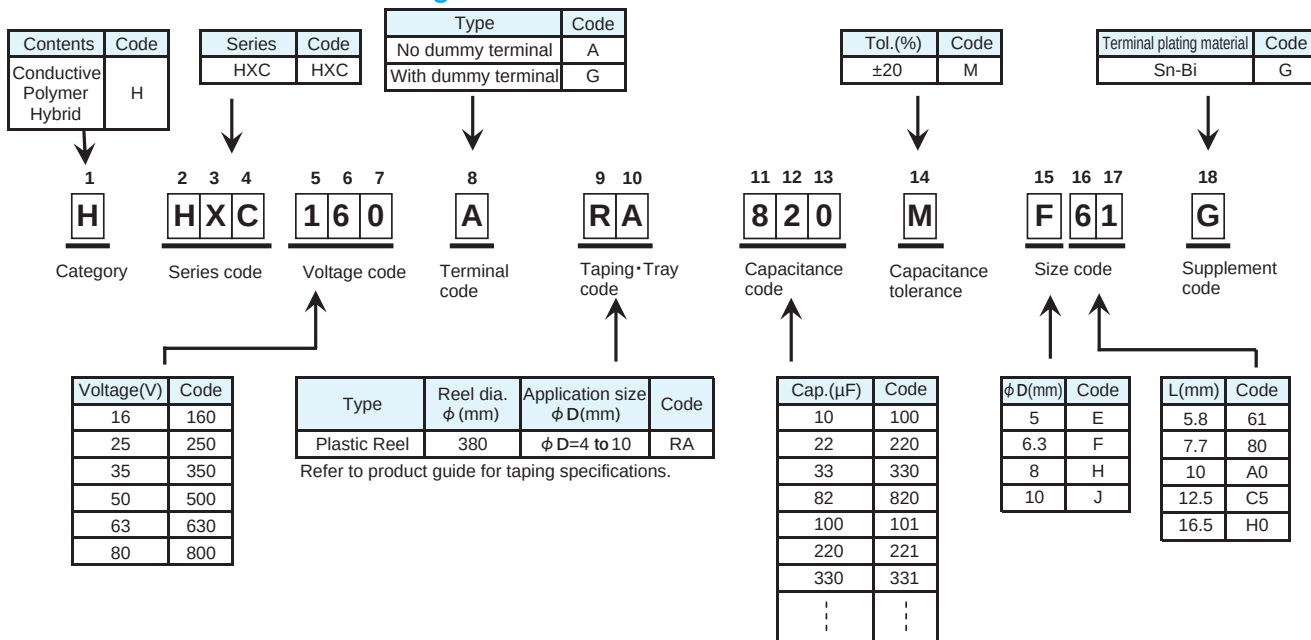
If 15 years or more may be required as an expected lifetime, please consult us.

## Product code guide (Conductive polymer hybrid Surface mount type)

(Example : HXC series, 16V-82μF, φ6.3×5.8L)



Please refer to the following table



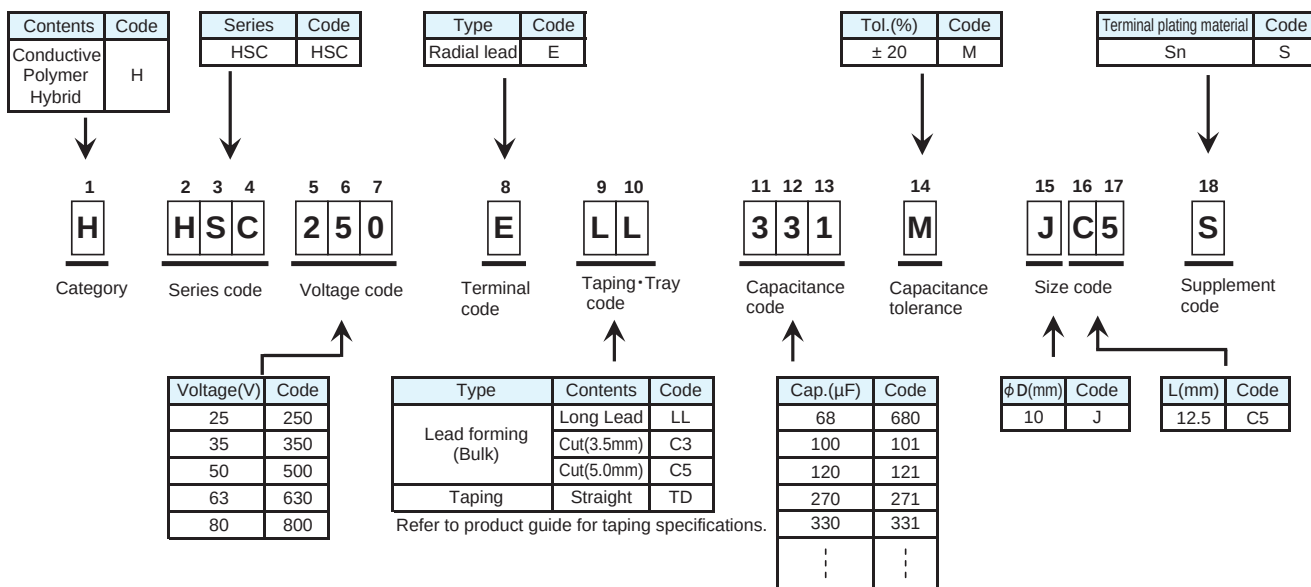
\*Refer to the appendix (Part number) for codes not listed here.

## Product code guide (Conductive polymer hybrid Radial lead type)

(Example : HSC series, 25V-330μF, φ10×12.5L, Long Lead with bulk)



Please refer to the following table



\*Refer to the appendix (Part number) for codes not listed here.

# HXF Series

- Guaranteed short time operating temperature at 150°C
- High reliability is realized by hybrid electrolyte
- Endurance with ripple current : 4,000 hours at 135°C
- Rated voltage range : 25 to 63V<sub>dc</sub>, Capacitance range : 33 to 560μF
- For high temperature and high reliability applications.  
(Automotive equipment, Base station equipment, etc.)
- RoHS2 Compliant
- Halogen Free
- AEC-Q200 compliant : Please contact Chemi-Con for more details, test data, information.

HXF

↑ Higher ripple  
HXE

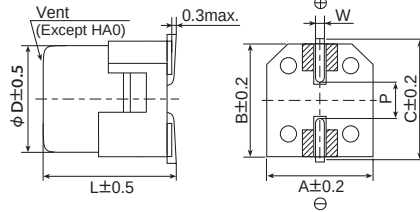
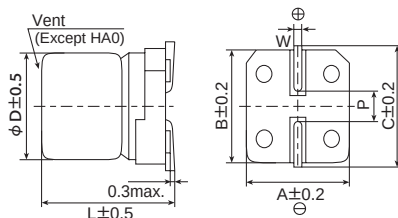


## SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |      |      |      |                           |
|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|------|---------------------------|
| Category                                               | -55 to +135°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |      |      |      |                           |
| Temperature Range                                      | -55 to +135°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |      |      |      |                           |
| Rated Voltage Range                                    | 25 to 63V <sub>dc</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |      |      |      |                           |
| Capacitance Tolerance                                  | ±20% (M)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |      |      |      |                           |
| Leakage Current                                        | I=0.01CV or 3μA, whichever is greater<br>Where, I : Max. leakage current (μA), C: Nominal capacitance (μF), V : Rated voltage(V)<br>(at 20°C, 120Hz)                                                                                                                                                                                                                                                                                                                                                                                    |      |      |      |      |                           |
| Dissipation Factor (tan δ)                             | Rated voltage(V <sub>dc</sub> )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 25V  | 35V  | 50V  | 63V  | (at 20°C after 2 minutes) |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 0.14 | 0.12 | 0.10 | 0.08 | (at 20°C, 120Hz)          |
| Low Temperature Characteristics (Max. Impedance Ratio) | Z(-25°C)/Z(+20°C) ≤ 1.5<br>Z(-55°C)/Z(+20°C) ≤ 2.0<br>(at 100kHz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |      |      |      |                           |
| Endurance 1                                            | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 4,000 hours at 125°C or 135°C.<br>Capacitance change ≤ ±30% of the initial value<br>D.F. (tan δ) ≤ 200% of the initial specified value<br>ESR ≤ 200% of the initial specified value<br>Leakage current ≤ The initial specified value                                                                          |      |      |      |      |                           |
| Endurance 2                                            | The following specifications shall be satisfied when the temperatures of capacitors are restored to 20°C after the rated voltage is applied for 300 hours at 150°C and subjected to DC voltage while the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 3,000 hours at 125°C or 135°C.<br>Capacitance change ≤ ±30% of the initial value<br>D.F. (tan δ) ≤ 200% of the initial specified value<br>ESR ≤ 200% of the initial specified value<br>Leakage current ≤ The initial specified value |      |      |      |      |                           |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 135°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to item 4.1 of JIS C 5101-4.<br>Capacitance change ≤ ±30% of the initial value<br>D.F. (tan δ) ≤ 200% of the initial specified value<br>ESR ≤ 200% of the initial specified value<br>Leakage current ≤ The initial specified value                                           |      |      |      |      |                           |
| Bias Humidity Test                                     | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to the DC rated voltage at 85°C, 85% RH for 2,000 hours.<br>Appearance No significant damage<br>Capacitance change ≤ ±30% of the initial value<br>D.F. (tan δ) ≤ 200% of the initial specified value<br>ESR ≤ 200% of the initial specified value<br>Leakage current ≤ The initial specified value                                                                                                                       |      |      |      |      |                           |

## DIMENSIONS [mm]

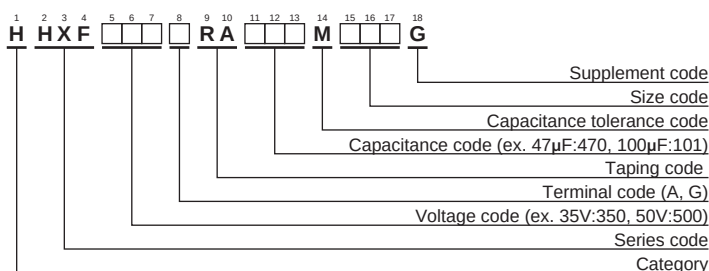
- Terminal Code : A
- Size code : HA0 to JH0
- Terminal Code : G (Vibration resistant structure)
- Size code : HA0 to JH0



▨ : Dummy terminals

| Size Code | φD | L    | A    | B    | C    | W          | P   |
|-----------|----|------|------|------|------|------------|-----|
| HA0       | 8  | 10.0 | 8.3  | 8.3  | 9.0  | 0.7 to 1.1 | 3.1 |
| JA0       | 10 | 10.0 | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |
| JC5       | 10 | 12.5 | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |
| JH0       | 10 | 16.5 | 10.3 | 10.3 | 11.0 | 1.0 to 1.3 | 4.2 |

## PART NUMBERING SYSTEM



## MARKING

EX) 35V270μF



## Rated voltage symbol

| Rated voltage (V <sub>dc</sub> ) | Symbol |
|----------------------------------|--------|
| 25                               | E      |
| 35                               | V      |
| 50                               | H      |
| 63                               | J      |

Please refer to "Product code guide (conductive polymer hybrid type)"



**HXF** Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>( $\mu$ F) | Size code | ESR<br>(m $\Omega$ max./20°C, 100kHz) | Rated ripple current<br>(mA <sub>rms</sub> /100kHz) |       | Part No.           |
|--------------------------|-------------------|-----------|---------------------------------------|-----------------------------------------------------|-------|--------------------|
|                          |                   |           |                                       | 125°C                                               | 135°C |                    |
| 25                       | 150               | HA0       | 18                                    | 3,900                                               | 2,800 | HHXF250□RA151MHA0G |
|                          | 220               | HA0       | 18                                    | 3,900                                               | 2,800 | HHXF250□RA221MHA0G |
|                          | 270               | JA0       | 16                                    | 4,500                                               | 3,300 | HHXF250□RA271MJA0G |
|                          | 330               | JA0       | 16                                    | 4,500                                               | 3,300 | HHXF250□RA331MJA0G |
|                          | 470               | JC5       | 14                                    | 5,100                                               | 3,600 | HHXF250□RA471MJC5G |
|                          | 560               | JH0       | 10                                    | 6,000                                               | 4,300 | HHXF250□RA561MJH0G |
| 35                       | 100               | HA0       | 18                                    | 3,900                                               | 2,800 | HHXF350□RA101MHA0G |
|                          | 150               | HA0       | 18                                    | 3,900                                               | 2,800 | HHXF350□RA151MHA0G |
|                          | 150               | JA0       | 16                                    | 4,500                                               | 3,300 | HHXF350□RA151MJA0G |
|                          | 270               | JA0       | 16                                    | 4,500                                               | 3,300 | HHXF350□RA271MJA0G |
|                          | 330               | JC5       | 15                                    | 4,900                                               | 3,500 | HHXF350□RA331MJC5G |
|                          | 470               | JH0       | 11                                    | 5,800                                               | 4,100 | HHXF350□RA471MJH0G |
| 50                       | 47                | HA0       | 24                                    | 3,600                                               | 2,500 | HHXF500□RA470MHA0G |
|                          | 68                | HA0       | 24                                    | 3,600                                               | 2,500 | HHXF500□RA680MHA0G |
|                          | 100               | JA0       | 20                                    | 4,300                                               | 3,000 | HHXF500□RA101MJA0G |
|                          | 120               | JA0       | 20                                    | 4,300                                               | 3,000 | HHXF500□RA121MJA0G |
|                          | 150               | JC5       | 17                                    | 4,600                                               | 3,300 | HHXF500□RA151MJC5G |
|                          | 220               | JH0       | 13                                    | 5,300                                               | 3,800 | HHXF500□RA221MJH0G |
| 63                       | 33                | HA0       | 27                                    | 3,300                                               | 2,300 | HHXF630□RA330MHA0G |
|                          | 47                | HA0       | 27                                    | 3,300                                               | 2,300 | HHXF630□RA470MHA0G |
|                          | 56                | JA0       | 22                                    | 4,000                                               | 2,800 | HHXF630□RA560MJA0G |
|                          | 82                | JA0       | 22                                    | 4,000                                               | 2,800 | HHXF630□RA820MJA0G |
|                          | 100               | JC5       | 17                                    | 4,600                                               | 3,300 | HHXF630□RA101MJC5G |
|                          | 150               | JH0       | 13                                    | 5,300                                               | 3,800 | HHXF630□RA151MJH0G |

□ : Enter the appropriate terminal code.

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

| Capacitance( $\mu$ F) | Frequency(Hz) |      |      |      |      |      |              |
|-----------------------|---------------|------|------|------|------|------|--------------|
|                       | 120           | 1k   | 5k   | 10k  | 20k  | 30k  | 100k to 500k |
| 33 to 150             | 0.10          | 0.30 | 0.50 | 0.60 | 0.75 | 0.75 | 1.00         |
| 220 to 560            | 0.10          | 0.40 | 0.60 | 0.70 | 0.80 | 0.85 | 1.00         |

# HXE Series

- High ripple current model is now available for JC5 size.
- High reliability is realized by hybrid electrolyte
- Endurance with ripple current : 2,000 to 4,000 hours at 135°C
- Rated voltage range : 16 to 63V<sub>dc</sub>, Capacitance range : 22 to 560μF
- For high temperature and high reliability applications.  
(Automotive equipment, Base station equipment, etc.)
- RoHS2 Compliant
- Halogen Free
- AEC-Q200 compliant : Please contact Chemi-Con for more details, test data, information.

HXE

↑ Higher temperature  
Higher ripple  
HXC



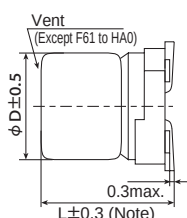
## ◆SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                       |                                       |      |      |      |      |                 |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|------|------|------|------|-----------------|
| Category                                               |                                                                                                                                                                                                                                                                                       |                                       |      |      |      |      |                 |
| Temperature Range                                      | -55 to +135℃                                                                                                                                                                                                                                                                          |                                       |      |      |      |      |                 |
| Rated Voltage Range                                    | 16 to 63V <sub>dc</sub>                                                                                                                                                                                                                                                               |                                       |      |      |      |      |                 |
| Capacitance Tolerance                                  | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                             |                                       |      |      |      |      |                 |
| Leakage Current                                        | I=0.01CV or 3 μA, whichever is greater<br>Where, I : Max. leakage current (μA), C: Nominal capacitance(μF), V : Rated voltage(V) (at 20℃ after 2 minutes)                                                                                                                             |                                       |      |      |      |      |                 |
| Dissipation Factor (tan δ )                            | Rated voltage(V <sub>dc</sub> )                                                                                                                                                                                                                                                       | 16V                                   | 25V  | 35V  | 50V  | 63V  | (at 20℃, 120Hz) |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.16                                  | 0.14 | 0.12 | 0.10 | 0.08 |                 |
| Low Temperature Characteristics (Max. Impedance Ratio) | Z(-25℃)/Z(+20℃)≤1.5<br>Z(-55℃)/Z(+20℃)≤2.0 (at 100kHz)                                                                                                                                                                                                                                |                                       |      |      |      |      |                 |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 4,000 hours (F61, F80 : 2,000 hours) at 125℃ or 135℃.        |                                       |      |      |      |      |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±30% of the initial value           |      |      |      |      |                 |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤ 200% of the initial specified value |      |      |      |      |                 |
|                                                        | ESR                                                                                                                                                                                                                                                                                   | ≤ 200% of the initial specified value |      |      |      |      |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value         |      |      |      |      |                 |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 135℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to item 4.1 of JIS C 5101-4. |                                       |      |      |      |      |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±30% of the initial value           |      |      |      |      |                 |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤ 200% of the initial specified value |      |      |      |      |                 |
|                                                        | ESR                                                                                                                                                                                                                                                                                   | ≤ 200% of the initial specified value |      |      |      |      |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value         |      |      |      |      |                 |
| Bias Humidity Test                                     | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjecting them to the DC rated voltage at 85℃, 85% RH for 2,000 hours.                                                                                                                 |                                       |      |      |      |      |                 |
|                                                        | Appearance                                                                                                                                                                                                                                                                            | No significant damage                 |      |      |      |      |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±30% of the initial value           |      |      |      |      |                 |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤ 200% of the initial specified value |      |      |      |      |                 |
|                                                        | ESR                                                                                                                                                                                                                                                                                   | ≤ 200% of the initial specified value |      |      |      |      |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value         |      |      |      |      |                 |

## ◆DIMENSIONS [mm]

- Terminal Code : A

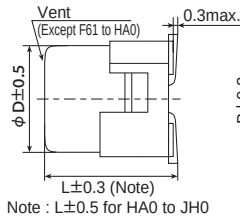
- Size code : F61 to JH0



Note : L±0.5 for HA0 to JH0

- Terminal Code : G(Vibration resistant structure)

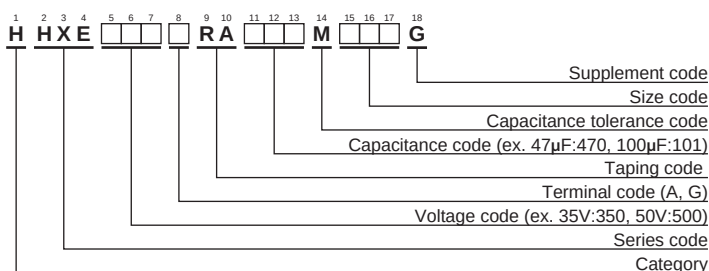
- Size code : F61 to JH0



▨ : Dummy terminals

| Size Code | φD  | L    | A    | B    | C    | W          | P   |
|-----------|-----|------|------|------|------|------------|-----|
| F61       | 6.3 | 5.8  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| F80       | 6.3 | 7.7  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| HA0       | 8   | 10.0 | 8.3  | 8.3  | 9.0  | 0.7 to 1.1 | 3.1 |
| JA0       | 10  | 10.0 | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |
| JC5       | 10  | 12.5 | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |
| JH0       | 10  | 16.5 | 10.3 | 10.3 | 11.0 | 1.0 to 1.3 | 4.2 |

## ◆PART NUMBERING SYSTEM



Please refer to "Product code guide (conductive polymer hybrid type)"

## ◆MARKING

EX) 35V270μF



- Rated voltage symbol

| Rated voltage (V <sub>dc</sub> ) | Symbol |
|----------------------------------|--------|
| 16                               | C      |
| 25                               | E      |
| 35                               | V      |
| 50                               | H      |
| 63                               | J      |



## HXE Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>( $\mu$ F) | Size code | ESR<br>(m $\Omega$ max./20°C, 100kHz) | Rated ripple current<br>(mA <sub>rms</sub> /100kHz) |       | Part No.           |
|--------------------------|-------------------|-----------|---------------------------------------|-----------------------------------------------------|-------|--------------------|
|                          |                   |           |                                       | 125°C                                               | 135°C |                    |
| 16                       | 82                | F61       | 45                                    | 1,700                                               | 950   | HHXE160□RA820MF61G |
|                          | 150               | F80       | 27                                    | 2,500                                               | 1,450 | HHXE160□RA151MF80G |
|                          | 270               | HA0       | 20                                    | 3,050                                               | 1,700 | HHXE160□RA271MHA0G |
|                          | 470               | JA0       | 18                                    | 3,400                                               | 2,100 | HHXE160□RA471MJA0G |
|                          | 560               | JC5       | 15                                    | 4,200                                               | 2,550 | HHXE160□RA561MJC5G |
| 25                       | 56                | F61       | 50                                    | 1,400                                               | 900   | HHXE250□RA560MF61G |
|                          | 100               | F80       | 30                                    | 2,100                                               | 1,400 | HHXE250□RA101MF80G |
|                          | 220               | HA0       | 22                                    | 2,900                                               | 1,600 | HHXE250□RA221MHA0G |
|                          | 330               | JA0       | 20                                    | 3,300                                               | 2,000 | HHXE250□RA331MJA0G |
|                          | 470               | JC5       | 16                                    | 4,050                                               | 2,500 | HHXE250□RA471MJC5G |
| 35                       | 560               | JH0       | 14                                    | 4,300                                               | 2,500 | HHXE250□RA561MJH0G |
|                          | 47                | F61       | 60                                    | 1,400                                               | 900   | HHXE350□RA470MF61G |
|                          | 68                | F80       | 35                                    | 2,100                                               | 1,400 | HHXE350□RA680MF80G |
|                          | 150               | HA0       | 22                                    | 2,900                                               | 1,600 | HHXE350□RA151MHA0G |
|                          | 270               | JA0       | 20                                    | 3,300                                               | 2,000 | HHXE350□RA271MJA0G |
| 50                       | 330               | JC5       | 17                                    | 3,950                                               | 2,400 | HHXE350□RA331MJC5G |
|                          | 470               | JH0       | 14                                    | 4,300                                               | 2,500 | HHXE350□RA471MJH0G |
|                          | 33                | HA0       | 30                                    | 2,400                                               | 1,250 | HHXE500□RA330MHA0G |
|                          | 47                | HA0       | 30                                    | 2,400                                               | 1,250 | HHXE500□RA470MHA0G |
|                          | 56                | JA0       | 25                                    | 2,900                                               | 1,600 | HHXE500□RA560MJA0G |
| 63                       | 68                | HA0       | 30                                    | 2,400                                               | 1,250 | HHXE500□RA680MHA0G |
|                          | 100               | JA0       | 25                                    | 2,900                                               | 1,600 | HHXE500□RA101MJA0G |
|                          | 120               | JA0       | 25                                    | 2,900                                               | 1,600 | HHXE500□RA121MJA0G |
|                          | 150               | JC5       | 19                                    | 3,700                                               | 2,250 | HHXE500□RA151MJC5G |
|                          | 220               | JH0       | 16                                    | 4,100                                               | 2,400 | HHXE500□RA221MJH0G |
| 63                       | 22                | HA0       | 40                                    | 2,100                                               | 1,100 | HHXE630□RA220MHA0G |
|                          | 33                | HA0       | 40                                    | 2,100                                               | 1,100 | HHXE630□RA330MHA0G |
|                          | 33                | JA0       | 30                                    | 2,600                                               | 1,400 | HHXE630□RA330MJA0G |
|                          | 47                | HA0       | 40                                    | 2,100                                               | 1,100 | HHXE630□RA470MHA0G |
|                          | 56                | JA0       | 30                                    | 2,600                                               | 1,400 | HHXE630□RA560MJA0G |
|                          | 82                | JA0       | 30                                    | 2,600                                               | 1,400 | HHXE630□RA820MJA0G |
|                          | 100               | JC5       | 22                                    | 3,450                                               | 2,100 | HHXE630□RA101MJC5G |
|                          | 150               | JH0       | 16                                    | 4,100                                               | 2,400 | HHXE630□RA151MJH0G |

□ : Enter the appropriate terminal code.

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

| Capacitance( $\mu$ F) | Frequency(Hz) |      |      |      |      |      |              |
|-----------------------|---------------|------|------|------|------|------|--------------|
|                       | 120           | 1k   | 5k   | 10k  | 20k  | 30k  | 100k to 500k |
| 22 to 33              | 0.07          | 0.30 | 0.50 | 0.60 | 0.70 | 0.75 | 1.00         |
| 47 to 150             | 0.10          | 0.40 | 0.60 | 0.70 | 0.80 | 0.80 | 1.00         |
| 220 to 560            | 0.13          | 0.45 | 0.65 | 0.75 | 0.85 | 0.85 | 1.00         |

# HXK Series

- High reliability is realized by hybrid electrolyte
- Endurance with ripple current : 4,000 hours at 125°C
- Rated voltage range : 16 to 35V<sub>dc</sub>, Capacitance range : 270 to 1,200μF
- For high temperature and high reliability applications.  
(Automotive equipment, etc.)
- RoHS2 Compliant
- Halogen Free
- AEC-Q200 compliant : Please contact Chemi-Con for more details, test data, information.

HXK

↓  
Downsized  
HXJ



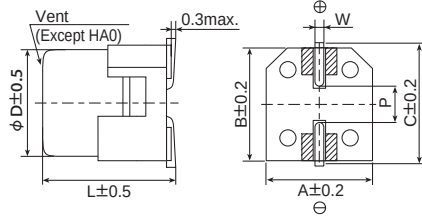
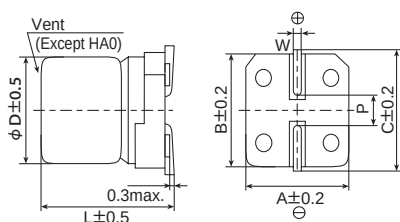
## SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                       |                                       |      |      |                 |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|------|------|-----------------|
| Category                                               |                                                                                                                                                                                                                                                                                       |                                       |      |      |                 |
| Temperature Range                                      | -55 to +125℃                                                                                                                                                                                                                                                                          |                                       |      |      |                 |
| Rated Voltage Range                                    | 16 to 35V <sub>dc</sub>                                                                                                                                                                                                                                                               |                                       |      |      |                 |
| Capacitance Tolerance                                  | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                             |                                       |      |      |                 |
| Leakage Current                                        | I=0.01CV or 3 μ A, whichever is greater<br>Where, I : Max. leakage current (μ A), C: Nominal capacitance(μ F), V : Rated voltage(V) (at 20℃ after 2 minutes)                                                                                                                          |                                       |      |      |                 |
| Dissipation Factor (tan δ )                            | Rated voltage(V <sub>dc</sub> )                                                                                                                                                                                                                                                       | 16V                                   | 25V  | 35V  | (at 20℃, 120Hz) |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.16                                  | 0.14 | 0.12 |                 |
| Low Temperature Characteristics (Max. Impedance Ratio) | Z(-25℃)/Z(+20℃)≤1.5<br>Z(-55℃)/Z(+20℃)≤2.0 (at 100kHz)                                                                                                                                                                                                                                |                                       |      |      |                 |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 4,000 hours at 125℃.                                         |                                       |      |      |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±30% of the initial value           |      |      |                 |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤ 200% of the initial specified value |      |      |                 |
|                                                        | ESR                                                                                                                                                                                                                                                                                   | ≤ 200% of the initial specified value |      |      |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value         |      |      |                 |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 125℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to item 4.1 of JIS C 5101-4. |                                       |      |      |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±30% of the initial value           |      |      |                 |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤ 200% of the initial specified value |      |      |                 |
|                                                        | ESR                                                                                                                                                                                                                                                                                   | ≤ 200% of the initial specified value |      |      |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value         |      |      |                 |
| Bias Humidity Test                                     | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjecting them to the DC rated voltage at 85℃, 85% RH for 2,000 hours.                                                                                                                 |                                       |      |      |                 |
|                                                        | Appearance                                                                                                                                                                                                                                                                            | No significant damage                 |      |      |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±30% of the initial value           |      |      |                 |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤ 200% of the initial specified value |      |      |                 |
|                                                        | ESR                                                                                                                                                                                                                                                                                   | ≤ 200% of the initial specified value |      |      |                 |
| Leakage current                                        | ≤ The initial specified value                                                                                                                                                                                                                                                         |                                       |      |      |                 |

## DIMENSIONS [mm]

- Terminal Code : A
- Size code : HA0 to JC5

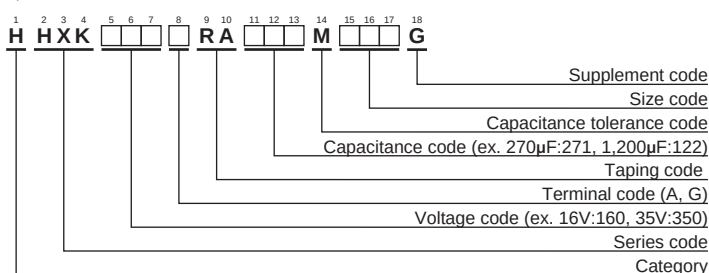
- Terminal Code : G(Vibration resistant structure)
- Size code : HA0 to JC5



| Size Code | φD | L    | A    | B    | C    | W          | P   |
|-----------|----|------|------|------|------|------------|-----|
| HA0       | 8  | 10.0 | 8.3  | 8.3  | 9.0  | 0.7 to 1.1 | 3.1 |
| JA0       | 10 | 10.0 | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |
| JC5       | 10 | 12.5 | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |

▨ : Dummy terminals

## PART NUMBERING SYSTEM



## MARKING

EX) 35V270μF



## Rated voltage symbol

| Rated voltage (V <sub>dc</sub> ) | Symbol |
|----------------------------------|--------|
| 16                               | C      |
| 25                               | E      |
| 35                               | V      |

Please refer to "Product code guide (conductive polymer hybrid type)"



## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>( $\mu$ F) | Size code | ESR<br>(m $\Omega$ max./20°C, 100kHz) | Rated ripple current<br>(mA <sub>rms</sub> /125°C, 100kHz) | Part No.           |
|--------------------------|-------------------|-----------|---------------------------------------|------------------------------------------------------------|--------------------|
| 16                       | 560               | HA0       | 20                                    | 3,100                                                      | HHXK160□RA561MHA0G |
|                          | 1,000             | JA0       | 18                                    | 3,500                                                      | HHXK160□RA102MJA0G |
|                          | 1,200             | JC5       | 15                                    | 4,100                                                      | HHXK160□RA122MJC5G |
| 25                       | 390               | HA0       | 22                                    | 3,100                                                      | HHXK250□RA391MHA0G |
|                          | 680               | JA0       | 20                                    | 3,500                                                      | HHXK250□RA681MJA0G |
|                          | 820               | JC5       | 15                                    | 4,100                                                      | HHXK250□RA821MJC5G |
| 35                       | 270               | HA0       | 22                                    | 3,100                                                      | HHXK350□RA271MHA0G |
|                          | 470               | JA0       | 20                                    | 3,500                                                      | HHXK350□RA471MJA0G |
|                          | 560               | JC5       | 16                                    | 4,100                                                      | HHXK350□RA561MJC5G |

□ : Enter the appropriate terminal code.

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

| Capacitance( $\mu$ F) | Frequency(Hz) |      |      |      |      |      |      |      |      |      |              |
|-----------------------|---------------|------|------|------|------|------|------|------|------|------|--------------|
|                       | 120           | 1k   | 2k   | 3k   | 5k   | 10k  | 15k  | 20k  | 30k  | 50k  | 100k to 500k |
| 270 to 1,200          | 0.15          | 0.50 | 0.60 | 0.65 | 0.70 | 0.75 | 0.80 | 0.85 | 0.85 | 0.90 | 1.00         |

# HXJ Series

- High reliability is realized by hybrid electrolyte
- Endurance with ripple current : 4,000 hours at 125°C
- Rated voltage range : 16 to 63V<sub>dc</sub>, Capacitance range : 56 to 820μF
- For high temperature and high reliability applications.  
(Automotive equipment, Base station equipment, etc.)
- RoHS2 Compliant
- Halogen Free
- AEC-Q200 compliant : Please contact Chemi-Con for more details, test data, information.

HXJ

↑ Downsized  
HXC

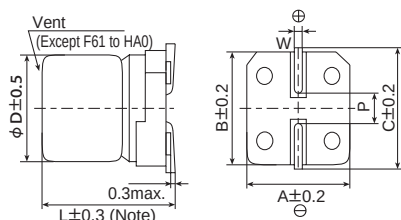


## ◆ SPECIFICATIONS

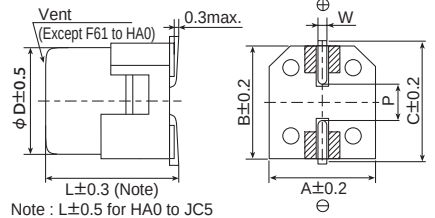
| Items                                                  | Characteristics                                                                                                                                                                                                                                                                         |                                       |      |      |      |      |                  |
|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|------|------|------|------|------------------|
| Category                                               |                                                                                                                                                                                                                                                                                         |                                       |      |      |      |      |                  |
| Temperature Range                                      | -55 to +125°C                                                                                                                                                                                                                                                                           |                                       |      |      |      |      |                  |
| Rated Voltage Range                                    | 16 to 63V <sub>dc</sub>                                                                                                                                                                                                                                                                 |                                       |      |      |      |      |                  |
| Capacitance Tolerance                                  | ± 20% (M) (at 20°C, 120Hz)                                                                                                                                                                                                                                                              |                                       |      |      |      |      |                  |
| Leakage Current                                        | I=0.01CV or 3 μ A, whichever is greater<br>Where, I : Max. leakage current (μ A), C: Nominal capacitance(μ F), V : Rated voltage(V) (at 20°C after 2 minutes)                                                                                                                           |                                       |      |      |      |      |                  |
| Dissipation Factor (tan δ )                            | Rated voltage(V <sub>dc</sub> )                                                                                                                                                                                                                                                         | 16V                                   | 25V  | 35V  | 50V  | 63V  | (at 20°C, 120Hz) |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                            | 0.16                                  | 0.14 | 0.12 | 0.10 | 0.08 |                  |
| Low Temperature Characteristics (Max. Impedance Ratio) | Z(-25°C)/Z(+20°C)≤1.5<br>Z(-55°C)/Z(+20°C)≤2.0 (at 100kHz)                                                                                                                                                                                                                              |                                       |      |      |      |      |                  |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 4,000 hours at 125°C.                                         |                                       |      |      |      |      |                  |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                      | ≤ ±30% of the initial value           |      |      |      |      |                  |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                           | ≤ 200% of the initial specified value |      |      |      |      |                  |
|                                                        | ESR                                                                                                                                                                                                                                                                                     | ≤ 200% of the initial specified value |      |      |      |      |                  |
|                                                        | Leakage current                                                                                                                                                                                                                                                                         | ≤ The initial specified value         |      |      |      |      |                  |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 125°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to item 4.1 of JIS C 5101-4. |                                       |      |      |      |      |                  |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                      | ≤ ±30% of the initial value           |      |      |      |      |                  |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                           | ≤ 200% of the initial specified value |      |      |      |      |                  |
|                                                        | ESR                                                                                                                                                                                                                                                                                     | ≤ 200% of the initial specified value |      |      |      |      |                  |
|                                                        | Leakage current                                                                                                                                                                                                                                                                         | ≤ The initial specified value         |      |      |      |      |                  |
| Bias Humidity Test                                     | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to the DC rated voltage at 85°C, 85% RH for 2,000 hours.                                                                                                                 |                                       |      |      |      |      |                  |
|                                                        | Appearance                                                                                                                                                                                                                                                                              | No significant damage                 |      |      |      |      |                  |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                      | ≤ ±30% of the initial value           |      |      |      |      |                  |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                           | ≤ 200% of the initial specified value |      |      |      |      |                  |
|                                                        | ESR                                                                                                                                                                                                                                                                                     | ≤ 200% of the initial specified value |      |      |      |      |                  |
|                                                        | Leakage current                                                                                                                                                                                                                                                                         | ≤ The initial specified value         |      |      |      |      |                  |

### ◆ DIMENSIONS [mm]

- Terminal Code : A
- Size code : F61 to JC5



Note :  $L \pm 0.5$  for HA0 to JC5

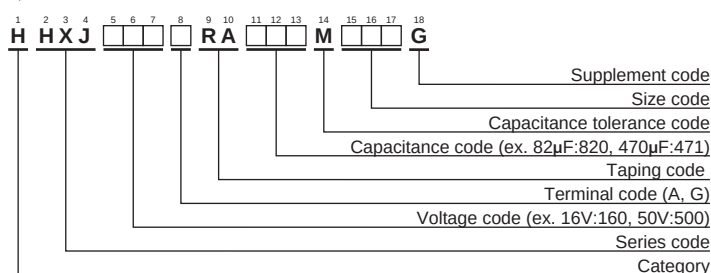


Note :  $L \pm 0.5$  for HA0 to JC5

 : Dummy terminals

| Size Code | φD  | L    | A    | B    | C    | W          | P   |
|-----------|-----|------|------|------|------|------------|-----|
| F61       | 6.3 | 5.8  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| F80       | 6.3 | 7.7  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| HA0       | 8   | 10.0 | 8.3  | 8.3  | 9.0  | 0.7 to 1.1 | 3.1 |
| JA0       | 10  | 10.0 | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |
| JC5       | 10  | 12.5 | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |

## ◆PART NUMBERING SYSTEM



Please refer to "Product code guide (conductive polymer hybrid type)"

**◆ MARKING**

EX) 35V330 $\mu$ F



- Rated voltage symbol

| Rated voltage (V <sub>dc</sub> ) | Symbol |
|----------------------------------|--------|
| 16                               | C      |
| 25                               | E      |
| 35                               | V      |
| 50                               | H      |
| 63                               | J      |



## HXJ Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>( $\mu$ F) | Size code | ESR<br>(m $\Omega$ max./20°C, 100kHz) | Rated ripple current<br>(mA <sub>rms</sub> /125°C, 100kHz) | Part No.           |
|--------------------------|-------------------|-----------|---------------------------------------|------------------------------------------------------------|--------------------|
| 16                       | 150               | F61       | 45                                    | 1,080                                                      | HHXJ160□RA151MF61G |
|                          | 220               | F80       | 27                                    | 1,800                                                      | HHXJ160□RA221MF80G |
|                          | 470               | HA0       | 20                                    | 2,000                                                      | HHXJ160□RA471MHA0G |
|                          | 820               | JA0       | 18                                    | 2,800                                                      | HHXJ160□RA821MJA0G |
| 25                       | 68                | F61       | 50                                    | 1,300                                                      | HHXJ250□RA680MF61G |
|                          | 82                | F61       | 50                                    | 1,300                                                      | HHXJ250□RA820MF61G |
|                          | 100               | F61       | 50                                    | 1,300                                                      | HHXJ250□RA101MF61G |
|                          | 150               | F80       | 30                                    | 1,800                                                      | HHXJ250□RA151MF80G |
|                          | 180               | F80       | 30                                    | 1,800                                                      | HHXJ250□RA181MF80G |
|                          | 270               | HA0       | 22                                    | 2,000                                                      | HHXJ250□RA271MHA0G |
|                          | 330               | HA0       | 22                                    | 2,000                                                      | HHXJ250□RA331MHA0G |
|                          | 470               | JA0       | 20                                    | 2,800                                                      | HHXJ250□RA471MJA0G |
|                          | 560               | JA0       | 20                                    | 2,800                                                      | HHXJ250□RA561MJA0G |
|                          | 680               | JC5       | 15                                    | 3,700                                                      | HHXJ250□RA681MJC5G |
| 35                       | 56                | F61       | 60                                    | 1,200                                                      | HHXJ350□RA560MF61G |
|                          | 68                | F61       | 60                                    | 1,200                                                      | HHXJ350□RA680MF61G |
|                          | 100               | F80       | 35                                    | 1,700                                                      | HHXJ350□RA101MF80G |
|                          | 120               | F80       | 35                                    | 1,700                                                      | HHXJ350□RA121MF80G |
|                          | 180               | HA0       | 22                                    | 2,000                                                      | HHXJ350□RA181MHA0G |
|                          | 220               | HA0       | 22                                    | 2,000                                                      | HHXJ350□RA221MHA0G |
|                          | 330               | JA0       | 20                                    | 2,800                                                      | HHXJ350□RA331MJA0G |
|                          | 390               | JA0       | 20                                    | 2,800                                                      | HHXJ350□RA391MJA0G |
|                          | 470               | JC5       | 16                                    | 3,600                                                      | HHXJ350□RA471MJC5G |
| 50                       | 82                | HA0       | 30                                    | 1,700                                                      | HHXJ500□RA820MHA0G |
|                          | 150               | JA0       | 25                                    | 2,000                                                      | HHXJ500□RA151MJA0G |
|                          | 180               | JC5       | 19                                    | 3,300                                                      | HHXJ500□RA181MJC5G |
| 63                       | 56                | HA0       | 40                                    | 1,700                                                      | HHXJ630□RA560MHA0G |
|                          | 100               | JA0       | 30                                    | 2,000                                                      | HHXJ630□RA101MJA0G |
|                          | 120               | JC5       | 19                                    | 3,300                                                      | HHXJ630□RA121MJC5G |

□ : Enter the appropriate terminal code.

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ● Frequency Multipliers

| Capacitance( $\mu$ F) | Frequency(Hz) | 120  | 1k   | 5k   | 10k  | 20k  | 30k  | 100k to 500k |
|-----------------------|---------------|------|------|------|------|------|------|--------------|
| 56 to 82              |               | 0.15 | 0.50 | 0.70 | 0.75 | 0.80 | 0.80 | 1.00         |
| 100 to 820            |               | 0.15 | 0.50 | 0.70 | 0.75 | 0.85 | 0.85 | 1.00         |



# HXC Series

● 80VV model has been introduced to the product range. High ripple current model is now available for JC5 size.

● High reliability and high voltage are realized by hybrid electrolyte

● Endurance with ripple current : 4,000 hours at 125°C

● Rated voltage range : 16 to 80V<sub>dc</sub>, Capacitance range : 6.8 to 560μF

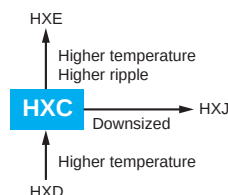
● For high temperature and high reliability applications.

(Automotive equipment, Base station equipment, etc.)

● RoHS2 Compliant

● Halogen Free

● AEC-Q200 compliant : Please contact Chemi-Con for more details, test data, information.



## SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                       |                                       |      |      |      |      |      |                 |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|------|------|------|------|------|-----------------|
| Category                                               |                                                                                                                                                                                                                                                                                       |                                       |      |      |      |      |      |                 |
| Temperature Range                                      | -55 to +125℃                                                                                                                                                                                                                                                                          |                                       |      |      |      |      |      |                 |
| Rated Voltage Range                                    | 16 to 80V <sub>dc</sub>                                                                                                                                                                                                                                                               |                                       |      |      |      |      |      |                 |
| Capacitance Tolerance                                  | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                             |                                       |      |      |      |      |      |                 |
| Leakage Current                                        | I=0.01CV or 3 μA, whichever is greater<br>Where, I : Max. leakage current (μA), C: Nominal capacitance(μF), V : Rated voltage(V) (at 20℃ after 2 minutes)                                                                                                                             |                                       |      |      |      |      |      |                 |
| Dissipation Factor (tan δ)                             | Rated voltage(V <sub>dc</sub> )                                                                                                                                                                                                                                                       | 16V                                   | 25V  | 35V  | 50V  | 63V  | 80V  | (at 20℃, 120Hz) |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.16                                  | 0.14 | 0.12 | 0.10 | 0.08 | 0.08 |                 |
| Low Temperature Characteristics (Max. Impedance Ratio) | Z(-25℃)/Z(+20℃)≤1.5<br>Z(-55℃)/Z(+20℃)≤2.0 (at 100kHz)                                                                                                                                                                                                                                |                                       |      |      |      |      |      |                 |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 4,000 hours at 125℃.                                         |                                       |      |      |      |      |      |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±30% of the initial value           |      |      |      |      |      |                 |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤ 200% of the initial specified value |      |      |      |      |      |                 |
|                                                        | ESR                                                                                                                                                                                                                                                                                   | ≤ 200% of the initial specified value |      |      |      |      |      |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value         |      |      |      |      |      |                 |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 125℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to item 4.1 of JIS C 5101-4. |                                       |      |      |      |      |      |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±30% of the initial value           |      |      |      |      |      |                 |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤ 200% of the initial specified value |      |      |      |      |      |                 |
|                                                        | ESR                                                                                                                                                                                                                                                                                   | ≤ 200% of the initial specified value |      |      |      |      |      |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value         |      |      |      |      |      |                 |
| Bias Humidity Test                                     | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjecting them to the DC rated voltage at 85℃, 85% RH for 2,000 hours.                                                                                                                 |                                       |      |      |      |      |      |                 |
|                                                        | Appearance                                                                                                                                                                                                                                                                            | No significant damage                 |      |      |      |      |      |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±30% of the initial value           |      |      |      |      |      |                 |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤ 200% of the initial specified value |      |      |      |      |      |                 |
|                                                        | ESR                                                                                                                                                                                                                                                                                   | ≤ 200% of the initial specified value |      |      |      |      |      |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value         |      |      |      |      |      |                 |

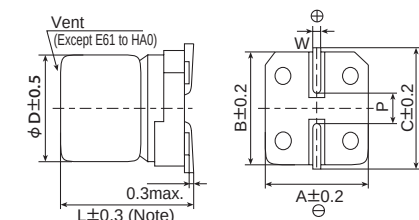
## DIMENSIONS [mm]

● Terminal Code : A

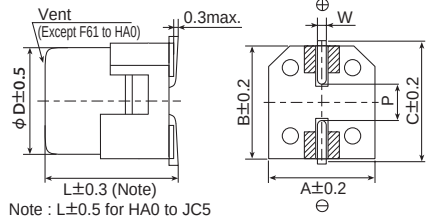
● Size code : E61 to JC5

● Terminal Code : G(Vibration resistant structure)

● Size code : F61 to JC5



Note : L±0.5 for HA0 to JC5

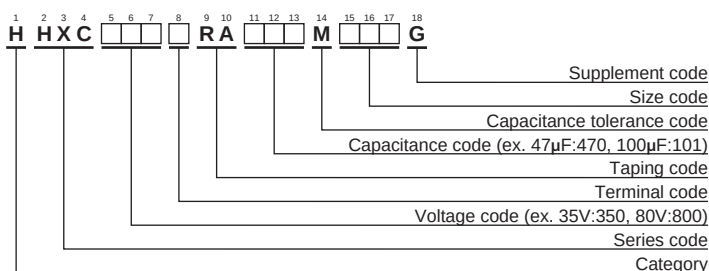


Note : L±0.5 for HA0 to JC5

▨ : Dummy terminals

| Size Code | φD  | L    | A    | B    | C    | W          | P   |
|-----------|-----|------|------|------|------|------------|-----|
| E61       | 5   | 5.8  | 5.3  | 5.3  | 5.9  | 0.5 to 0.8 | 1.4 |
| F61       | 6.3 | 5.8  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| F80       | 6.3 | 7.7  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| HA0       | 8   | 10.0 | 8.3  | 8.3  | 9.0  | 0.7 to 1.1 | 3.1 |
| JA0       | 10  | 10.0 | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |
| JC5       | 10  | 12.5 | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |

## PART NUMBERING SYSTEM



Please refer to "Product code guide (conductive polymer hybrid type)"

## MARKING

EX) 35V270μF



● Rated voltage symbol

| Rated voltage (V <sub>dc</sub> ) | Symbol |
|----------------------------------|--------|
| 16                               | C      |
| 25                               | E      |
| 35                               | V      |
| 50                               | H      |
| 63                               | J      |
| 80                               | K      |



## HXC Series

## ◆ STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Size code | ESR<br>(mΩ max./20°C, 100kHz) | Rated ripple current<br>(mA rms/125°C, 100kHz) | Part No.           |
|--------------------------|-------------|-----------|-------------------------------|------------------------------------------------|--------------------|
| 16                       | 47          | E61       | 80                            | 550                                            | HHXC160ARA470ME61G |
|                          | 82          | F61       | 45                            | 950                                            | HHXC160□RA820MF61G |
|                          | 150         | F80       | 27                            | 1,450                                          | HHXC160□RA151MF80G |
|                          | 270         | HA0       | 22                            | 1,700                                          | HHXC160□RA271MHA0G |
|                          | 470         | JA0       | 18                            | 2,100                                          | HHXC160□RA471MJA0G |
|                          | 560         | JC5       | 15                            | 2,550                                          | HHXC160□RA561MJC5G |
| 25                       | 33          | E61       | 80                            | 550                                            | HHXC250ARA330ME61G |
|                          | 47          | F61       | 50                            | 900                                            | HHXC250□RA470MF61G |
|                          | 56          | F61       | 50                            | 900                                            | HHXC250□RA560MF61G |
|                          | 68          | F80       | 30                            | 1,400                                          | HHXC250□RA680MF80G |
|                          | 100         | F80       | 30                            | 1,400                                          | HHXC250□RA101MF80G |
|                          | 150         | HA0       | 27                            | 1,600                                          | HHXC250□RA151MHA0G |
|                          | 220         | HA0       | 27                            | 1,600                                          | HHXC250□RA221MHA0G |
|                          | 270         | JA0       | 20                            | 2,000                                          | HHXC250□RA271MJA0G |
|                          | 330         | JA0       | 20                            | 2,000                                          | HHXC250□RA331MJA0G |
| 35                       | 470         | JC5       | 16                            | 2,500                                          | HHXC250□RA471MJC5G |
|                          | 22          | E61       | 100                           | 550                                            | HHXC350ARA220ME61G |
|                          | 27          | F61       | 60                            | 900                                            | HHXC350□RA270MF61G |
|                          | 47          | F61       | 60                            | 900                                            | HHXC350□RA470MF61G |
|                          | 47          | F80       | 35                            | 1,400                                          | HHXC350□RA470MF80G |
|                          | 68          | F80       | 35                            | 1,400                                          | HHXC350□RA680MF80G |
|                          | 100         | HA0       | 27                            | 1,600                                          | HHXC350□RA101MHA0G |
|                          | 150         | HA0       | 27                            | 1,600                                          | HHXC350□RA151MHA0G |
|                          | 150         | JA0       | 20                            | 2,000                                          | HHXC350□RA151MJA0G |
| 50                       | 270         | JA0       | 20                            | 2,000                                          | HHXC350□RA271MJA0G |
|                          | 330         | JC5       | 17                            | 2,400                                          | HHXC350□RA331MJC5G |
|                          | 10          | F61       | 80                            | 750                                            | HHXC500□RA100MF61G |
|                          | 15          | F80       | 40                            | 1,100                                          | HHXC500□RA150MF80G |
|                          | 22          | F61       | 80                            | 750                                            | HHXC500□RA220MF61G |
|                          | 33          | F80       | 40                            | 1,100                                          | HHXC500□RA330MF80G |
|                          | 33          | HA0       | 30                            | 1,250                                          | HHXC500□RA330MHA0G |
|                          | 47          | HA0       | 30                            | 1,250                                          | HHXC500□RA470MHA0G |
|                          | 56          | JA0       | 25                            | 1,600                                          | HHXC500□RA560MJA0G |
| 63                       | 68          | HA0       | 30                            | 1,250                                          | HHXC500□RA680MHA0G |
|                          | 100         | JA0       | 25                            | 1,600                                          | HHXC500□RA101MJA0G |
|                          | 120         | JA0       | 25                            | 1,600                                          | HHXC500□RA121MJA0G |
|                          | 150         | JC5       | 19                            | 2,250                                          | HHXC500□RA151MJC5G |
|                          | 6.8         | F61       | 120                           | 700                                            | HHXC630□RA6R8MF61G |
|                          | 10          | F61       | 120                           | 700                                            | HHXC630□RA100MF61G |
|                          | 10          | F80       | 80                            | 900                                            | HHXC630□RA100MF80G |
|                          | 22          | F80       | 80                            | 900                                            | HHXC630□RA220MF80G |
|                          | 22          | HA0       | 40                            | 1,100                                          | HHXC630□RA220MHA0G |
| 80                       | 33          | HA0       | 40                            | 1,100                                          | HHXC630□RA330MHA0G |
|                          | 33          | JA0       | 30                            | 1,400                                          | HHXC630□RA330MJA0G |
|                          | 47          | HA0       | 40                            | 1,100                                          | HHXC630□RA470MHA0G |
|                          | 56          | JA0       | 30                            | 1,400                                          | HHXC630□RA560MJA0G |
|                          | 82          | JA0       | 30                            | 1,400                                          | HHXC630□RA820MJA0G |
|                          | 100         | JC5       | 22                            | 2,100                                          | HHXC630□RA101MJC5G |
|                          | 22          | HA0       | 45                            | 1,100                                          | HHXC800□RA220MHA0G |
|                          | 39          | JA0       | 33                            | 1,400                                          | HHXC800□RA390MJA0G |
|                          | 47          | JA0       | 33                            | 1,700                                          | HHXC800□RA470MJA0G |

□ : Enter the appropriate terminal code.

## ◆ RATED RIPPLE CURRENT MULTIPLIERS

## ● Frequency Multipliers

| Capacitance(μF) | Frequency(Hz) | 120  | 1k   | 5k   | 10k  | 20k  | 30k  | 100k to 500k |
|-----------------|---------------|------|------|------|------|------|------|--------------|
| to 10           |               | 0.03 | 0.30 | 0.50 | 0.60 | 0.70 | 0.75 | 1.00         |
| 15 to 33        |               | 0.07 | 0.30 | 0.50 | 0.60 | 0.70 | 0.75 | 1.00         |
| 39 to 150       |               | 0.10 | 0.40 | 0.60 | 0.70 | 0.80 | 0.80 | 1.00         |
| 220 to 560      |               | 0.13 | 0.45 | 0.65 | 0.75 | 0.85 | 0.85 | 1.00         |

# HXD Series

- High reliability and high voltage are realized by hybrid electrolyte
- Endurance with ripple current : 5,000 to 10,000 hours at 105°C
- Rated voltage range : 16 to 80V<sub>dc</sub>, Capacitance range : 6.8 to 560μF
- For high reliability applications.  
(Automotive equipment, Base station equipment, etc.)
- RoHS2 Compliant
- Halogen Free
- AEC-Q200 compliant : Please contact Chemi-Con for more details, test data, information.

HXC  
↑  
Higher temperature

HXD



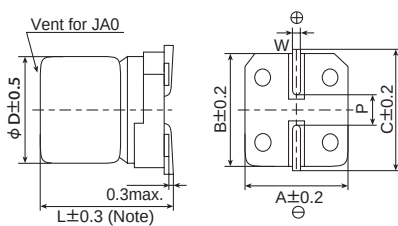
## SPECIFICATIONS

| Items                                                     | Characteristics                                                                                                                                                                                                                                                                        |                                       |      |      |      |      |      |                 |
|-----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|------|------|------|------|------|-----------------|
| Category                                                  |                                                                                                                                                                                                                                                                                        |                                       |      |      |      |      |      |                 |
| Temperature Range                                         | -55 to +105℃                                                                                                                                                                                                                                                                           |                                       |      |      |      |      |      |                 |
| Rated Voltage Range                                       | 16 to 80V <sub>dc</sub>                                                                                                                                                                                                                                                                |                                       |      |      |      |      |      |                 |
| Capacitance Tolerance                                     | ± 20% (M)<br>(at 20℃, 120Hz)                                                                                                                                                                                                                                                           |                                       |      |      |      |      |      |                 |
| Leakage Current                                           | I=0.01CV or 3 μA, whichever is greater<br>Where, I : Max. leakage current (μA), C: Nominal capacitance(μF), V : Rated voltage(V)<br>(at 20℃ after 2 minutes)                                                                                                                           |                                       |      |      |      |      |      |                 |
| Dissipation Factor<br>(tan δ)                             | Rated voltage(V <sub>dc</sub> )                                                                                                                                                                                                                                                        | 16V                                   | 25V  | 35V  | 50V  | 63V  | 80V  | (at 20℃, 120Hz) |
|                                                           | tan δ (Max.)                                                                                                                                                                                                                                                                           | 0.16                                  | 0.14 | 0.12 | 0.10 | 0.08 | 0.08 |                 |
| Low Temperature Characteristics<br>(Max. Impedance Ratio) | Z(-25℃)/Z(+20℃)≤1.5<br>Z(-55℃)/Z(+20℃)≤2.0<br>(at 100kHz)                                                                                                                                                                                                                              |                                       |      |      |      |      |      |                 |
| Endurance                                                 | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 10,000 hours (E61 and F61: 5,000 hours) at 105 ℃.             |                                       |      |      |      |      |      |                 |
|                                                           | Capacitance change                                                                                                                                                                                                                                                                     | ≤ ±30% of the initial value           |      |      |      |      |      |                 |
|                                                           | D.F. (tan δ)                                                                                                                                                                                                                                                                           | ≤ 200% of the initial specified value |      |      |      |      |      |                 |
|                                                           | ESR                                                                                                                                                                                                                                                                                    | ≤ 200% of the initial specified value |      |      |      |      |      |                 |
|                                                           | Leakage current                                                                                                                                                                                                                                                                        | ≤ The initial specified value         |      |      |      |      |      |                 |
| Shelf Life                                                | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105 ℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to item 4.1 of JIS C 5101-4. |                                       |      |      |      |      |      |                 |
|                                                           | Capacitance change                                                                                                                                                                                                                                                                     | ≤ ±30% of the initial value           |      |      |      |      |      |                 |
|                                                           | D.F. (tan δ)                                                                                                                                                                                                                                                                           | ≤ 200% of the initial specified value |      |      |      |      |      |                 |
|                                                           | ESR                                                                                                                                                                                                                                                                                    | ≤ 200% of the initial specified value |      |      |      |      |      |                 |
|                                                           | Leakage current                                                                                                                                                                                                                                                                        | ≤ The initial specified value         |      |      |      |      |      |                 |
| Bias Humidity Test                                        | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjecting them to the DC rated voltage at 85℃, 85% RH for 2,000 hours.                                                                                                                  |                                       |      |      |      |      |      |                 |
|                                                           | Appearance                                                                                                                                                                                                                                                                             | No significant damage                 |      |      |      |      |      |                 |
|                                                           | Capacitance change                                                                                                                                                                                                                                                                     | ≤ ±30% of the initial value           |      |      |      |      |      |                 |
|                                                           | D.F. (tan δ)                                                                                                                                                                                                                                                                           | ≤ 200% of the initial specified value |      |      |      |      |      |                 |
|                                                           | ESR                                                                                                                                                                                                                                                                                    | ≤ 200% of the initial specified value |      |      |      |      |      |                 |
|                                                           | Leakage current                                                                                                                                                                                                                                                                        | ≤ The initial specified value         |      |      |      |      |      |                 |

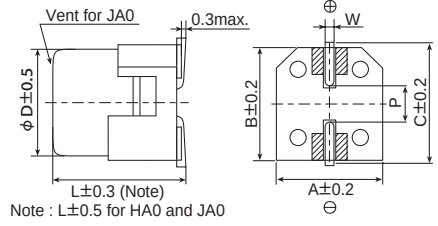
## DIMENSIONS [mm]

- Terminal Code : A
- Size code : E61 to JA0

- Terminal Code : G(Vibration resistant structure)
- Size code : F61 to JA0



Note : L±0.5 for HA0 and JA0

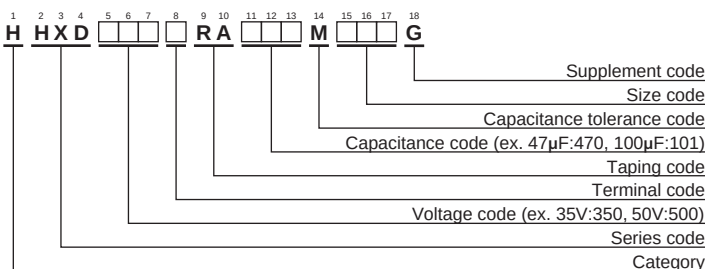


Note : L±0.5 for HA0 and JA0

⊠ : Dummy terminals

| Size Code | φD  | L    | A    | B    | C    | W          | P   |
|-----------|-----|------|------|------|------|------------|-----|
| E61       | 5   | 5.8  | 5.3  | 5.3  | 5.9  | 0.5 to 0.8 | 1.4 |
| F61       | 6.3 | 5.8  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| F80       | 6.3 | 7.7  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| HA0       | 8   | 10.0 | 8.3  | 8.3  | 9.0  | 0.7 to 1.1 | 3.1 |
| JA0       | 10  | 10.0 | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |

## PART NUMBERING SYSTEM



Please refer to "Product code guide (conductive polymer hybrid type)"

## MARKING

EX) 35V47μF



- Rated voltage symbol

| Rated voltage (V <sub>dc</sub> ) | Symbol |
|----------------------------------|--------|
| 16                               | C      |
| 25                               | E      |
| 35                               | V      |
| 50                               | H      |
| 63                               | J      |
| 80                               | K      |



## HXD Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Size code | ESR<br>(mΩ max./20°C, 100kHz) | Rated ripple current<br>(mA rms/105°C, 100kHz) | Part No.           |
|--------------------------|-------------|-----------|-------------------------------|------------------------------------------------|--------------------|
| 16                       | 47          | E61       | 80                            | 900                                            | HHXD160ARA470ME61G |
|                          | 82          | F61       | 45                            | 1,600                                          | HHXD160□RA820MF61G |
|                          | 100         | F61       | 45                            | 1,600                                          | HHXD160□RA101MF61G |
|                          | 150         | F80       | 27                            | 2,200                                          | HHXD160□RA151MF80G |
|                          | 180         | F80       | 27                            | 2,200                                          | HHXD160□RA181MF80G |
|                          | 270         | HA0       | 22                            | 2,500                                          | HHXD160□RA271MHA0G |
|                          | 330         | HA0       | 22                            | 2,500                                          | HHXD160□RA331MHA0G |
|                          | 470         | JA0       | 18                            | 2,600                                          | HHXD160□RA471MJA0G |
| 25                       | 560         | JA0       | 18                            | 2,600                                          | HHXD160□RA561MJA0G |
|                          | 33          | E61       | 80                            | 900                                            | HHXD250ARA330ME61G |
|                          | 47          | F61       | 50                            | 1,300                                          | HHXD250□RA470MF61G |
|                          | 56          | F61       | 50                            | 1,300                                          | HHXD250□RA560MF61G |
|                          | 68          | F80       | 30                            | 2,000                                          | HHXD250□RA680MF80G |
|                          | 100         | F80       | 30                            | 2,000                                          | HHXD250□RA101MF80G |
|                          | 150         | HA0       | 27                            | 2,300                                          | HHXD250□RA151MHA0G |
|                          | 220         | HA0       | 27                            | 2,300                                          | HHXD250□RA221MHA0G |
| 35                       | 270         | JA0       | 20                            | 2,500                                          | HHXD250□RA271MJA0G |
|                          | 330         | JA0       | 20                            | 2,500                                          | HHXD250□RA331MJA0G |
|                          | 390         | JA0       | 20                            | 2,500                                          | HHXD250□RA391MJA0G |
|                          | 22          | E61       | 100                           | 900                                            | HHXD350ARA220ME61G |
|                          | 27          | F61       | 60                            | 1,300                                          | HHXD350□RA270MF61G |
|                          | 47          | F61       | 60                            | 1,300                                          | HHXD350□RA470MF61G |
|                          | 47          | F80       | 35                            | 2,000                                          | HHXD350□RA470MF80G |
|                          | 68          | F80       | 35                            | 2,000                                          | HHXD350□RA680MF80G |
| 50                       | 100         | HA0       | 27                            | 2,300                                          | HHXD350□RA101MHA0G |
|                          | 150         | HA0       | 27                            | 2,300                                          | HHXD350□RA151MHA0G |
|                          | 150         | JA0       | 20                            | 2,500                                          | HHXD350□RA151MJA0G |
|                          | 270         | JA0       | 20                            | 2,500                                          | HHXD350□RA271MJA0G |
|                          | 10          | F61       | 80                            | 1,100                                          | HHXD500□RA100MF61G |
|                          | 15          | F80       | 40                            | 1,600                                          | HHXD500□RA150MF80G |
|                          | 22          | F61       | 80                            | 1,100                                          | HHXD500□RA220MF61G |
|                          | 33          | F80       | 40                            | 1,600                                          | HHXD500□RA330MF80G |
| 63                       | 33          | HA0       | 30                            | 1,800                                          | HHXD500□RA330MHA0G |
|                          | 47          | HA0       | 30                            | 1,800                                          | HHXD500□RA470MHA0G |
|                          | 56          | JA0       | 25                            | 2,400                                          | HHXD500□RA560MJA0G |
|                          | 68          | HA0       | 30                            | 1,800                                          | HHXD500□RA680MHA0G |
|                          | 82          | HA0       | 30                            | 1,800                                          | HHXD500□RA820MHA0G |
|                          | 100         | JA0       | 25                            | 2,400                                          | HHXD500□RA101MJA0G |
|                          | 120         | JA0       | 25                            | 2,400                                          | HHXD500□RA121MJA0G |
|                          | 6.8         | F61       | 120                           | 1,000                                          | HHXD630□RA6R8MF61G |
| 80                       | 10          | F61       | 120                           | 1,000                                          | HHXD630□RA100MF61G |
|                          | 10          | F80       | 80                            | 1,500                                          | HHXD630□RA100MF80G |
|                          | 22          | F80       | 80                            | 1,500                                          | HHXD630□RA220MF80G |
|                          | 22          | HA0       | 40                            | 1,600                                          | HHXD630□RA220MHA0G |
|                          | 33          | HA0       | 40                            | 1,600                                          | HHXD630□RA330MHA0G |
|                          | 33          | JA0       | 30                            | 2,400                                          | HHXD630□RA330MJA0G |
|                          | 47          | HA0       | 40                            | 1,600                                          | HHXD630□RA470MHA0G |
|                          | 56          | JA0       | 30                            | 2,400                                          | HHXD630□RA560MJA0G |
| 80                       | 82          | JA0       | 30                            | 2,400                                          | HHXD630□RA820MJA0G |
|                          | 100         | JA0       | 30                            | 2,400                                          | HHXD630□RA101MJA0G |
| 80                       | 27          | HA0       | 45                            | 1,600                                          | HHXD800□RA270MHA0G |
|                          | 56          | JA0       | 33                            | 2,400                                          | HHXD800□RA560MJA0G |

□ : Enter the appropriate terminal code.

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

| Capacitance(μF) | Frequency(Hz) | 120  | 1k   | 5k   | 10k  | 20k  | 30k  | 100k to 500k |
|-----------------|---------------|------|------|------|------|------|------|--------------|
| to 10           |               | 0.03 | 0.30 | 0.50 | 0.60 | 0.70 | 0.75 | 1.00         |
|                 | 15 to 33      | 0.07 | 0.30 | 0.50 | 0.60 | 0.70 | 0.75 | 1.00         |
| 47 to 180       |               | 0.10 | 0.40 | 0.60 | 0.70 | 0.80 | 0.80 | 1.00         |
|                 | 220 to 560    | 0.13 | 0.45 | 0.65 | 0.75 | 0.85 | 0.85 | 1.00         |

# HSE Series

- High reliability and high voltage are realized by hybrid electrolyte
- Endurance with ripple current : 4,000 hours at 135°C
- Rated voltage range : 25 to 63V<sub>dc</sub>, Capacitance range : 100 to 330μF
- For high temperature and high reliability applications.  
(Automotive equipment, Base station equipment, etc.)
- RoHS2 Compliant
- Halogen Free
- AEC-Q200 compliant : Please contact Chemi-Con for more details, test data, information.

HSE

Higher temperature  
Higher ripple  
HSC

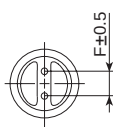
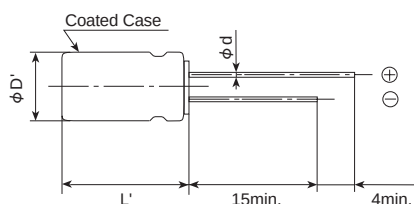


## SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
|--------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|--------------------|---------------------------------------|--------------|---------------------------------------|-----------------|---------------------------------------|-----------------|-------------------------------|
| Category                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| Temperature Range                                      | -55 to +135°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| Rated Voltage Range                                    | 25 to 63V <sub>dc</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| Capacitance Tolerance                                  | ±20% (M) (at 20°C, 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| Leakage Current                                        | I=0.05CV<br>Where, I : Max. leakage current (μA), C: Nominal capacitance(μF), V : Rated voltage(V) (at 20°C after 2 minutes)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| Dissipation Factor (tan δ)                             | 0.16 max. (at 20°C, 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| Low Temperature Characteristics (Max. Impedance Ratio) | Z(-25°C)/Z(+20°C) ≤ 1.5<br>Z(-55°C)/Z(+20°C) ≤ 2.0 (at 100kHz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 4,000 hours at 125°C or 135°C.<br><table border="1"> <tr> <td>Capacitance change</td><td>≤ ±30% of the initial value</td></tr> <tr> <td>D.F. (tan δ)</td><td>≤ 200% of the initial specified value</td></tr> <tr> <td>ESR</td><td>≤ 200% of the initial specified value</td></tr> <tr> <td>Leakage current</td><td>≤ The initial specified value</td></tr> </table>                                | Capacitance change | ≤ ±30% of the initial value | D.F. (tan δ)       | ≤ 200% of the initial specified value | ESR          | ≤ 200% of the initial specified value | Leakage current | ≤ The initial specified value         |                 |                               |
| Capacitance change                                     | ≤ ±30% of the initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| D.F. (tan δ)                                           | ≤ 200% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| ESR                                                    | ≤ 200% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| Leakage current                                        | ≤ The initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 135°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to item 4.1 of JIS C 5101-4.<br><table border="1"> <tr> <td>Capacitance change</td><td>≤ ±30% of the initial value</td></tr> <tr> <td>D.F. (tan δ)</td><td>≤ 200% of the initial specified value</td></tr> <tr> <td>ESR</td><td>≤ 200% of the initial specified value</td></tr> <tr> <td>Leakage current</td><td>≤ The initial specified value</td></tr> </table> | Capacitance change | ≤ ±30% of the initial value | D.F. (tan δ)       | ≤ 200% of the initial specified value | ESR          | ≤ 200% of the initial specified value | Leakage current | ≤ The initial specified value         |                 |                               |
| Capacitance change                                     | ≤ ±30% of the initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| D.F. (tan δ)                                           | ≤ 200% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| ESR                                                    | ≤ 200% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| Leakage current                                        | ≤ The initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| Bias Humidity Test                                     | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to the DC rated voltage at 85°C, 85% RH for 2,000 hours.<br><table border="1"> <tr> <td>Appearance</td><td>No significant damage</td></tr> <tr> <td>Capacitance change</td><td>≤ ±30% of the initial value</td></tr> <tr> <td>D.F. (tan δ)</td><td>≤ 200% of the initial specified value</td></tr> <tr> <td>ESR</td><td>≤ 200% of the initial specified value</td></tr> <tr> <td>Leakage current</td><td>≤ The initial specified value</td></tr> </table>                                                     | Appearance         | No significant damage       | Capacitance change | ≤ ±30% of the initial value           | D.F. (tan δ) | ≤ 200% of the initial specified value | ESR             | ≤ 200% of the initial specified value | Leakage current | ≤ The initial specified value |
| Appearance                                             | No significant damage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| Capacitance change                                     | ≤ ±30% of the initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| D.F. (tan δ)                                           | ≤ 200% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| ESR                                                    | ≤ 200% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| Leakage current                                        | ≤ The initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |

## DIMENSIONS [mm]

### Terminal Code : E



| Size Code | JC5        |
|-----------|------------|
| φD        | 10         |
| φd        | 0.6        |
| F         | 5.0        |
| φD'       | φD+0.5max. |
| L'        | L+1.5max.  |

## MARKING

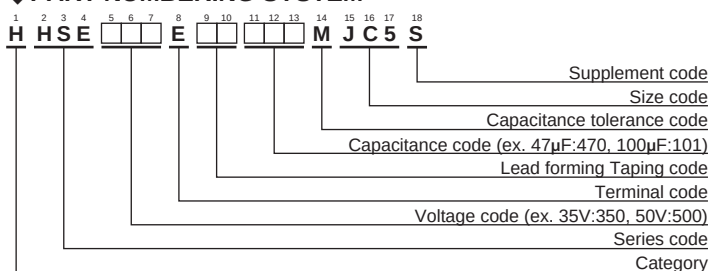
EX) 35V270μF



### Rated voltage symbol

| Rated voltage (V <sub>ac</sub> ) | Symbol |
|----------------------------------|--------|
| 25                               | E      |
| 35                               | V      |
| 50                               | H      |
| 63                               | J      |

## PART NUMBERING SYSTEM



Please refer to "Product code guide (conductive polymer hybrid type)"



HSESeries

◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φ D×L (mm) | ESR<br>(mΩ max./20℃, 100kHz) | Rated ripple current<br>(mA <sub>rms</sub> /100kHz) |       | Part No.           |
|--------------------------|-------------|-------------------------|------------------------------|-----------------------------------------------------|-------|--------------------|
|                          |             |                         |                              | 125℃                                                | 135℃  |                    |
| 25                       | 330         | 10×12.5                 | 16                           | 3,800                                               | 2,300 | HHSE250E□□331MJC5S |
| 35                       | 270         | 10×12.5                 | 17                           | 3,700                                               | 2,200 | HHSE350E□□271MJC5S |
| 50                       | 120         | 10×12.5                 | 19                           | 3,500                                               | 2,100 | HHSE500E□□121MJC5S |
| 63                       | 100         | 10×12.5                 | 20                           | 3,400                                               | 2,000 | HHSE630E□□101MJC5S |

□□:Enter the appropriate lead forming or taping code.

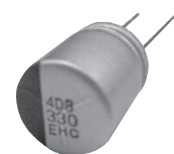
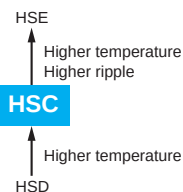
◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multipliers

| Capacitance(μF) \ Frequency(Hz) | 120  | 1k   | 5k   | 10k  | 20k  | 30k  | 100k to 500k |
|---------------------------------|------|------|------|------|------|------|--------------|
| 100, 120                        | 0.10 | 0.40 | 0.60 | 0.70 | 0.80 | 0.80 | 1.00         |
| 270, 330                        | 0.13 | 0.45 | 0.65 | 0.75 | 0.85 | 0.85 | 1.00         |

# HSC Series

- High reliability and high voltage are realized by hybrid electrolyte
- Endurance with ripple current : 4,000 hours at 125°C
- Rated voltage range : 25 to 80V<sub>dc</sub>, Capacitance range : 56 to 330μF
- For high temperature and high reliability applications.  
(Automotive equipment, Base station equipment, etc.)
- RoHS2 Compliant
- Halogen Free
- AEC-Q200 compliant : Please contact Chemi-Con for more details, test data, information.

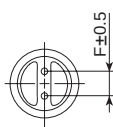
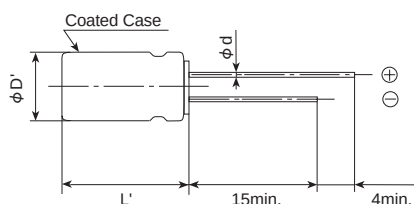


## SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
|--------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|--------------------|---------------------------------------|--------------|---------------------------------------|-----------------|---------------------------------------|-----------------|-------------------------------|
| Category                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| Temperature Range                                      | -55 to +125°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| Rated Voltage Range                                    | 25 to 80V <sub>dc</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| Capacitance Tolerance                                  | ±20% (M) (at 20°C, 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| Leakage Current                                        | I=0.05CV<br>Where, I : Max. leakage current (μA), C: Nominal capacitance(μF), V : Rated voltage(V) (at 20°C after 2 minutes)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| Dissipation Factor (tan δ)                             | 0.16 max. (at 20°C, 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| Low Temperature Characteristics (Max. Impedance Ratio) | Z(-25°C)/Z(+20°C) ≤ 1.5<br>Z(-55°C)/Z(+20°C) ≤ 2.0 (at 100kHz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 4,000 hours at 125°C.<br><table border="1"> <tr> <td>Capacitance change</td><td>≤ ±30% of the initial value</td></tr> <tr> <td>D.F. (tan δ)</td><td>≤ 200% of the initial specified value</td></tr> <tr> <td>ESR</td><td>≤ 200% of the initial specified value</td></tr> <tr> <td>Leakage current</td><td>≤ The initial specified value</td></tr> </table>                                         | Capacitance change | ≤ ±30% of the initial value | D.F. (tan δ)       | ≤ 200% of the initial specified value | ESR          | ≤ 200% of the initial specified value | Leakage current | ≤ The initial specified value         |                 |                               |
| Capacitance change                                     | ≤ ±30% of the initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| D.F. (tan δ)                                           | ≤ 200% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| ESR                                                    | ≤ 200% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| Leakage current                                        | ≤ The initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 125°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to item 4.1 of JIS C 5101-4.<br><table border="1"> <tr> <td>Capacitance change</td><td>≤ ±30% of the initial value</td></tr> <tr> <td>D.F. (tan δ)</td><td>≤ 200% of the initial specified value</td></tr> <tr> <td>ESR</td><td>≤ 200% of the initial specified value</td></tr> <tr> <td>Leakage current</td><td>≤ The initial specified value</td></tr> </table> | Capacitance change | ≤ ±30% of the initial value | D.F. (tan δ)       | ≤ 200% of the initial specified value | ESR          | ≤ 200% of the initial specified value | Leakage current | ≤ The initial specified value         |                 |                               |
| Capacitance change                                     | ≤ ±30% of the initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| D.F. (tan δ)                                           | ≤ 200% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| ESR                                                    | ≤ 200% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| Leakage current                                        | ≤ The initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| Bias Humidity Test                                     | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to the DC rated voltage at 85°C, 85% RH for 2,000 hours.<br><table border="1"> <tr> <td>Appearance</td><td>No significant damage</td></tr> <tr> <td>Capacitance change</td><td>≤ ±30% of the initial value</td></tr> <tr> <td>D.F. (tan δ)</td><td>≤ 200% of the initial specified value</td></tr> <tr> <td>ESR</td><td>≤ 200% of the initial specified value</td></tr> <tr> <td>Leakage current</td><td>≤ The initial specified value</td></tr> </table>                                                     | Appearance         | No significant damage       | Capacitance change | ≤ ±30% of the initial value           | D.F. (tan δ) | ≤ 200% of the initial specified value | ESR             | ≤ 200% of the initial specified value | Leakage current | ≤ The initial specified value |
| Appearance                                             | No significant damage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| Capacitance change                                     | ≤ ±30% of the initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| D.F. (tan δ)                                           | ≤ 200% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| ESR                                                    | ≤ 200% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| Leakage current                                        | ≤ The initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |

## DIMENSIONS [mm]

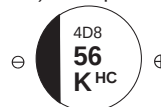
### Terminal Code : E



| Size Code | JC5        |
|-----------|------------|
| φD        | 10         |
| φd        | 0.6        |
| F         | 5.0        |
| φD'       | φD+0.5max. |
| L'        | L+1.5max.  |

## MARKING

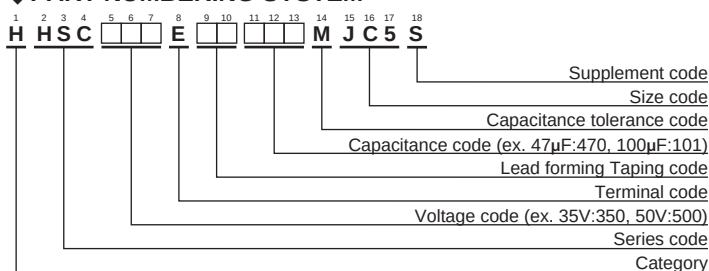
EX) 80V56μF



### Rated voltage symbol

| Rated voltage (V <sub>dc</sub> ) | Symbol |
|----------------------------------|--------|
| 25                               | E      |
| 35                               | V      |
| 50                               | H      |
| 63                               | J      |
| 80                               | K      |

## PART NUMBERING SYSTEM



Please refer to "Product code guide (conductive polymer hybrid type)"





## HSC Series

### ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φ D×L (mm) | ESR<br>(mΩ max./20°C, 100kHz) | Rated ripple current<br>(mA <sub>rms</sub> /125°C, 100kHz) | Part No.           |
|--------------------------|-------------|-------------------------|-------------------------------|------------------------------------------------------------|--------------------|
| 25                       | 330         | 10×12.5                 | 16                            | 2,300                                                      | HHSC250E□□331MJC5S |
| 35                       | 270         | 10×12.5                 | 17                            | 2,200                                                      | HHSC350E□□271MJC5S |
| 50                       | 120         | 10×12.5                 | 19                            | 2,100                                                      | HHSC500E□□121MJC5S |
| 63                       | 100         | 10×12.5                 | 20                            | 2,000                                                      | HHSC630E□□101MJC5S |
| 80                       | 56          | 10×12.5                 | 28                            | 1,900                                                      | HHSC800E□□560MJC5S |

□□:Enter the appropriate lead forming or taping code.

### ◆RATED RIPPLE CURRENT MULTIPLIERS

#### ●Frequency Multipliers

| Capacitance(μF) \ Frequency(Hz) | 120  | 1k   | 5k   | 10k  | 20k  | 30k  | 100k to 500k |
|---------------------------------|------|------|------|------|------|------|--------------|
| 56 to 120                       | 0.10 | 0.40 | 0.60 | 0.70 | 0.80 | 0.80 | 1.00         |
| 270, 330                        | 0.13 | 0.45 | 0.65 | 0.75 | 0.85 | 0.85 | 1.00         |

# HSD Series

- High reliability and high voltage are realized by hybrid electrolyte
- Endurance with ripple current : 10,000 hours at 105°C
- Rated voltage range : 25 to 80V<sub>dc</sub>, Capacitance range : 68 to 470μF
- For high reliability applications.  
(Automotive equipment, Base station equipment, etc.)
- RoHS2 Compliant
- Halogen Free
- AEC-Q200 compliant : Please contact Chemi-Con for more details, test data, information.

HSC  
↑ Higher temperature

HSD

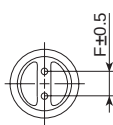
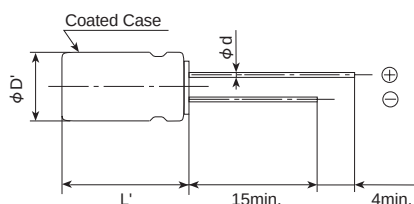


## SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
|--------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|--------------------|---------------------------------------|--------------|---------------------------------------|-----------------|---------------------------------------|-----------------|-------------------------------|
| Category                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| Temperature Range                                      | -55 to +105°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| Rated Voltage Range                                    | 25 to 80V <sub>dc</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| Capacitance Tolerance                                  | ±20% (M) (at 20°C, 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| Leakage Current                                        | I=0.05CV<br>Where, I : Max. leakage current (μA), C: Nominal capacitance(μF), V : Rated voltage(V) (at 20°C after 2 minutes)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| Dissipation Factor (tan δ)                             | 0.16 max. (at 20°C, 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| Low Temperature Characteristics (Max. Impedance Ratio) | Z(-25°C)/Z(+20°C) ≤ 1.5<br>Z(-55°C)/Z(+20°C) ≤ 2.0 (at 100kHz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 10,000 hours at 105 °C.<br><table border="1"> <tr> <td>Capacitance change</td><td>≤ ±30% of the initial value</td></tr> <tr> <td>D.F. (tan δ)</td><td>≤ 200% of the initial specified value</td></tr> <tr> <td>ESR</td><td>≤ 200% of the initial specified value</td></tr> <tr> <td>Leakage current</td><td>≤ The initial specified value</td></tr> </table>                                        | Capacitance change | ≤ ±30% of the initial value | D.F. (tan δ)       | ≤ 200% of the initial specified value | ESR          | ≤ 200% of the initial specified value | Leakage current | ≤ The initial specified value         |                 |                               |
| Capacitance change                                     | ≤ ±30% of the initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| D.F. (tan δ)                                           | ≤ 200% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| ESR                                                    | ≤ 200% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| Leakage current                                        | ≤ The initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105 °C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to item 4.1 of JIS C 5101-4.<br><table border="1"> <tr> <td>Capacitance change</td><td>≤ ±30% of the initial value</td></tr> <tr> <td>D.F. (tan δ)</td><td>≤ 200% of the initial specified value</td></tr> <tr> <td>ESR</td><td>≤ 200% of the initial specified value</td></tr> <tr> <td>Leakage current</td><td>≤ The initial specified value</td></tr> </table> | Capacitance change | ≤ ±30% of the initial value | D.F. (tan δ)       | ≤ 200% of the initial specified value | ESR          | ≤ 200% of the initial specified value | Leakage current | ≤ The initial specified value         |                 |                               |
| Capacitance change                                     | ≤ ±30% of the initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| D.F. (tan δ)                                           | ≤ 200% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| ESR                                                    | ≤ 200% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| Leakage current                                        | ≤ The initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| Bias Humidity Test                                     | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjecting them to the DC rated voltage at 85°C, 85% RH for 2,000 hours.<br><table border="1"> <tr> <td>Appearance</td><td>No significant damage</td></tr> <tr> <td>Capacitance change</td><td>≤ ±30% of the initial value</td></tr> <tr> <td>D.F. (tan δ)</td><td>≤ 200% of the initial specified value</td></tr> <tr> <td>ESR</td><td>≤ 200% of the initial specified value</td></tr> <tr> <td>Leakage current</td><td>≤ The initial specified value</td></tr> </table>                                                      | Appearance         | No significant damage       | Capacitance change | ≤ ±30% of the initial value           | D.F. (tan δ) | ≤ 200% of the initial specified value | ESR             | ≤ 200% of the initial specified value | Leakage current | ≤ The initial specified value |
| Appearance                                             | No significant damage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| Capacitance change                                     | ≤ ±30% of the initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| D.F. (tan δ)                                           | ≤ 200% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| ESR                                                    | ≤ 200% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |
| Leakage current                                        | ≤ The initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                    |                             |                    |                                       |              |                                       |                 |                                       |                 |                               |

## DIMENSIONS [mm]

### Terminal Code : E



| Size Code | JC5        |
|-----------|------------|
| φD        | 10         |
| φd        | 0.6        |
| F         | 5.0        |
| φD'       | φD+0.5max. |
| L'        | L+1.5max.  |

## MARKING

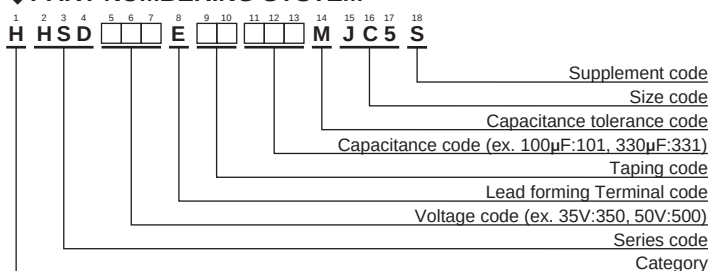
EX) 25V330μF



### Rated voltage symbol

| Rated voltage (V <sub>dc</sub> ) | Symbol |
|----------------------------------|--------|
| 25                               | E      |
| 35                               | V      |
| 50                               | H      |
| 63                               | J      |
| 80                               | K      |

## PART NUMBERING SYSTEM



Please refer to "Product code guide (conductive polymer hybrid type)"



HSDSeries

◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap (μF) | Case size φ<br>D×L (mm) | ESR<br>(mΩ max./20°C, 100kHz) | Rated ripple current<br>(mA <sub>rms</sub> /105°C, 100kHz) | Part No.           |
|--------------------------|----------|-------------------------|-------------------------------|------------------------------------------------------------|--------------------|
| 25                       | 330      | 10×12.5                 | 16                            | 3,100                                                      | HHSD250E□□331MJC5S |
|                          | 470      | 10×12.5                 | 16                            | 3,100                                                      | HHSD250E□□471MJC5S |
| 35                       | 270      | 10×12.5                 | 17                            | 3,000                                                      | HHSD350E□□271MJC5S |
|                          | 330      | 10×12.5                 | 17                            | 3,000                                                      | HHSD350E□□331MJC5S |
| 50                       | 120      | 10×12.5                 | 19                            | 2,800                                                      | HHSD500E□□121MJC5S |
|                          | 180      | 10×12.5                 | 19                            | 3,000                                                      | HHSD500E□□181MJC5S |
| 63                       | 100      | 10×12.5                 | 20                            | 2,600                                                      | HHSD630E□□101MJC5S |
|                          | 120      | 10×12.5                 | 20                            | 3,000                                                      | HHSD630E□□121MJC5S |
| 80                       | 68       | 10×12.5                 | 28                            | 3,000                                                      | HHSD800E□□680MJC5S |

□□:Enter the appropriate lead forming or taping code.

◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multipliers

| Capacitance(μF) \ Frequency(Hz) | 120  | 1k   | 5k   | 10k  | 20k  | 30k  | 100k to 500k |
|---------------------------------|------|------|------|------|------|------|--------------|
| 68 to 180                       | 0.10 | 0.40 | 0.60 | 0.70 | 0.80 | 0.80 | 1.00         |
| 270 to 470                      | 0.13 | 0.45 | 0.65 | 0.75 | 0.85 | 0.85 | 1.00         |

# Aluminum Electrolytic Capacitors



## Precautions and Guidelines (Aluminum Electrolytic Capacitors)

The circuits described as examples in this catalog and the "delivery specifications" are featured in order to show the operations and usage of our products, however, this fact does not guarantee that the circuits are available to function in your equipment systems.

We are not in any case responsible for any failures or damage caused by the use of information contained herein.

You should examine our products, of which the characteristics are described in the "delivery specifications" and other documents, and determine whether or not our products suit your requirements according to the specifications of your equipment systems. Therefore, you bear final responsibility regarding the use of our products.

Please make sure that you take appropriate safety measures such as use of redundant design and malfunction prevention measures in order to prevent fatal accidents and/or fires in the event any of our products malfunction.

For Conductive Polymer Aluminum Solid Capacitors, see Precautions and Guidelines (Conductive Polymer).

For Conductive Polymer Hybrid Aluminum Electrolytic Capacitors, see Precautions and Guidelines (Conductive Polymer Hybrid).

### 1 Device circuits design considerations

#### 1) Confirm installation and operating requirements for capacitors, then use them within the performance limits prescribed in this catalog or product specifications.

#### 2) Polarity

Aluminum electrolytic capacitors are polarized.

Never apply a reverse voltage or AC voltage. Connecting with wrong polarity will short-circuit or damage the capacitor with the pressure relief vent opening early on. To identify the polarity of a capacitor, see the relevant diagram in the catalogs or product specifications, or the polarity marking on the body of the capacitor. Incidentally, the rubber end seal bungs of the radial lead type capacitors have a solder-flux gas escaping configuration, which is nothing to do with the polarity of the capacitors. For circuits where the polarity is occasionally reversed, use a bi-polar type of aluminum electrolytic capacitor. However, note that even bi-polar type capacitors must not be used for AC circuits.

#### 3) Operating voltage

Do not apply an over-voltage that exceeds a rated voltage specified for the capacitors. The total peak value of the ripple voltage plus the DC voltage must not exceed the rated voltage of the capacitors. Although capacitors specify a surge voltage that exceeds the full rated voltage, it does not assure long-term use but limited use under specific conditions.

#### 4) Ripple current

Do not apply an overcurrent that exceeds the rated ripple current specified for the capacitors. Excessive ripple current will increase heat production within the capacitors, causing the capacitors to be damaged as follows:

- Shorten lifetime
- Open pressure relief vent
- Short circuit

The rated ripple current is specified along with a specific ripple frequency.

Where using the capacitors at any other ripple frequency other than the specified frequency, calculate the allowable ripple current by multiplying the rated ripple current by a frequency compensation factor (Frequency Multiplier) specified for each product series.

#### 5) Operating temperature (Category temperature)

Do not apply high temperatures that exceed the upper limit of the category temperature range specified for the capacitors.

Using the capacitor at temperatures higher than the upper limit will considerably shorten the lifetime of the capacitor and make the pressure relief vent open.

In other words, lowering ambient temperatures will extend the expected lifetime of the capacitors.

#### 6) Lifetime

Select the capacitors to meet the service life requirements of a device.

#### 7) Charging and discharging

Do not use capacitors in circuits intended for rapid charge and discharge cycle operations.

If capacitors are used in the circuits that repeat a charge and discharge with a large voltage drop or a rapid charge and discharge at a short interval cycle, capacitance will decrease and/or the capacitors will be damaged by internal heat generation.

Consult us for a heavy charge and discharge type of capacitor so that the capacitor will be designed in accordance with requirements of duty cycle of charge and discharge, the number of cycles, discharging resistance and operating temperatures.

#### 8) Failure mode of capacitors

Non-solid aluminum electrolytic capacitors have a limited lifetime which ends in an open circuit failure mode, in general. Depending on the product type and operating conditions, the failure mode may involve in opening of the pressure relief vent.

#### 9) Capacitor insulation

Electrically isolate the following sections of a capacitor from the negative terminal, the positive terminal and the circuit patterns.

- The outer can case of a non-solid aluminum capacitor.
- The dummy terminal of a snap-in type non-solid aluminum capacitor, which is designed for mounting stability.

#### 10) Outer sleeve

The outer sleeve of a capacitor does not assure electrical insulation (except for screw-terminal type capacitors). It should not be used where electrical insulation is required.

#### 11) Operating conditions

Do not use/expose capacitors to the following conditions:

- ① Direct contact with water, salt water or oil, or high condensation environment.
- ② Direct sunlight.
- ③ Toxic gases such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine and its compounds, bromine and its compounds and ammonium.
- ④ Ozone, ultraviolet rays or radiation.
- ⑤ Extreme vibration or mechanical shock that exceeds limits in the catalogs or product specifications.

The standard vibration condition is applicable to JIS C 5101-4.

#### 12) Mounting

① Non-solid aluminum electrolytic capacitors contain paper separators and electric-conductive electrolyte that contains organic solvent as main solvent material, both of which are flammable. If the electrolyte leaks onto a printed circuit board, it can erode the device circuit pattern, may short-circuit the copper traces, smoke and burn. Make sure of designing a PC board as follows:

- Provide the appropriate hole spacing on the PC board to match the terminal spacing of a capacitor.
- Provide the following adequate clearance space over the pressure relief vent of a capacitor to avoid blocking the correct opening of the pressure relief vent.

| Case diameter       | Clearance   |
|---------------------|-------------|
| φ 8(6.3) to φ 16mm: | 2mm minimum |
| φ 18 to φ 35mm:     | 3mm minimum |
| φ 40 mm and above:  | 5mm minimum |

- Do not locate any wire or circuit pattern over the pressure relief vent of a capacitor.
  - If a capacitor is mounted with its pressure relief vent facing down on the PC board, provide a ventilation hole in the board beneath it to let gas escape when the vent opens.
  - Do not print any copper trace under the seal (terminal) side of a capacitor. Copper traces should be 1 mm (preferably 2mm or more) spaced apart from the side of the capacitor body.
  - Avoid locating any heat source components near capacitors or on the opposite side of the PC board under capacitors.
  - In designing a double-sided PC board, do not locate any through-hole via or unnecessary hole underneath a capacitor.
  - In designing a double-sided PC board, do not print any circuit pattern underneath a capacitor.
- ② For a screw terminal type capacitor, tightening the terminal screws and the mounting clamp should be within the maximum torque specified in the catalogs or product specifications. Do not mount a screw terminal type capacitor with the terminals facing downward. Also, if the body of a capacitor is installed horizontally such as being laid on its side, do not position the pressure relief vent downward.
  - ③ For a chip type capacitor, design the land patterns of the PC board in accordance with the recommended footprint dimensions described in the catalogs or product specifications.

### 13) Using capacitors for significantly safety-oriented applications

Consult with us in advance of usage of our products in the following listed applications. ① Aerospace equipment ② Power generation equipment such as thermal power, nuclear power etc. ③ Medical equipment ④ Transport equipment (automobiles, trains, ships, etc.) ⑤ Transportation control equipment ⑥ Disaster prevention / crime prevention equipment ⑦ Highly publicized information processing equipment ⑧ Submarine equipment ⑨ Other applications that are not considered general-purpose applications.

Note that some products such as photoflash use capacitors which have been designed for specific applications cannot be used for any other application.

### 14) Others

Design device circuits taking into consideration the following conditions:

- ① Electrical characteristics of a capacitor depend on the temperature and frequency. In designing the device circuits, consider the change in the characteristics.
- ② If using more than one capacitor connected in parallel, design the device circuits to balance the current flow in individual capacitors.
- ③ If using more than one capacitor connected in series, connect shunting resistors in parallel with the individual capacitors to balance the voltage.

## 2) Installation

### 1) Assembling

- ① Do not try to reuse the capacitors once assembled and electrified, except only capacitors that are taken from a device for periodic inspection to measure their electrical characteristics.
- ② Capacitors may have been spontaneously recharged with time by a recovery voltage phenomenon. In this case, discharge the capacitors through a resistor of approximately 1kΩ before use.
- ③ If non-solid aluminum electrolytic capacitors have been stored at any conditions more than 35°C and 75%RH for long storage periods of time more than the limits specified in the catalogs or product specifications, they may have high leakage current. In this case, make pre-conditioning by applying the rated voltage through a resistor of approximately 1kΩ.

- ④ Confirm the rated capacitance and voltage of capacitors before installation.
- ⑤ Confirm the polarity of capacitors before installation.
- ⑥ Do not try to use the capacitors that were dropped to the floor and so forth.
- ⑦ Do not deform the can case of a capacitor.
- ⑧ Make sure that the terminal spacing of a capacitor equals the holes spacing on the PC board before installing the capacitor. For radial lead type capacitors, some standard pre-formed lead types are also available.
- ⑨ When installing a snap-in type capacitor on the PC board, insert the terminals into the holes and press the capacitor down until the body is settled flush on the surface of the PC board (without the body standing off).
- ⑩ Do not apply excessive mechanical force to capacitors more than the limits prescribed in the catalogs or product specifications. Avoid excessive mechanical force while the capacitors are in the process of vacuum-picking, placing and positioning by automatic mounting machines or cutting the lead wires by automatic insertion machines.

### 2) Soldering and heat resistance

- ① For soldering using a soldering iron, consider the following conditions:
  - Soldering conditions (temperature and time) should be within the limits prescribed in the catalogs or product specifications.
  - If it is necessary to pre-form the terminal spacing of a capacitor to match the hole spacing on the PC board before assembly and soldering, do not make mechanical stress reach into the body of the capacitor but only the lead wires.
  - Do not touch the body of a capacitor with the hot tip of the soldering iron.
- ② For flow soldering, consider the following conditions:
  - Do not dip the body of a capacitor into a solder bath. Expose only the terminals to the melt solder with the PC board interposing between the solder and the body of the capacitor. Solder only the reverse side of the PC board where the body of the capacitor is not located.
  - Soldering conditions should be within the limits prescribed in the catalogs or product specifications.
  - Do not apply flux to any part of a capacitor other than the terminals.
  - Do not let any other component lean against nor come into contact with the capacitor while soldering.
- ③ For reflow soldering, consider the following conditions:
  - Soldering conditions (preheat, reflow temperature and time) should be within the limits prescribed in the catalogs or product specifications.
  - When using the infrared heater and setting its temperatures, adjust the heating levels taking into consideration that the color and materials of a capacitor vary in their infrared absorbance.
  - The allowable number of reflow passes is specified in the catalogs or product specifications.
  - When mounting a capacitor on the double-sided PC board, do not place any wiring pattern underneath the capacitor.
  - Please consult us about vapor phase soldering (VPS).
- ④ Do not try to reuse the capacitor that was removed from the PC board after soldering.
- ⑤ Only use chip type capacitors for reflow soldering. The other type capacitors are not designed for the reflow.

### 3) Handling after soldering

After soldering the PC board, do not apply the following mechanical stress to the capacitor:

- ① Do not tilt, push down or twist the body of the capacitor.
- ② Do not grab the body of the capacitor to carry the assembly board.
- ③ Do not hit anything against the capacitor. When stacking the assembled boards, do not put any of the PC boards or other



components against the capacitor.

- ④ Do not drop the assembled board.

#### 4) Cleaning assembly boards

- ① Do not clean capacitors with the following cleaning agents:

- Halogenated solvents: cause capacitor failures due to corrosion.
- Alkali system solvents: corrode (dissolve) the aluminum can case.
- Terpene and petroleum system solvents: deteriorate the rubber seal materials.
- Xylene and toluene: deteriorates the rubber seal materials as well.
- Acetone: erases the markings printed on a capacitor.

Where cleaning is necessary, use only solvent resistant type capacitors that have been assured for the cleaning within the specific cleaning conditions prescriber in the catalogs or product specifications. In particular, carefully set up the conditions for ultrasonic cleaning system.

- ② Where cleaning the solvent resistance type of aluminum electrolytic capacitors, confirm the following conditions:

- Control the contamination (the conductivity, pH, specific gravity, water content, etc.) of the cleaning agents.
- After the cleaning, do not leave the capacitors (assembly boards) in an environment of cleaning agent-rich or in a closed container. Sufficiently evaporate the residual cleaning agent from the assembly boards and the capacitors by forced hot air at temperatures less than the upper limit of category temperature range for more than 10 minutes.

In general, aluminum electrolytic capacitors are sensitive to contamination of halogen ions (particularly to chlorine ions). Depending on the properties of the electrolyte and rubber seal materials used in a capacitor, the halogen ions lead up to catastrophic failures on the capacitor. Where the inside of a capacitor has been contaminated with more than a certain amount of halogen ions and the capacitor is in use, the corrosion reaction of aluminum occurs. The corrosion causes the capacitor to have a significant increase in leakage current with heat produced, open the pressure relief vent and become open circuit mode failure.

Due to global environmental issues (greenhouse effects and other environmental destruction by depletion of the ozone layer), the conventional cleaning solvents of CFC 113, Trichloroethylene and 1,1,1-trichloroethylene were replaced by substitutes.

The following are some substitute cleaning agents and allowable cleaning conditions:

- a) Fatty-alcohol cleaning agents  
Pine Alpha ST-100S (Arakawa Chemical)  
Clean Through 750H, 750HS and 750J (Kao)

#### [Compatible capacitor products]

| Terminal Shape     | Subject Series                     |
|--------------------|------------------------------------|
| Surface Mount Type | All Series                         |
| Radial Lead Type   | All Series                         |
| Snap-in Type       | All Series (Less and equal 100Vdc) |

#### [Cleaning conditions]

Either of immersion or ultrasonic cleaning, for a maximum of 10 minutes and at a maximum liquid temperature of 60°C is acceptable. Make sure that the markings on the capacitor are not rubbed against any other component or the PC board during cleaning. Note that shower cleaning affects the markings on the capacitor.

- b) HCFC (Freon 225) as Alternative CFCs  
AK225AES (Asahi Glass)

#### [Cleaning conditions]

Solvent resistant type capacitors, which were originally developed to intend to resist Freon TE or Freon TES, are also capable of withstanding any one of immersion, ultrasonic or vapor cleaning, for a maximum of 5 minutes (or 2 minutes for

KRE series capacitors or 3 minutes for SRM series).

However, this type of cleaning agent is not recommended to use, as the cleaning materials may be banned in near future in view of global environmental issues.

- c) IPA (Isopropyl Alcohol)

Immersion cleaning with a maximum flux concentration of 2 wt% is acceptable.

#### 5) Adhesives and coating materials

- ① Do not use any adhesive or coating materials containing halogenated solvents.
- ② Make sure of the following conditions before applying adhesive or coating materials to a capacitor,
  - No flux residue nor stain is left between the rubber seal of a capacitor and PC board.
  - Dry the capacitor to remove residual cleaning agents before applying adhesive and coating materials. Do not cover up the entire surface of the rubber seal of the capacitor with adhesives or coating materials.
  - Heating and curing conditions for adhesives and coating materials should be followed as prescribed in the catalogs or product specifications.
  - Covering up the entire surface of the rubber seal with resin mold materials will obstruct the normal diffusion of internal hydrogen gas from a capacitor and result in serious failures. Also, where the adhesive and coating materials contain a large amount of halogen ions, the halogen ions will contaminate the inside of the capacitor through the rubber seal materials, causing the capacitor to become a failure.
  - Depending on solvent materials that the adhesive or coating materials contains, note that the outer sleeve of a capacitor may lose a gloss or whiten in appearance.

#### 6) Fumigation

In exporting or importing electronic devices, they may be exposed to fumigation with halide such as methyl bromide. Where aluminum electrolytic capacitors are exposed to halide such as methyl bromide, the capacitors will be damaged with the corrosion reaction with halogen ions in the same way as cleaning agents. For the export and import, Nippon Chemi-Con considers using some packaging method and so forth so that fumigation is not required. For customers to export or import electronic devices, semi-assembly products or capacitor components, confirm if they will be exposed to fumigation and also consider final condition of packaging. (Note that either cardboard or vinyl package has a risk of fumigation gas penetration.)

### 3) Precautions during operation of devices

- 1) Never touch the terminals of a capacitor directly with bare hands.
- 2) Do not short-circuit between the capacitor terminals with anything conductive.  
Also, do not spill any conductive liquid such as acid or alkaline solution over a capacitor.
- 3) Confirm environmental conditions where the device will be placed. Do not use the device in the following environmental conditions:
  - ① Water or oil spatters, or high condensation environment.
  - ② Direct sunlight.
  - ③ Ozone, ultraviolet rays or radiation.
  - ④ Toxic gases such as hydrogen sulfide, sulfuric acid, nitrous acid, chlorine and its compounds, bromine and its compounds and ammonium.
  - ⑤ Severe vibration or mechanical shock conditions beyond the limits prescribed in the catalog or product specification. The standard vibration condition is applicable to JIS C 5101-4.



**4 Maintenance inspections**

- 1) For industrial use capacitors, make periodic inspections of the capacitors. Before the inspections, turn off the power supply of the device and discharge the electricity of the capacitors. When checking it by a volt-ohm meter, confirm the polarity beforehand. Do not apply mechanical stress to the terminals of the capacitors during inspection.
- 2) Characteristics to be inspected
  - ① Significant damage in appearance: vent opening, electrolyte leakage, etc.
  - ② Electrical characteristics: Leakage current, capacitance,  $\tan \delta$  and other characteristics prescribed in the catalogs or product specifications.

If finding anything abnormal on the characteristics above, check the specifications of the capacitor and take appropriate actions such as replacement.

**5 Capacitor venting**

- 1) A capacitor with more than a certain case size has the pressure relief vent functioning to escape abnormal gas pressure increase.  
If gas expels from a venting capacitor, disconnect the power supply of the device or unplug the power supply cord. If not disconnecting the power supply, the device circuit may be damaged due to the short circuit failure of the capacitor or short-circuited with the liquid that the gas was condensed to. It may cause secondary damages such as device burnout in the worst case scenario.  
The gas that comes out of the open vent is vaporized electrolyte, not smoke.
- 2) The gas expelled from a venting capacitor is more than 100°C. Never expose your face to the capacitor. If your eyes are exposed to the gas or you inhale it, immediately flush your eyes and/or gargle with water. If the electrolyte comes in contact with the skin, wash with soap and water.

**6 Storage**

- 1) Do not store capacitors at high temperature or high humidity. Store the capacitors indoors at temperatures of 5 to 35°C and humidities of less than 75%RH.  
In principle, aluminum electrolytic capacitors should be used within three years after production.
- 2) Keep capacitors packed in the original packaging material wherever possible.
- 3) Avoid the following storage environmental conditions:
  - ① Water spattering, high temperatures, high humidity or condensation environment.
  - ② Oil spattering or oil mist filled.
  - ③ Salt water spattering or salt filled.
  - ④ Acidic toxic gases such as hydrogen sulfide, sulfuric acid, nitrous acid, chlorine, bromine and methyl bromide filled.
  - ⑤ Alkaline toxic gases such as ammonium filled.
  - ⑥ Acid or alkaline solutions spattering.
  - ⑦ Direct sunlight, ozone, ultraviolet rays or radiation.
  - ⑧ Extreme vibration or shock loading.
- 4) JEDEC J-STD-020 is not applicable.

**7 Capacitor disposal**

Please consult with a local organization for the proper disposal of industrial waste. For incinerating capacitors, apply a high-temperature incineration (over 800°C). Incinerating them at temperatures lower than that may produce toxic gases such as chlorine. To prevent capacitors from explosion, punch holes in or sufficiently crush the can cases of the capacitors, then incinerate.

**8 About AEC-Q200**

The Automotive Electronics Council (AEC) was originally established by major American automotive related manufactures. Today, the committees are composed of representatives from the sustaining Members of manufacturing companies in automotive electrical components. It has standardized the criteria for "stress test qualification" and "reliability tests" for electronic components.

AEC-Q200 is the reliability test standard for approval of passive components in Automotive applications. It specifies the test type, parameters and quantity, etc. for each component. The criteria of the reliability tests such as for our main products, "Aluminum Electrolytic Capacitors" are described in this standard.

Pursuant to the customer's specific testing requirements, Chemi-Con submits the test results according to AEC-Q200 for Aluminum Electrolytic Capacitors used in automotive applications on request.

An electronic component manufacturer cannot simply claim that their product is "AEC-Q200 Qualified". It can be claimed "Compliant", "Capable", "Available", etc., however each component must be tested per each users "Qualification Test Plan" in order to claim AEC-Q200 status.

Please contact us for more information.

**9 Response to the Substances of Concern**

- 1) Nippon Chemi-Con aims for developing products that meet laws and regulations concerning substances of concern.  
(Some products may contain regulated substances for exempted application)  
Please contact us for more information about law-compliance status.
- 2) According to the content of REACH handbook (Guidance on requirements for substances in articles which is published on May 2008), our electronic components are "articles without any intended release". Therefore they are not applicable for "Registration" for EU REACH Regulation Article 7 (1).  
Reference: Electrolytic Condenser Investigation Society  
"Study of REACH Regulation in EU about Electrolytic Capacitor"  
(publicized on 13 March 2008)

**10 Catalogs**

Specifications in the catalogs are subject to change without notice. Test data shown in the catalogs are not assured as the whole performance values, but typical values.

For more details, refer to JEITA RCR-2367D (March 2019) with the title of "Safety Application Guide for fixed aluminum electrolytic capacitors for use in electronic equipment".

## RECOMMENDED SOLDERING CONDITIONS

## ◆SURFACE MOUNT TYPE

Alchip™ MVE/MZT/MZS/MZL/MZR/MZJ/MZA/MVY/MZF/MZE/MZK/MLA/MLF/MLK/MVL/MVJ/MXB/MHS/MVH/MHL/MHB/MHJ/MHK

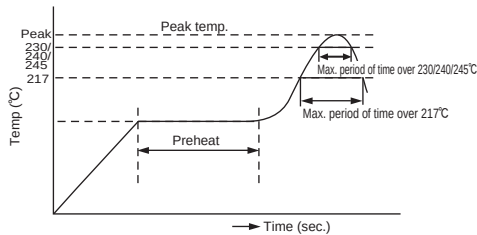
The following conditions are recommended for air convection and infrared reflow soldering on the SMD products onto a glass epoxy circuit boards by cream solder. The dimensions of the glass epoxy boards with resist are 90×50×0.8mm for D55 to KG5 case code SMD capacitors and 180×90×0.8mm for LH0 to MN0 case codes SMD capacitors.

The temperatures shown are the surface temperature values on the top of the can and on the capacitor terminals.

Reflow should be performed twice or less. (Only some products: 3 times)

Please ensure that the capacitor became cold enough to the room temperature (5 to 35°C) before the second reflow and the third reflow (Only some products). Consult with us when performing reflow profile in IPC / JEDEC (J-STD-020)

## ●Recommended soldering heat conditions (Except for Conductive Polymer Aluminum Solid Capacitors)

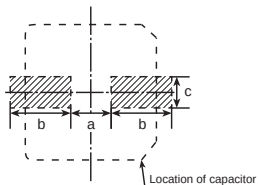


| Series                                                                                                            | Size code  | Voltage range (Vdc)           | Preheat                      | Time maintained above 217°C | Time maintained above 230°C | Peak temp. | Reflow number   |
|-------------------------------------------------------------------------------------------------------------------|------------|-------------------------------|------------------------------|-----------------------------|-----------------------------|------------|-----------------|
| MVE, MZT, MZS, MZL, MZR, MZJ, MZA, MVY, MZF, MZE, MZK, MLA, MLF, MLE, MLK, MVL, MVJ, MVH, MHL, MHB, MHJ, MHK, MXB | D55 to F90 | 4 to 63V (Except 63V for MVH) | 150 to 180°C<br>120sec. max. | 90sec. max.                 | 60sec. max.                 | 260°C max. | 2 times or less |
|                                                                                                                   |            | 63V (MVH), 80V                |                              | 60sec. max.                 | 40sec. max.                 | 250°C max. | 2 times or less |
|                                                                                                                   | H63 to JA0 | 4 to 50V                      |                              | 60sec. max.                 | 30sec. max.                 | 245°C max. | 2 times or less |
|                                                                                                                   |            | 63 to 100V                    |                              | 30sec. max.                 | 20sec. max.                 | 240°C max. | 2 times or less |
|                                                                                                                   | KE0 to MN0 | 6.3 to 50V                    |                              | 30sec. max.                 | 20sec. max.                 | 240°C max. | 2 times or less |
|                                                                                                                   |            | 63 to 100V                    |                              | 20sec. max.                 | —                           | 230°C max. | 2 times or less |

| Series | Size code  | Voltage range (Vdc) | Preheat                      | Time maintained above 217°C | Time maintained above 240°C | Time maintained above 245°C | Peak temp. | Reflow number   |
|--------|------------|---------------------|------------------------------|-----------------------------|-----------------------------|-----------------------------|------------|-----------------|
| MHS    | HA0        | 16 to 80V           | 150 to 180°C<br>120sec. max. | 90sec. max.                 | —                           | 40sec. max.                 | 250°C max. | 3 times or less |
|        | JA0        | 16 to 100V          |                              | 70sec. max.                 | 20sec. max.                 | —                           | 245°C max. | 2 times or less |
|        | KE0 to MN0 | 16 to 100V          |                              |                             |                             |                             | 245°C max. | 3 times or less |

## ●Recommended Solder Land on PC Board



▨ : Solder land on PC board

## ◆RADIAL LEAD AND SNAP-IN TYPE

## ●Recommended soldering heat conditions

Preheat : 150°C 120 seconds max. (Radial lead type)

Flow : 260±5°C max. 10±1 seconds max.

(Or 380±10°C max. 3±0.5 seconds max.: hand soldering)

## ◆PRECAUTIONS FOR USERS

## Soldering method

The capacitors of Alchip-series have no capability to withstand such dip or wave soldering as totally immerses components into a solder bath.

## Reflow soldering

Reflow the capacitors within recommended reflow soldering conditions. Verify there is no temperature stress to the capacitors because the following differences might degrade capacitors electrically and mechanically. Please consult us if other reflow conditions are employed.

1. Location of components : Temperature increases at the edge of PC board more than the center.
2. Population of PC board : The lower the component population is, the more temperature rises.
3. Material of PC board : A ceramic made board needs more heat than a glass epoxy made board. The heat increase may cause damage to the capacitors.
4. Thickness of PC board : A thicker board needs more heat than a thinner board. The heat increase may damage the capacitors.
5. Size of PC board : A larger board needs more heat than a smaller board. The heat increase may damage the capacitors.
6. Solder thickness  
If very thin cream solder paste is to be used for SMD types, please consult with us.
7. Location of infrared ray lamps : IR reflow as well as hot plate reflow heats only on the reverse side of the PC board to lessen heat stress to the capacitors.
8. Please consult us about vapor phase soldering (VPS).

## Rework of soldering

Use a soldering iron for rework. Do not exceed an iron tip temperature of 380±10°C and an exposure time of 3±0.5 seconds.

## Mechanical stress

Do not use the capacitors for lifting the PC board and give stress to the capacitor. Avoid bending the PC board. This may damage the capacitors.

## Cleaning assembly board

Immediately after solvent cleaning, remove residual solvent with an air knife for at least 10 minutes. If the solvent is insufficiently dry, the capacitors may corrode.

## Coating on assembly board

1. Before curing coating material, remove the cleaning solvents from the assembly board.
2. Before conformal coating, a chloride free pre-coat material is recommended to decrease the stress on the capacitors.

## Molding with resin

Internal chemical reaction gradually produces gas in the capacitor; then, increasing internal pressure. If the end seal of the capacitor is completely covered by resin the gas will be unable to escape causing a potentially dangerous situation. The chlorine contained resin will penetrate into the end seal, reach the inside element, and cause damage of the capacitor.

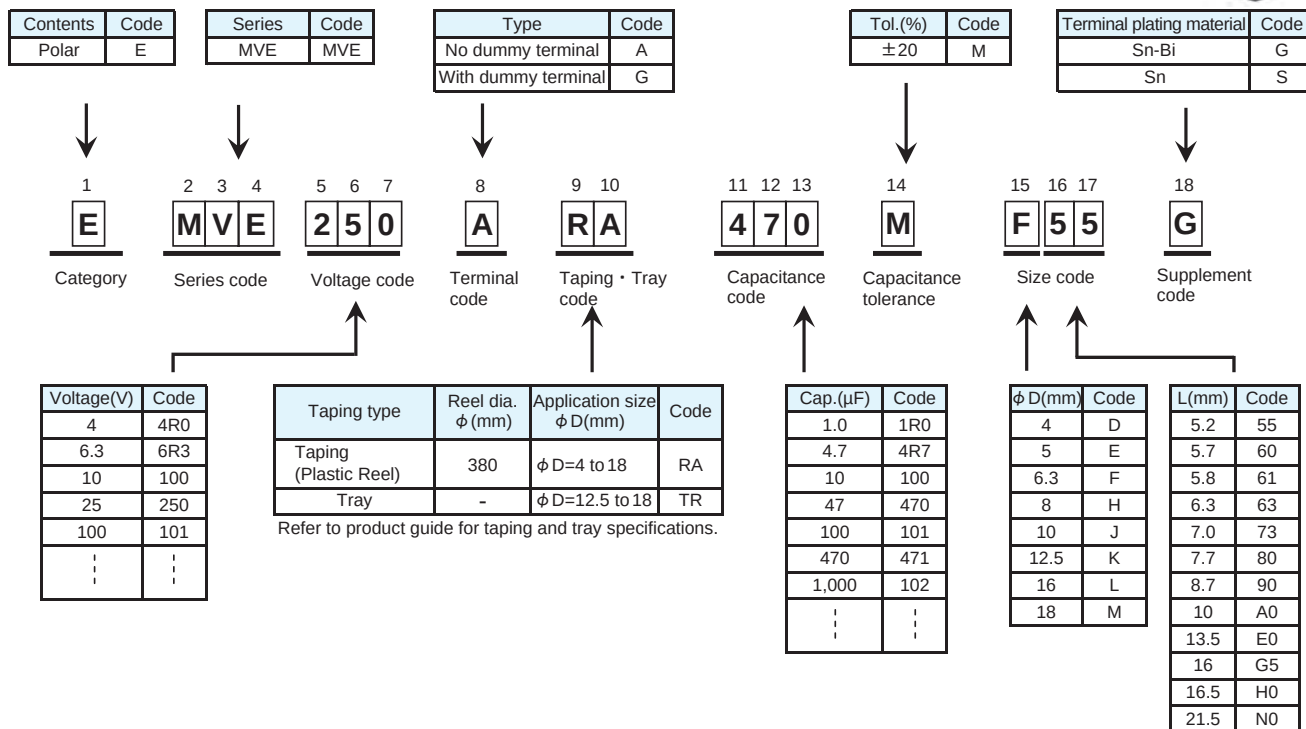
## Others

Refer to PRECAUTIONS AND GUIDELINES.

## Product code guide (Surface mount type)

(Example : MVE series, 25V-47 $\mu$ F,  $\phi$ 6.3 $\times$ 5.2L)

Please refer to the following table



\*Refer to the appendix (Part number) for codes not listed here.



## Alchip™-MVE Series

- Endurance : 1,000 to 2,000 hours at 105°C
- Case size range :  $\phi 4 \times 5.2\text{L}$  to  $\phi 18 \times 21.5\text{L}$
- Solvent resistant type except 100V<sub>dc</sub> (see PRECAUTIONS AND GUIDELINES)
- RoHS2 Compliant
- AEC-Q200 compliant : Please contact Chemi-Con for more details, test data, information.

MVE → Longer life → MVL  
MVJ

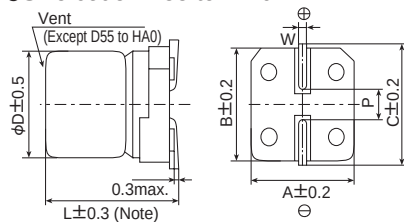
## ◆ SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                       |      |     |     |     |                                      |     |     |      |            |
|--------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----|-----|-----|--------------------------------------|-----|-----|------|------------|
| Category                                               | -40 to +105℃                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                       |      |     |     |     |                                      |     |     |      |            |
| Temperature Range                                      |                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                       |      |     |     |     |                                      |     |     |      |            |
| Rated Voltage Range                                    | 6.3 to 100V <sub>dc</sub>                                                                                                                                            |                                                                                                                                                                                                                                                                                                                       |      |     |     |     |                                      |     |     |      |            |
| Capacitance Tolerance                                  | ±20%(M) (at 20℃, 120Hz)                                                                                                                                              |                                                                                                                                                                                                                                                                                                                       |      |     |     |     |                                      |     |     |      |            |
| Leakage Current                                        | D55 to JA0                                                                                                                                                           | I=0.01CV or 3μA, whichever is greater (2 minutes)                                                                                                                                                                                                                                                                     |      |     |     |     |                                      |     |     |      |            |
|                                                        | KE0 to MN0                                                                                                                                                           | I=0.03CV or 4μA, whichever is greater (1 minute)                                                                                                                                                                                                                                                                      |      |     |     |     |                                      |     |     |      |            |
|                                                        | Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃)                                                                   |                                                                                                                                                                                                                                                                                                                       |      |     |     |     |                                      |     |     |      |            |
| Dissipation Factor (tan δ)                             | See STANDARD RATINGS (at 20℃, 120Hz)                                                                                                                                 |                                                                                                                                                                                                                                                                                                                       |      |     |     |     |                                      |     |     |      |            |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                     |                                                                                                                                                                                                                                                                                                                       | 6.3V | 10V | 16V | 25V | 35V                                  | 50V | 63V | 100V | (at 120Hz) |
|                                                        | D55 to JA0                                                                                                                                                           | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                                                       | 4    | 3   | 2   | 2   | 2                                    | 2   | 2   | 3    |            |
|                                                        |                                                                                                                                                                      | Z(-40℃)/Z(+20℃)                                                                                                                                                                                                                                                                                                       | 12   | 8   | 6   | 4   | 3                                    | 3   | 3   | 4    |            |
|                                                        | KE0 to MN0                                                                                                                                                           | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                                                       | 5    | 4   | 3   | 2   | 2                                    | 2   | 2   | 2    |            |
|                                                        |                                                                                                                                                                      | Z(-40℃)/Z(+20℃)                                                                                                                                                                                                                                                                                                       | 10   | 8   | 6   | 4   | 3                                    | 3   | 3   | 3    |            |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for the specified period of time at 105℃. |                                                                                                                                                                                                                                                                                                                       |      |     |     |     |                                      |     |     |      |            |
|                                                        | Size code                                                                                                                                                            | D55 to F80                                                                                                                                                                                                                                                                                                            |      |     |     |     | HA0 to MN0                           |     |     |      |            |
|                                                        | Time                                                                                                                                                                 | 1,000 hours                                                                                                                                                                                                                                                                                                           |      |     |     |     | 2,000 hours                          |     |     |      |            |
|                                                        | Capacitance change                                                                                                                                                   | ≤ ±30% of the initial value                                                                                                                                                                                                                                                                                           |      |     |     |     | ≤ ±20% of the initial value          |     |     |      |            |
|                                                        | D.F. (tan δ)                                                                                                                                                         | ≤300% of the initial specified value                                                                                                                                                                                                                                                                                  |      |     |     |     | ≤200% of the initial specified value |     |     |      |            |
|                                                        | Leakage current                                                                                                                                                      | ≤The initial specified value                                                                                                                                                                                                                                                                                          |      |     |     |     | ≤The initial specified value         |     |     |      |            |
|                                                        | Shelf Life                                                                                                                                                           | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours (500 hours for B55 to F80 size) at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |      |     |     |     |                                      |     |     |      |            |
| Size code                                              |                                                                                                                                                                      | D55 to F80                                                                                                                                                                                                                                                                                                            |      |     |     |     | HA0 to MN0                           |     |     |      |            |
| Capacitance change                                     |                                                                                                                                                                      | ≤ ±25% of the initial value                                                                                                                                                                                                                                                                                           |      |     |     |     | ≤ ±20% of the initial value          |     |     |      |            |
| D.F. (tan δ)                                           |                                                                                                                                                                      | ≤200% of the initial specified value                                                                                                                                                                                                                                                                                  |      |     |     |     | ≤200% of the initial specified value |     |     |      |            |
| Leakage current                                        |                                                                                                                                                                      | ≤The initial specified value                                                                                                                                                                                                                                                                                          |      |     |     |     | ≤The initial specified value         |     |     |      |            |
|                                                        |                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                       |      |     |     |     |                                      |     |     |      |            |
|                                                        |                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                       |      |     |     |     |                                      |     |     |      |            |

## ◆ DIMENSIONS [mm]

● Terminal Code : A

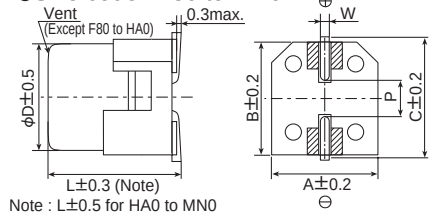
● Size code : D55 to MN0



Note : L±0.5 for HA0 to MN0

● Terminal Code : G (Vibration resistant structure)

● Size code : F80 to MN0



Note : L±0.5 for HA0 to MN0

⊠ : Dummy terminals

| Size code | D    | L    | A    | B    | C    | W          | P   |
|-----------|------|------|------|------|------|------------|-----|
| D55       | 4    | 5.2  | 4.3  | 4.3  | 5.1  | 0.5 to 0.8 | 1.0 |
| E55       | 5    | 5.2  | 5.3  | 5.3  | 5.9  | 0.5 to 0.8 | 1.4 |
| F55       | 6.3  | 5.2  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| F80       | 6.3  | 7.7  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| HA0       | 8    | 10.0 | 8.3  | 8.3  | 9.0  | 0.7 to 1.1 | 3.1 |
| JA0       | 10   | 10.0 | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |
| KE0       | 12.5 | 13.5 | 13.0 | 13.0 | 13.7 | 1.0 to 1.3 | 4.2 |
| KG5       | 12.5 | 16.0 | 13.0 | 13.0 | 13.7 | 1.0 to 1.3 | 4.2 |
| LH0       | 16   | 16.5 | 17.0 | 17.0 | 18.0 | 1.0 to 1.3 | 6.5 |
| LN0       | 16   | 21.5 | 17.0 | 17.0 | 18.0 | 1.0 to 1.3 | 6.5 |
| MH0       | 18   | 16.5 | 19.0 | 19.0 | 20.0 | 1.0 to 1.3 | 6.5 |
| MN0       | 18   | 21.5 | 19.0 | 19.0 | 20.0 | 1.0 to 1.3 | 6.5 |

## ◆ MARKING

D55 to JA0

Ex) 16V22μF

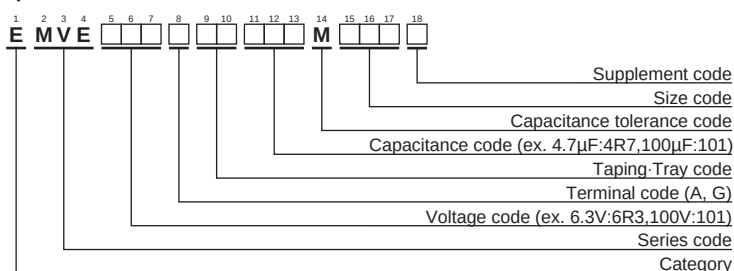


KE0 to MN0

Ex) 25V1,000μF



## ◆ PART NUMBERING SYSTEM



## ◆ RATED RIPPLE CURRENT MULTIPLIERS

● Frequency Multipliers

| Size code  | Capacitance(μF) | Frequency(Hz) |      |      |      |
|------------|-----------------|---------------|------|------|------|
|            |                 | 120           | 1k   | 10k  | 100k |
| D55 to JA0 | 1.0             | 1.00          | 1.50 | 1.75 | 1.80 |
|            | 2.2 to 10       | 1.00          | 1.30 | 1.40 | 1.50 |
|            | 22 to 1,500     | 1.00          | 1.05 | 1.08 | 1.08 |
| KE0 to MN0 | 47, 68          | 1.00          | 1.50 | 1.75 | 1.80 |
|            | 100 to 1,000    | 1.00          | 1.30 | 1.40 | 1.50 |
|            | 2,200 to 6,800  | 1.00          | 1.05 | 1.08 | 1.08 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

Please refer to "Product code guide (surface mount type)"



## ◆ STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Size code | tan δ | Rated ripple<br>current<br>(mA <sub>rms</sub> /105°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Size code | tan δ | Rated ripple<br>current<br>(mA <sub>rms</sub> /105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------|-------|--------------------------------------------------------------|--------------------|--------------------------|-------------|-----------|-------|--------------------------------------------------------------|--------------------|
| 6.3                      | 22          | D55       | 0.30  | 22                                                           | EMVE6R3ARA220MD55G | 35                       | 4.7         | D55       | 0.14  | 16                                                           | EMVE350ARA4R7MD55G |
|                          | 33          | E55       | 0.30  | 34                                                           | EMVE6R3ARA330ME55G |                          | 10          | E55       | 0.14  | 27                                                           | EMVE350ARA100ME55G |
|                          | 47          | E55       | 0.30  | 38                                                           | EMVE6R3ARA470ME55G |                          | 22          | F55       | 0.14  | 44                                                           | EMVE350ARA220MF55G |
|                          | 100         | F55       | 0.30  | 69                                                           | EMVE6R3ARA101MF55G |                          | 47          | F80       | 0.16  | 80                                                           | EMVE350□RA470MF80G |
|                          | 220         | F80       | 0.45  | 120                                                          | EMVE6R3□RA221MF80G |                          | 100         | F80       | 0.16  | 100                                                          | EMVE350□RA101MF80G |
|                          | 330         | HA0       | 0.40  | 290                                                          | EMVE6R3□RA331MHA0G |                          | 150         | HA0       | 0.16  | 260                                                          | EMVE350□RA151MHA0G |
|                          | 470         | HA0       | 0.45  | 320                                                          | EMVE6R3□RA471MHA0G |                          | 220         | JA0       | 0.16  | 375                                                          | EMVE350□RA221MJA0G |
|                          | 680         | HA0       | 0.45  | 340                                                          | EMVE6R3□RA681MHA0G |                          | 330         | JA0       | 0.16  | 450                                                          | EMVE350□RA331MJA0G |
|                          | 1,000       | JA0       | 0.40  | 410                                                          | EMVE6R3□RA102MJA0G |                          | 470         | KE0       | 0.22  | 520                                                          | EMVE350□RA471MKE0S |
|                          | 1,500       | JA0       | 0.45  | 550                                                          | EMVE6R3□RA152MJA0G |                          | 470         | LH0       | 0.22  | 650                                                          | EMVE350□RA471MLH0S |
|                          | 2,200       | KE0       | 0.40  | 680                                                          | EMVE6R3□RA222MKE0S |                          | 1,000       | LH0       | 0.22  | 750                                                          | EMVE350□RA102MLH0S |
|                          | 2,200       | LH0       | 0.40  | 840                                                          | EMVE6R3□RA222MLH0S |                          | 1,000       | MH0       | 0.22  | 1,000                                                        | EMVE350□RA102MMH0S |
|                          | 3,300       | KG5       | 0.42  | 850                                                          | EMVE6R3□RA332MKG5S |                          | 2,200       | MN0       | 0.24  | 1,450                                                        | EMVE350□RA222MMN0S |
|                          | 3,300       | MH0       | 0.42  | 1,000                                                        | EMVE6R3□RA332MMH0S | 50                       | 1.0         | D55       | 0.12  | 8.0                                                          | EMVE500ARA1R0MD55G |
|                          | 4,700       | LN0       | 0.44  | 1,200                                                        | EMVE6R3□RA472MLN0S |                          | 2.2         | D55       | 0.12  | 12                                                           | EMVE500ARA2R2MD55G |
|                          | 4,700       | MH0       | 0.44  | 1,200                                                        | EMVE6R3□RA472MMH0S |                          | 3.3         | D55       | 0.12  | 15                                                           | EMVE500ARA3R3MD55G |
| 10                       | 6,800       | LN0       | 0.48  | 1,200                                                        | EMVE6R3□RA682MLN0S |                          | 4.7         | E55       | 0.12  | 20                                                           | EMVE500ARA4R7ME55G |
|                          | 6,800       | MN0       | 0.48  | 1,350                                                        | EMVE6R3□RA682MMN0S |                          | 10          | F55       | 0.12  | 32                                                           | EMVE500ARA100MF55G |
|                          | 22          | E55       | 0.24  | 30                                                           | EMVE100ARA220ME55G |                          | 33          | F80       | 0.14  | 65                                                           | EMVE500□RA330MF80G |
|                          | 33          | E55       | 0.24  | 34                                                           | EMVE100ARA330ME55G |                          | 47          | F80       | 0.14  | 80                                                           | EMVE500□RA470MF80G |
|                          | 47          | F55       | 0.24  | 48                                                           | EMVE100ARA470MF55G |                          | 100         | HA0       | 0.14  | 230                                                          | EMVE500□RA101MHA0G |
|                          | 100         | F55       | 0.30  | 69                                                           | EMVE100ARA101MF55G |                          | 220         | JA0       | 0.14  | 375                                                          | EMVE500□RA221MJA0G |
|                          | 150         | F80       | 0.35  | 100                                                          | EMVE100□RA151MF80G |                          | 330         | KE0       | 0.18  | 500                                                          | EMVE500□RA331MKE0S |
|                          | 220         | F80       | 0.35  | 120                                                          | EMVE100□RA221MF80G |                          | 330         | LH0       | 0.18  | 600                                                          | EMVE500□RA331MLH0S |
|                          | 330         | HA0       | 0.35  | 290                                                          | EMVE100□RA331MHA0G |                          | 470         | LH0       | 0.18  | 700                                                          | EMVE500□RA471MLH0S |
|                          | 470         | HA0       | 0.35  | 320                                                          | EMVE100□RA471MHA0G |                          | 470         | MH0       | 0.18  | 750                                                          | EMVE500□RA471MMH0S |
|                          | 1,000       | JA0       | 0.35  | 410                                                          | EMVE100□RA102MJA0G |                          | 1,000       | MN0       | 0.18  | 1,200                                                        | EMVE500□RA102MMN0S |
|                          | 2,200       | KG5       | 0.36  | 750                                                          | EMVE100□RA222MKG5S | 63                       | 1.0         | D55       | 0.12  | 8.0                                                          | EMVE630ARA1R0MD55G |
|                          | 2,200       | LH0       | 0.36  | 850                                                          | EMVE100□RA222MLH0S |                          | 2.2         | D55       | 0.12  | 12                                                           | EMVE630ARA2R2MD55G |
|                          | 3,300       | LH0       | 0.38  | 1,000                                                        | EMVE100□RA332MLH0S |                          | 3.3         | E55       | 0.12  | 17                                                           | EMVE630ARA3R3ME55G |
|                          | 3,300       | MH0       | 0.38  | 1,100                                                        | EMVE100□RA332MMH0S |                          | 4.7         | F55       | 0.12  | 22                                                           | EMVE630ARA4R7MF55G |
|                          | 4,700       | LN0       | 0.40  | 1,300                                                        | EMVE100□RA472MLN0S |                          | 10          | F55       | 0.12  | 32                                                           | EMVE630ARA100MF55G |
|                          | 4,700       | MN0       | 0.40  | 1,350                                                        | EMVE100□RA472MMN0S |                          | 22          | F80       | 0.12  | 58                                                           | EMVE630□RA220MF80G |
| 16                       | 10          | D55       | 0.20  | 17                                                           | EMVE160ARA100MD55G |                          | 33          | HA0       | 0.12  | 140                                                          | EMVE630□RA330MHA0G |
|                          | 22          | E55       | 0.20  | 30                                                           | EMVE160ARA220ME55G |                          | 47          | HA0       | 0.12  | 170                                                          | EMVE630□RA470MHA0G |
|                          | 33          | F55       | 0.20  | 45                                                           | EMVE160ARA330MF55G |                          | 100         | JA0       | 0.12  | 310                                                          | EMVE630□RA101MJA0G |
|                          | 47          | F55       | 0.20  | 48                                                           | EMVE160ARA470MF55G |                          | 220         | KE0       | 0.14  | 470                                                          | EMVE630□RA221MKE0S |
|                          | 100         | F55       | 0.26  | 69                                                           | EMVE160ARA101MF55G |                          | 220         | LH0       | 0.14  | 560                                                          | EMVE630□RA221MLH0S |
|                          | 150         | F80       | 0.28  | 100                                                          | EMVE160□RA151MF80G |                          | 330         | LH0       | 0.14  | 700                                                          | EMVE630□RA331MLH0S |
|                          | 220         | F80       | 0.28  | 120                                                          | EMVE160□RA221MF80G |                          | 330         | MH0       | 0.14  | 750                                                          | EMVE630□RA331MMH0S |
|                          | 330         | HA0       | 0.28  | 290                                                          | EMVE160□RA331MHA0G |                          | 470         | LN0       | 0.14  | 900                                                          | EMVE630□RA471MLN0S |
|                          | 470         | HA0       | 0.28  | 320                                                          | EMVE160□RA471MHA0G |                          | 470         | MH0       | 0.14  | 900                                                          | EMVE630□RA471MMH0S |
|                          | 680         | JA0       | 0.28  | 470                                                          | EMVE160□RA681MJA0G | *1<br>100                | 22          | HA0       | 0.12  | 100                                                          | EMVE101□RA220MHA0G |
|                          | 1,000       | KE0       | 0.30  | 550                                                          | EMVE160□RA102MKE0S |                          | 33          | JA0       | 0.12  | 150                                                          | EMVE101□RA330MJA0G |
|                          | 1,000       | LH0       | 0.30  | 650                                                          | EMVE160□RA102MLH0S |                          | 47          | KE0       | 0.10  | 250                                                          | EMVE101□RA470MKE0S |
|                          | 2,200       | LH0       | 0.32  | 950                                                          | EMVE160□RA222MLH0S |                          | 68          | KE0       | 0.10  | 300                                                          | EMVE101□RA680MKE0S |
|                          | 2,200       | MH0       | 0.32  | 1,000                                                        | EMVE160□RA222MMH0S |                          | 100         | KE0       | 0.10  | 380                                                          | EMVE101□RA101MKE0S |
|                          | 3,300       | LN0       | 0.34  | 1,200                                                        | EMVE160□RA332MLN0S |                          | 100         | LH0       | 0.10  | 450                                                          | EMVE101□RA101MLH0S |
|                          | 3,300       | MH0       | 0.34  | 1,200                                                        | EMVE160□RA332MMH0S |                          | 220         | LN0       | 0.10  | 750                                                          | EMVE101□RA221MLN0S |
| 25                       | 10          | E55       | 0.16  | 27                                                           | EMVE250ARA100ME55G |                          | 220         | MH0       | 0.10  | 750                                                          | EMVE101□RA221MMH0S |
|                          | 22          | F55       | 0.16  | 44                                                           | EMVE250ARA220MF55G |                          | 330         | MN0       | 0.10  | 980                                                          | EMVE101□RA331MMN0S |
|                          | 33          | F55       | 0.16  | 50                                                           | EMVE250ARA330MF55G | 25                       | 10          | F55       | 0.16  | 60                                                           | EMVE250ARA470MF55G |
|                          | 47          | F55       | 0.16  | 60                                                           | EMVE250ARA470MF55G |                          | 100         | F80       | 0.18  | 100                                                          | EMVE250□RA101MF80G |
|                          | 100         | F80       | 0.18  | 100                                                          | EMVE250□RA101MF80G |                          | 150         | HA0       | 0.18  | 240                                                          | EMVE250□RA151MHA0G |
|                          | 150         | HA0       | 0.18  | 240                                                          | EMVE250□RA151MHA0G |                          | 220         | HA0       | 0.18  | 320                                                          | EMVE250□RA221MHA0G |
|                          | 220         | HA0       | 0.18  | 320                                                          | EMVE250□RA221MHA0G |                          | 330         | JA0       | 0.16  | 450                                                          | EMVE250□RA331MJA0G |
|                          | 330         | JA0       | 0.16  | 450                                                          | EMVE250□RA331MJA0G |                          | 470         | JA0       | 0.18  | 490                                                          | EMVE250□RA471MJA0G |
|                          | 470         | JA0       | 0.18  | 490                                                          | EMVE250□RA471MJA0G |                          | 1,000       | LH0       | 0.26  | 820                                                          | EMVE250□RA102MLH0S |
|                          | 1,000       | LH0       | 0.26  | 820                                                          | EMVE250□RA102MLH0S |                          | 1,000       | MH0       | 0.26  | 880                                                          | EMVE250□RA102MMH0S |
|                          | 1,000       | MH0       | 0.26  | 880                                                          | EMVE250□RA102MMH0S |                          | 2,200       | LN0       | 0.28  | 1,250                                                        | EMVE250□RA222MLN0S |
|                          | 2,200       | LN0       | 0.28  | 1,250                                                        | EMVE250□RA222MLN0S |                          | 2,200       | MN0       | 0.28  | 1,300                                                        | EMVE250□RA222MMN0S |
|                          | 2,200       | MN0       | 0.28  | 1,300                                                        | EMVE250□RA222MMN0S |                          |             |           |       |                                                              |                    |

□ : Enter the appropriate terminal code.

Production of the products shown in   is scheduled to be discontinued.

\*1: Assembly boards with the designated products attached cannot be cleaned.



# Alchip™.MZT Series

Upgrade!

- Downsizing and Lower ESR, 2,000hours at 105°C
- Rated voltage range : 16 to 35V, Nominal capacitance range : 220 to 1,500μF
- Solvent resistant type(see PRECAUTIONS AND GUIDELINES)
- Vibration resistance structure
- RoHS2 Compliant
- AEC-Q200 compliant : Please contact Chemi-Con for more details, test data, information.

MZT

↑ Higher capacitance  
MZS



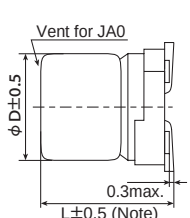
## SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                       |                                      |      |      |                 |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------|------|-----------------|
| Category                                               | -55 to +105℃                                                                                                                                                                                                                                                                          |                                      |      |      |                 |
| Temperature Range                                      |                                                                                                                                                                                                                                                                                       |                                      |      |      |                 |
| Rated Voltage Range                                    | 16 to 35V <sub>dc</sub>                                                                                                                                                                                                                                                               |                                      |      |      |                 |
| Capacitance Tolerance                                  | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                             |                                      |      |      |                 |
| Leakage Current                                        | I=0.01CV or 3μA, whichever is greater.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 2 minutes)                                                                                                                          |                                      |      |      |                 |
| Dissipation Factor (tan δ )                            | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 16V                                  | 25V  | 35V  | (at 20℃, 120Hz) |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.16                                 | 0.14 | 0.12 |                 |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 16V                                  | 25V  | 35V  | (at 120Hz)      |
|                                                        | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 2                                    | 2    | 2    |                 |
|                                                        | Z(-40℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 3                                    | 3    | 3    |                 |
|                                                        | Z(-55℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 4                                    | 3    | 3    |                 |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 2,000 hours at 105℃.                                                                                                                                   |                                      |      |      |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±30% of the initial value          |      |      |                 |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤200% of the initial specified value |      |      |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value         |      |      |                 |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                      |      |      |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±30% of the initial value          |      |      |                 |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤200% of the initial specified value |      |      |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value         |      |      |                 |
| Surge Voltage Test                                     | The capacitors shall be subjected to 1,000 cycles each consisting of charging with the specified surge voltage for 30±5 seconds through a protective resistor (as required for RC=0.1±0.05sec) and open-circuiting for 5.5 minutes at a room temperature of 15 to 35℃.                |                                      |      |      |                 |
|                                                        | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 16                                   | 25   | 35   |                 |
|                                                        | Surge voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 18                                   | 29   | 40   |                 |
|                                                        |                                                                                                                                                                                                                                                                                       |                                      |      |      |                 |
|                                                        | Appearance                                                                                                                                                                                                                                                                            | No significant damage                |      |      |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±20% of the initial value          |      |      |                 |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤200% of the initial specified value |      |      |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value         |      |      |                 |
|                                                        | (Caution)                                                                                                                                                                                                                                                                             |                                      |      |      |                 |
|                                                        | Surge Voltage Test intends to evaluate capacitors in durability of an exceptional excessive voltage under specific conditions.It does not imply long-term use at all.                                                                                                                 |                                      |      |      |                 |

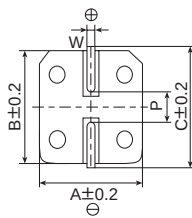
## DIMENSIONS [mm]

- Terminal Code : A

- Size code : F80 to JA0

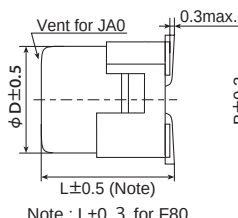


Note : L±0.3 for F80

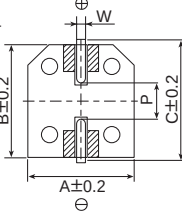


- Terminal Code : G(Vibration resistant structure)

- Size code : F80 to JA0



Note : L±0.3 for F80



⊠ : Dummy terminals

| Size code | D   | L    | A    | B    | C    | W          | P   |
|-----------|-----|------|------|------|------|------------|-----|
| F80       | 6.3 | 7.7  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| HA0       | 8   | 10.0 | 8.3  | 8.3  | 9.0  | 0.7 to 1.1 | 3.1 |
| JA0       | 10  | 10.0 | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |

## MARKING

EX) 25V1,200μF



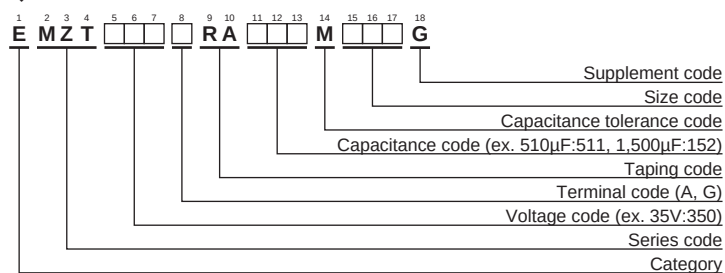
- Rated voltage symbol

| Rated voltage (V <sub>dc</sub> ) | 16 | 25 | 35 |
|----------------------------------|----|----|----|
| Symbol                           | C  | E  | V  |

Applying voltage over the rated voltages causes the capacitors to have short lifetime.  
 Besides, applying voltage over the specified surge voltages may cause to have short circuit failure. A protection circuit should be used if applied voltage will exceed the rated voltages.

Alchip™-M<sup>2</sup>T Series Upgrade!

## ◆PART NUMBERING SYSTEM



Please refer to "Product code guide (surface mount type)"

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Size code | tan δ | ESR<br>(Ω max./20°C, 100kHz) | Rated ripple current<br>(mA rms/105°C, 100kHz) | Part No.           |
|--------------------------|-------------|-----------|-------|------------------------------|------------------------------------------------|--------------------|
| 16                       | 470         | F80       | 0.16  | 0.16                         | 600                                            | EMZT160□RA471MF80G |
|                          | 820         | HA0       | 0.16  | 0.08                         | 850                                            | EMZT160□RA821MHA0G |
|                          | 1,500       | JA0       | 0.16  | 0.06                         | 1,190                                          | EMZT160□RA152MJA0G |
| 25                       | 330         | F80       | 0.14  | 0.16                         | 600                                            | EMZT250□RA331MF80G |
|                          | 680         | HA0       | 0.14  | 0.08                         | 850                                            | EMZT250□RA681MHA0G |
|                          | 1,200       | JA0       | 0.14  | 0.06                         | 1,190                                          | EMZT250□RA122MJA0G |
| 35                       | 220         | F80       | 0.12  | 0.16                         | 600                                            | EMZT350□RA221MF80G |
|                          | 510         | HA0       | 0.12  | 0.08                         | 850                                            | EMZT350□RA511MHA0G |
|                          | 820         | JA0       | 0.12  | 0.06                         | 1,190                                          | EMZT350□RA821MJA0G |

□ : Enter the appropriate terminal code.

New products are indicated in red text.

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

| Capacitance(μF) \ Frequency(Hz) | 120  | 1k   | 10k  | 100k |
|---------------------------------|------|------|------|------|
| 220 to 510                      | 0.50 | 0.85 | 0.94 | 1.00 |
| 680 to 1,500                    | 0.60 | 0.87 | 0.95 | 1.00 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.



## Alchip™-MZS Series

- Downsizing and Lower ESR, 2,000hours at 105°C
- Rated voltage range : 25, 35V, Nominal capacitance range : 330 to 1,000μF
- Solvent resistant type(see PRECAUTIONS AND GUIDELINES)
- Vibration resistance structure
- RoHS2 Compliant
- AEC-Q200 compliant : Please contact Chemi-Con for more details, test data, information.

MZS

↑ Higher capacitance  
MZR



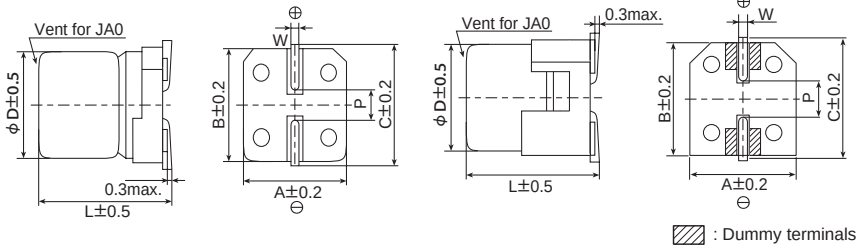
## ◆ SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                       |                                      |                      |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|----------------------|
| Category                                               | -55 to +105℃                                                                                                                                                                                                                                                                          |                                      |                      |
| Temperature Range                                      |                                                                                                                                                                                                                                                                                       |                                      |                      |
| Rated Voltage Range                                    | 25, 35V <sub>dc</sub>                                                                                                                                                                                                                                                                 |                                      |                      |
| Capacitance Tolerance                                  | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                             |                                      |                      |
| Leakage Current                                        | I=0.01CV or 3μA, whichever is greater.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 2 minutes)                                                                                                                          |                                      |                      |
| Dissipation Factor (tan δ )                            | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 25V                                  | 35V                  |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.14                                 | 0.12 (at 20℃, 120Hz) |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 25V                                  | 35V                  |
|                                                        | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 2                                    | 2                    |
|                                                        | Z(-40℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 3                                    | 3                    |
|                                                        | Z(-55℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 3                                    | 3 (at 120Hz)         |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 2,000 hours at 105℃.                                                                                                                                   |                                      |                      |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ± 30% of the initial value         |                      |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤200% of the initial specified value |                      |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value        |                      |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                      |                      |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ± 30% of the initial value         |                      |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤200% of the initial specified value |                      |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value        |                      |
| Surge Voltage Test                                     | The capacitors shall be subjected to 1,000 cycles each consisting of charging with the specified surge voltage for 30±5 seconds through a protective resistor (as required for RC=0.1±0.05sec) and open-circuiting for 5.5 minutes at a room temperature of 15 to 35℃.                |                                      |                      |
|                                                        | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 25                                   | 35                   |
|                                                        | Surge voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 29                                   | 40                   |
|                                                        |                                                                                                                                                                                                                                                                                       |                                      |                      |
|                                                        | Appearance                                                                                                                                                                                                                                                                            | No significant damage                |                      |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ± 20% of the initial value         |                      |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤200% of the initial specified value |                      |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value        |                      |
|                                                        | (Caution)                                                                                                                                                                                                                                                                             |                                      |                      |
|                                                        | Surge Voltage Test intends to evaluate capacitors in durability of an exceptional excessive voltage under specific conditions.It does not imply long-term use at all.                                                                                                                 |                                      |                      |

## ◆ DIMENSIONS [mm]

- Terminal Code : A
- Size code : HA0 and JA0

- Terminal Code : G(Vibration resistant structure)
- Size code : HA0 and JA0



| Size code | D  | L    | A    | B    | C    | W          | P   |
|-----------|----|------|------|------|------|------------|-----|
| HA0       | 8  | 10.0 | 8.3  | 8.3  | 9.0  | 0.7 to 1.1 | 3.1 |
| JA0       | 10 | 10.0 | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |

## ◆ MARKING

EX) 25V1,000μF



- Rated voltage symbol

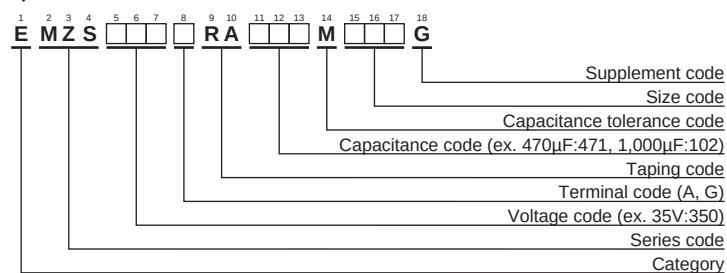
| Rated voltage (V <sub>dc</sub> ) | 25 | 35 |
|----------------------------------|----|----|
| Symbol                           | E  | V  |

Applying voltage over the rated voltages causes the capacitors to have short lifetime.  
Besides, applying voltage over the specified surge voltages may cause to have short circuit failure. A protection circuit should be used if applied voltage will exceed the rated voltages.



## Alchip™-MZS Series

## ◆PART NUMBERING SYSTEM



Please refer to "Product code guide (surface mount type)"

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Size code | tan δ | ESR<br>(Ω max./20°C, 100kHz) | Rated ripple current<br>(mA <sub>rms</sub> /105°C, 100kHz) | Part No.           |
|--------------------------|-------------|-----------|-------|------------------------------|------------------------------------------------------------|--------------------|
| 25                       | 470         | HA0       | 0.14  | 0.08                         | 850                                                        | EMZS250□RA471MHA0G |
|                          | 560         | HA0       | 0.14  | 0.08                         | 850                                                        | EMZS250□RA561MHA0G |
|                          | 820         | JA0       | 0.14  | 0.06                         | 1,190                                                      | EMZS250□RA821MJA0G |
|                          | 1,000       | JA0       | 0.14  | 0.06                         | 1,190                                                      | EMZS250□RA102MJA0G |
| 35                       | 330         | HA0       | 0.12  | 0.08                         | 850                                                        | EMZS350□RA331MHA0G |
|                          | 410         | HA0       | 0.12  | 0.08                         | 850                                                        | EMZS350□RA411MHA0G |
|                          | 470         | HA0       | 0.12  | 0.08                         | 850                                                        | EMZS350□RA471MHA0G |
|                          | 560         | JA0       | 0.12  | 0.06                         | 1,190                                                      | EMZS350□RA561MJA0G |
|                          | 680         | JA0       | 0.12  | 0.06                         | 1,190                                                      | EMZS350□RA681MJA0G |

□ : Enter the appropriate terminal code.

## ◆RATED RIPPLE CURRENT MULTIPLIERS

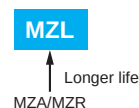
## ●Frequency Multipliers

| Capacitance(μF) \ Frequency(Hz) | 120  | 1k   | 10k  | 100k |
|---------------------------------|------|------|------|------|
| 330 to 560                      | 0.50 | 0.85 | 0.94 | 1.00 |
| 680 to 1,000                    | 0.60 | 0.87 | 0.95 | 1.00 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

## Alchip™-MZL Series

- Low ESR, 5,000hours at 105°C
- Rated voltage range : 6.3 to 50V, Nominal capacitance range : 100 to 1,500μF
- Solvent resistant type(see PRECAUTIONS AND GUIDELINES)
- Vibration resistance structure
- RoHS2 Compliant
- AEC-Q200 compliant : Please contact Chemi-Con for more details, test data, information.



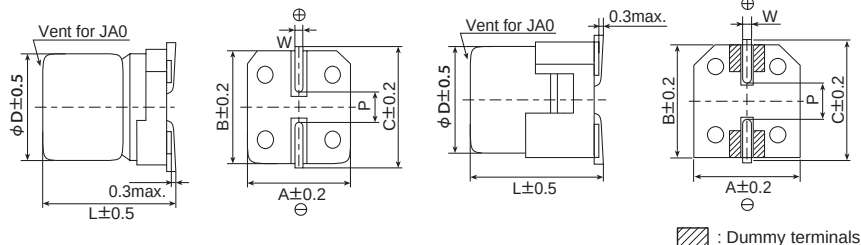
## ◆SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                       |                                      |      |      |      |      |      |                 |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------|------|------|------|------|-----------------|
| Category                                               |                                                                                                                                                                                                                                                                                       |                                      |      |      |      |      |      |                 |
| Temperature Range                                      | -55 to +105℃                                                                                                                                                                                                                                                                          |                                      |      |      |      |      |      |                 |
| Rated Voltage Range                                    | 6.3 to 50V <sub>dc</sub>                                                                                                                                                                                                                                                              |                                      |      |      |      |      |      |                 |
| Capacitance Tolerance                                  | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                             |                                      |      |      |      |      |      |                 |
| Leakage Current                                        | I=0.01CV or 3μA, whichever is greater.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 2 minutes)                                                                                                                          |                                      |      |      |      |      |      |                 |
| Dissipation Factor (tan δ)                             | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 6.3V                                 | 10V  | 16V  | 25V  | 35V  | 50V  | (at 20℃, 120Hz) |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.26                                 | 0.19 | 0.16 | 0.14 | 0.12 | 0.10 |                 |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 6.3V                                 | 10V  | 16V  | 25V  | 35V  | 50V  | (at 120Hz)      |
|                                                        | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 2                                    | 2    | 2    | 2    | 2    | 2    |                 |
|                                                        | Z(-40℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 3                                    | 3    | 3    | 3    | 3    | 3    |                 |
|                                                        | Z(-55℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 4                                    | 4    | 4    | 3    | 3    | 3    |                 |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 5,000 hours at 105℃.                                                                                                                                   |                                      |      |      |      |      |      |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±35% of the initial value          |      |      |      |      |      |                 |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤300% of the initial specified value |      |      |      |      |      |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value         |      |      |      |      |      |                 |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                      |      |      |      |      |      |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±30% of the initial value          |      |      |      |      |      |                 |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤200% of the initial specified value |      |      |      |      |      |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value         |      |      |      |      |      |                 |
| Surge Voltage Test                                     | The capacitors shall be subjected to 1,000 cycles each consisting of charging with the specified surge voltage for 30±5 seconds through a protective resistor (as required for RC=0.1±0.05sec) and open-circuiting for 5.5 minutes at a room temperature of 15 to 35℃.                |                                      |      |      |      |      |      |                 |
|                                                        | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 6.3                                  | 10   | 16   | 25   | 35   | 50   |                 |
|                                                        | Surge voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 7.2                                  | 12   | 18   | 29   | 40   | 58   |                 |
|                                                        |                                                                                                                                                                                                                                                                                       |                                      |      |      |      |      |      |                 |
|                                                        | Appearance                                                                                                                                                                                                                                                                            | No significant damage                |      |      |      |      |      |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±20% of the initial value          |      |      |      |      |      |                 |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤200% of the initial specified value |      |      |      |      |      |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value         |      |      |      |      |      |                 |
|                                                        | (Caution)                                                                                                                                                                                                                                                                             |                                      |      |      |      |      |      |                 |
|                                                        | Surge Voltage Test intends to evaluate capacitors in durability of an exceptional excessive voltage under specific conditions.It does not imply long-term use at all.                                                                                                                 |                                      |      |      |      |      |      |                 |

## ◆DIMENSIONS [mm]

● Terminal Code : A

● Terminal Code : G(Vibration resistant structure)



| Size code | D  | L    | A    | B    | C    | W          | P   |
|-----------|----|------|------|------|------|------------|-----|
| HA0       | 8  | 10.0 | 8.3  | 8.3  | 9.0  | 0.7 to 1.1 | 3.1 |
| JA0       | 10 | 10.0 | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |

## ◆MARKING

EX) 35V560μF



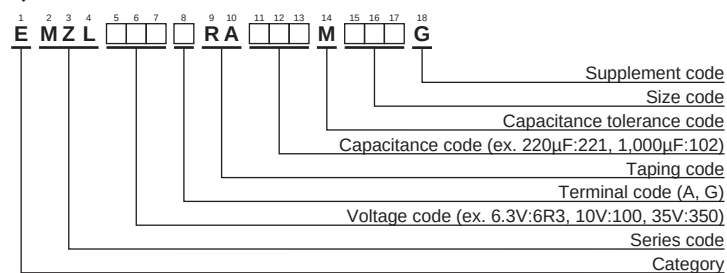
● Rated voltage symbol

| Rated voltage (V <sub>dc</sub> ) | 6.3 | 10 | 16 | 25 | 35 | 50 |
|----------------------------------|-----|----|----|----|----|----|
| Symbol                           | j   | A  | C  | E  | V  | H  |

Applying voltage over the rated voltages causes the capacitors to have short lifetime.  
Besides, applying voltage over the specified surge voltages may cause to have short circuit failure. A protection circuit should be used if applied voltage will exceed the rated voltages.

## Alchip™-MZL Series

## ◆PART NUMBERING SYSTEM



Please refer to "Product code guide (surface mount type)"

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(µF) | Size code | tan δ | ESR<br>(Ω max./20°C, 100kHz) | Rated ripple current<br>(mA rms/105°C, 100kHz) | Part No.           |
|--------------------------|-------------|-----------|-------|------------------------------|------------------------------------------------|--------------------|
| 6.3                      | 470         | HA0       | 0.26  | 0.16                         | 600                                            | EMZL6R3□RA471MHA0G |
|                          | 1,000       | HA0       | 0.26  | 0.16                         | 600                                            | EMZL6R3□RA102MHA0G |
|                          | 1,500       | JA0       | 0.26  | 0.08                         | 850                                            | EMZL6R3□RA152MJA0G |
| 10                       | 330         | HA0       | 0.19  | 0.16                         | 600                                            | EMZL100□RA331MHA0G |
|                          | 470         | HA0       | 0.19  | 0.16                         | 600                                            | EMZL100□RA471MHA0G |
|                          | 680         | HA0       | 0.19  | 0.16                         | 600                                            | EMZL100□RA681MHA0G |
|                          | 1,000       | JA0       | 0.19  | 0.08                         | 850                                            | EMZL100□RA102MJA0G |
| 16                       | 330         | HA0       | 0.16  | 0.16                         | 600                                            | EMZL160□RA331MHA0G |
|                          | 470         | HA0       | 0.16  | 0.16                         | 600                                            | EMZL160□RA471MHA0G |
|                          | 680         | JA0       | 0.16  | 0.08                         | 850                                            | EMZL160□RA681MJA0G |
| 25                       | 220         | HA0       | 0.14  | 0.16                         | 600                                            | EMZL250□RA221MHA0G |
|                          | 330         | HA0       | 0.14  | 0.16                         | 600                                            | EMZL250□RA331MHA0G |
|                          | 470         | HA0       | 0.14  | 0.08                         | 850                                            | EMZL250□RA471MHA0G |
|                          | 470         | JA0       | 0.14  | 0.08                         | 850                                            | EMZL250□RA471MJA0G |
|                          | 820         | JA0       | 0.14  | 0.06                         | 1,190                                          | EMZL250□RA821MJA0G |
| 35                       | 100         | HA0       | 0.12  | 0.16                         | 600                                            | EMZL350□RA101MHA0G |
|                          | 220         | HA0       | 0.12  | 0.16                         | 600                                            | EMZL350□RA221MHA0G |
|                          | 330         | HA0       | 0.12  | 0.08                         | 850                                            | EMZL350□RA331MHA0G |
|                          | 330         | JA0       | 0.12  | 0.08                         | 850                                            | EMZL350□RA331MJA0G |
|                          | 560         | JA0       | 0.12  | 0.06                         | 1,190                                          | EMZL350□RA561MJA0G |
| 50                       | 100         | HA0       | 0.10  | 0.34                         | 350                                            | EMZL500□RA101MHA0G |
|                          | 220         | JA0       | 0.10  | 0.18                         | 670                                            | EMZL500□RA221MJA0G |

□ : Enter the appropriate terminal code.

## ◆RATED RIPPLE CURRENT MULTIPLIERS

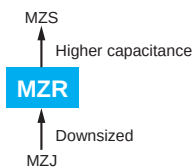
## ●Frequency Multipliers

| Capacitance(µF) \ Frequency(Hz) | 120  | 1k   | 10k  | 100k |
|---------------------------------|------|------|------|------|
| 100                             | 0.40 | 0.75 | 0.90 | 1.00 |
| 220 to 560                      | 0.50 | 0.85 | 0.94 | 1.00 |
| 680 to 1,500                    | 0.60 | 0.87 | 0.95 | 1.00 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

## Alchip™-MZR Series

- Downsizing and Lower ESR, 2,000hours at 105°C
- Rated voltage range : 6.3 to 50V, Nominal capacitance range : 22 to 2,200μF
- Solvent resistant type(see PRECAUTIONS AND GUIDELINES)
- Vibration resistance structure
- RoHS2 Compliant
- AEC-Q200 compliant : Please contact Chemi-Con for more details, test data, information.

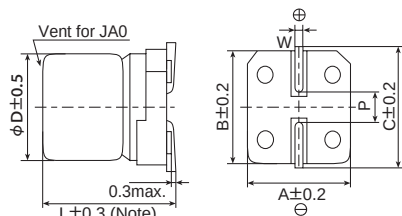


## ◆ SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                         |                                      |      |      |      |      |      |                  |
|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------|------|------|------|------|------------------|
| Category                                               |                                                                                                                                                                                                                                                                                         |                                      |      |      |      |      |      |                  |
| Temperature Range                                      | -55 to +105°C                                                                                                                                                                                                                                                                           |                                      |      |      |      |      |      |                  |
| Rated Voltage Range                                    | 6.3 to 50V <sub>dc</sub>                                                                                                                                                                                                                                                                |                                      |      |      |      |      |      |                  |
| Capacitance Tolerance                                  | ± 20% (M) (at 20°C, 120Hz)                                                                                                                                                                                                                                                              |                                      |      |      |      |      |      |                  |
| Leakage Current                                        | I=0.01CV or 3μA, whichever is greater.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C after 2 minutes)                                                                                                                           |                                      |      |      |      |      |      |                  |
| Dissipation Factor (tan δ)                             | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                        | 6.3V                                 | 10V  | 16V  | 25V  | 35V  | 50V  | (at 20°C, 120Hz) |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                            | 0.26                                 | 0.19 | 0.16 | 0.14 | 0.12 | 0.10 |                  |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                        | 6.3V                                 | 10V  | 16V  | 25V  | 35V  | 50V  | (at 120Hz)       |
|                                                        | Z(-25°C)/Z(+20°C)                                                                                                                                                                                                                                                                       | 2                                    | 2    | 2    | 2    | 2    | 2    |                  |
|                                                        | Z(-40°C)/Z(+20°C)                                                                                                                                                                                                                                                                       | 3                                    | 3    | 3    | 3    | 3    | 3    |                  |
|                                                        | Z(-55°C)/Z(+20°C)                                                                                                                                                                                                                                                                       | 4                                    | 4    | 4    | 3    | 3    | 3    |                  |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 2,000 hours at 105°C.                                                                                                                                   |                                      |      |      |      |      |      |                  |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                      | ≤ ±30% of the initial value          |      |      |      |      |      |                  |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                            | ≤200% of the initial specified value |      |      |      |      |      |                  |
|                                                        | Leakage current                                                                                                                                                                                                                                                                         | ≤The initial specified value         |      |      |      |      |      |                  |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                      |      |      |      |      |      |                  |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                      | ≤ ±30% of the initial value          |      |      |      |      |      |                  |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                            | ≤200% of the initial specified value |      |      |      |      |      |                  |
|                                                        | Leakage current                                                                                                                                                                                                                                                                         | ≤The initial specified value         |      |      |      |      |      |                  |
| Surge Voltage Test                                     | The capacitors shall be subjected to 1,000 cycles each consisting of charging with the specified surge voltage for 30±5 seconds through a protective resistor (as required for RC=0.1±0.05sec) and open-circuiting for 5.5 minutes at a room temperature of 15 to 35°C.                 |                                      |      |      |      |      |      |                  |
|                                                        | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                        | 6.3                                  | 10   | 16   | 25   | 35   | 50   |                  |
|                                                        | Surge voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                        | 7.2                                  | 12   | 18   | 29   | 40   | 58   |                  |
|                                                        |                                                                                                                                                                                                                                                                                         |                                      |      |      |      |      |      |                  |
|                                                        | Appearance                                                                                                                                                                                                                                                                              | No significant damage                |      |      |      |      |      |                  |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                      | ≤ ±20% of the initial value          |      |      |      |      |      |                  |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                            | ≤200% of the initial specified value |      |      |      |      |      |                  |
|                                                        | Leakage current                                                                                                                                                                                                                                                                         | ≤The initial specified value         |      |      |      |      |      |                  |
|                                                        | (Caution)                                                                                                                                                                                                                                                                               |                                      |      |      |      |      |      |                  |
|                                                        | Surge Voltage Test intends to evaluate capacitors in durability of an exceptional excessive voltage under specific conditions.It does not imply long-term use at all.                                                                                                                   |                                      |      |      |      |      |      |                  |

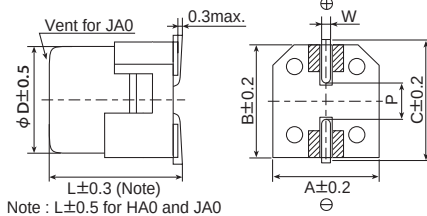
## ◆ DIMENSIONS [mm]

- Terminal Code : A
- Size code : E61 to JA0



Note : L±0.5 for HA0 and JA0

- Terminal Code : G (Vibration resistant structure)
- Size code : F61 to JA0



Note : L±0.5 for HA0 and JA0

⊠ : Dummy terminals

| Size code | D   | L    | A    | B    | C    | W          | P   |
|-----------|-----|------|------|------|------|------------|-----|
| E61       | 5   | 5.8  | 5.3  | 5.3  | 5.9  | 0.5 to 0.8 | 1.4 |
| F61       | 6.3 | 5.8  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| F80       | 6.3 | 7.7  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| HA0       | 8   | 10.0 | 8.3  | 8.3  | 9.0  | 0.7 to 1.1 | 3.1 |
| JA0       | 10  | 10.0 | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |

## ◆ MARKING

EX) 35V330μF



- Rated voltage symbol

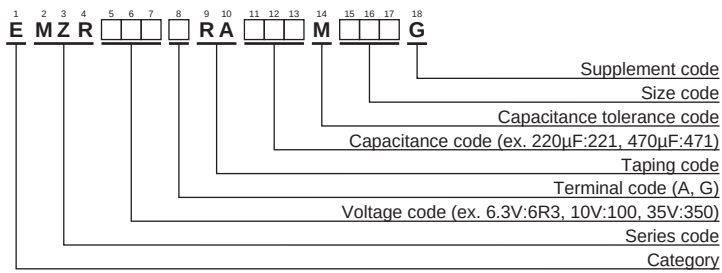
| Rated voltage (V <sub>dc</sub> ) | 6.3 | 10 | 16 | 25 | 35 | 50 |
|----------------------------------|-----|----|----|----|----|----|
| Symbol                           | j   | A  | C  | E  | V  | H  |

Applying voltage over the rated voltages causes the capacitors to have short lifetime.  
Besides, applying voltage over the specified surge voltages may cause to have short circuit failure. A protection circuit should be used if applied voltage will exceed the rated voltages.



## Alchip™-MZR Series

## ◆PART NUMBERING SYSTEM



Please refer to "Product code guide (surface mount type)"

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Size code | tan δ | ESR<br>(Ω max./20°C, 100kHz) | Rated ripple current<br>(mA rms/105°C, 100kHz) | Part No.             |
|--------------------------|-------------|-----------|-------|------------------------------|------------------------------------------------|----------------------|
| 6.3                      | 220         | E61       | 0.26  | 0.36                         | 240                                            | EMZR6R3ARA221ME61G   |
|                          | 330         | F61       | 0.26  | 0.26                         | 300                                            | EMZR6R3[ ]RA331MF61G |
|                          | 680         | F80       | 0.26  | 0.16                         | 600                                            | EMZR6R3[ ]RA681MF80G |
|                          | 1,500       | HA0       | 0.26  | 0.08                         | 850                                            | EMZR6R3[ ]RA152MHA0G |
|                          | 2,200       | JA0       | 0.26  | 0.06                         | 1,190                                          | EMZR6R3[ ]RA222MJA0G |
| 10                       | 150         | E61       | 0.19  | 0.36                         | 240                                            | EMZR100ARA151ME61G   |
|                          | 220         | F61       | 0.19  | 0.26                         | 300                                            | EMZR100[ ]RA221MF61G |
|                          | 470         | F80       | 0.19  | 0.16                         | 600                                            | EMZR100[ ]RA471MF80G |
|                          | 1,000       | HA0       | 0.19  | 0.08                         | 850                                            | EMZR100[ ]RA102MHA0G |
|                          | 1,500       | JA0       | 0.19  | 0.06                         | 1,190                                          | EMZR100[ ]RA152MJA0G |
| 16                       | 100         | E61       | 0.16  | 0.36                         | 240                                            | EMZR160ARA101ME61G   |
|                          | 220         | F61       | 0.16  | 0.26                         | 300                                            | EMZR160[ ]RA221MF61G |
|                          | 330         | F80       | 0.16  | 0.16                         | 600                                            | EMZR160[ ]RA331MF80G |
|                          | 680         | HA0       | 0.16  | 0.08                         | 850                                            | EMZR160[ ]RA681MHA0G |
|                          | 1,000       | JA0       | 0.16  | 0.06                         | 1,190                                          | EMZR160[ ]RA102MJA0G |
| 25                       | 68          | E61       | 0.14  | 0.36                         | 240                                            | EMZR250ARA680ME61G   |
|                          | 100         | F61       | 0.14  | 0.26                         | 300                                            | EMZR250[ ]RA101MF61G |
|                          | 220         | F80       | 0.14  | 0.16                         | 600                                            | EMZR250[ ]RA221MF80G |
|                          | 470         | HA0       | 0.14  | 0.08                         | 850                                            | EMZR250[ ]RA471MHA0G |
|                          | 820         | JA0       | 0.14  | 0.06                         | 1,190                                          | EMZR250[ ]RA821MJA0G |
| 35                       | 47          | E61       | 0.12  | 0.36                         | 240                                            | EMZR350ARA470ME61G   |
|                          | 100         | F61       | 0.12  | 0.26                         | 300                                            | EMZR350[ ]RA101MF61G |
|                          | 150         | F80       | 0.12  | 0.16                         | 600                                            | EMZR350[ ]RA151MF80G |
|                          | 330         | HA0       | 0.12  | 0.08                         | 850                                            | EMZR350[ ]RA331MHA0G |
|                          | 560         | JA0       | 0.12  | 0.06                         | 1,190                                          | EMZR350[ ]RA561MJA0G |
| 50                       | 22          | E61       | 0.10  | 0.88                         | 165                                            | EMZR500ARA220ME61G   |
|                          | 47          | F61       | 0.10  | 0.68                         | 195                                            | EMZR500[ ]RA470MF61G |
|                          | 100         | F80       | 0.10  | 0.34                         | 350                                            | EMZR500[ ]RA101MF80G |
|                          | 220         | HA0       | 0.10  | 0.18                         | 670                                            | EMZR500[ ]RA221MHA0G |
|                          | 330         | JA0       | 0.10  | 0.12                         | 900                                            | EMZR500[ ]RA331MJA0G |

[ ] : Enter the appropriate terminal code.

## ◆RATED RIPPLE CURRENT MULTIPLIERS

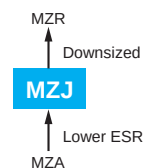
## ●Frequency Multipliers

| Capacitance(μF) | Frequency(Hz) |      |      |      |
|-----------------|---------------|------|------|------|
|                 | 120           | 1k   | 10k  | 100k |
| 22 to 150       | 0.40          | 0.75 | 0.90 | 1.00 |
| 220 to 560      | 0.50          | 0.85 | 0.94 | 1.00 |
| 680 to 2,200    | 0.60          | 0.87 | 0.95 | 1.00 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

## Alchip™-MZJ Series

- Lower ESR, 2,000 to 5,000 hours at 105°C
- Rated voltage range : 6.3 to 50V
- Nominal capacitance range : 22 to 10,000μF
- Solvent resistant type (see PRECAUTIONS AND GUIDELINES)
- Vibration resistant structure
- RoHS2 Compliant
- AEC-Q200 compliant : Please contact Chemi-Con for more details, test data, information.



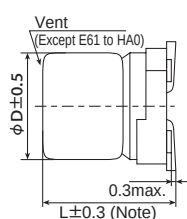
## ◆ SPECIFICATIONS

| Items                                                        | Characteristics                                                                                                                                                                                                                                                                         |                                      |      |      |      |      |                  |
|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------|------|------|------|------------------|
| Category                                                     | -55 to +105°C                                                                                                                                                                                                                                                                           |                                      |      |      |      |      |                  |
| Temperature Range                                            |                                                                                                                                                                                                                                                                                         |                                      |      |      |      |      |                  |
| Rated Voltage Range                                          | 6.3 to 50V <sub>dc</sub>                                                                                                                                                                                                                                                                |                                      |      |      |      |      |                  |
| Capacitance Tolerance                                        | ± 20% (M)                                                                                                                                                                                                                                                                               |                                      |      |      |      |      | (at 20°C, 120Hz) |
| Leakage Current                                              | I=0.01CV or 3μA, whichever is greater.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)<br>(at 20°C after 2 minutes)                                                                                                                        |                                      |      |      |      |      |                  |
| Dissipation Factor<br>(tan δ )                               | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                        | 6.3V                                 | 10V  | 16V  | 25V  | 35V  | 50V              |
|                                                              | tan δ (Max.)                                                                                                                                                                                                                                                                            | 0.26                                 | 0.19 | 0.16 | 0.14 | 0.12 | 0.12             |
|                                                              | When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase.                                                                                                                                                                                        |                                      |      |      |      |      | (at 20°C, 120Hz) |
| Low Temperature<br>Characteristics<br>(Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                        | 6.3V                                 | 10V  | 16V  | 25V  | 35V  | 50V              |
|                                                              | Z(-25°C)/Z(+20°C)                                                                                                                                                                                                                                                                       | 2                                    | 2    | 2    | 2    | 2    | 2                |
|                                                              | Z(-40°C)/Z(+20°C)                                                                                                                                                                                                                                                                       | 3                                    | 3    | 3    | 3    | 3    | 3                |
|                                                              | Z(-55°C)/Z(+20°C)                                                                                                                                                                                                                                                                       | 4                                    | 4    | 4    | 3    | 3    | 3                |
|                                                              |                                                                                                                                                                                                                                                                                         |                                      |      |      |      |      | (at 120Hz)       |
| Endurance                                                    | The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for specified time at 105°C.                                                                                                                                |                                      |      |      |      |      |                  |
|                                                              | Time                                                                                                                                                                                                                                                                                    | E61 to JAO : 2,000 hours             |      |      |      |      |                  |
|                                                              |                                                                                                                                                                                                                                                                                         | KE0 to LNO : 5,000 hours             |      |      |      |      |                  |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                      | ≤ ±30% of the initial value          |      |      |      |      |                  |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                           | ≤200% of the initial specified value |      |      |      |      |                  |
| Leakage current                                              | ≤The initial specified value                                                                                                                                                                                                                                                            |                                      |      |      |      |      |                  |
| Shelf Life                                                   | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                      |      |      |      |      |                  |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                      | ≤ ±30% of the initial value          |      |      |      |      |                  |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                           | ≤200% of the initial specified value |      |      |      |      |                  |
|                                                              | Leakage current                                                                                                                                                                                                                                                                         | ≤The initial specified value         |      |      |      |      |                  |
| Surge Voltage Test                                           | The capacitors shall be subjected to 1,000 cycles each consisting of charging with the specified surge voltage for 30±5 seconds through a protective resistor (as required for RC=0.1±0.05sec) and open-circuiting for 5.5 minutes at a room temperature of 15 to 35°C.                 |                                      |      |      |      |      |                  |
|                                                              | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                        | 6.3                                  | 10   | 16   | 25   | 35   | 50               |
|                                                              | Surge voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                        | 7.2                                  | 12   | 18   | 29   | 40   | 58               |
|                                                              |                                                                                                                                                                                                                                                                                         |                                      |      |      |      |      |                  |
|                                                              | Appearance                                                                                                                                                                                                                                                                              | No significant damage                |      |      |      |      |                  |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                      | ≤ ±20% of the initial value          |      |      |      |      |                  |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                           | ≤200% of the initial specified value |      |      |      |      |                  |
|                                                              | Leakage current                                                                                                                                                                                                                                                                         | ≤The initial specified value         |      |      |      |      |                  |
|                                                              | (Caution)                                                                                                                                                                                                                                                                               |                                      |      |      |      |      |                  |
|                                                              | Surge Voltage Test intends to evaluate capacitors in durability of an exceptional excessive voltage under specific conditions.It does not imply long-term use at all.                                                                                                                   |                                      |      |      |      |      |                  |

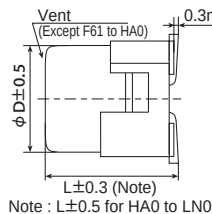
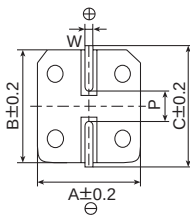
## ◆ DIMENSIONS [mm]

- Terminal Code : A

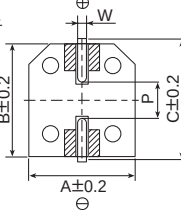
- Size code : E61 to LN0



Note : L±0.5 for HA0 to LN0



Note : L±0.5 for HA0 to LN0



⊠ : Dummy terminals

| Size code | φD   | L    | A    | B    | C    | W          | P   |
|-----------|------|------|------|------|------|------------|-----|
| E61       | 5    | 5.8  | 5.3  | 5.3  | 5.9  | 0.5 to 0.8 | 1.4 |
| F61       | 6.3  | 5.8  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| F80       | 6.3  | 7.7  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| HA0       | 8    | 10.0 | 8.3  | 8.3  | 9.0  | 0.7 to 1.1 | 3.1 |
| JA0       | 10   | 10.0 | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |
| KE0       | 12.5 | 13.5 | 13.0 | 13.0 | 13.7 | 1.0 to 1.3 | 4.2 |
| KG5       | 12.5 | 16.0 | 13.0 | 13.0 | 13.7 | 1.0 to 1.3 | 4.2 |
| LH0       | 16   | 16.5 | 17.0 | 17.0 | 18.0 | 1.0 to 1.3 | 6.5 |
| LN0       | 16   | 21.5 | 17.0 | 17.0 | 18.0 | 1.0 to 1.3 | 6.5 |

## ◆ MARKING

EX) 35V220μF

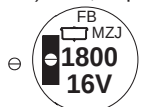


- Rated voltage symbol (E61 to JA0)

| Rated voltage (V <sub>dc</sub> ) | 6.3 | 10 | 16 | 25 | 35 |
|----------------------------------|-----|----|----|----|----|
| Symbol                           | j   | A  | C  | E  | V  |

KE0 to LN0

EX) 16V1,800μF



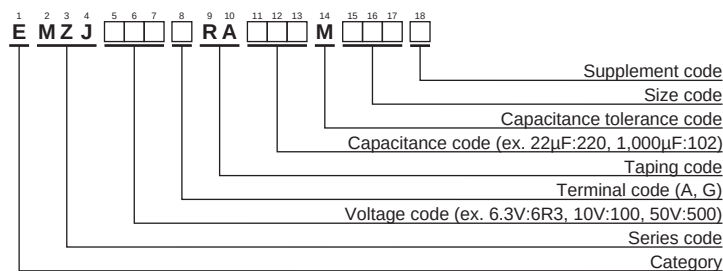
Applying voltage over the rated voltages causes the capacitors to have short lifetime.  
Besides, applying voltage over the specified surge voltages may cause to have short circuit failure. A protection circuit should be used if applied voltage will exceed the rated voltages.





## Alchip™-MZJ Series

## ◆PART NUMBERING SYSTEM



Please refer to "Product code guide (surface mount type)"

## ◆STANDARD RATINGS

| WV (V <sub>dc</sub> ) | Cap (μF) | Size code | ESR (Ω max./20°C, 100kHz) | Rated ripple current (mA <sub>rms</sub> /105°C, 100kHz) | Part No.           | WV (V <sub>dc</sub> ) | Cap (μF) | Size code | ESR (Ω max./20°C, 100kHz) | Rated ripple current (mA <sub>rms</sub> /105°C, 100kHz) | Part No.           |
|-----------------------|----------|-----------|---------------------------|---------------------------------------------------------|--------------------|-----------------------|----------|-----------|---------------------------|---------------------------------------------------------|--------------------|
| 6.3                   | 100      | E61       | 0.36                      | 240                                                     | EMZJ6R3ARA101ME61G | 25                    | 33       | E61       | 0.36                      | 240                                                     | EMZJ250ARA330ME61G |
|                       | 220      | F61       | 0.26                      | 300                                                     | EMZJ6R3□RA221MF61G |                       | 33       | F61       | 0.26                      | 300                                                     | EMZJ250□RA330MF61G |
|                       | 330      | F80       | 0.16                      | 600                                                     | EMZJ6R3□RA331MF80G |                       | 47       | F61       | 0.26                      | 300                                                     | EMZJ250□RA470MF61G |
|                       | 1,000    | HA0       | 0.08                      | 850                                                     | EMZJ6R3□RA102MHA0G |                       | 68       | F61       | 0.26                      | 300                                                     | EMZJ250□RA680MF61G |
|                       | 1,500    | JA0       | 0.06                      | 1,190                                                   | EMZJ6R3□RA152MJA0G |                       | 100      | F80       | 0.16                      | 600                                                     | EMZJ250□RA101MF80G |
|                       | 1,800    | JA0       | 0.06                      | 1,190                                                   | EMZJ6R3□RA182MJA0G |                       | 330      | HA0       | 0.08                      | 850                                                     | EMZJ250□RA331MHA0G |
|                       | 3,300    | KE0       | 0.051                     | 1,210                                                   | EMZJ6R3□RA332MKE0S |                       | 470      | JA0       | 0.06                      | 1,190                                                   | EMZJ250□RA471MJA0G |
|                       | 3,900    | KG5       | 0.044                     | 1,420                                                   | EMZJ6R3□RA392MKG5S |                       | 560      | JA0       | 0.06                      | 1,190                                                   | EMZJ250□RA561MJA0G |
|                       | 6,800    | LH0       | 0.035                     | 1,850                                                   | EMZJ6R3□RA682MLH0S |                       | 1,200    | KE0       | 0.051                     | 1,210                                                   | EMZJ250□RA122MKE0S |
|                       | 10,000   | LN0       | 0.026                     | 2,330                                                   | EMZJ6R3□RA103MLN0S |                       | 1,500    | KG5       | 0.044                     | 1,420                                                   | EMZJ250□RA152MKG5S |
| 10                    | 150      | F61       | 0.26                      | 300                                                     | EMZJ100□RA151MF61G | 35                    | 220      | LH0       | 0.035                     | 1,850                                                   | EMZJ250□RA222MLH0S |
|                       | 680      | HA0       | 0.08                      | 850                                                     | EMZJ100□RA681MHA0G |                       | 3,900    | LN0       | 0.026                     | 2,330                                                   | EMZJ250□RA392MLN0S |
|                       | 1,000    | JA0       | 0.06                      | 1,190                                                   | EMZJ100□RA102MJA0G |                       | 22       | E61       | 0.36                      | 240                                                     | EMZJ350ARA220ME61G |
|                       | 1,200    | JA0       | 0.06                      | 1,190                                                   | EMZJ100□RA122MJA0G |                       | 33       | F61       | 0.26                      | 300                                                     | EMZJ350□RA330MF61G |
|                       | 2,200    | KE0       | 0.051                     | 1,210                                                   | EMZJ100□RA222MKE0S |                       | 47       | F61       | 0.26                      | 300                                                     | EMZJ350□RA470MF61G |
|                       | 2,700    | KG5       | 0.044                     | 1,420                                                   | EMZJ100□RA272MKG5S |                       | 68       | F61       | 0.26                      | 300                                                     | EMZJ350□RA680MF61G |
|                       | 4,700    | LH0       | 0.035                     | 1,850                                                   | EMZJ100□RA472MLH0S | 50                    | 100      | F80       | 0.16                      | 600                                                     | EMZJ350□RA101MF80G |
| 16                    | 6,800    | LN0       | 0.026                     | 2,330                                                   | EMZJ100□RA682MLN0S |                       | 100      | HA0       | 0.08                      | 850                                                     | EMZJ350□RA101MHA0G |
|                       | 47       | E61       | 0.36                      | 240                                                     | EMZJ160ARA470ME61G |                       | 150      | HA0       | 0.08                      | 850                                                     | EMZJ350□RA151MHA0G |
|                       | 100      | F61       | 0.26                      | 300                                                     | EMZJ160□RA101MF61G |                       | 220      | HA0       | 0.08                      | 850                                                     | EMZJ350□RA221MHA0G |
|                       | 150      | F80       | 0.16                      | 600                                                     | EMZJ160□RA151MF80G |                       | 330      | JA0       | 0.06                      | 1,190                                                   | EMZJ350□RA331MJA0G |
|                       | 220      | F80       | 0.16                      | 600                                                     | EMZJ160□RA221MF80G |                       | 390      | JA0       | 0.06                      | 1,190                                                   | EMZJ350□RA391MJA0G |
|                       | 470      | HA0       | 0.08                      | 850                                                     | EMZJ160□RA471MHA0G |                       | 680      | KE0       | 0.051                     | 1,210                                                   | EMZJ350□RA681MKE0S |
|                       | 680      | JA0       | 0.06                      | 1,190                                                   | EMZJ160□RA681MJA0G |                       | 820      | KG5       | 0.044                     | 1,420                                                   | EMZJ350□RA821MKG5S |
|                       | 820      | JA0       | 0.06                      | 1,190                                                   | EMZJ160□RA821MJA0G |                       | 1,500    | LH0       | 0.035                     | 1,850                                                   | EMZJ350□RA152MLH0S |
|                       | 1,800    | KE0       | 0.051                     | 1,210                                                   | EMZJ160□RA182MKE0S |                       | 2,700    | LN0       | 0.026                     | 2,330                                                   | EMZJ350□RA272MLN0S |
|                       | 2,200    | KG5       | 0.044                     | 1,420                                                   | EMZJ160□RA222MKG5S |                       | 390      | KE0       | 0.105                     | 930                                                     | EMZJ500□RA391MKE0S |
| 25                    | 3,900    | LH0       | 0.035                     | 1,850                                                   | EMZJ160□RA392MLH0S |                       | 470      | KG5       | 0.092                     | 1,120                                                   | EMZJ500□RA471MKG5S |
|                       | 5,600    | LN0       | 0.026                     | 2,330                                                   | EMZJ160□RA562MLN0S |                       | 1,000    | LH0       | 0.073                     | 1,660                                                   | EMZJ500□RA102MLH0S |
|                       | 22       | E61       | 0.36                      | 240                                                     | EMZJ250ARA220ME61G |                       | 1,200    | LN0       | 0.050                     | 1,920                                                   | EMZJ500□RA122MLN0S |
|                       |          |           |                           |                                                         |                    |                       |          |           |                           |                                                         |                    |
|                       |          |           |                           |                                                         |                    |                       |          |           |                           |                                                         |                    |

□ : Enter the appropriate terminal code.

## ◆RATED RIPPLE CURRENT MULTIPLIERS

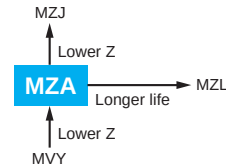
## ●Frequency Multipliers

| Size code  | Capacitance(μF) | Frequency(Hz) | 120  | 1k   | 10k  | 100k |
|------------|-----------------|---------------|------|------|------|------|
| E61 to JA0 | 22 to 150       |               | 0.40 | 0.75 | 0.90 | 1.00 |
|            | 220 to 560      |               | 0.50 | 0.85 | 0.94 | 1.00 |
|            | 680 to 1,800    |               | 0.60 | 0.87 | 0.95 | 1.00 |
| KE0 to LN0 | 390 to 470      |               | 0.50 | 0.85 | 0.94 | 1.00 |
|            | 680 to 1,800    |               | 0.60 | 0.87 | 0.95 | 1.00 |
|            | 2,200 to 3,300  |               | 0.75 | 0.90 | 0.95 | 1.00 |
|            | 3,900 to 10,000 |               | 0.85 | 0.95 | 0.98 | 1.00 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

## Alchip™-MZA Series

- Endurance : 2,000 to 5,000 hours at 105°C
- Low impedance
- Solvent resistant type(see PRECAUTIONS AND GUIDELINES)
- Vibration resistant structure
- RoHS2 Compliant
- AEC-Q200 compliant : Please contact Chemi-Con for more details, test data, information.

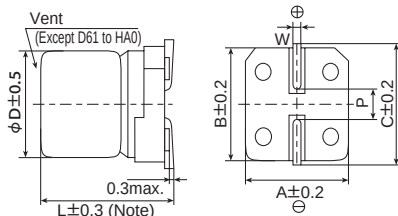


## ◆SPECIFICATIONS

| Items                                                                                                             | Characteristics                                                                                                                                              |                                                      |      |      |      |      |      |      |      |      |
|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|------|------|------|------|------|------|------|------|
| Category                                                                                                          | -55 to +105°C                                                                                                                                                |                                                      |      |      |      |      |      |      |      |      |
| Temperature Range                                                                                                 | -55 to +105°C                                                                                                                                                |                                                      |      |      |      |      |      |      |      |      |
| Rated Voltage Range                                                                                               | 6.3 to 100V <sub>dc</sub>                                                                                                                                    |                                                      |      |      |      |      |      |      |      |      |
| Capacitance Tolerance                                                                                             | ±20%(M) (at 20°C, 120Hz)                                                                                                                                     |                                                      |      |      |      |      |      |      |      |      |
| Leakage Current                                                                                                   | I=0.01CV or 3μA, whichever is greater<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C after 2 minutes) |                                                      |      |      |      |      |      |      |      |      |
| Dissipation Factor (tan δ)                                                                                        | Rated voltage(V <sub>dc</sub> )                                                                                                                              | 6.3V                                                 | 10V  | 16V  | 25V  | 35V  | 50V  | 63V  | 80V  | 100V |
|                                                                                                                   | tan δ(Max.)                                                                                                                                                  | D61 to JA0                                           | 0.26 | 0.19 | 0.16 | 0.14 | 0.12 | 0.10 | 0.08 | 0.08 |
|                                                                                                                   |                                                                                                                                                              | KE0 to MN0                                           | —    | —    | —    | 0.16 | 0.14 | 0.12 | 0.12 | 0.10 |
| When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase. (at 20°C, 120Hz) |                                                                                                                                                              |                                                      |      |      |      |      |      |      |      |      |
| Low Temperature Characteristics (Max. impedance Ratio)                                                            | Rated voltage(V <sub>dc</sub> )                                                                                                                              | 6.3V                                                 | 10V  | 16V  | 25V  | 35V  | 50V  | 63V  | 80V  | 100V |
|                                                                                                                   | Z(-25°C)/Z(+20°C)                                                                                                                                            | 2                                                    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    |
|                                                                                                                   | Z(-40°C)/Z(+20°C)                                                                                                                                            | 3                                                    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |
|                                                                                                                   | Z(-55°C)/Z(+20°C)                                                                                                                                            | 4                                                    | 4    | 4    | 3    | 3    | 3    | 3    | 3    | 3    |
| (at 120Hz)                                                                                                        |                                                                                                                                                              |                                                      |      |      |      |      |      |      |      |      |
| Endurance                                                                                                         | The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for specified time at 105°C.     |                                                      |      |      |      |      |      |      |      |      |
|                                                                                                                   | Time                                                                                                                                                         | D61 to JA0 : 2,000 hours<br>KE0 to MN0 : 5,000 hours |      |      |      |      |      |      |      |      |
|                                                                                                                   | Capacitance change                                                                                                                                           | ≤ ±30% of the initial value                          |      |      |      |      |      |      |      |      |
|                                                                                                                   | D.F. (tan δ)                                                                                                                                                 | ≤200% of the initial specified value                 |      |      |      |      |      |      |      |      |
|                                                                                                                   | Leakage current                                                                                                                                              | ≤The initial specified value                         |      |      |      |      |      |      |      |      |

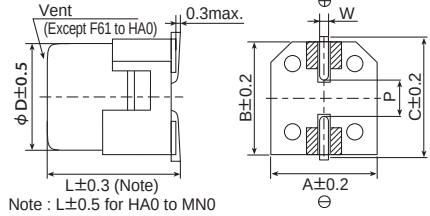
## ◆DIMENSIONS [mm]

- Terminal Code : A
- Size code : D61 to MN0



Note : L±0.5 for HA0 to MN0

- Terminal Code : G(Vibration resistant structure)
- Size code : F61 to MN0

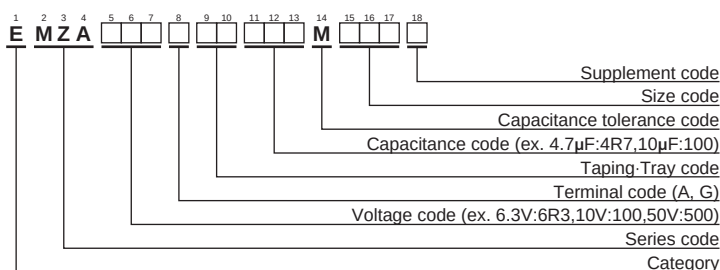


Note : L±0.5 for HA0 to MN0

⊠ : Dummy terminals

| Size code | D    | L    | A    | B    | C    | W          | P   |
|-----------|------|------|------|------|------|------------|-----|
| D61       | 4    | 5.8  | 4.3  | 4.3  | 5.1  | 0.5 to 0.8 | 1.0 |
| E61       | 5    | 5.8  | 5.3  | 5.3  | 5.9  | 0.5 to 0.8 | 1.4 |
| F61       | 6.3  | 5.8  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| F80       | 6.3  | 7.7  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| HA0       | 8    | 10.0 | 8.3  | 8.3  | 9.0  | 0.7 to 1.1 | 3.1 |
| JA0       | 10   | 10.0 | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |
| KE0       | 12.5 | 13.5 | 13.0 | 13.0 | 13.7 | 1.0 to 1.3 | 4.2 |
| KG5       | 12.5 | 16.0 | 13.0 | 13.0 | 13.7 | 1.0 to 1.3 | 4.2 |
| LH0       | 16   | 16.5 | 17.0 | 17.0 | 18.0 | 1.0 to 1.3 | 6.5 |
| LN0       | 16   | 21.5 | 17.0 | 17.0 | 18.0 | 1.0 to 1.3 | 6.5 |
| MH0       | 18   | 16.5 | 19.0 | 19.0 | 20.0 | 1.0 to 1.3 | 6.5 |
| MN0       | 18   | 21.5 | 19.0 | 19.0 | 20.0 | 1.0 to 1.3 | 6.5 |

## ◆PART NUMBERING SYSTEM



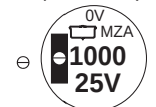
Please refer to "Product code guide (surface mount type)"

## ◆MARKING

D61 to JA0  
EX) 16V220μF



KE0 to MN0  
EX) 25V1,000μF



- Rated voltage symbol (D61 to JA0)

| Rated voltage (V <sub>dc</sub> ) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 80 |
|----------------------------------|-----|----|----|----|----|----|----|----|
| Symbol                           | j   | A  | C  | E  | V  | H  | J  | K  |



Alchip™-MZA Series

## ◆STANDARD RATINGS

| WV<br>(Vdc) | Cap<br>(μF) | Size<br>code | Impedance<br>(Ω max./<br>100kHz) |       | Rated ripple<br>current<br>(mA rms/<br>105°C, 100kHz) | Part No.             |
|-------------|-------------|--------------|----------------------------------|-------|-------------------------------------------------------|----------------------|
|             |             |              | 20°C                             | -40°C |                                                       |                      |
| 6.3         | 22          | D61          | 1.35                             | —     | 90                                                    | EMZA6R3ARA220MD61G   |
|             | 47          | D61          | 1.35                             | —     | 90                                                    | EMZA6R3ARA470MD61G   |
|             | 47          | E61          | 0.70                             | —     | 160                                                   | EMZA6R3ARA470ME61G   |
|             | 100         | E61          | 0.70                             | —     | 160                                                   | EMZA6R3ARA101ME61G   |
|             | 100         | F61          | 0.36                             | —     | 240                                                   | EMZA6R3 □ RA101MF61G |
|             | 220         | F61          | 0.36                             | —     | 240                                                   | EMZA6R3 □ RA221MF61G |
|             | 330         | F80          | 0.34                             | —     | 280                                                   | EMZA6R3 □ RA331MF80G |
|             | 470         | HA0          | 0.16                             | —     | 600                                                   | EMZA6R3 □ RA471MHA0G |
|             | 1,000       | HA0          | 0.16                             | —     | 600                                                   | EMZA6R3 □ RA102MHA0G |
|             | 1,500       | JA0          | 0.08                             | —     | 850                                                   | EMZA6R3 □ RA152MJA0G |
| 10          | 22          | D61          | 1.35                             | —     | 90                                                    | EMZA100ARA220MD61G   |
|             | 33          | D61          | 1.35                             | —     | 90                                                    | EMZA100ARA330MD61G   |
|             | 33          | E61          | 0.70                             | —     | 160                                                   | EMZA100ARA330ME61G   |
|             | 220         | F80          | 0.34                             | —     | 280                                                   | EMZA100 □ RA221MF80G |
|             | 330         | HA0          | 0.16                             | —     | 600                                                   | EMZA100 □ RA331MHA0G |
|             | 470         | HA0          | 0.16                             | —     | 600                                                   | EMZA100 □ RA471MHA0G |
|             | 680         | HA0          | 0.16                             | —     | 600                                                   | EMZA100 □ RA681MHA0G |
|             | 1,000       | JA0          | 0.08                             | —     | 850                                                   | EMZA100 □ RA102MJA0G |
|             | 10          | D61          | 1.35                             | —     | 90                                                    | EMZA160ARA100MD61G   |
|             | 22          | D61          | 1.35                             | —     | 90                                                    | EMZA160ARA220MD61G   |
| 16          | 22          | E61          | 0.70                             | —     | 160                                                   | EMZA160ARA220ME61G   |
|             | 47          | E61          | 0.70                             | —     | 160                                                   | EMZA160ARA470ME61G   |
|             | 47          | F61          | 0.36                             | —     | 240                                                   | EMZA160 □ RA470MF61G |
|             | 100         | F61          | 0.36                             | —     | 240                                                   | EMZA160 □ RA101MF61G |
|             | 220         | F80          | 0.34                             | —     | 280                                                   | EMZA160 □ RA221MF80G |
|             | 330         | HA0          | 0.16                             | —     | 600                                                   | EMZA160 □ RA331MHA0G |
|             | 470         | HA0          | 0.16                             | —     | 600                                                   | EMZA160 □ RA471MHA0G |
|             | 680         | JA0          | 0.08                             | —     | 850                                                   | EMZA160 □ RA681MJA0G |
|             | 10          | D61          | 1.35                             | —     | 90                                                    | EMZA250ARA100MD61G   |
|             | 22          | E61          | 0.70                             | —     | 160                                                   | EMZA250ARA220ME61G   |
| 25          | 33          | E61          | 0.70                             | —     | 160                                                   | EMZA250ARA330ME61G   |
|             | 33          | F61          | 0.36                             | —     | 240                                                   | EMZA250 □ RA330MF61G |
|             | 47          | F61          | 0.36                             | —     | 240                                                   | EMZA250 □ RA470MF61G |
|             | 100         | F80          | 0.34                             | —     | 280                                                   | EMZA250 □ RA101MF80G |
|             | 220         | HA0          | 0.16                             | —     | 600                                                   | EMZA250 □ RA221MHA0G |
|             | 330         | HA0          | 0.16                             | —     | 600                                                   | EMZA250 □ RA331MHA0G |
|             | 470         | JA0          | 0.08                             | —     | 850                                                   | EMZA250 □ RA471MJA0G |
|             | 1,000       | KE0          | 0.060                            | 0.30  | 1,320                                                 | EMZA250 □ RA102MKE0S |
|             | 1,300       | KG5          | 0.056                            | 0.28  | 1,470                                                 | EMZA250 □ RA132MKG5S |
|             | 1,800       | LH0          | 0.047                            | 0.24  | 1,820                                                 | EMZA250 □ RA182MLH0S |
| 35          | 2,400       | MH0          | 0.045                            | 0.23  | 2,060                                                 | EMZA250 □ RA242MMH0S |
|             | 3,000       | LNO          | 0.034                            | 0.17  | 2,400                                                 | EMZA250 □ RA302MLN0S |
|             | 3,900       | MNO          | 0.032                            | 0.16  | 2,640                                                 | EMZA250 □ RA392MMNO  |
|             | 4.7         | D61          | 1.35                             | —     | 90                                                    | EMZA350ARA4R7MD61G   |
|             | 10          | D61          | 1.35                             | —     | 90                                                    | EMZA350ARA100MD61G   |
|             | 10          | E61          | 0.70                             | —     | 160                                                   | EMZA350ARA100ME61G   |
|             | 22          | E61          | 0.70                             | —     | 160                                                   | EMZA350ARA220ME61G   |
|             | 33          | F61          | 0.36                             | —     | 240                                                   | EMZA350 □ RA330MF61G |
|             | 47          | F61          | 0.36                             | —     | 240                                                   | EMZA350 □ RA470MF61G |
|             | 100         | F80          | 0.34                             | —     | 280                                                   | EMZA350 □ RA101MF80G |
| 50          | 100         | HA0          | 0.16                             | —     | 600                                                   | EMZA350 □ RA101MHA0G |
|             | 220         | HA0          | 0.16                             | —     | 600                                                   | EMZA350 □ RA221MHA0G |
|             | 330         | JA0          | 0.08                             | —     | 850                                                   | EMZA350 □ RA331MJA0G |
|             | 620         | KE0          | 0.060                            | 0.30  | 1,320                                                 | EMZA350 □ RA621MKE0S |
|             | 820         | KG5          | 0.056                            | 0.28  | 1,470                                                 | EMZA350 □ RA821MKG5S |
|             | 1,200       | LH0          | 0.047                            | 0.24  | 1,820                                                 | EMZA350 □ RA122MLH0S |
|             | 1,600       | MH0          | 0.045                            | 0.23  | 2,060                                                 | EMZA350 □ RA162MMH0S |
|             | 1,800       | LNO          | 0.034                            | 0.17  | 2,400                                                 | EMZA350 □ RA182MLN0S |
|             | 2,400       | MNO          | 0.032                            | 0.16  | 2,640                                                 | EMZA350 □ RA242MMNO  |
|             | 4.7         | D61          | 2.9                              | —     | 60                                                    | EMZA500ARA4R7MD61G   |
| 63          | 10          | E61          | 1.52                             | —     | 85                                                    | EMZA500ARA100ME61G   |
|             | 10          | F61          | 0.88                             | —     | 165                                                   | EMZA500 □ RA100MF61G |
|             | 22          | F61          | 0.88                             | —     | 165                                                   | EMZA500 □ RA220MF61G |
|             | 33          | F80          | 0.68                             | —     | 195                                                   | EMZA500 □ RA330MF80G |
|             | 47          | F80          | 0.68                             | —     | 195                                                   | EMZA500 □ RA470MF80G |
|             | 100         | HA0          | 0.34                             | —     | 350                                                   | EMZA500 □ RA101MHA0G |
|             | 220         | JA0          | 0.18                             | —     | 670                                                   | EMZA500 □ RA221MJA0G |
|             | 330         | KE0          | 0.11                             | 0.55  | 980                                                   | EMZA500 □ RA331MKE0S |
|             | 430         | KG5          | 0.10                             | 0.50  | 1,090                                                 | EMZA500 □ RA431MKG5S |
|             | 620         | LH0          | 0.087                            | 0.44  | 1,320                                                 | EMZA500 □ RA621MLH0S |
| 80          | 820         | MH0          | 0.087                            | 0.44  | 1,420                                                 | EMZA500 □ RA821MMH0S |
|             | 1,000       | LNO          | 0.050                            | 0.25  | 1,910                                                 | EMZA500 □ RA102MLN0S |
|             | 1,300       | MNO          | 0.050                            | 0.25  | 2,180                                                 | EMZA500 □ RA132MMNO  |
|             | 4.7         | E61          | 4.8                              | —     | 50                                                    | EMZA630ARA4R7ME61G   |
|             | 10          | F61          | 2.2                              | —     | 80                                                    | EMZA630 □ RA100MF61G |
|             | 22          | F80          | 2.1                              | —     | 120                                                   | EMZA630 □ RA220MF80G |
|             | 33          | HA0          | 0.70                             | —     | 250                                                   | EMZA630 □ RA330MHA0G |
|             | 47          | HA0          | 0.70                             | —     | 250                                                   | EMZA630 □ RA470MHA0G |
|             | 68          | HA0          | 0.70                             | —     | 250                                                   | EMZA630 □ RA680MHA0G |
|             | 100         | JA0          | 0.45                             | —     | 400                                                   | EMZA630 □ RA101MJA0G |
| 100         | 240         | KE0          | 0.19                             | 1.54  | 880                                                   | EMZA630 □ RA241MKE0S |
|             | 300         | KG5          | 0.17                             | 1.19  | 1,000                                                 | EMZA630 □ RA301MKG5S |
|             | 430         | LH0          | 0.15                             | 1.05  | 1,220                                                 | EMZA630 □ RA431MLH0S |
|             | 560         | MH0          | 0.12                             | 0.84  | 1,430                                                 | EMZA630 □ RA561MMH0S |
|             | 680         | LNO          | 0.085                            | 0.58  | 1,790                                                 | EMZA630 □ RA681MLN0S |
|             | 910         | MNO          | 0.070                            | 0.49  | 1,960                                                 | EMZA630 □ RA911MMNO  |
|             | 3.3         | E61          | 5.0                              | —     | 25                                                    | EMZA800ARA3R3ME61G   |
|             | 4.7         | F61          | 3.0                              | —     | 40                                                    | EMZA800 □ RA4R7MF61G |
|             | 10          | F80          | 2.4                              | —     | 60                                                    | EMZA800 □ RA100MF80G |
|             | 22          | HA0          | 1.3                              | —     | 130                                                   | EMZA800 □ RA220MHA0G |
| 100         | 33          | HA0          | 1.3                              | —     | 130                                                   | EMZA800 □ RA330MHA0G |
|             | 47          | JA0          | 0.70                             | —     | 200                                                   | EMZA800 □ RA470MJA0G |
|             | 150         | KE0          | 0.22                             | 1.54  | 810                                                   | EMZA800 □ RA151MKE0S |
|             | 220         | KG5          | 0.17                             | 1.19  | 1,000                                                 | EMZA800 □ RA221MKG5S |
|             | 330         | LH0          | 0.15                             | 1.05  | 1,220                                                 | EMZA800 □ RA331MLH0S |
|             | 430         | MH0          | 0.12                             | 0.84  | 1,430                                                 | EMZA800 □ RA431MMH0S |
|             | 470         | LNO          | 0.085                            | 0.58  | 1,790                                                 | EMZA800 □ RA471MLN0S |
|             | 680         | MNO          | 0.070                            | 0.49  | 1,960                                                 | EMZA800 □ RA681MMNO  |
|             | 110         | KE0          | 0.28                             | 2.24  | 740                                                   | EMZA101 □ RA111MKE0S |
|             | 130         | KG5          | 0.21                             | 1.68  | 900                                                   | EMZA101 □ RA131MKG5S |
| 100         | 200         | LH0          | 0.18                             | 1.44  | 1,090                                                 | EMZA101 □ RA201MLH0S |
|             | 270         | MH0          | 0.15                             | 1.2   | 1,280                                                 | EMZA101 □ RA271MMH0S |
|             | 330         | LNO          | 0.11                             | 0.88  | 1,580                                                 | EMZA101 □ RA331MLN0S |
|             | 430         | MNO          | 0.091                            | 0.73  | 1,690                                                 | EMZA101 □ RA431MMNO  |

□ : Enter the appropriate terminal code.

Production of the products shown in   is scheduled to be discontinued.

## ◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multipliers

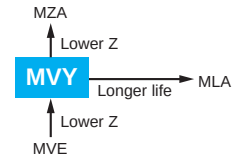
| Size code  | Capacitance(μF) | Frequency(Hz) |      |      |      |
|------------|-----------------|---------------|------|------|------|
|            |                 | 120           | 1k   | 10k  | 100k |
| D61 to JA0 | 3.3 to 4.7      | 0.35          | 0.70 | 0.90 | 1.00 |
|            | 10 to 100       | 0.40          | 0.75 | 0.90 | 1.00 |
|            | 220 to 470      | 0.50          | 0.85 | 0.94 | 1.00 |
|            | 680 to 1,500    | 0.60          | 0.87 | 0.95 | 1.00 |
| KE0 to MNO | 110 to 200      | 0.40          | 0.75 | 0.90 | 1.00 |
|            | 220 to 620      | 0.50          | 0.85 | 0.94 | 1.00 |
|            | 680 to 1,800    | 0.60          | 0.87 | 0.95 | 1.00 |
|            | 2,400 to 3,000  | 0.75          | 0.90 | 0.95 | 1.00 |
|            | 3,900           | 0.85          | 0.95 | 0.98 | 1.00 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

Product specifications in this catalog are subject to change without notice. Request our product specifications before purchase and/or use. Please use our products based on the information contained in this catalog and product specifications.

# Alchip™-MVY Series

- Endurance : 1,000 to 5,000 hours at 105°C
- Low impedance
- For digital equipment, especially DC-DC converters
- Solvent resistant type except 80 & 100V<sub>dc</sub> (see PRECAUTIONS AND GUIDELINES)
- Vibration resistant structure
- RoHS2 Compliant
- AEC-Q200 compliant : Please contact Chemi-Con for more details, test data, information.



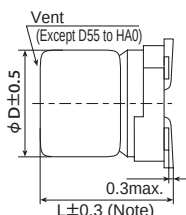
## SPECIFICATIONS

| Items                                                        | Characteristics                                                                                                                                                                                                                                                                       |                                                                                 |      |      |      |      |      |                                      |      |      |      |                                                                                                                         |
|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|------|------|------|------|------|--------------------------------------|------|------|------|-------------------------------------------------------------------------------------------------------------------------|
| Category                                                     |                                                                                                                                                                                                                                                                                       |                                                                                 |      |      |      |      |      |                                      |      |      |      |                                                                                                                         |
| Temperature Range                                            | -55 to +105℃ (6.3 to 63V <sub>dc</sub> )    -40 to +105℃ (80 & 100V <sub>dc</sub> )                                                                                                                                                                                                   |                                                                                 |      |      |      |      |      |                                      |      |      |      |                                                                                                                         |
| Rated Voltage Range                                          | 6.3 to 100V <sub>dc</sub>                                                                                                                                                                                                                                                             |                                                                                 |      |      |      |      |      |                                      |      |      |      |                                                                                                                         |
| Capacitance Tolerance                                        | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                             |                                                                                 |      |      |      |      |      |                                      |      |      |      |                                                                                                                         |
| Leakage Current                                              | I=0.01CV or 3μA, whichever is greater.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 2 minutes)                                                                                                                          |                                                                                 |      |      |      |      |      |                                      |      |      |      |                                                                                                                         |
| Dissipation Factor<br>(tan δ)                                | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      |                                                                                 | 6.3V | 10V  | 16V  | 25V  | 35V  | 50V                                  | 63V  | 80V  | 100V | When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase.<br><br>(at 20℃, 120Hz) |
|                                                              | tan δ (Max.)                                                                                                                                                                                                                                                                          | D55 to F80                                                                      | 0.24 | 0.20 | 0.16 | 0.14 | 0.12 | 0.12                                 | —    | —    | —    |                                                                                                                         |
|                                                              |                                                                                                                                                                                                                                                                                       | HA0 & JA0                                                                       | 0.28 | 0.24 | 0.20 | 0.16 | 0.14 | 0.12                                 | —    | —    | —    |                                                                                                                         |
|                                                              |                                                                                                                                                                                                                                                                                       | KE0 to MN0                                                                      | 0.26 | 0.22 | 0.18 | 0.16 | 0.14 | 0.12                                 | 0.14 | 0.10 | 0.10 |                                                                                                                         |
| Low Temperature<br>Characteristics<br>(Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      |                                                                                 | 6.3V | 10V  | 16V  | 25V  | 35V  | 50V                                  | 63V  | 80V  | 100V | (at 120Hz)                                                                                                              |
|                                                              | Z(-40℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | D55 to JA0                                                                      | 3    | 2    | 2    | 2    | 2    | 2                                    | —    | —    | —    |                                                                                                                         |
|                                                              |                                                                                                                                                                                                                                                                                       | KE0 to MN0                                                                      | 10   | 8    | 6    | 4    | 3    | 3                                    | 3    | 3    | 3    |                                                                                                                         |
| Endurance                                                    | The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for specified ime at 105℃.                                                                                                                                 |                                                                                 |      |      |      |      |      |                                      |      |      |      |                                                                                                                         |
|                                                              | Time                                                                                                                                                                                                                                                                                  | D55 to F80 : 1,000 hours<br>HA0 & JA0 : 2,000 hours<br>KE0 to MN0 : 5,000 hours |      |      |      |      |      |                                      |      |      |      |                                                                                                                         |
|                                                              | Rated voltage                                                                                                                                                                                                                                                                         | 6.3V <sub>dc</sub> (D55 to JA0)                                                 |      |      |      |      |      | 6.3 to 100V <sub>dc</sub>            |      |      |      |                                                                                                                         |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±30% of the initial value                                                     |      |      |      |      |      | ≤ ±20% of the initial value          |      |      |      |                                                                                                                         |
|                                                              | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤300% of the initial specified value                                            |      |      |      |      |      | ≤200% of the initial specified value |      |      |      |                                                                                                                         |
|                                                              | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value                                                    |      |      |      |      |      | ≤The initial specified value         |      |      |      |                                                                                                                         |
|                                                              |                                                                                                                                                                                                                                                                                       |                                                                                 |      |      |      |      |      |                                      |      |      |      |                                                                                                                         |
| Shelf Life                                                   | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                                                                 |      |      |      |      |      |                                      |      |      |      |                                                                                                                         |
|                                                              | Rated voltage                                                                                                                                                                                                                                                                         | 6.3V <sub>dc</sub> (D55 to JA0)                                                 |      |      |      |      |      | 6.3 to 100V <sub>dc</sub>            |      |      |      |                                                                                                                         |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±30% of the initial value                                                     |      |      |      |      |      | ≤ ±20% of the initial value          |      |      |      |                                                                                                                         |
|                                                              | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤300% of the initial specified value                                            |      |      |      |      |      | ≤200% of the initial specified value |      |      |      |                                                                                                                         |
|                                                              | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value                                                    |      |      |      |      |      | ≤The initial specified value         |      |      |      |                                                                                                                         |

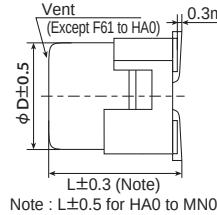
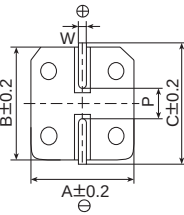
## DIMENSIONS [mm]

- Terminal Code : A
- Size code : D55 to MN0

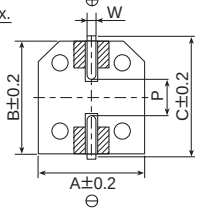
- Terminal Code : G(Vibration resistant structure)
- Size code : F61 to MN0



Note : L±0.5 for HA0 to MN0



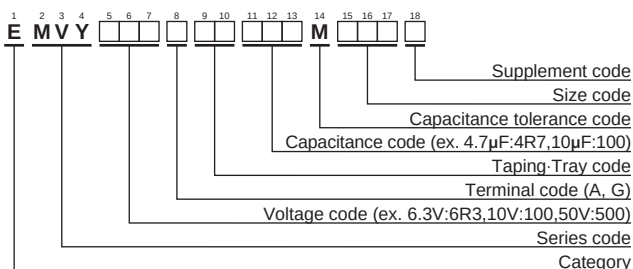
Note : L±0.5 for HA0 to MN0



⊠ : Dummy terminals

| Size code | D    | L    | A    | B    | C    | W          | P   |
|-----------|------|------|------|------|------|------------|-----|
| D55       | 4    | 5.2  | 4.3  | 4.3  | 5.1  | 0.5 to 0.8 | 1.0 |
| E55       | 5    | 5.2  | 5.3  | 5.3  | 5.9  | 0.5 to 0.8 | 1.4 |
| F55       | 6.3  | 5.2  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| F61       | 6.3  | 5.8  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| F80       | 6.3  | 7.7  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| HA0       | 8    | 10.0 | 8.3  | 8.3  | 9.0  | 0.7 to 1.1 | 3.1 |
| JA0       | 10   | 10.0 | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |
| KE0       | 12.5 | 13.5 | 13.0 | 13.0 | 13.7 | 1.0 to 1.3 | 4.2 |
| KG5       | 12.5 | 16.0 | 13.0 | 13.0 | 13.7 | 1.0 to 1.3 | 4.2 |
| LH0       | 16   | 16.5 | 17.0 | 17.0 | 18.0 | 1.0 to 1.3 | 6.5 |
| LN0       | 16   | 21.5 | 17.0 | 17.0 | 18.0 | 1.0 to 1.3 | 6.5 |
| MH0       | 18   | 16.5 | 19.0 | 19.0 | 20.0 | 1.0 to 1.3 | 6.5 |
| MN0       | 18   | 21.5 | 19.0 | 19.0 | 20.0 | 1.0 to 1.3 | 6.5 |

## PART NUMBERING SYSTEM



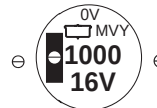
Please refer to "Product code guide (surface mount type)"

## MARKING

D55 to JA0  
EX) 6.3V100μF



KE0 to MN0  
EX) 16V1,000μF





Alchip™-MVY Series

## ◆STANDARD RATINGS

| WV (V <sub>dc</sub> ) | Cap (μF) | Size code | Impedance (Ω max./20°C, 100kHz) | Rated ripple current (mA rms/105°C, 100kHz) | Part No.           | WV (V <sub>dc</sub> ) | Cap (μF) | Size code | Impedance (Ω max./20°C, 100kHz) | Rated ripple current (mA rms/105°C, 100kHz) | Part No.           |
|-----------------------|----------|-----------|---------------------------------|---------------------------------------------|--------------------|-----------------------|----------|-----------|---------------------------------|---------------------------------------------|--------------------|
| 6.3                   | 22       | D55       | 3.0                             | 60                                          | EMVY6R3ARA220MD55G | 25                    | 330      | HA0       | 0.30                            | 450                                         | EMVY250□RA331MHA0G |
|                       | 33       | E55       | 1.8                             | 95                                          | EMVY6R3ARA330ME55G |                       | 470      | JA0       | 0.15                            | 670                                         | EMVY250□RA471MJA0G |
|                       | 47       | E55       | 1.8                             | 95                                          | EMVY6R3ARA470ME55G |                       | 1,000    | LH0       | 0.054                           | 1,260                                       | EMVY250□RA102MLH0S |
|                       | 100      | F55       | 1.0                             | 140                                         | EMVY6R3ARA101MF55G |                       | 1,000    | MH0       | 0.054                           | 1,350                                       | EMVY250□RA102MMH0S |
|                       | 220      | F55       | 1.0                             | 140                                         | EMVY6R3ARA221MF55G |                       | 2,200    | LN0       | 0.038                           | 1,630                                       | EMVY250□RA222MLN0S |
|                       | 330      | F80       | 0.34                            | 280                                         | EMVY6R3□RA331MF80G |                       | 2,200    | MN0       | 0.038                           | 1,750                                       | EMVY250□RA222MMN0S |
|                       | 470      | HA0       | 0.30                            | 450                                         | EMVY6R3□RA471MHA0G |                       | 3,300    | MN0       | 0.038                           | 1,750                                       | EMVY250□RA332MMN0S |
|                       | 680      | HA0       | 0.30                            | 450                                         | EMVY6R3□RA681MHA0G | 35                    | 4.7      | D55       | 3.0                             | 60                                          | EMVY350ARA4R7MD55G |
|                       | 1,000    | HA0       | 0.30                            | 450                                         | EMVY6R3□RA102MHA0G |                       | 10       | E55       | 1.8                             | 95                                          | EMVY350ARA100ME55G |
|                       | 1,500    | JA0       | 0.15                            | 670                                         | EMVY6R3□RA152MJA0G |                       | 22       | F55       | 1.0                             | 140                                         | EMVY350ARA220MF55G |
|                       | 2,200    | KE0       | 0.070                           | 820                                         | EMVY6R3□RA222MKE0S |                       | 33       | F55       | 1.0                             | 140                                         | EMVY350ARA330MF55G |
|                       | 2,200    | LH0       | 0.054                           | 1,260                                       | EMVY6R3□RA222MLH0S |                       | 47       | F55       | 1.0                             | 140                                         | EMVY350ARA470MF55G |
|                       | 3,300    | KG5       | 0.060                           | 950                                         | EMVY6R3□RA332MKG5S |                       | 47       | F61       | 1.0                             | 140                                         | EMVY350□RA470MF61G |
|                       | 3,300    | MH0       | 0.054                           | 1,350                                       | EMVY6R3□RA332MMH0S |                       | 68       | F80       | 0.34                            | 280                                         | EMVY350□RA680MF80G |
|                       | 4,700    | LN0       | 0.038                           | 1,630                                       | EMVY6R3□RA472MLN0S |                       | 100      | HA0       | 0.30                            | 450                                         | EMVY350□RA101MHA0G |
|                       | 4,700    | MH0       | 0.054                           | 1,350                                       | EMVY6R3□RA472MMH0S |                       | 220      | HA0       | 0.30                            | 450                                         | EMVY350□RA221MHA0G |
|                       | 6,800    | LN0       | 0.038                           | 1,630                                       | EMVY6R3□RA682MLN0S |                       | 330      | JA0       | 0.15                            | 670                                         | EMVY350□RA331MJA0G |
|                       | 6,800    | MN0       | 0.038                           | 1,750                                       | EMVY6R3□RA682MMN0S |                       | 470      | KE0       | 0.070                           | 820                                         | EMVY350□RA471MKE0S |
|                       | 8,200    | MN0       | 0.038                           | 1,750                                       | EMVY6R3□RA822MMN0S |                       | 470      | LH0       | 0.054                           | 1,260                                       | EMVY350□RA471MLH0S |
| 10                    | 22       | E55       | 1.8                             | 95                                          | EMVY100ARA220ME55G |                       | 1,000    | LH0       | 0.054                           | 1,260                                       | EMVY350□RA102MLH0S |
|                       | 33       | E55       | 1.8                             | 95                                          | EMVY100ARA330ME55G |                       | 1,000    | MH0       | 0.054                           | 1,350                                       | EMVY350□RA102MMH0S |
|                       | 47       | F55       | 1.0                             | 140                                         | EMVY100ARA470MF55G |                       | 2,200    | MN0       | 0.038                           | 1,750                                       | EMVY350□RA222MMN0S |
|                       | 100      | F55       | 1.0                             | 140                                         | EMVY100ARA101MF55G | 50                    | 1.0      | D55       | 5.0                             | 30                                          | EMVY500ARA1R0MD55G |
|                       | 220      | F80       | 0.34                            | 280                                         | EMVY100□RA221MF80G |                       | 2.2      | D55       | 5.0                             | 30                                          | EMVY500ARA2R2MD55G |
|                       | 330      | HA0       | 0.30                            | 450                                         | EMVY100□RA331MHA0G |                       | 3.3      | D55       | 5.0                             | 30                                          | EMVY500ARA3R3MD55G |
|                       | 470      | HA0       | 0.30                            | 450                                         | EMVY100□RA471MHA0G |                       | 4.7      | E55       | 3.0                             | 50                                          | EMVY500ARA4R7ME55G |
|                       | 680      | JA0       | 0.15                            | 670                                         | EMVY100□RA681MJA0G |                       | 10       | F55       | 2.0                             | 70                                          | EMVY500ARA100MF55G |
|                       | 1,000    | JA0       | 0.15                            | 670                                         | EMVY100□RA102MJA0G |                       | 22       | F55       | 2.0                             | 70                                          | EMVY500ARA220MF55G |
|                       | 2,200    | KG5       | 0.060                           | 950                                         | EMVY100□RA222MKG5S |                       | 33       | F80       | 0.60                            | 170                                         | EMVY500□RA330MF80G |
|                       | 2,200    | LH0       | 0.054                           | 1,260                                       | EMVY100□RA222MLH0S |                       | 47       | F80       | 0.60                            | 170                                         | EMVY500□RA470MF80G |
|                       | 3,300    | LH0       | 0.054                           | 1,260                                       | EMVY100□RA332MLH0S |                       | 68       | HA0       | 0.60                            | 300                                         | EMVY500□RA680MHA0G |
|                       | 3,300    | MH0       | 0.054                           | 1,350                                       | EMVY100□RA332MMH0S |                       | 100      | HA0       | 0.60                            | 300                                         | EMVY500□RA101MHA0G |
|                       | 4,700    | LN0       | 0.038                           | 1,630                                       | EMVY100□RA472MLN0S |                       | 220      | JA0       | 0.30                            | 500                                         | EMVY500□RA221MJA0G |
|                       | 4,700    | MN0       | 0.038                           | 1,750                                       | EMVY100□RA472MMN0S |                       | 330      | KE0       | 0.11                            | 650                                         | EMVY500□RA331MKE0S |
|                       | 6,800    | MN0       | 0.038                           | 1,750                                       | EMVY100□RA682MMN0S |                       | 330      | LH0       | 0.087                           | 900                                         | EMVY500□RA331MLH0S |
| 16                    | 10       | D55       | 3.0                             | 60                                          | EMVY160ARA100MD55G | 63                    | 470      | LH0       | 0.087                           | 900                                         | EMVY500□RA471MLH0S |
|                       | 22       | E55       | 1.8                             | 95                                          | EMVY160ARA220ME55G |                       | 470      | MH0       | 0.087                           | 1,060                                       | EMVY500□RA471MMH0S |
|                       | 33       | F55       | 1.0                             | 140                                         | EMVY160ARA330MF55G |                       | 1,000    | MN0       | 0.050                           | 1,520                                       | EMVY500□RA102MMN0S |
|                       | 47       | F55       | 1.0                             | 140                                         | EMVY160ARA470MF55G | 80                    | 68       | KE0       | 0.19                            | 500                                         | EMVY630□RA680MKE0S |
|                       | 100      | F55       | 1.0                             | 140                                         | EMVY160ARA101MF55G |                       | 100      | KE0       | 0.19                            | 500                                         | EMVY630□RA101MKE0S |
|                       | 220      | F80       | 0.34                            | 280                                         | EMVY160□RA221MF80G |                       | 220      | KE0       | 0.19                            | 500                                         | EMVY630□RA221MKE0S |
|                       | 330      | HA0       | 0.30                            | 450                                         | EMVY160□RA331MHA0G |                       | 220      | LH0       | 0.12                            | 845                                         | EMVY630□RA221MLH0S |
|                       | 470      | HA0       | 0.30                            | 450                                         | EMVY160□RA471MHA0G |                       | 330      | LH0       | 0.12                            | 845                                         | EMVY630□RA331MLH0S |
|                       | 680      | JA0       | 0.15                            | 670                                         | EMVY160□RA681MJA0G |                       | 330      | MH0       | 0.12                            | 905                                         | EMVY630□RA331MMH0S |
|                       | 1,000    | KE0       | 0.070                           | 820                                         | EMVY160□RA102MKE0S |                       | 470      | LN0       | 0.085                           | 1,100                                       | EMVY630□RA471MLN0S |
|                       | 1,000    | LH0       | 0.054                           | 1,260                                       | EMVY160□RA102MLH0S |                       | 470      | MH0       | 0.12                            | 905                                         | EMVY630□RA471MMH0S |
|                       | 2,200    | LH0       | 0.054                           | 1,260                                       | EMVY160□RA222MLH0S | 100                   | 100      | KE0       | 0.33                            | 450                                         | EMVY800□RA101MKE0S |
|                       | 2,200    | MH0       | 0.054                           | 1,350                                       | EMVY160□RA222MMH0S |                       | 220      | KG5       | 0.26                            | 550                                         | EMVY800□RA221MKG5S |
|                       | 3,300    | LN0       | 0.038                           | 1,630                                       | EMVY160□RA332MLN0S |                       | 330      | LN0       | 0.16                            | 900                                         | EMVY800□RA331MLN0S |
|                       | 3,300    | MH0       | 0.054                           | 1,350                                       | EMVY160□RA332MMH0S |                       | 330      | MH0       | 0.24                            | 700                                         | EMVY800□RA331MMH0S |
|                       | 4,700    | MN0       | 0.038                           | 1,750                                       | EMVY160□RA472MMN0S |                       | 470      | MN0       | 0.16                            | 950                                         | EMVY800□RA471MMN0S |
|                       | 4,700    | MN0       | 0.038                           | 1,750                                       | EMVY160□RA472MMN0S |                       | 47       | KE0       | 0.33                            | 450                                         | EMVY101□RA470MKE0S |
| 25                    | 10       | E55       | 1.8                             | 95                                          | EMVY250ARA100ME55G |                       | 68       | KE0       | 0.33                            | 450                                         | EMVY101□RA680MKE0S |
|                       | 22       | F55       | 1.0                             | 140                                         | EMVY250ARA220MF55G |                       | 100      | KE0       | 0.33                            | 450                                         | EMVY101□RA101MKE0S |
|                       | 33       | F55       | 1.0                             | 140                                         | EMVY250ARA330MF55G |                       | 100      | LH0       | 0.24                            | 650                                         | EMVY101□RA101MLH0S |
|                       | 47       | F55       | 1.0                             | 140                                         | EMVY250ARA470MF55G |                       | 220      | LN0       | 0.16                            | 900                                         | EMVY101□RA221MLN0S |
|                       | 100      | F80       | 0.34                            | 280                                         | EMVY250□RA101MF80G |                       | 220      | MH0       | 0.24                            | 700                                         | EMVY101□RA221MMH0S |
|                       | 220      | HA0       | 0.30                            | 450                                         | EMVY250□RA221MHA0G |                       | 330      | MN0       | 0.16                            | 950                                         | EMVY101□RA331MMN0S |

□ : Enter the appropriate terminal code.

Production of the products shown in   is scheduled to be discontinued.

\*1: Assembly boards with the designated products attached cannot be cleaned.

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

| Size code  | Capacitance(μF) | Frequency(Hz) | 120  | 1k   | 10k  | 100k |
|------------|-----------------|---------------|------|------|------|------|
| D55 to JA0 | 1.0 to 4.7      |               | 0.35 | 0.70 | 0.90 | 1.00 |
|            | 10 to 100       |               | 0.40 | 0.75 | 0.90 | 1.00 |
|            | 220 to 470      |               | 0.50 | 0.85 | 0.94 | 1.00 |
|            | 680 to 1,500    |               | 0.60 | 0.87 | 0.95 | 1.00 |
| KE0 to MN0 | 47 to 100       |               | 0.40 | 0.75 | 0.90 | 1.00 |
|            | 220 to 470      |               | 0.50 | 0.85 | 0.94 | 1.00 |
|            | 1,000           |               | 0.60 | 0.87 | 0.95 | 1.00 |
|            | 2,200 to 3,300  |               | 0.75 | 0.90 | 0.95 | 1.00 |
|            | 4,700 to 8,200  |               | 0.85 | 0.95 | 0.98 | 1.00 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

Product specifications in this catalog are subject to change without notice. Request our product specifications before purchase and/or use. Please use our products based on the information contained in this catalog and product specifications.





## Alchip™-MZF Series

- Endurance : 10,000 hours at 105°C
- Low impedance
- Rated voltage range : 6.3 to 50V
- Nominal capacitance range : 10 to 470μF
- Suitable for long life and low profile products
- Solvent resistant type (see PRECAUTIONS AND GUIDELINES)
- RoHS2 Compliant

MLA  $\xrightarrow{\text{Longer life}}$  MZE  $\xrightarrow{\text{Longer life}}$  **MZF**

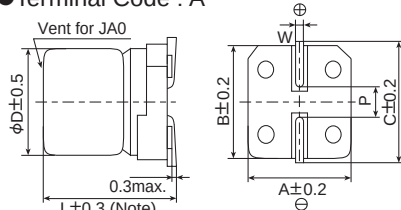


### SPECIFICATIONS

| Items                                                        | Characteristics                                                                                                                                                                                                                                                                       |                                      |      |      |      |      |      |
|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------|------|------|------|------|
| Category                                                     | -25 to +105℃                                                                                                                                                                                                                                                                          |                                      |      |      |      |      |      |
| Temperature Range                                            |                                                                                                                                                                                                                                                                                       |                                      |      |      |      |      |      |
| Rated Voltage Range                                          | 6.3 to 50V <sub>dc</sub>                                                                                                                                                                                                                                                              |                                      |      |      |      |      |      |
| Capacitance Tolerance                                        | ± 20%(M) (at 20℃,120Hz)                                                                                                                                                                                                                                                               |                                      |      |      |      |      |      |
| Leakage Current                                              | I=0.01CV or 3μA, whichever is greater<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃, after 2 minutes)                                                                                                                          |                                      |      |      |      |      |      |
| Dissipation Factor<br>(tan δ )                               | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 6.3V                                 | 10V  | 16V  | 25V  | 35V  | 50V  |
|                                                              | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.32                                 | 0.28 | 0.26 | 0.16 | 0.14 | 0.14 |
| (at 20℃,120Hz)                                               |                                                                                                                                                                                                                                                                                       |                                      |      |      |      |      |      |
| Low Temperature<br>Characteristics<br>(Max. Impedance Ratio) | Rated voltage(V <sub>dc</sub> )                                                                                                                                                                                                                                                       | 6.3V                                 | 10V  | 16V  | 25V  | 35V  | 50V  |
|                                                              | Z(-10℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 4                                    | 3    | 2    | 2    | 2    | 2    |
| (at 120Hz)                                                   |                                                                                                                                                                                                                                                                                       |                                      |      |      |      |      |      |
| Endurance                                                    | The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 10,000 hours at 105℃.                                                                                                                                  |                                      |      |      |      |      |      |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±30% of the initial value          |      |      |      |      |      |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤300% of the initial specified value |      |      |      |      |      |
|                                                              | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value         |      |      |      |      |      |
| Shelf Life                                                   | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                      |      |      |      |      |      |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±30% of the initial value          |      |      |      |      |      |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤300% of the initial specified value |      |      |      |      |      |
|                                                              | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value         |      |      |      |      |      |

### DIMENSIONS [mm]

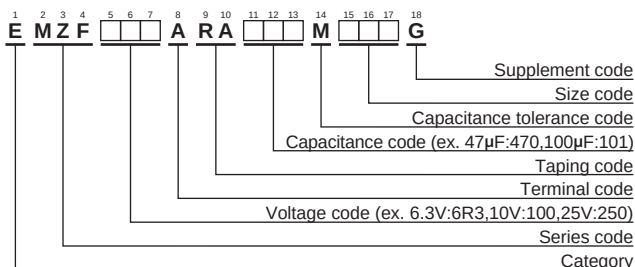
#### Terminal Code : A



Note : L±0.5 for HA0 and JA0

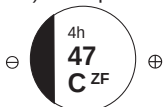
| Size code | D   | L    | A    | B    | C    | W          | P   |
|-----------|-----|------|------|------|------|------------|-----|
| E73       | 5   | 7.0  | 5.3  | 5.3  | 5.9  | 0.5 to 0.8 | 1.4 |
| F73       | 6.3 | 7.0  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| F90       | 6.3 | 8.7  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| HA0       | 8   | 10.0 | 8.3  | 8.3  | 9.0  | 0.7 to 1.1 | 3.1 |
| JA0       | 10  | 10.0 | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |

### PART NUMBERING SYSTEM



### MARKING

EX) 16V47μF



#### Rated voltage symbol

| Rated voltage (V <sub>dc</sub> ) | 6.3 | 10 | 16 | 25 | 35 | 50 |
|----------------------------------|-----|----|----|----|----|----|
| Symbol                           | j   | A  | C  | E  | V  | H  |



## Alchip™-MZF Series

## ◆STANDARD RATINGS

| WV (V <sub>dc</sub> ) | Cap (μF) | Size code | Impedance (Ω max./20°C, 100kHz) | Rated ripple current (mA rms/105°C, 100kHz) | Part No.           | WV (V <sub>dc</sub> ) | Cap (μF) | Size code | Impedance (Ω max./20°C, 100kHz) | Rated ripple current (mA rms/105°C, 100kHz) | Part No.           |
|-----------------------|----------|-----------|---------------------------------|---------------------------------------------|--------------------|-----------------------|----------|-----------|---------------------------------|---------------------------------------------|--------------------|
| 6.3                   | 47       | E73       | 2.2                             | 95                                          | EMZF6R3ARA470ME73G | 25                    | 33       | F73       | 1.1                             | 140                                         | EMZF250ARA330MF73G |
|                       | 100      | F73       | 1.1                             | 140                                         | EMZF6R3ARA101MF73G |                       | 47       | F73       | 1.1                             | 140                                         | EMZF250ARA470MF73G |
|                       | 220      | F90       | 1.0                             | 230                                         | EMZF6R3ARA221MF90G |                       | 100      | F90       | 1.0                             | 230                                         | EMZF250ARA101MF90G |
|                       | 330      | F90       | 1.0                             | 230                                         | EMZF6R3ARA331MF90G |                       | 220      | HA0       | 0.22                            | 600                                         | EMZF250ARA221MHA0G |
| 10                    | 470      | HA0       | 0.22                            | 600                                         | EMZF6R3ARA471MHA0G | 35                    | 330      | JA0       | 0.16                            | 850                                         | EMZF250ARA331MJA0G |
|                       | 33       | E73       | 2.2                             | 95                                          | EMZF100ARA330ME73G |                       | 10       | E73       | 2.2                             | 95                                          | EMZF350ARA100ME73G |
|                       | 150      | F73       | 1.1                             | 140                                         | EMZF100ARA151MF73G |                       | 10       | F73       | 1.1                             | 140                                         | EMZF350ARA100MF73G |
|                       | 22       | E73       | 2.2                             | 95                                          | EMZF160ARA220ME73G |                       | 22       | E73       | 2.2                             | 95                                          | EMZF350ARA220ME73G |
| 16                    | 47       | F73       | 1.1                             | 140                                         | EMZF160ARA470MF73G |                       | 22       | F73       | 1.1                             | 140                                         | EMZF350ARA220MF73G |
|                       | 100      | F73       | 1.1                             | 140                                         | EMZF160ARA101MF73G |                       | 33       | F90       | 1.0                             | 230                                         | EMZF350ARA330MF90G |
|                       | 150      | F90       | 1.0                             | 230                                         | EMZF160ARA151MF90G |                       | 47       | F90       | 1.0                             | 230                                         | EMZF350ARA470MF90G |
|                       | 220      | F90       | 1.0                             | 230                                         | EMZF160ARA221MF90G | 50                    | 100      | HA0       | 0.22                            | 600                                         | EMZF350ARA101MHA0G |
| 25                    | 330      | HA0       | 0.22                            | 600                                         | EMZF160ARA331MHA0G |                       | 220      | JA0       | 0.16                            | 850                                         | EMZF350ARA221MJA0G |
|                       | 470      | JA0       | 0.16                            | 850                                         | EMZF160ARA471MJA0G |                       | 47       | HA0       | 0.53                            | 350                                         | EMZF500ARA470MHA0G |
|                       | 22       | E73       | 2.2                             | 95                                          | EMZF250ARA220ME73G |                       | 100      | JA0       | 0.35                            | 670                                         | EMZF500ARA101MJA0G |

Production of the products shown in   is scheduled to be discontinued.

## ◆RATED RIPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

| Capacitance(μF) | Frequency(Hz) | 120  | 1k   | 10k  | 100k |
|-----------------|---------------|------|------|------|------|
| 10 to 150       |               | 0.40 | 0.75 | 0.90 | 1.00 |
| 220 to 470      |               | 0.50 | 0.85 | 0.94 | 1.00 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.





# SURFACE MOUNT ALUMINUM ELECTROLYTIC CAPACITORS

Low impedance, 7000 to 8000-hours-life, 105°C

## Alchip™-MZE Series

- Endurance : 7,000 to 8,000 hours at 105°C
- Low impedance
- Rated voltage range : 6.3 to 50V
- Nominal capacitance range : 10 to 470μF
- Suitable for long life and low profile products
- Solvent resistant type (see PRECAUTIONS AND GUIDELINES)
- RoHS2 Compliant

MVY  $\xrightarrow{\text{Longer life}}$  MLA  $\xrightarrow{\text{Longer life}}$  **MZE**

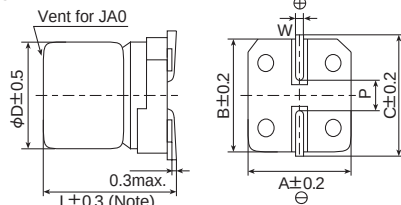


### SPECIFICATIONS

| Items                                                        | Characteristics                                                                                                                                              |                                                                                                                                                                                                                                                                                       |      |      |      |      |      |
|--------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|------|------|
| Category                                                     | -25 to +105℃                                                                                                                                                 |                                                                                                                                                                                                                                                                                       |      |      |      |      |      |
| Temperature Range                                            |                                                                                                                                                              |                                                                                                                                                                                                                                                                                       |      |      |      |      |      |
| Rated Voltage Range                                          | 6.3 to 50V <sub>dc</sub>                                                                                                                                     |                                                                                                                                                                                                                                                                                       |      |      |      |      |      |
| Capacitance Tolerance                                        | ± 20%(M) (at 20℃,120Hz)                                                                                                                                      |                                                                                                                                                                                                                                                                                       |      |      |      |      |      |
| Leakage Current                                              | I=0.01CV or 3μA, whichever is greater<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃, after 2 minutes) |                                                                                                                                                                                                                                                                                       |      |      |      |      |      |
| Dissipation Factor<br>(tan δ)                                | Rated voltage (V <sub>dc</sub> )                                                                                                                             | 6.3V                                                                                                                                                                                                                                                                                  | 10V  | 16V  | 25V  | 35V  | 50V  |
|                                                              | tan δ (Max.)                                                                                                                                                 | 0.32                                                                                                                                                                                                                                                                                  | 0.28 | 0.26 | 0.16 | 0.14 | 0.14 |
| (at 20℃,120Hz)                                               |                                                                                                                                                              |                                                                                                                                                                                                                                                                                       |      |      |      |      |      |
| Low Temperature<br>Characteristics<br>(Max. Impedance Ratio) | Rated voltage(V <sub>dc</sub> )                                                                                                                              | 6.3V                                                                                                                                                                                                                                                                                  | 10V  | 16V  | 25V  | 35V  | 50V  |
|                                                              | Z(-10℃)/Z(+20℃)                                                                                                                                              | 4                                                                                                                                                                                                                                                                                     | 3    | 2    | 2    | 2    | 2    |
| (at 120Hz)                                                   |                                                                                                                                                              |                                                                                                                                                                                                                                                                                       |      |      |      |      |      |
| Endurance                                                    | The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for specified time at 105℃.       |                                                                                                                                                                                                                                                                                       |      |      |      |      |      |
|                                                              | Time                                                                                                                                                         | E73 & F73 : 7,000 hours<br>F90 to JA0 : 8,000 hours                                                                                                                                                                                                                                   |      |      |      |      |      |
|                                                              | Capacitance change                                                                                                                                           | ≤ ±30% of the initial value                                                                                                                                                                                                                                                           |      |      |      |      |      |
|                                                              | D.F. (tan δ)                                                                                                                                                 | ≤300% of the initial specified value                                                                                                                                                                                                                                                  |      |      |      |      |      |
|                                                              | Leakage current                                                                                                                                              | ≤The initial specified value                                                                                                                                                                                                                                                          |      |      |      |      |      |
|                                                              | Shelf Life                                                                                                                                                   | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |      |      |      |      |      |
| Capacitance change                                           |                                                                                                                                                              | ≤ ±30% of the initial value                                                                                                                                                                                                                                                           |      |      |      |      |      |
| D.F. (tan δ)                                                 |                                                                                                                                                              | ≤300% of the initial specified value                                                                                                                                                                                                                                                  |      |      |      |      |      |
| Leakage current                                              |                                                                                                                                                              | ≤The initial specified value                                                                                                                                                                                                                                                          |      |      |      |      |      |

### DIMENSIONS [mm]

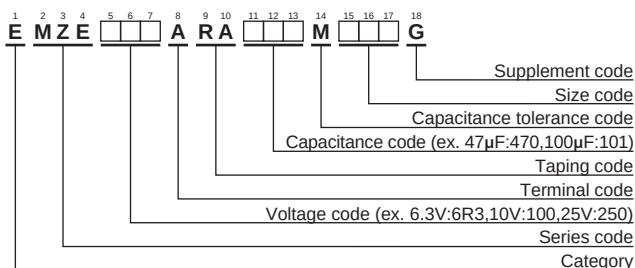
#### Terminal Code : A



Note : L±0.5 for HA0 and JA0

| Size code | D   | L    | A    | B    | C    | W          | P   |
|-----------|-----|------|------|------|------|------------|-----|
| E73       | 5   | 7.0  | 5.3  | 5.3  | 5.9  | 0.5 to 0.8 | 1.4 |
| F73       | 6.3 | 7.0  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| F90       | 6.3 | 8.7  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| HA0       | 8   | 10.0 | 8.3  | 8.3  | 9.0  | 0.7 to 1.1 | 3.1 |
| JA0       | 10  | 10.0 | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |

### PART NUMBERING SYSTEM



Please refer to "Product code guide (surface mount type)"

### MARKING

EX) 16V47μF



#### Rated voltage symbol

| Rated voltage (V <sub>dc</sub> ) | 6.3 | 10 | 16 | 25 | 35 | 50 |
|----------------------------------|-----|----|----|----|----|----|
| Symbol                           | j   | A  | C  | E  | V  | H  |



## Alchip™-MZE Series

## ◆STANDARD RATINGS

| WV (V <sub>dc</sub> ) | Cap (μF) | Size code | Impedance (Ω max./20°C, 100kHz) | Rated ripple current (mA <sub>rms</sub> /105°C, 100kHz) | Part No.           | WV (V <sub>dc</sub> ) | Cap (μF) | Size code | Impedance (Ω max./20°C, 100kHz) | Rated ripple current (mA <sub>rms</sub> /105°C, 100kHz) | Part No.           |
|-----------------------|----------|-----------|---------------------------------|---------------------------------------------------------|--------------------|-----------------------|----------|-----------|---------------------------------|---------------------------------------------------------|--------------------|
| 6.3                   | 47       | E73       | 2.2                             | 95                                                      | EMZE6R3ARA470ME73G | 25                    | 33       | F73       | 1.1                             | 140                                                     | EMZE250ARA330MF73G |
|                       | 100      | F73       | 1.1                             | 140                                                     | EMZE6R3ARA101MF73G |                       | 47       | F73       | 1.1                             | 140                                                     | EMZE250ARA470MF73G |
|                       | 220      | F90       | 1.0                             | 230                                                     | EMZE6R3ARA221MF90G |                       | 100      | F90       | 1.0                             | 230                                                     | EMZE250ARA101MF90G |
|                       | 330      | F90       | 1.0                             | 230                                                     | EMZE6R3ARA331MF90G |                       | 220      | HA0       | 0.22                            | 600                                                     | EMZE250ARA221MHA0G |
| 10                    | 470      | HA0       | 0.22                            | 600                                                     | EMZE6R3ARA471MHA0G |                       | 330      | JA0       | 0.16                            | 850                                                     | EMZE250ARA331MJA0G |
|                       | 33       | E73       | 2.2                             | 95                                                      | EMZE100ARA330ME73G | 35                    | 10       | E73       | 2.2                             | 95                                                      | EMZE350ARA100ME73G |
| 16                    | 150      | F73       | 1.1                             | 140                                                     | EMZE100ARA151MF73G |                       | 10       | F73       | 1.1                             | 140                                                     | EMZE350ARA100MF73G |
|                       | 22       | E73       | 2.2                             | 95                                                      | EMZE160ARA220ME73G |                       | 22       | E73       | 2.2                             | 95                                                      | EMZE350ARA220ME73G |
|                       | 47       | F73       | 1.1                             | 140                                                     | EMZE160ARA470MF73G |                       | 22       | F73       | 1.1                             | 140                                                     | EMZE350ARA220MF73G |
|                       | 100      | F73       | 1.1                             | 140                                                     | EMZE160ARA101MF73G |                       | 33       | F90       | 1.0                             | 230                                                     | EMZE350ARA330MF90G |
|                       | 150      | F90       | 1.0                             | 230                                                     | EMZE160ARA151MF90G |                       | 47       | F90       | 1.0                             | 230                                                     | EMZE350ARA470MF90G |
|                       | 220      | F90       | 1.0                             | 230                                                     | EMZE160ARA221MF90G |                       | 100      | HA0       | 0.22                            | 600                                                     | EMZE350ARA101MHA0G |
|                       | 330      | HA0       | 0.22                            | 600                                                     | EMZE160ARA331MHA0G |                       | 220      | JA0       | 0.16                            | 850                                                     | EMZE350ARA221MJA0G |
|                       | 470      | JA0       | 0.16                            | 850                                                     | EMZE160ARA471MJA0G | 50                    | 47       | HA0       | 0.53                            | 350                                                     | EMZE500ARA470MHA0G |
| 25                    | 22       | E73       | 2.2                             | 95                                                      | EMZE250ARA220ME73G |                       | 100      | JA0       | 0.35                            | 670                                                     | EMZE500ARA101MJA0G |

Production of the products shown in   is scheduled to be discontinued.

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

| Capacitance(μF) | Frequency(Hz) | 120  | 1k   | 10k  | 100k |
|-----------------|---------------|------|------|------|------|
| 10 to 150       |               | 0.40 | 0.75 | 0.90 | 1.00 |
| 220 to 470      |               | 0.50 | 0.85 | 0.94 | 1.00 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.



## Alchip™-MZK Series

- Endurance : 5,000 hours at 105°C
- Low impedance
- Rated voltage range : 6.3 to 35V
- Nominal capacitance range : 10 to 150μF
- Suitable for low profile products
- Solvent resistant type (see PRECAUTIONS AND GUIDELINES)
- RoHS2 Compliant

MVY → Longer life → **MZK**

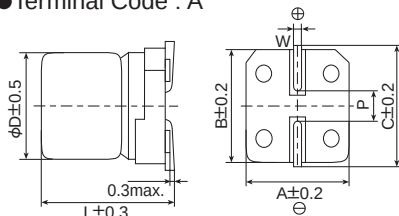


### ◆ SPECIFICATIONS

| Items                                                        | Characteristics                                                                                                                                                                                                                                                                       |                                      |      |      |      |      |                |
|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------|------|------|------|----------------|
| Category                                                     |                                                                                                                                                                                                                                                                                       |                                      |      |      |      |      |                |
| Temperature Range                                            | -25 to +105℃                                                                                                                                                                                                                                                                          |                                      |      |      |      |      |                |
| Rated Voltage Range                                          | 6.3 to 35V <sub>dc</sub>                                                                                                                                                                                                                                                              |                                      |      |      |      |      |                |
| Capacitance Tolerance                                        | ± 20%(M) (at 20℃,120Hz)                                                                                                                                                                                                                                                               |                                      |      |      |      |      |                |
| Leakage Current                                              | I=0.01CV or 3μA, whichever is greater<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃, after 2 minutes)                                                                                                                          |                                      |      |      |      |      |                |
| Dissipation Factor<br>(tan δ)                                | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 6.3V                                 | 10V  | 16V  | 25V  | 35V  | (at 20℃,120Hz) |
|                                                              | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.32                                 | 0.28 | 0.26 | 0.16 | 0.14 |                |
| Low Temperature<br>Characteristics<br>(Max. Impedance Ratio) | Rated voltage(V <sub>dc</sub> )                                                                                                                                                                                                                                                       | 6.3V                                 | 10V  | 16V  | 25V  | 35V  | (at 120Hz)     |
|                                                              | Z(-10℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 4                                    | 3    | 2    | 2    | 2    |                |
| Endurance                                                    | The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 5,000 hours at 105℃.                                                                                                                                   |                                      |      |      |      |      |                |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±30% of the initial value          |      |      |      |      |                |
|                                                              | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤300% of the initial specified value |      |      |      |      |                |
|                                                              | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value         |      |      |      |      |                |
| Shelf Life                                                   | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                      |      |      |      |      |                |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±30% of the initial value          |      |      |      |      |                |
|                                                              | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤300% of the initial specified value |      |      |      |      |                |
|                                                              | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value         |      |      |      |      |                |

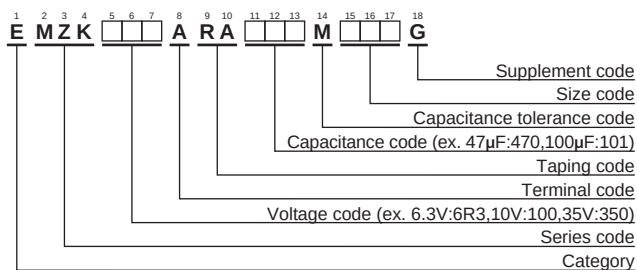
### ◆ DIMENSIONS [mm]

- Terminal Code : A



| Size code | D   | L   | A   | B   | C   | W          | P   |
|-----------|-----|-----|-----|-----|-----|------------|-----|
| E61       | 5   | 5.8 | 5.3 | 5.3 | 5.9 | 0.5 to 0.8 | 1.4 |
| F61       | 6.3 | 5.8 | 6.6 | 6.6 | 7.2 | 0.5 to 0.8 | 1.9 |

### ◆ PART NUMBERING SYSTEM



Please refer to "Product code guide (surface mount type)"

### ◆ MARKING

EX) 35V47μF



- Rated voltage symbol

| Rated voltage (V <sub>dc</sub> ) | 6.3 | 10 | 16 | 25 | 35 |
|----------------------------------|-----|----|----|----|----|
| Symbol                           | j   | A  | C  | E  | V  |



## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Size code | Impedance<br>(Ω max./20°C, 100kHz) | Rated ripple current<br>(mA <sub>rms</sub> /105°C, 100kHz) | Part No.           |
|--------------------------|-------------|-----------|------------------------------------|------------------------------------------------------------|--------------------|
| 6.3                      | 100         | E61       | 2.2                                | 95                                                         | EMZK6R3ARA101ME61G |
| 10                       | 150         | F61       | 1.1                                | 140                                                        | EMZK100ARA151MF61G |
| 16                       | 33          | E61       | 2.2                                | 95                                                         | EMZK160ARA330ME61G |
|                          | 47          | E61       | 2.2                                | 95                                                         | EMZK160ARA470ME61G |
|                          | 100         | F61       | 1.1                                | 140                                                        | EMZK160ARA101MF61G |
| 25                       | 68          | F61       | 1.1                                | 140                                                        | EMZK250ARA680MF61G |
| 35                       | 10          | E61       | 2.2                                | 95                                                         | EMZK350ARA100ME61G |
|                          | 10          | F61       | 1.1                                | 140                                                        | EMZK350ARA100MF61G |
|                          | 22          | E61       | 2.2                                | 95                                                         | EMZK350ARA220ME61G |
|                          | 22          | F61       | 1.1                                | 140                                                        | EMZK350ARA220MF61G |
|                          | 33          | F61       | 1.1                                | 140                                                        | EMZK350ARA330MF61G |
|                          | 47          | F61       | 1.1                                | 140                                                        | EMZK350ARA470MF61G |

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

| Frequency(Hz)            | 120  | 1k   | 10k  | 100k |
|--------------------------|------|------|------|------|
| 6.3 to 35V <sub>dc</sub> | 0.40 | 0.75 | 0.90 | 1.00 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.



## Alchip™-MLA Series

- Low impedance, long life
- Rated voltage 6.3 to 50V, Capacitance 10 to 1,000μF
- Case size  $\phi 5 \times 5.8\text{L}$  to  $\phi 10 \times 10\text{L}$
- Suitable for applications requiring long life and low impedance such as equipment in continuous operation, industrial applications, etc.
- Solvent resistant type (see PRECAUTIONS AND GUIDELINES)
- RoHS2 Compliant

MVY → Longer life

MLA

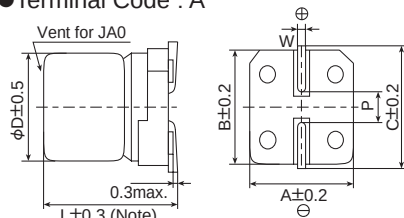


## ◆ SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                       |                                      |      |      |      |      |      |  |            |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------|------|------|------|------|--|------------|
| Category                                               |                                                                                                                                                                                                                                                                                       |                                      |      |      |      |      |      |  |            |
| Temperature Range                                      | -40 to +105℃                                                                                                                                                                                                                                                                          |                                      |      |      |      |      |      |  |            |
| Rated Voltage Range                                    | 6.3 to 50V <sub>dc</sub>                                                                                                                                                                                                                                                              |                                      |      |      |      |      |      |  |            |
| Capacitance Tolerance                                  | ± 20%(M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                              |                                      |      |      |      |      |      |  |            |
| Leakage Current                                        | I=0.01CV or 3μA, whichever is greater<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 2 minutes)                                                                                                                           |                                      |      |      |      |      |      |  |            |
| Dissipation Factor (tan δ )                            | Rated voltage(V <sub>dc</sub> )                                                                                                                                                                                                                                                       | 6.3V                                 | 10V  | 16V  | 25V  | 35V  | 50V  |  |            |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                          | E61 to F61                           | 0.28 | 0.24 | 0.22 | 0.16 | 0.13 |  | 0.12       |
|                                                        |                                                                                                                                                                                                                                                                                       | F80                                  | 0.32 | 0.27 | 0.24 | 0.16 | 0.13 |  | 0.12       |
|                                                        |                                                                                                                                                                                                                                                                                       | HA0 to JA0                           | 0.28 | 0.24 | 0.22 | 0.16 | 0.13 |  | 0.12       |
| Low Temperature Characteristics (Max. impedance Ratio) | Rated voltage(V <sub>dc</sub> )                                                                                                                                                                                                                                                       | 6.3V                                 | 10V  | 16V  | 25V  | 35V  | 50V  |  |            |
|                                                        | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 4                                    | 3    | 2    | 2    | 2    | 2    |  |            |
|                                                        | Z(-40℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 10                                   | 7    | 5    | 3    | 3    | 3    |  |            |
|                                                        |                                                                                                                                                                                                                                                                                       |                                      |      |      |      |      |      |  | (at 120Hz) |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 3,000 hours at 105℃.                                                                                                                                   |                                      |      |      |      |      |      |  |            |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±30% of the initial value          |      |      |      |      |      |  |            |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤300% of the initial specified value |      |      |      |      |      |  |            |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value         |      |      |      |      |      |  |            |
| Shelf life                                             | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                      |      |      |      |      |      |  |            |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±30% of the initial value          |      |      |      |      |      |  |            |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤300% of the initial specified value |      |      |      |      |      |  |            |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value         |      |      |      |      |      |  |            |

## ◆ DIMENSIONS [mm]

## ● Terminal Code : A



Note : L±0.5 for HA0 and JA0

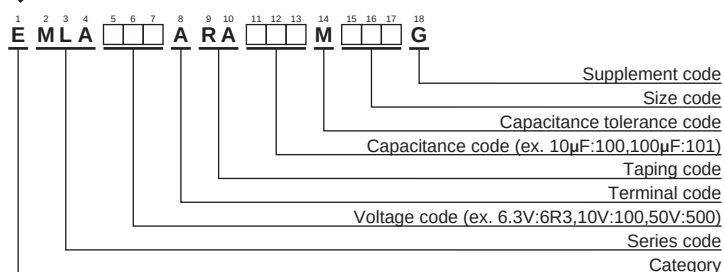
| Size code | D   | L    | A    | B    | C    | W          | P   |
|-----------|-----|------|------|------|------|------------|-----|
| E61       | 5   | 5.8  | 5.3  | 5.3  | 5.9  | 0.5 to 0.8 | 1.4 |
| F61       | 6.3 | 5.8  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| F80       | 6.3 | 7.7  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| HA0       | 8   | 10.0 | 8.3  | 8.3  | 9.0  | 0.7 to 1.1 | 3.1 |
| JA0       | 10  | 10.0 | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |

## ◆ MARKING

EX) 16V100μF



## ◆ PART NUMBERING SYSTEM



Please refer to "Product code guide (surface mount type)"

## ● Rated voltage symbol

| Rated voltage (V <sub>dc</sub> ) | Symbol |
|----------------------------------|--------|
| 6.3                              | j      |
| 10                               | A      |
| 16                               | C      |
| 25                               | E      |
| 35                               | V      |
| 50                               | H      |



## ◆STANDARD RATINGS

| WV (V <sub>ac</sub> ) | Cap (μF) | Size code | tan δ | Impedance (Ω max./20°C, 100kHz) | Rated ripple current (mA <sub>rms</sub> /105°C, 100kHz) | Part No.           | WV (V <sub>dc</sub> ) | Cap (μF) | Size code | tan δ | Impedance (Ω max./20°C, 100kHz) | Rated ripple current (mA <sub>rms</sub> /105°C, 100kHz) | Part No.           |
|-----------------------|----------|-----------|-------|---------------------------------|---------------------------------------------------------|--------------------|-----------------------|----------|-----------|-------|---------------------------------|---------------------------------------------------------|--------------------|
| 6.3                   | 47       | E61       | 0.28  | 1.30                            | 95                                                      | EMLA6R3ARA470ME61G | 25                    | 33       | F61       | 0.16  | 0.70                            | 140                                                     | EMLA250ARA330MF61G |
|                       | 100      | F61       | 0.28  | 0.70                            | 140                                                     | EMLA6R3ARA101MF61G |                       | 47       | F61       | 0.16  | 0.70                            | 140                                                     | EMLA250ARA470MF61G |
|                       | 150      | F61       | 0.28  | 0.70                            | 140                                                     | EMLA6R3ARA151MF61G |                       | 47       | F80       | 0.16  | 0.70                            | 230                                                     | EMLA250ARA470MF80G |
|                       | 220      | F80       | 0.32  | 0.70                            | 230                                                     | EMLA6R3ARA221MF80G |                       | 100      | F80       | 0.16  | 0.70                            | 230                                                     | EMLA250ARA101MF80G |
|                       | 330      | F80       | 0.32  | 0.70                            | 230                                                     | EMLA6R3ARA331MF80G |                       | 100      | HA0       | 0.16  | 0.16                            | 600                                                     | EMLA250ARA101MHA0G |
|                       | 330      | HA0       | 0.28  | 0.16                            | 600                                                     | EMLA6R3ARA331MHA0G |                       | 150      | HA0       | 0.16  | 0.16                            | 600                                                     | EMLA250ARA151MHA0G |
|                       | 470      | HA0       | 0.28  | 0.16                            | 600                                                     | EMLA6R3ARA471MHA0G |                       | 220      | HA0       | 0.16  | 0.16                            | 600                                                     | EMLA250ARA221MHA0G |
| 10                    | 1,000    | JA0       | 0.28  | 0.08                            | 850                                                     | EMLA6R3ARA102MJA0G |                       | 330      | HA0       | 0.16  | 0.16                            | 600                                                     | EMLA250ARA331MHA0G |
|                       | 33       | E61       | 0.24  | 1.30                            | 95                                                      | EMLA100ARA330ME61G | 35                    | 330      | JA0       | 0.16  | 0.08                            | 850                                                     | EMLA250ARA331MJA0G |
|                       | 47       | F61       | 0.24  | 0.70                            | 140                                                     | EMLA100ARA470MF61G |                       | 470      | JA0       | 0.16  | 0.08                            | 850                                                     | EMLA250ARA471MJA0G |
|                       | 100      | F61       | 0.24  | 0.70                            | 140                                                     | EMLA100ARA101MF61G |                       | 10       | E61       | 0.13  | 1.30                            | 95                                                      | EMLA350ARA100ME61G |
|                       | 150      | F61       | 0.24  | 0.70                            | 140                                                     | EMLA100ARA151MF61G |                       | 22       | F61       | 0.13  | 0.70                            | 140                                                     | EMLA350ARA220MF61G |
|                       | 220      | F80       | 0.27  | 0.70                            | 230                                                     | EMLA100ARA221MF80G |                       | 33       | F61       | 0.13  | 0.70                            | 140                                                     | EMLA350ARA330MF61G |
|                       | 220      | HA0       | 0.24  | 0.16                            | 600                                                     | EMLA100ARA221MHA0G |                       | 33       | F80       | 0.13  | 0.70                            | 230                                                     | EMLA350ARA330MF80G |
| 16                    | 330      | HA0       | 0.24  | 0.16                            | 600                                                     | EMLA100ARA331MHA0G |                       | 47       | F80       | 0.13  | 0.70                            | 230                                                     | EMLA350ARA470MF80G |
|                       | 470      | HA0       | 0.24  | 0.16                            | 600                                                     | EMLA100ARA471MHA0G | 50                    | 100      | F80       | 0.13  | 0.70                            | 230                                                     | EMLA350ARA101MF80G |
|                       | 22       | E61       | 0.22  | 1.30                            | 95                                                      | EMLA160ARA220ME61G |                       | 100      | HA0       | 0.13  | 0.16                            | 600                                                     | EMLA350ARA101MHA0G |
|                       | 33       | F61       | 0.22  | 0.70                            | 140                                                     | EMLA160ARA330MF61G |                       | 150      | HA0       | 0.13  | 0.16                            | 600                                                     | EMLA350ARA151MHA0G |
|                       | 47       | F61       | 0.22  | 0.70                            | 140                                                     | EMLA160ARA470MF61G |                       | 220      | HA0       | 0.13  | 0.16                            | 600                                                     | EMLA350ARA221MHA0G |
|                       | 100      | F61       | 0.22  | 0.70                            | 140                                                     | EMLA160ARA101MF61G |                       | 220      | JA0       | 0.13  | 0.08                            | 850                                                     | EMLA350ARA221MJA0G |
|                       | 100      | F80       | 0.24  | 0.70                            | 230                                                     | EMLA160ARA101MF80G |                       | 330      | JA0       | 0.13  | 0.08                            | 850                                                     | EMLA350ARA331MJA0G |
| 25                    | 150      | F80       | 0.24  | 0.70                            | 230                                                     | EMLA160ARA151MF80G |                       | 10       | F61       | 0.12  | 2.00                            | 70                                                      | EMLA500ARA100MF61G |
|                       | 220      | F80       | 0.24  | 0.70                            | 230                                                     | EMLA160ARA221MF80G | 50                    | 22       | F61       | 0.12  | 2.00                            | 70                                                      | EMLA500ARA220MF61G |
|                       | 220      | HA0       | 0.22  | 0.16                            | 600                                                     | EMLA160ARA221MHA0G |                       | 33       | F80       | 0.12  | 1.60                            | 100                                                     | EMLA500ARA330MF80G |
|                       | 330      | HA0       | 0.22  | 0.16                            | 600                                                     | EMLA160ARA331MHA0G |                       | 47       | F80       | 0.12  | 1.60                            | 100                                                     | EMLA500ARA470MF80G |
|                       | 470      | HA0       | 0.22  | 0.16                            | 600                                                     | EMLA160ARA471MHA0G |                       | 47       | HA0       | 0.12  | 0.34                            | 350                                                     | EMLA500ARA470MHA0G |
|                       | 470      | JA0       | 0.22  | 0.08                            | 850                                                     | EMLA160ARA471MJA0G |                       | 100      | HA0       | 0.12  | 0.34                            | 350                                                     | EMLA500ARA101MHA0G |
|                       | 10       | E61       | 0.16  | 1.30                            | 95                                                      | EMLA250ARA100ME61G |                       | 100      | JA0       | 0.12  | 0.18                            | 670                                                     | EMLA500ARA101MJA0G |
| 25                    | 22       | E61       | 0.16  | 1.30                            | 95                                                      | EMLA250ARA220ME61G |                       | 150      | JA0       | 0.12  | 0.18                            | 670                                                     | EMLA500ARA151MJA0G |
|                       | 22       | F61       | 0.16  | 0.70                            | 140                                                     | EMLA250ARA220MF61G |                       | 220      | JA0       | 0.12  | 0.18                            | 670                                                     | EMLA500ARA221MJA0G |

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ● Frequency Multipliers

| Capacitance(μF) | Frequency(Hz) | 120  | 1k   | 10k  | 100k |
|-----------------|---------------|------|------|------|------|
| 10 to 150       |               | 0.40 | 0.75 | 0.90 | 1.00 |
| 220 to 470      |               | 0.50 | 0.85 | 0.94 | 1.00 |
| 1,000           |               | 0.60 | 0.87 | 0.95 | 1.00 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

## Alchip™-MLF Series

- Endurance : 10,000 hours at 105°C
- Rated voltage range : 6.3 to 50V
- Nominal capacitance range : 1.0 to 1,000μF
- Suitable for long life and low profile products
- Solvent resistant type (see PRECAUTIONS AND GUIDELINES)
- RoHS2 Compliant

MVL  $\xrightarrow{\text{Longer life}}$  MLE  $\xrightarrow{\text{Longer life}}$  **MLF**

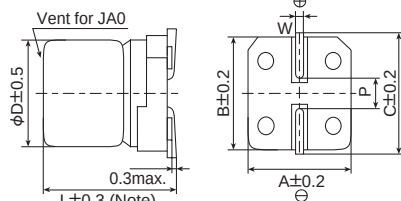


## ◆ SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                         |                                       |      |      |      |      |      |                 |
|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|------|------|------|------|------|-----------------|
| Category                                               |                                                                                                                                                                                                                                                                                         |                                       |      |      |      |      |      |                 |
| Temperature Range                                      | -25 to +105°C                                                                                                                                                                                                                                                                           |                                       |      |      |      |      |      |                 |
| Rated Voltage Range                                    | 6.3 to 50V <sub>dc</sub>                                                                                                                                                                                                                                                                |                                       |      |      |      |      |      |                 |
| Capacitance Tolerance                                  | ± 20%(M) (at 20°C,120Hz)                                                                                                                                                                                                                                                                |                                       |      |      |      |      |      |                 |
| Leakage Current                                        | I=0.03CV or 4μA, whichever is greater<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C, after 2 minutes)                                                                                                                           |                                       |      |      |      |      |      |                 |
| Dissipation Factor (tan δ)                             | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                        | 6.3V                                  | 10V  | 16V  | 25V  | 35V  | 50V  | (at 20°C,120Hz) |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                            | 0.32                                  | 0.28 | 0.26 | 0.16 | 0.14 | 0.14 |                 |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage(V <sub>dc</sub> )                                                                                                                                                                                                                                                         | 6.3V                                  | 10V  | 16V  | 25V  | 35V  | 50V  | (at 120Hz)      |
|                                                        | Z(-10°C)/Z(+20°C)                                                                                                                                                                                                                                                                       | 4                                     | 3    | 2    | 2    | 2    | 2    |                 |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 10,000 hours at 105°C.                                                                                                                                  |                                       |      |      |      |      |      |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                      | ≤ ± 30% of the initial value          |      |      |      |      |      |                 |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                            | ≤ 300% of the initial specified value |      |      |      |      |      |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                         | ≤ The initial specified value         |      |      |      |      |      |                 |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                       |      |      |      |      |      |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                      | ≤ ± 30% of the initial value          |      |      |      |      |      |                 |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                            | ≤ 300% of the initial specified value |      |      |      |      |      |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                         | ≤ The initial specified value         |      |      |      |      |      |                 |

## ◆ DIMENSIONS [mm]

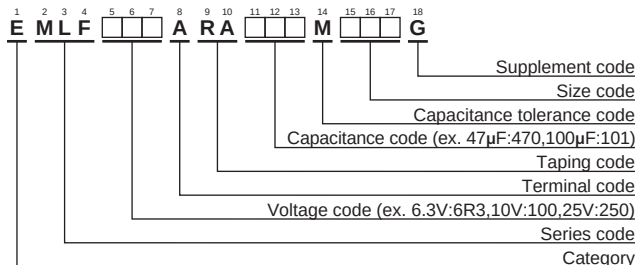
## ● Terminal Code : A



Note : L±0.5 for HA0 and JA0

| Size code | D   | L    | A    | B    | C    | W          | P   |
|-----------|-----|------|------|------|------|------------|-----|
| D73       | 4   | 7.0  | 4.3  | 4.3  | 5.1  | 0.5 to 0.8 | 1.0 |
| E73       | 5   | 7.0  | 5.3  | 5.3  | 5.9  | 0.5 to 0.8 | 1.4 |
| F73       | 6.3 | 7.0  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| F90       | 6.3 | 8.7  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| HA0       | 8   | 10.0 | 8.3  | 8.3  | 9.0  | 0.7 to 1.1 | 3.1 |
| JA0       | 10  | 10.0 | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |

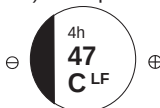
## ◆ PART NUMBERING SYSTEM



Please refer to "Product code guide (surface mount type)"

## ◆ MARKING

EX) 16V47μF



## ● Rated voltage symbol

| Rated voltage (V <sub>dc</sub> ) | 6.3 | 10 | 16 | 25 | 35 | 50 |
|----------------------------------|-----|----|----|----|----|----|
| Symbol                           | j   | A  | C  | E  | V  | H  |





## Alchip™-MLF Series

## ◆STANDARD RATINGS

| WV (V <sub>dc</sub> ) | Cap (μF) | Size code | Rated ripple current (mA <sub>rms</sub> /105°C, 120Hz) | Part No.           | WV (V <sub>dc</sub> ) | Cap (μF) | Size code | Rated ripple current (mA <sub>rms</sub> /105°C, 120Hz) | Part No.           |
|-----------------------|----------|-----------|--------------------------------------------------------|--------------------|-----------------------|----------|-----------|--------------------------------------------------------|--------------------|
| 6.3                   | 22       | D73       | 22                                                     | EMLF6R3ARA220MD73G | 35                    | 1.0      | D73       | 6.2                                                    | EMLF350ARA1R0MD73G |
|                       | 47       | E73       | 36                                                     | EMLF6R3ARA470ME73G |                       | 2.2      | D73       | 11                                                     | EMLF350ARA2R2MD73G |
|                       | 100      | F73       | 60                                                     | EMLF6R3ARA101MF73G |                       | 3.3      | D73       | 14                                                     | EMLF350ARA3R3MD73G |
|                       | 220      | F90       | 101                                                    | EMLF6R3ARA221MF90G |                       | 4.7      | D73       | 15                                                     | EMLF350ARA4R7MD73G |
|                       | 330      | HA0       | 160                                                    | EMLF6R3ARA331MHA0G |                       | 4.7      | E73       | 19                                                     | EMLF350ARA4R7ME73G |
| 10                    | 1,000    | JA0       | 313                                                    | EMLF6R3ARA102MJA0G |                       | 10       | E73       | 25                                                     | EMLF350ARA100ME73G |
|                       | 33       | E73       | 35                                                     | EMLF100ARA330ME73G |                       | 10       | F73       | 30                                                     | EMLF350ARA100MF73G |
|                       | 220      | HA0       | 141                                                    | EMLF100ARA221MHA0G |                       | 22       | F73       | 42                                                     | EMLF350ARA220MF73G |
| 16                    | 10       | D73       | 18                                                     | EMLF160ARA100MD73G |                       | 22       | F90       | 49                                                     | EMLF350ARA220MF90G |
|                       | 22       | E73       | 30                                                     | EMLF160ARA220ME73G |                       | 33       | F90       | 57                                                     | EMLF350ARA330MF90G |
|                       | 47       | F73       | 50                                                     | EMLF160ARA470MF73G |                       | 220      | JA0       | 216                                                    | EMLF350ARA221MJA0G |
|                       | 100      | F90       | 81                                                     | EMLF160ARA101MF90G | 50                    | 33       | HA0       | 77                                                     | EMLF500ARA330MHA0G |
|                       | 470      | JA0       | 254                                                    | EMLF160ARA471MJA0G |                       | 47       | HA0       | 92                                                     | EMLF500ARA470MHA0G |
| 25                    | 33       | F73       | 48                                                     | EMLF250ARA330MF73G |                       | 100      | JA0       | 151                                                    | EMLF500ARA101MJA0G |
|                       | 47       | F90       | 63                                                     | EMLF250ARA470MF90G |                       |          |           |                                                        |                    |
|                       | 100      | HA0       | 116                                                    | EMLF250ARA101MHA0G |                       |          |           |                                                        |                    |

Production of the products shown in   is scheduled to be discontinued.

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ⊙Frequency Multipliers

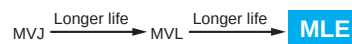
| Capacitance(μF) \ Frequency(Hz) | 120  | 1k   | 10k  | 100k |
|---------------------------------|------|------|------|------|
| 1.0                             | 1.00 | 1.50 | 1.75 | 1.80 |
| 2.2 to 10                       | 1.00 | 1.30 | 1.40 | 1.50 |
| 22 to 1,000                     | 1.00 | 1.05 | 1.08 | 1.08 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.



## Alchip™-MLE Series

- Endurance : 7,000 to 8,000 hours at 105°C
- Rated voltage range : 6.3 to 50V
- Nominal capacitance range : 1.0 to 1,000μF
- Suitable for long life and low profile products
- Solvent resistant type (see PRECAUTIONS AND GUIDELINES)
- RoHS2 Compliant

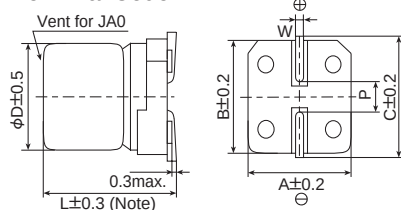


### SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                       |                                                      |      |      |      |      |      |                |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|------|------|------|------|------|----------------|
| Category                                               |                                                                                                                                                                                                                                                                                       |                                                      |      |      |      |      |      |                |
| Temperature Range                                      | -25 to +105℃                                                                                                                                                                                                                                                                          |                                                      |      |      |      |      |      |                |
| Rated Voltage Range                                    | 6.3 to 50V <sub>dc</sub>                                                                                                                                                                                                                                                              |                                                      |      |      |      |      |      |                |
| Capacitance Tolerance                                  | ± 20%(M) (at 20℃,120Hz)                                                                                                                                                                                                                                                               |                                                      |      |      |      |      |      |                |
| Leakage Current                                        | I=0.03CV or 4μA, whichever is greater<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃, after 2 minutes)                                                                                                                          |                                                      |      |      |      |      |      |                |
| Dissipation Factor (tan δ )                            | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 6.3V                                                 | 10V  | 16V  | 25V  | 35V  | 50V  | (at 20℃,120Hz) |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.32                                                 | 0.28 | 0.26 | 0.16 | 0.14 | 0.14 |                |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage(V <sub>dc</sub> )                                                                                                                                                                                                                                                       | 6.3V                                                 | 10V  | 16V  | 25V  | 35V  | 50V  | (at 120Hz)     |
|                                                        | Z(-10℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 4                                                    | 3    | 2    | 2    | 2    | 2    |                |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for specified time at 105℃.                                                                                                                                |                                                      |      |      |      |      |      |                |
|                                                        | Time                                                                                                                                                                                                                                                                                  | D73 to F73 : 7,000 hours<br>F90 to JA0 : 8,000 hours |      |      |      |      |      |                |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±30% of the initial value                          |      |      |      |      |      |                |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤300% of the initial specified value                 |      |      |      |      |      |                |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value                         |      |      |      |      |      |                |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                                      |      |      |      |      |      |                |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±30% of the initial value                          |      |      |      |      |      |                |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤300% of the initial specified value                 |      |      |      |      |      |                |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value                         |      |      |      |      |      |                |

### DIMENSIONS [mm]

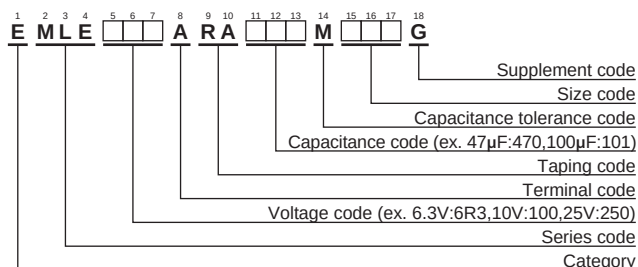
#### Terminal Code : A



Note : L±0.5 for HA0 and JA0

| Size code | D   | L    | A    | B    | C    | W          | P   |
|-----------|-----|------|------|------|------|------------|-----|
| D73       | 4   | 7.0  | 4.3  | 4.3  | 5.1  | 0.5 to 0.8 | 1.0 |
| E73       | 5   | 7.0  | 5.3  | 5.3  | 5.9  | 0.5 to 0.8 | 1.4 |
| F73       | 6.3 | 7.0  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| F90       | 6.3 | 8.7  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| HA0       | 8   | 10.0 | 8.3  | 8.3  | 9.0  | 0.7 to 1.1 | 3.1 |
| JA0       | 10  | 10.0 | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |

### PART NUMBERING SYSTEM



Please refer to "Product code guide (surface mount type)"

### MARKING

EX) 16V47μF



#### Rated voltage symbol

| Rated voltage (V <sub>dc</sub> ) | 6.3 | 10 | 16 | 25 | 35 | 50 |
|----------------------------------|-----|----|----|----|----|----|
| Symbol                           | j   | A  | C  | E  | V  | H  |



## Alchip™-MLE Series

## ◆STANDARD RATINGS

| WV (V <sub>ac</sub> ) | Cap (μF) | Size code | Rated ripple current (mA <sub>rms</sub> /105°C, 120Hz) | Part No.           | WV (V <sub>ac</sub> ) | Cap (μF) | Size code | Rated ripple current (mA <sub>rms</sub> /105°C, 120Hz) | Part No.           |
|-----------------------|----------|-----------|--------------------------------------------------------|--------------------|-----------------------|----------|-----------|--------------------------------------------------------|--------------------|
| 6.3                   | 22       | D73       | 22                                                     | EMLE6R3ARA220MD73G | 35                    | 1.0      | D73       | 6.2                                                    | EMLE350ARA1R0MD73G |
|                       | 47       | E73       | 36                                                     | EMLE6R3ARA470ME73G |                       | 2.2      | D73       | 11                                                     | EMLE350ARA2R2MD73G |
|                       | 100      | F73       | 60                                                     | EMLE6R3ARA101MF73G |                       | 3.3      | D73       | 14                                                     | EMLE350ARA3R3MD73G |
|                       | 220      | F90       | 101                                                    | EMLE6R3ARA221MF90G |                       | 4.7      | D73       | 15                                                     | EMLE350ARA4R7MD73G |
|                       | 330      | HA0       | 160                                                    | EMLE6R3ARA331MHA0G |                       | 4.7      | E73       | 19                                                     | EMLE350ARA4R7ME73G |
|                       | 1,000    | JA0       | 313                                                    | EMLE6R3ARA102MJA0G |                       | 10       | E73       | 25                                                     | EMLE350ARA100ME73G |
| 10                    | 33       | E73       | 35                                                     | EMLE100ARA330ME73G |                       | 10       | F73       | 30                                                     | EMLE350ARA100MF73G |
|                       | 220      | HA0       | 141                                                    | EMLE100ARA221MHA0G |                       | 22       | F73       | 42                                                     | EMLE350ARA220MF73G |
| 16                    | 10       | D73       | 18                                                     | EMLE160ARA100MD73G |                       | 22       | F90       | 49                                                     | EMLE350ARA220MF90G |
|                       | 22       | E73       | 30                                                     | EMLE160ARA220ME73G |                       | 33       | F90       | 57                                                     | EMLE350ARA330MF90G |
|                       | 47       | F73       | 50                                                     | EMLE160ARA470MF73G |                       | 220      | JA0       | 216                                                    | EMLE350ARA221MJA0G |
|                       | 100      | F90       | 81                                                     | EMLE160ARA101MF90G | 50                    | 33       | HA0       | 77                                                     | EMLE500ARA330MHA0G |
|                       | 470      | JA0       | 254                                                    | EMLE160ARA471MJA0G |                       | 47       | HA0       | 92                                                     | EMLE500ARA470MHA0G |
| 25                    | 33       | F73       | 48                                                     | EMLE250ARA330MF73G |                       | 100      | JA0       | 151                                                    | EMLE500ARA101MJA0G |
|                       | 47       | F90       | 63                                                     | EMLE250ARA470MF90G |                       |          |           |                                                        |                    |
|                       | 100      | HA0       | 116                                                    | EMLE250ARA101MHA0G |                       |          |           |                                                        |                    |

Production of the products shown in   is scheduled to be discontinued.

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

| Capacitance(μF) \ Frequency(Hz) | 120  | 1k   | 10k  | 100k |
|---------------------------------|------|------|------|------|
| 1.0                             | 1.00 | 1.50 | 1.75 | 1.80 |
| 2.2 to 10                       | 1.00 | 1.30 | 1.40 | 1.50 |
| 22 to 1,000                     | 1.00 | 1.05 | 1.08 | 1.08 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

## Alchip™-MLK Series

- 6.1mm height
- Endurance : 5,000 hours at 105°C
- Rated voltage range : 6.3 to 35V
- Nominal capacitance range : 4.7 to 100μF
- Suitable to fit for downsized equipment
- Solvent resistant type (see PRECAUTIONS AND GUIDELINES)
- RoHS2 Compliant

MVL

Longer life

MLK

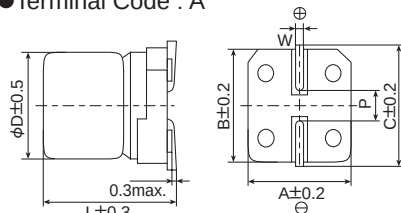


## ◆ SPECIFICATIONS

| Items                                                        | Characteristics                                                                                                                                                                                                                                                                       |                                      |      |      |      |      |                |
|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------|------|------|------|----------------|
| Category                                                     | -25 to +105℃                                                                                                                                                                                                                                                                          |                                      |      |      |      |      |                |
| Temperature Range                                            |                                                                                                                                                                                                                                                                                       |                                      |      |      |      |      |                |
| Rated Voltage Range                                          | 6.3 to 35V <sub>dc</sub>                                                                                                                                                                                                                                                              |                                      |      |      |      |      |                |
| Capacitance Tolerance                                        | ± 20%(M) (at 20℃,120Hz)                                                                                                                                                                                                                                                               |                                      |      |      |      |      |                |
| Leakage Current                                              | I=0.03CV or 4μA, whichever is greater<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃, after 2 minutes)                                                                                                                          |                                      |      |      |      |      |                |
| Dissipation Factor<br>(tan δ )                               | Rated voltage (V <sub>ac</sub> )                                                                                                                                                                                                                                                      | 6.3V                                 | 10V  | 16V  | 25V  | 35V  | (at 20℃,120Hz) |
|                                                              | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.32                                 | 0.28 | 0.26 | 0.16 | 0.14 |                |
| Low Temperature<br>Characteristics<br>(Max. Impedance Ratio) | Rated voltage(V <sub>dc</sub> )                                                                                                                                                                                                                                                       | 6.3V                                 | 10V  | 16V  | 25V  | 35V  | (at 120Hz)     |
|                                                              | Z(-10℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 4                                    | 3    | 2    | 2    | 2    |                |
| Endurance                                                    | The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 5,000 hours at 105℃.                                                                                                                                   |                                      |      |      |      |      |                |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±30% of the initial value          |      |      |      |      |                |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤300% of the initial specified value |      |      |      |      |                |
|                                                              | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value         |      |      |      |      |                |
| Shelf Life                                                   | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                      |      |      |      |      |                |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±30% of the initial value          |      |      |      |      |                |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤300% of the initial specified value |      |      |      |      |                |
|                                                              | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value         |      |      |      |      |                |

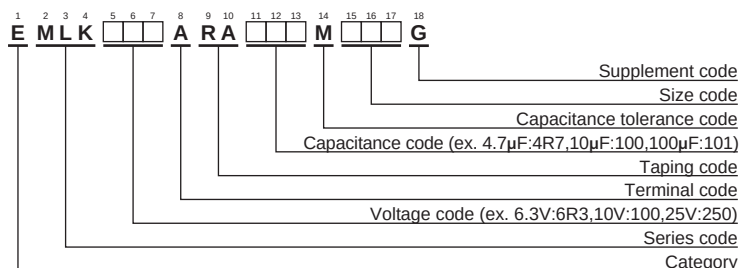
## ◆ DIMENSIONS [mm]

- Terminal Code : A



| Size code | D   | L   | A   | B   | C   | W          | P   |
|-----------|-----|-----|-----|-----|-----|------------|-----|
| E61       | 5   | 5.8 | 5.3 | 5.3 | 5.9 | 0.5 to 0.8 | 1.4 |
| F61       | 6.3 | 5.8 | 6.6 | 6.6 | 7.2 | 0.5 to 0.8 | 1.9 |

## ◆ PART NUMBERING SYSTEM



Please refer to "Product code guide (surface mount type)"

## ◆ MARKING

EX) 35V10μF



- Rated voltage symbol

| Rated voltage (V <sub>dc</sub> ) | 6.3 | 10 | 16 | 25 | 35 |
|----------------------------------|-----|----|----|----|----|
| Symbol                           | j   | A  | C  | E  | V  |

## ◆ STANDARD RATINGS

| WV (V <sub>dc</sub> ) | Cap (μF) | Size code | tan δ | Rated ripple current (mA <sub>rms</sub> /105°C, 120Hz) | Part No.           |
|-----------------------|----------|-----------|-------|--------------------------------------------------------|--------------------|
| 6.3                   | 47       | E61       | 0.32  | 36                                                     | EMLK6R3ARA470ME61G |
|                       | 100      | F61       | 0.32  | 60                                                     | EMLK6R3ARA101MF61G |
| 10                    | 33       | E61       | 0.28  | 35                                                     | EMLK100ARA330ME61G |
| 16                    | 22       | E61       | 0.26  | 30                                                     | EMLK160ARA220ME61G |
|                       | 47       | F61       | 0.26  | 50                                                     | EMLK160ARA470MF61G |
| 25                    | 33       | F61       | 0.16  | 48                                                     | EMLK250ARA330MF61G |
| 35                    | 4.7      | E61       | 0.14  | 19                                                     | EMLK350ARA4R7ME61G |
|                       | 10       | E61       | 0.14  | 25                                                     | EMLK350ARA100ME61G |
|                       | 10       | F61       | 0.14  | 30                                                     | EMLK350ARA100MF61G |
|                       | 22       | F61       | 0.14  | 42                                                     | EMLK350ARA220MF61G |

## ◆ RATED RIPPLE CURRENT MULTIPLIERS

- Frequency Multipliers

| Frequency (Hz)           | 120  | 1k   | 10k  | 100k |
|--------------------------|------|------|------|------|
| 6.3 to 35V <sub>dc</sub> | 1.00 | 1.05 | 1.08 | 1.08 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.



## Alchip™-MVL Series

- Endurance : 3,000 to 5,000 hours at 105°C
- Suitable for applications requiring long life such as continuously operating equipment, industrial applications, etc
- Solvent resistant type (see PRECAUTIONS AND GUIDELINES)
- RoHS2 Compliant

MVL

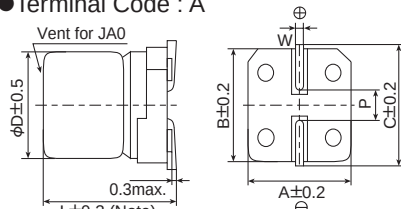
Longer life  
MVJ


### SPECIFICATIONS

| Items                                                        | Characteristics                                                                                                                                                                                                                                                                       |                                                     |      |      |      |      |      |
|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|------|------|------|------|------|
| Category                                                     |                                                                                                                                                                                                                                                                                       |                                                     |      |      |      |      |      |
| Temperature Range                                            | -40 to +105℃                                                                                                                                                                                                                                                                          |                                                     |      |      |      |      |      |
| Rated Voltage Range                                          | 6.3 to 50V <sub>dc</sub>                                                                                                                                                                                                                                                              |                                                     |      |      |      |      |      |
| Capacitance Tolerance                                        | ± 20%(M) (at 20℃,120Hz)                                                                                                                                                                                                                                                               |                                                     |      |      |      |      |      |
| Leakage Current                                              | I=0.03CV or 4μA, whichever is greater<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃, after 2 minutes)                                                                                                                          |                                                     |      |      |      |      |      |
| Dissipation Factor<br>(tan δ )                               | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 6.3V                                                | 10V  | 16V  | 25V  | 35V  | 50V  |
|                                                              | Max. tan δ                                                                                                                                                                                                                                                                            | 0.28                                                | 0.24 | 0.20 | 0.16 | 0.13 | 0.12 |
| Low Temperature<br>Characteristics<br>(Max. impedance Ratio) | Rated voltage(V <sub>dc</sub> )                                                                                                                                                                                                                                                       | 6.3V                                                | 10V  | 16V  | 25V  | 35V  | 50V  |
|                                                              | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 4                                                   | 3    | 2    | 2    | 2    | 2    |
|                                                              | Z(-40℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 10                                                  | 7    | 5    | 3    | 3    | 3    |
| (at 120Hz)                                                   |                                                                                                                                                                                                                                                                                       |                                                     |      |      |      |      |      |
| Endurance                                                    | The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for specified time at 105℃.                                                                                                                                |                                                     |      |      |      |      |      |
|                                                              | Time                                                                                                                                                                                                                                                                                  | D60 to F80 : 3,000 hours<br>HA0 & JA0 : 5,000 hours |      |      |      |      |      |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±30% of the initial value                         |      |      |      |      |      |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤300% of the initial specified value                |      |      |      |      |      |
|                                                              | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value                        |      |      |      |      |      |
| Shelf Life                                                   | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                                     |      |      |      |      |      |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±30% of the initial value                         |      |      |      |      |      |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤300% of the initial specified value                |      |      |      |      |      |
|                                                              | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value                        |      |      |      |      |      |

### DIMENSIONS [mm]

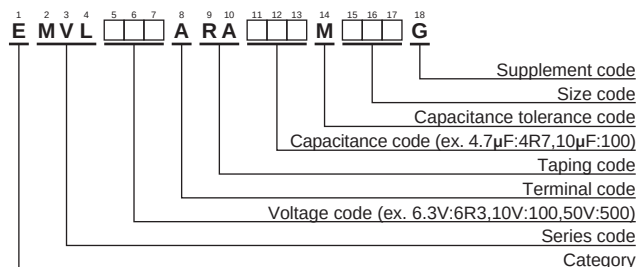
#### Terminal Code : A



Note : L±0.5 for HA0 and JA0

| Size code | D   | L    | A    | B    | C    | W          | P   |
|-----------|-----|------|------|------|------|------------|-----|
| D60       | 4   | 5.7  | 4.3  | 4.3  | 5.1  | 0.5 to 0.8 | 1.0 |
| E60       | 5   | 5.7  | 5.3  | 5.3  | 5.9  | 0.5 to 0.8 | 1.4 |
| F60       | 6.3 | 5.7  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| F80       | 6.3 | 7.7  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| HA0       | 8   | 10.0 | 8.3  | 8.3  | 9.0  | 0.7 to 1.1 | 3.1 |
| JA0       | 10  | 10.0 | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |

### PART NUMBERING SYSTEM



Please refer to "Product code guide (surface mount type)"

### MARKING

EX) 16V47μF





## ◆ STANDARD RATINGS

| WV (V <sub>dc</sub> ) | Cap (μF) | Size code | tan δ | Rated ripple current (mA <sub>rms</sub> /105°C, 120Hz) | Part No.           | WV (V <sub>dc</sub> ) | Cap (μF) | Size code | tan δ | Rated ripple current (mA <sub>rms</sub> /105°C, 120Hz) | Part No.           |
|-----------------------|----------|-----------|-------|--------------------------------------------------------|--------------------|-----------------------|----------|-----------|-------|--------------------------------------------------------|--------------------|
| 6.3                   | 22       | D60       | 0.28  | 22                                                     | EMVL6R3ARA220MD60G | 35                    | 4.7      | D60       | 0.13  | 15                                                     | EMVL350ARA4R7MD60G |
|                       | 47       | E60       | 0.28  | 36                                                     | EMVL6R3ARA470ME60G |                       | 10       | E60       | 0.13  | 25                                                     | EMVL350ARA100ME60G |
|                       | 100      | F60       | 0.28  | 60                                                     | EMVL6R3ARA101MF60G |                       | 22       | F60       | 0.13  | 42                                                     | EMVL350ARA220MF60G |
|                       | 220      | F80       | 0.28  | 101                                                    | EMVL6R3ARA221MF80G |                       | 33       | F80       | 0.13  | 57                                                     | EMVL350ARA330MF80G |
|                       | 330      | HA0       | 0.28  | 160                                                    | EMVL6R3ARA331MHA0G |                       | 220      | JA0       | 0.13  | 216                                                    | EMVL350ARA221MJA0G |
| 10                    | 1,000    | JA0       | 0.28  | 313                                                    | EMVL6R3ARA102MJA0G | 50                    | 1.0      | D60       | 0.12  | 6.2                                                    | EMVL500ARA1R0MD60G |
|                       | 33       | E60       | 0.24  | 35                                                     | EMVL100ARA330ME60G |                       | 2.2      | D60       | 0.12  | 11                                                     | EMVL500ARA2R2MD60G |
| 16                    | 220      | HA0       | 0.24  | 141                                                    | EMVL100ARA221MHA0G |                       | 3.3      | D60       | 0.12  | 14                                                     | EMVL500ARA3R3MD60G |
|                       | 10       | D60       | 0.20  | 18                                                     | EMVL160ARA100MD60G |                       | 4.7      | E60       | 0.12  | 19                                                     | EMVL500ARA4R7ME60G |
| 25                    | 22       | E60       | 0.20  | 30                                                     | EMVL160ARA220ME60G |                       | 10       | F60       | 0.12  | 30                                                     | EMVL500ARA100MF60G |
|                       | 47       | F60       | 0.20  | 50                                                     | EMVL160ARA470MF60G |                       | 22       | F80       | 0.12  | 49                                                     | EMVL500ARA220MF80G |
|                       | 100      | F80       | 0.20  | 81                                                     | EMVL160ARA101MF80G |                       | 33       | HA0       | 0.12  | 77                                                     | EMVL500ARA330MHA0G |
|                       | 470      | JA0       | 0.20  | 254                                                    | EMVL160ARA471MJA0G |                       | 47       | HA0       | 0.12  | 92                                                     | EMVL500ARA470MHA0G |
|                       | 33       | F60       | 0.16  | 48                                                     | EMVL250ARA330MF60G |                       | 100      | JA0       | 0.12  | 151                                                    | EMVL500ARA101MJA0G |
| 25                    | 47       | F80       | 0.16  | 63                                                     | EMVL250ARA470MF80G |                       |          |           |       |                                                        |                    |
|                       | 100      | HA0       | 0.16  | 116                                                    | EMVL250ARA101MHA0G |                       |          |           |       |                                                        |                    |
|                       | 330      | JA0       | 0.16  | 238                                                    | EMVL250ARA331MJA0G |                       |          |           |       |                                                        |                    |

Production of the products shown in   is scheduled to be discontinued.

## ◆ RATED RIPPLE CURRENT MULTIPLIERS

## ● Frequency Multipliers

| Capacitance(μF) \ Frequency(Hz) | 120  | 1k   | 10k  | 100k |
|---------------------------------|------|------|------|------|
| 1.0                             | 1.00 | 1.50 | 1.75 | 1.80 |
| 2.2 to 10                       | 1.00 | 1.30 | 1.40 | 1.50 |
| 22 to 1,000                     | 1.00 | 1.05 | 1.08 | 1.08 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

## Alchip™-MVJ Series

- Endurance : 2,000 hours at 105°C
- Solvent resistant type (see PRECAUTIONS AND GUIDELINES)
- RoHS2 Compliant

MVL  
longer life  
MVJ  
longer life  
MVE

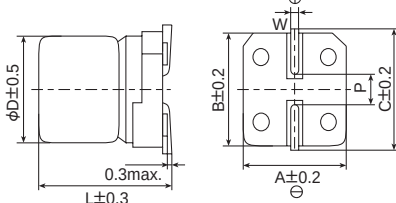


## ◆ SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                       |                                      |      |      |      |      |                                      |                 |                                      |  |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------|------|------|------|--------------------------------------|-----------------|--------------------------------------|--|
| Category                                               | -40 to +105℃                                                                                                                                                                                                                                                                          |                                      |      |      |      |      |                                      |                 |                                      |  |
| Temperature Range                                      |                                                                                                                                                                                                                                                                                       |                                      |      |      |      |      |                                      |                 |                                      |  |
| Rated Voltage Range                                    | 6.3 to 50V <sub>dc</sub>                                                                                                                                                                                                                                                              |                                      |      |      |      |      |                                      |                 |                                      |  |
| Capacitance Tolerance                                  | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                             |                                      |      |      |      |      |                                      |                 |                                      |  |
| Leakage Current                                        | I=0.01CV or 3μA, whichever is greater.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 2 minutes)                                                                                                                          |                                      |      |      |      |      |                                      |                 |                                      |  |
| Dissipation Factor (tan δ )                            | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 6.3V                                 | 10V  | 16V  | 25V  | 35V  | 50V                                  | (at 20℃, 120Hz) |                                      |  |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.30                                 | 0.24 | 0.20 | 0.16 | 0.14 | 0.12                                 |                 |                                      |  |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 6.3V                                 | 10V  | 16V  | 25V  | 35V  | 50V                                  | (at 120Hz)      |                                      |  |
|                                                        | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 4                                    | 3    | 2    | 2    | 2    | 2                                    |                 |                                      |  |
|                                                        | Z(-40℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 12                                   | 8    | 6    | 4    | 3    | 3                                    |                 |                                      |  |
|                                                        |                                                                                                                                                                                                                                                                                       |                                      |      |      |      |      |                                      |                 |                                      |  |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 2,000 hours at 105℃.                                                                                                                                   |                                      |      |      |      |      |                                      |                 |                                      |  |
|                                                        | Rated voltage                                                                                                                                                                                                                                                                         | 6.3V <sub>dc</sub>                   |      |      |      |      | 10 & 16V <sub>dc</sub>               |                 | 25 to 50V <sub>dc</sub>              |  |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±30% of the initial value          |      |      |      |      | ≤ ±25% of the initial value          |                 | ≤ ±20% of the initial value          |  |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤300% of the initial specified value |      |      |      |      | ≤300% of the initial specified value |                 | ≤200% of the initial specified value |  |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value         |      |      |      |      | ≤The initial specified value         |                 | ≤The initial specified value         |  |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                      |      |      |      |      |                                      |                 |                                      |  |
|                                                        | Rated voltage                                                                                                                                                                                                                                                                         | 6.3V <sub>dc</sub>                   |      |      |      |      | 10 & 16V <sub>dc</sub>               |                 | 25 to 50V <sub>dc</sub>              |  |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±30% of the initial value          |      |      |      |      | ≤ ±25% of the initial value          |                 | ≤ ±20% of the initial value          |  |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤300% of the initial specified value |      |      |      |      | ≤300% of the initial specified value |                 | ≤200% of the initial specified value |  |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value         |      |      |      |      | ≤The initial specified value         |                 | ≤The initial specified value         |  |
|                                                        |                                                                                                                                                                                                                                                                                       |                                      |      |      |      |      |                                      |                 |                                      |  |

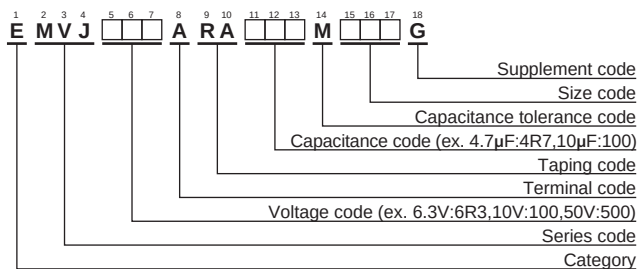
## ◆ DIMENSIONS [mm]

● Terminal Code : A



| Size code | D   | L   | A   | B   | C   | W          | P   |
|-----------|-----|-----|-----|-----|-----|------------|-----|
| D60       | 4   | 5.7 | 4.3 | 4.3 | 5.1 | 0.5 to 0.8 | 1.0 |
| E60       | 5   | 5.7 | 5.3 | 5.3 | 5.9 | 0.5 to 0.8 | 1.4 |
| F60       | 6.3 | 5.7 | 6.6 | 6.6 | 7.2 | 0.5 to 0.8 | 1.9 |

## ◆ PART NUMBERING SYSTEM



Please refer to "Product code guide (surface mount type)"

## ◆ MARKING

EX) 6.3V100μF



## ◆ STANDARD RATINGS

| WV (V <sub>dc</sub> ) | Cap (μF) | Size code | tan δ | Rated ripple current (mA <sub>rms</sub> /105°C,120Hz) | Part No.           | WV (V <sub>dc</sub> ) | Cap (μF) | Size code | tan δ | Rated ripple current (mA <sub>rms</sub> /105°C,120Hz) | Part No.           |
|-----------------------|----------|-----------|-------|-------------------------------------------------------|--------------------|-----------------------|----------|-----------|-------|-------------------------------------------------------|--------------------|
| 6.3                   | 22       | D60       | 0.30  | 21                                                    | EMVJ6R3ARA220MD60G | 35                    | 4.7      | D60       | 0.14  | 15                                                    | EMVJ350ARA4R7MD60G |
|                       | 47       | E60       | 0.30  | 36                                                    | EMVJ6R3ARA470ME60G |                       | 10       | E60       | 0.14  | 25                                                    | EMVJ350ARA100ME60G |
|                       | 100      | F60       | 0.30  | 56                                                    | EMVJ6R3ARA101MF60G |                       | 22       | F60       | 0.14  | 40                                                    | EMVJ350ARA220MF60G |
| 10                    | 33       | E60       | 0.24  | 34                                                    | EMVJ100ARA330ME60G | 50                    | 1.0      | D60       | 0.12  | 5.6                                                   | EMVJ500ARA1R0MD60G |
| 16                    | 10       | D60       | 0.20  | 16                                                    | EMVJ160ARA100MD60G |                       | 2.2      | D60       | 0.12  | 10                                                    | EMVJ500ARA2R2MD60G |
|                       | 22       | E60       | 0.20  | 30                                                    | EMVJ160ARA220ME60G |                       | 3.3      | D60       | 0.12  | 14                                                    | EMVJ500ARA3R3MD60G |
|                       | 47       | F60       | 0.20  | 48                                                    | EMVJ160ARA470MF60G |                       | 4.7      | E60       | 0.12  | 19                                                    | EMVJ500ARA4R7ME60G |
| 25                    | 33       | F60       | 0.16  | 45                                                    | EMVJ250ARA330MF60G |                       | 10       | F60       | 0.12  | 29                                                    | EMVJ500ARA100MF60G |

Production of the products shown in [ ] is scheduled to be discontinued.

## ◆ RATED RIPPLE CURRENT MULTIPLIERS

● Frequency Multipliers

| Capacitance(μF) | Frequency(Hz) | 120  | 1k   | 10k  | 100k |
|-----------------|---------------|------|------|------|------|
| 1.0             |               | 1.00 | 1.50 | 1.75 | 1.80 |
| 2.2 to 10       |               | 1.00 | 1.30 | 1.40 | 1.50 |
| 22 to 100       |               | 1.00 | 1.05 | 1.08 | 1.08 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

Product specifications in this catalog are subject to change without notice. Request our product specifications before purchase and/or use. Please use our products based on the information contained in this catalog and product specifications.





# Alchip™-MHS Series

Upgrade!

- Downsizing, High capacitance
- Endurance : 2,000 to 5,000 hours at 125°C
- For high temperature and high reliability applications (Base station equipment, etc)
- High temperature reflow soldering
- Solvent resistant type(see PRECAUTIONS AND GUIDELINES)
- Vibration resistant structure
- RoHS2 Compliant
- AEC-Q200 compliant : Please contact Chemi-Con for more details, test data, information.



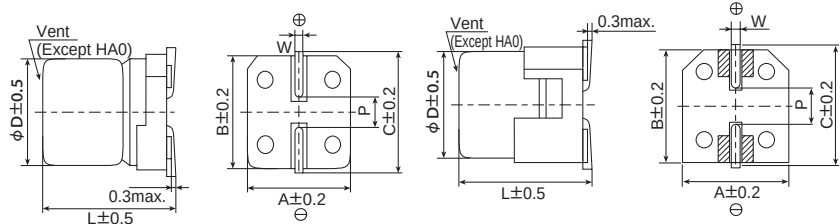
## SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Category                                               | -40 to +125°C                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Temperature Range                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Rated Voltage Range                                    | 16 to 100V <sub>dc</sub>                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Capacitance Tolerance                                  | ±20% (M) (at 20°C, 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Leakage Current                                        | HA0, JA0 I=0.01CV<br>KE0 to MN0 I=0.03CV<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C after 2 minutes)                                                                                                                                                                                                                                                                                  |
| Dissipation Factor (tan δ)                             | Rated voltage (V <sub>dc</sub> ) 16V 25V 35V 50V 63V 80V 100V<br>tan δ (Max.) HA0, JA0 0.20 0.16 0.14 0.14 0.14 0.12 —<br>KE0 to MN0 0.18 0.14 0.14 0.14 0.14 0.12 0.10<br>When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase. (at 20°C, 120Hz)                                                                                                                                                     |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> ) 16V 25V 35V 50V 63V 80V 100V<br>HA0, JA0 Z(-25°C)/Z(+20°C) 2 2 2 2 2 2 —<br>Z(-40°C)/Z(+20°C) 4 4 3 3 3 3 —<br>KE0 to MN0 Z(-25°C)/Z(+20°C) 3 2 2 2 2 2 2<br>Z(-40°C)/Z(+20°C) 6 4 3 3 3 3 3 (at 120Hz)                                                                                                                                                                                                         |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for the specified time at 125°C.<br>Time HA0, JA0 : 2,000hours<br>KE0 to MN0 : 5,000hours<br>Capacitance change ≤ ±30% of the initial value<br>D.F. (tan δ) ≤ 300% of the initial specified value<br>Leakage current ≤ The initial specified value                                                                   |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 125°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4.<br>Capacitance change ≤ ±30% of the initial value<br>D.F. (tan δ) ≤ 300% of the initial specified value<br>Leakage current ≤ The initial specified value |

## DIMENSIONS [mm]

- Terminal Code : A
- Size code : HA0 to MN0

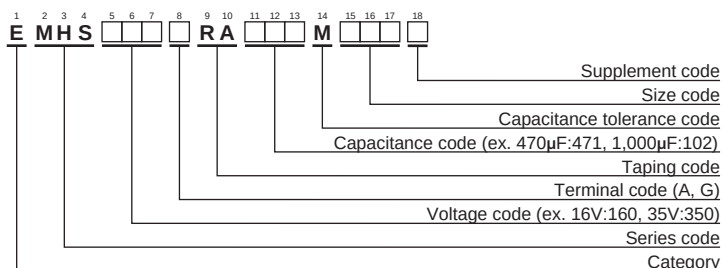
- Terminal Code : G(Vibration resistant structure)
- Size code : HA0 to MN0



▨ : Dummy terminals

| Size code | φD   | L    | A    | B    | C    | W          | P   |
|-----------|------|------|------|------|------|------------|-----|
| HA0       | 8    | 10.0 | 8.3  | 8.3  | 9.0  | 0.7 to 1.1 | 3.1 |
| JA0       | 10   | 10.0 | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |
| KE0       | 12.5 | 13.5 | 13.0 | 13.0 | 13.7 | 1.0 to 1.3 | 4.2 |
| KG5       | 12.5 | 16.0 | 13.0 | 13.0 | 13.7 | 1.0 to 1.3 | 4.2 |
| LH0       | 16   | 16.5 | 17.0 | 17.0 | 18.0 | 1.0 to 1.3 | 6.5 |
| LN0       | 16   | 21.5 | 17.0 | 17.0 | 18.0 | 1.0 to 1.3 | 6.5 |
| MH0       | 18   | 16.5 | 19.0 | 19.0 | 20.0 | 1.0 to 1.3 | 6.5 |
| MN0       | 18   | 21.5 | 19.0 | 19.0 | 20.0 | 1.0 to 1.3 | 6.5 |

## PART NUMBERING SYSTEM

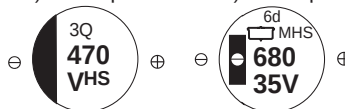


Please refer to "Product code guide (surface mount type)"

## MARKING

EX) 35V470μF

EX) 35V680μF



- Rated voltage symbol (HA0, JA0)

| Rated voltage (V <sub>dc</sub> ) | 16 | 25 | 35 | 50 | 63 | 80 |
|----------------------------------|----|----|----|----|----|----|
| Symbol                           | C  | E  | V  | H  | J  | K  |



## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Size code | ESR (Ω max./100kHz) |       | Rated ripple current<br>(mA <sub>rms</sub> /125°C, 100kHz) | Part No.           |
|--------------------------|-------------|-----------|---------------------|-------|------------------------------------------------------------|--------------------|
|                          |             |           | 20°C                | −40°C |                                                            |                    |
| 16                       | 680         | HA0       | 0.19                | 2.6   | 620                                                        | EMHS160□RA681MHA0G |
|                          | 1,000       | JA0       | 0.13                | 1.7   | 780                                                        | EMHS160□RA102MJA0G |
|                          | 1,500       | KE0       | 0.087               | 1.1   | 1,060                                                      | EMHS160□RA152MKE0S |
|                          | 2,000       | KG5       | 0.070               | 0.84  | 1,160                                                      | EMHS160□RA202MKG5S |
|                          | 2,700       | LH0       | 0.057               | 0.59  | 1,900                                                      | EMHS160□RA272MLH0S |
|                          | 3,600       | MH0       | 0.055               | 0.44  | 2,000                                                      | EMHS160□RA362MMH0S |
|                          | 4,700       | LN0       | 0.037               | 0.39  | 2,520                                                      | EMHS160□RA472MLN0S |
|                          | 6,200       | MN0       | 0.036               | 0.28  | 2,570                                                      | EMHS160□RA622MMN0S |
| 25                       | 470         | HA0       | 0.19                | 2.6   | 620                                                        | EMHS250□RA471MHA0G |
|                          | 680         | JA0       | 0.13                | 1.7   | 780                                                        | EMHS250□RA681MJA0G |
|                          | 1,000       | KE0       | 0.087               | 1.1   | 1,060                                                      | EMHS250□RA102MKE0S |
|                          | 1,300       | KG5       | 0.070               | 0.84  | 1,160                                                      | EMHS250□RA132MKG5S |
|                          | 1,800       | LH0       | 0.057               | 0.59  | 1,900                                                      | EMHS250□RA182MLH0S |
|                          | 2,400       | MH0       | 0.055               | 0.44  | 2,000                                                      | EMHS250□RA242MMH0S |
|                          | 3,300       | LN0       | 0.037               | 0.39  | 2,520                                                      | EMHS250□RA332MLN0S |
|                          | 4,300       | MN0       | 0.036               | 0.28  | 2,570                                                      | EMHS250□RA432MMN0S |
| 35                       | 220         | HA0       | 0.19                | 2.6   | 620                                                        | EMHS350□RA221MHA0G |
|                          | 270         | HA0       | 0.19                | 2.6   | 620                                                        | EMHS350□RA271MHA0G |
|                          | 470         | JA0       | 0.13                | 1.7   | 780                                                        | EMHS350□RA471MJA0G |
|                          | 680         | KE0       | 0.087               | 1.1   | 1,060                                                      | EMHS350□RA681MKE0S |
|                          | 820         | KG5       | 0.070               | 0.84  | 1,160                                                      | EMHS350□RA821MKG5S |
|                          | 1,200       | LH0       | 0.057               | 0.59  | 1,900                                                      | EMHS350□RA122MLH0S |
|                          | 1,500       | MH0       | 0.055               | 0.44  | 2,000                                                      | EMHS350□RA152MMH0S |
|                          | 2,000       | LN0       | 0.037               | 0.39  | 2,520                                                      | EMHS350□RA202MLN0S |
|                          | 2,400       | MN0       | 0.036               | 0.28  | 2,570                                                      | EMHS350□RA242MMN0S |
|                          | 100         | HA0       | 0.65                | 8.1   | 440                                                        | EMHS500□RA101MHA0G |
| 50                       | 150         | JA0       | 0.45                | 4.6   | 600                                                        | EMHS500□RA151MJA0G |
|                          | 180         | JA0       | 0.45                | 4.6   | 600                                                        | EMHS500□RA181MJA0G |
|                          | 360         | KE0       | 0.16                | 2.0   | 880                                                        | EMHS500□RA361MKE0S |
|                          | 470         | KG5       | 0.12                | 1.5   | 970                                                        | EMHS500□RA471MKG5S |
|                          | 560         | LH0       | 0.088               | 0.94  | 1,640                                                      | EMHS500□RA561MLH0S |
|                          | 750         | MH0       | 0.085               | 0.78  | 1,720                                                      | EMHS500□RA751MMH0S |
|                          | 1,000       | LN0       | 0.056               | 0.61  | 2,230                                                      | EMHS500□RA102MLN0S |
|                          | 1,300       | MN0       | 0.053               | 0.45  | 2,300                                                      | EMHS500□RA132MMN0S |
|                          | 68          | HA0       | 0.65                | 8.1   | 440                                                        | EMHS630□RA680MHA0G |
| 63                       | 82          | HA0       | 0.65                | 8.1   | 440                                                        | EMHS630□RA820MHA0G |
|                          | 100         | JA0       | 0.45                | 4.6   | 600                                                        | EMHS630□RA101MJA0G |
|                          | 120         | JA0       | 0.45                | 4.6   | 600                                                        | EMHS630□RA121MJA0G |
|                          | 240         | KE0       | 0.17                | 2.5   | 920                                                        | EMHS630□RA241MKE0S |
|                          | 330         | KG5       | 0.13                | 1.8   | 1,030                                                      | EMHS630□RA331MKG5S |
|                          | 430         | LH0       | 0.098               | 1.3   | 1,640                                                      | EMHS630□RA431MLH0S |
|                          | 560         | MH0       | 0.091               | 0.98  | 1,720                                                      | EMHS630□RA561MMH0S |
|                          | 680         | LN0       | 0.063               | 0.80  | 2,230                                                      | EMHS630□RA681MLN0S |
|                          | 910         | MN0       | 0.059               | 0.59  | 2,300                                                      | EMHS630□RA911MMN0S |
|                          | 1,000       | MN0       | 0.059               | 0.59  | 2,300                                                      | EMHS630□RA102MMN0S |
|                          | 1,100       | MN0       | 0.059               | 0.59  | 2,300                                                      | EMHS630□RA112MMN0S |
|                          | 1,300       | MN0       | 0.059               | 0.59  | 2,300                                                      | EMHS630□RA132MMN0S |
|                          | 47          | HA0       | 0.65                | 8.1   | 440                                                        | EMHS800□RA470MHA0G |
| 80                       | 68          | JA0       | 0.45                | 4.6   | 600                                                        | EMHS800□RA680MJA0G |
|                          | 82          | JA0       | 0.45                | 4.6   | 600                                                        | EMHS800□RA820MJA0G |
|                          | 180         | KE0       | 0.17                | 2.5   | 920                                                        | EMHS800□RA181MKE0S |
|                          | 240         | KG5       | 0.13                | 1.8   | 1,030                                                      | EMHS800□RA241MKG5S |
|                          | 270         | LH0       | 0.098               | 1.3   | 1,640                                                      | EMHS800□RA271MLH0S |
|                          | 360         | MH0       | 0.091               | 0.98  | 1,720                                                      | EMHS800□RA361MMH0S |
|                          | 430         | LN0       | 0.063               | 0.80  | 2,230                                                      | EMHS800□RA431MLN0S |
|                          | 560         | MN0       | 0.059               | 0.59  | 2,300                                                      | EMHS800□RA561MMN0S |
|                          | 110         | KE0       | 0.17                | 2.5   | 920                                                        | EMHS101□RA111MKE0S |
| 100                      | 150         | KG5       | 0.13                | 1.8   | 1,030                                                      | EMHS101□RA151MKG5S |
|                          | 160         | LH0       | 0.098               | 1.3   | 1,640                                                      | EMHS101□RA161MLH0S |
|                          | 200         | MH0       | 0.091               | 0.98  | 1,720                                                      | EMHS101□RA201MMH0S |
|                          | 240         | LN0       | 0.063               | 0.80  | 2,230                                                      | EMHS101□RA241MLN0S |
|                          | 330         | MN0       | 0.059               | 0.59  | 2,300                                                      | EMHS101□RA331MMN0S |

□ : Enter the appropriate terminal code.

New products are indicated in red text.

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

| Size code  | Capacitance(μF) | Frequency(Hz) | 120  | 1k   | 10k  | 100k |
|------------|-----------------|---------------|------|------|------|------|
| HA0, JA0   | 47 to 180       |               | 0.40 | 0.75 | 0.90 | 1.00 |
|            | 220 to 470      |               | 0.50 | 0.85 | 0.94 | 1.00 |
|            | 680 to 1,000    |               | 0.60 | 0.87 | 0.95 | 1.00 |
| KE0 to MN0 | 110 to 200      |               | 0.40 | 0.75 | 0.90 | 1.00 |
|            | 220 to 620      |               | 0.50 | 0.85 | 0.94 | 1.00 |
|            | 680 to 2,000    |               | 0.60 | 0.87 | 0.95 | 1.00 |
|            | 2,400 to 4,300  |               | 0.75 | 0.90 | 0.95 | 1.00 |
|            | 4,700 to 6,200  |               | 0.85 | 0.95 | 0.98 | 1.00 |
|            |                 |               |      |      |      |      |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

## Alchip™-MVH Series

- Lower ESR, Higher ripple current
- Endurance : 1,000 to 5,000 hours at 125°C
- Suitable to fit for automotive equipment
- Solvent resistant type except 63 to 100V<sub>dc</sub> (see PRECAUTIONS AND GUIDELINES)
- Vibration resistant structure
- RoHS2 Compliant
- AEC-Q200 compliant : Please contact Chemi-Con for more details, test data, information.

MVH

125°C  
MVE

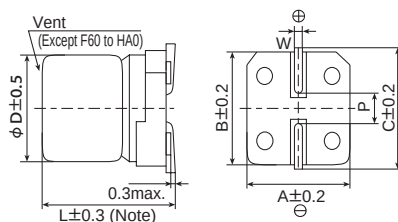
## ◆ SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                              |                                                                                                                                                                                                                                                                                         |      |      |      |      |                                       |      |      |      |  |
|--------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|------|---------------------------------------|------|------|------|--|
| Category                                               |                                                                                                                                                              |                                                                                                                                                                                                                                                                                         |      |      |      |      |                                       |      |      |      |  |
| Temperature Range                                      | -40 to +125°C                                                                                                                                                |                                                                                                                                                                                                                                                                                         |      |      |      |      |                                       |      |      |      |  |
| Rated Voltage Range                                    | 10 to 100V <sub>dc</sub>                                                                                                                                     |                                                                                                                                                                                                                                                                                         |      |      |      |      |                                       |      |      |      |  |
| Capacitance Tolerance                                  | ± 20% (M) (at 20°C, 120Hz)                                                                                                                                   |                                                                                                                                                                                                                                                                                         |      |      |      |      |                                       |      |      |      |  |
| Leakage Current                                        | F60 to JA0                                                                                                                                                   | I=0.01CV or 3μA, whichever is greater.                                                                                                                                                                                                                                                  |      |      |      |      |                                       |      |      |      |  |
|                                                        | KE0 to MN0                                                                                                                                                   | I=0.03CV or 4μA, whichever is greater.                                                                                                                                                                                                                                                  |      |      |      |      |                                       |      |      |      |  |
|                                                        | Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C after 2 minutes)                                          |                                                                                                                                                                                                                                                                                         |      |      |      |      |                                       |      |      |      |  |
| Dissipation Factor (tan δ)                             | Rated voltage (V <sub>dc</sub> )                                                                                                                             |                                                                                                                                                                                                                                                                                         | 10V  | 16V  | 25V  | 35V  | 50V                                   | 63V  | 80V  | 100V |  |
|                                                        | tan δ (Max.)                                                                                                                                                 | F60 to JA0                                                                                                                                                                                                                                                                              | 0.24 | 0.20 | 0.16 | 0.14 | 0.14                                  | 0.12 | 0.12 | 0.10 |  |
|                                                        |                                                                                                                                                              | KE0 to MN0                                                                                                                                                                                                                                                                              | 0.22 | 0.18 | 0.16 | 0.14 | 0.12                                  | 0.14 | —    | 0.10 |  |
|                                                        | When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase. (at 20°C, 120Hz)                                            |                                                                                                                                                                                                                                                                                         |      |      |      |      |                                       |      |      |      |  |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                             |                                                                                                                                                                                                                                                                                         | 10V  | 16V  | 25V  | 35V  | 50V                                   | 63V  | 80V  | 100V |  |
|                                                        | F60 to JA0                                                                                                                                                   | Z(-25°C)/Z(+20°C)                                                                                                                                                                                                                                                                       | 3    | 2    | 2    | 2    | 2                                     | 2    | 2    | 2    |  |
|                                                        |                                                                                                                                                              | Z(-40°C)/Z(+20°C)                                                                                                                                                                                                                                                                       | 6    | 4    | 4    | 3    | 3                                     | 3    | 3    | 3    |  |
|                                                        | KE0 to MN0                                                                                                                                                   | Z(-25°C)/Z(+20°C)                                                                                                                                                                                                                                                                       | 4    | 3    | 2    | 2    | 2                                     | 2    | —    | 2    |  |
|                                                        |                                                                                                                                                              | Z(-40°C)/Z(+20°C)                                                                                                                                                                                                                                                                       | 8    | 6    | 4    | 3    | 3                                     | 3    | —    | 3    |  |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for the specified time at 125°C. |                                                                                                                                                                                                                                                                                         |      |      |      |      |                                       |      |      |      |  |
|                                                        | Time                                                                                                                                                         | F60 to H63 (10 to 100V <sub>dc</sub> ) : 1,000hours<br>HA0 to JA0 (10 to 100V <sub>dc</sub> ) : 2,000hours<br>KE0 to MN0 (10 to 100V <sub>dc</sub> ) : 5,000hours                                                                                                                       |      |      |      |      |                                       |      |      |      |  |
|                                                        | Capacitance change                                                                                                                                           | ≤ ± 30% of the initial value                                                                                                                                                                                                                                                            |      |      |      |      |                                       |      |      |      |  |
|                                                        | D.F. (tan δ)                                                                                                                                                 | ≤ 300% of the initial specified value                                                                                                                                                                                                                                                   |      |      |      |      |                                       |      |      |      |  |
|                                                        | Leakage current                                                                                                                                              | ≤ The initial specified value                                                                                                                                                                                                                                                           |      |      |      |      |                                       |      |      |      |  |
|                                                        | Shelf Life                                                                                                                                                   | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 125°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |      |      |      |      |                                       |      |      |      |  |
| Rated voltage(V <sub>dc</sub> )                        |                                                                                                                                                              | 10 to 50V <sub>dc</sub>                                                                                                                                                                                                                                                                 |      |      |      |      | 63 to 100V <sub>dc</sub>              |      |      |      |  |
| Capacitance change                                     |                                                                                                                                                              | ≤ ± 30% of the initial value                                                                                                                                                                                                                                                            |      |      |      |      | ≤ ± 30% of the initial value          |      |      |      |  |
| D.F. (tan δ)                                           |                                                                                                                                                              | ≤ 300% of the initial specified value                                                                                                                                                                                                                                                   |      |      |      |      | ≤ 300% of the initial specified value |      |      |      |  |
| Leakage current                                        |                                                                                                                                                              | ≤ The initial specified value                                                                                                                                                                                                                                                           |      |      |      |      | ≤ 500% of the initial specified value |      |      |      |  |

## ◆ DIMENSIONS [mm]

- Terminal Code : A

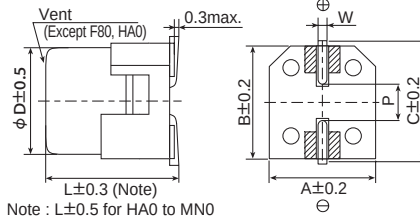
- Size code : F60 to MN0



Note : L±0.5 for HA0 to MN0

- Terminal Code : G(Vibration resistant structure)

- Size code : F80, HA0 to MN0

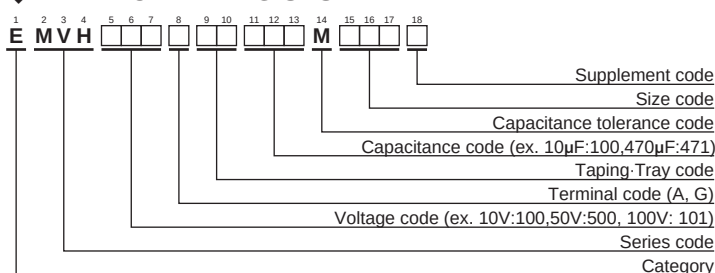


Note : L±0.5 for HA0 to MN0

: Dummy terminals

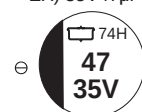
| Size code | D    | L    | A    | B    | C    | W          | P   |
|-----------|------|------|------|------|------|------------|-----|
| F60       | 6.3  | 5.7  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| F80       | 6.3  | 7.7  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| H63       | 8    | 6.3  | 8.3  | 8.3  | 9.0  | 0.5 to 0.8 | 2.3 |
| HA0       | 8    | 10.0 | 8.3  | 8.3  | 9.0  | 0.7 to 1.1 | 3.1 |
| JA0       | 10   | 10.0 | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |
| KE0       | 12.5 | 13.5 | 13.0 | 13.0 | 13.7 | 1.0 to 1.3 | 4.2 |
| KG5       | 12.5 | 16.0 | 13.0 | 13.0 | 13.7 | 1.0 to 1.3 | 4.2 |
| LH0       | 16   | 16.5 | 17.0 | 17.0 | 18.0 | 1.0 to 1.3 | 6.5 |
| LN0       | 16   | 21.5 | 17.0 | 17.0 | 18.0 | 1.0 to 1.3 | 6.5 |
| MH0       | 18   | 16.5 | 19.0 | 19.0 | 20.0 | 1.0 to 1.3 | 6.5 |
| MN0       | 18   | 21.5 | 19.0 | 19.0 | 20.0 | 1.0 to 1.3 | 6.5 |

## ◆ PART NUMBERING SYSTEM



Please refer to "Product code guide (surface mount type)"

## ◆ MARKING

F60 to JA0  
EX) 35V47μFKE0 to MN0  
EX) 16V1,000μF



## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Size<br>code | ESR<br>(Ω max./<br>100kHz) |       | Rated ripple<br>current<br>(mA rms/125°C) |       | Part No.           |
|--------------------------|-------------|--------------|----------------------------|-------|-------------------------------------------|-------|--------------------|
|                          |             |              | 20°C                       | -40°C | 100kHz                                    | 120Hz |                    |
| 10                       | 100         | F80          | 0.90                       | 14.0  | 110                                       | —     | EMVH100□RA101MF80G |
|                          | 100         | H63          | 0.90                       | 14.0  | 110                                       | —     | EMVH100ARA101MH63G |
|                          | 220         | F80          | 0.90                       | 14.0  | 110                                       | —     | EMVH100□RA221MF80G |
|                          | 220         | H63          | 0.90                       | 14.0  | 110                                       | —     | EMVH100ARA221MH63G |
|                          | 220         | HA0          | 0.40                       | 6.0   | 220                                       | —     | EMVH100□RA221MHA0G |
|                          | 330         | HA0          | 0.40                       | 6.0   | 220                                       | —     | EMVH100□RA331MHA0G |
|                          | 330         | JA0          | 0.30                       | 4.5   | 296                                       | —     | EMVH100□RA331MJA0G |
|                          | 470         | JA0          | 0.30                       | 4.5   | 296                                       | —     | EMVH100□RA471MJA0G |
|                          | 1,000       | KE0          | 0.14                       | 2.1   | 750                                       | —     | EMVH100□RA102MKE0S |
|                          | 2,200       | LH0          | 0.10                       | 1.5   | 1,000                                     | —     | EMVH100□RA222MLH0S |
|                          | 2,200       | MH0          | 0.10                       | 1.5   | 1,200                                     | —     | EMVH100□RA222MMH0S |
|                          | 3,300       | MH0          | 0.10                       | 1.5   | 1,200                                     | —     | EMVH100□RA332MMH0S |
|                          | 4,700       | MN0          | 0.058                      | 0.87  | 1,550                                     | —     | EMVH100□RA472MMN0S |
|                          | 47          | F60          | 1.6                        | 24.0  | 69                                        | —     | EMVH160ARA470MF60G |
| 16                       | 100         | HA0          | 0.40                       | 6.0   | 220                                       | —     | EMVH160□RA101MHA0G |
|                          | 220         | HA0          | 0.40                       | 6.0   | 220                                       | —     | EMVH160□RA221MHA0G |
|                          | 220         | JA0          | 0.30                       | 4.5   | 296                                       | —     | EMVH160□RA221MJA0G |
|                          | 330         | JA0          | 0.30                       | 4.5   | 296                                       | —     | EMVH160□RA331MJA0G |
|                          | 470         | KE0          | 0.14                       | 2.1   | 750                                       | —     | EMVH160□RA471MKE0S |
|                          | 680         | KE0          | 0.14                       | 2.1   | 750                                       | —     | EMVH160□RA681MKE0S |
|                          | 680         | LH0          | 0.10                       | 1.5   | 1,000                                     | —     | EMVH160□RA681MLH0S |
|                          | 1,000       | MH0          | 0.10                       | 1.5   | 1,200                                     | —     | EMVH160□RA102MMH0S |
|                          | 2,200       | MH0          | 0.10                       | 1.5   | 1,200                                     | —     | EMVH160□RA222MMH0S |
|                          | 33          | F60          | 1.6                        | 24.0  | 69                                        | —     | EMVH250ARA330MF60G |
| 25                       | 47          | F80          | 0.90                       | 14.0  | 110                                       | —     | EMVH250□RA470MF80G |
|                          | 47          | H63          | 0.90                       | 14.0  | 110                                       | —     | EMVH250ARA470MH63G |
|                          | 100         | F80          | 0.90                       | 14.0  | 110                                       | —     | EMVH250□RA101MF80G |
|                          | 100         | H63          | 0.90                       | 14.0  | 110                                       | —     | EMVH250ARA101MH63G |
|                          | 100         | HA0          | 0.40                       | 6.0   | 220                                       | —     | EMVH250□RA101MHA0G |
|                          | 220         | HA0          | 0.40                       | 6.0   | 220                                       | —     | EMVH250□RA221MHA0G |
|                          | 220         | JA0          | 0.30                       | 4.5   | 296                                       | —     | EMVH250□RA221MJA0G |
|                          | 330         | JA0          | 0.30                       | 4.5   | 296                                       | —     | EMVH250□RA331MJA0G |
|                          | 330         | KE0          | 0.14                       | 2.1   | 750                                       | —     | EMVH250□RA331MKE0S |
|                          | 470         | KE0          | 0.14                       | 2.1   | 750                                       | —     | EMVH250□RA471MKE0S |
|                          | 470         | LH0          | 0.10                       | 1.5   | 1,000                                     | —     | EMVH250□RA471MLH0S |
|                          | 680         | LH0          | 0.10                       | 1.5   | 1,000                                     | —     | EMVH250□RA681MLH0S |
|                          | 680         | MH0          | 0.10                       | 1.5   | 1,200                                     | —     | EMVH250□RA681MMH0S |
|                          | 1,000       | MN0          | 0.058                      | 0.87  | 1,550                                     | —     | EMVH250□RA102MMN0S |
| 35                       | 10          | F60          | 1.6                        | 24.0  | 69                                        | —     | EMVH350ARA100MF60G |
|                          | 22          | F60          | 1.6                        | 24.0  | 69                                        | —     | EMVH350ARA220MF60G |
|                          | 33          | F80          | 0.90                       | 14.0  | 110                                       | —     | EMVH350□RA330MF80G |
|                          | 33          | H63          | 0.90                       | 14.0  | 110                                       | —     | EMVH350ARA330MH63G |
|                          | 47          | F80          | 0.90                       | 14.0  | 110                                       | —     | EMVH350□RA470MF80G |
|                          | 47          | H63          | 0.90                       | 14.0  | 110                                       | —     | EMVH350ARA470MH63G |
|                          | 47          | HA0          | 0.40                       | 6.0   | 220                                       | —     | EMVH350□RA470MHA0G |
|                          | 100         | HA0          | 0.40                       | 6.0   | 220                                       | —     | EMVH350□RA101MHA0G |
|                          | 100         | JA0          | 0.30                       | 4.5   | 296                                       | —     | EMVH350□RA101MJA0G |
|                          | 220         | JA0          | 0.30                       | 4.5   | 296                                       | —     | EMVH350□RA221MJA0G |
|                          | 330         | KE0          | 0.14                       | 2.1   | 750                                       | —     | EMVH350□RA331MKE0S |
|                          | 330         | LH0          | 0.10                       | 1.5   | 1,000                                     | —     | EMVH350□RA331MLH0S |
|                          | 470         | KG5          | 0.11                       | 1.5   | 900                                       | —     | EMVH350□RA471MKG5S |
|                          | 470         | LH0          | 0.10                       | 1.5   | 1,000                                     | —     | EMVH350□RA471MLH0S |
|                          | 680         | MH0          | 0.10                       | 1.5   | 1,200                                     | —     | EMVH350□RA681MMH0S |
|                          | 10          | F60          | 1.6                        | 24.0  | 69                                        | —     | EMVH500ARA100MF60G |
|                          | 10          | H63          | 1.6                        | 30.0  | 83                                        | —     | EMVH500ARA100MH63G |
|                          | 22          | F80          | 2.0                        | 30.0  | 83                                        | —     | EMVH500□RA220MF80G |
| 50                       | 22          | H63          | 1.6                        | 30.0  | 83                                        | —     | EMVH500ARA220MH63G |
|                          | 33          | F80          | 2.0                        | 30.0  | 83                                        | —     | EMVH500□RA330MF80G |
|                          | 33          | H63          | 1.6                        | 30.0  | 83                                        | —     | EMVH500ARA330MH63G |
|                          | 33          | HA0          | 0.70                       | 11.0  | 160                                       | —     | EMVH500□RA330MHA0G |
|                          | 47          | HA0          | 0.70                       | 11.0  | 160                                       | —     | EMVH500□RA470MHA0G |
|                          | 47          | JA0          | 0.50                       | 7.5   | 247                                       | —     | EMVH500□RA470MJA0G |
|                          | 100         | JA0          | 0.50                       | 7.5   | 247                                       | —     | EMVH500□RA101MJA0G |
|                          | 100         | KE0          | 0.23                       | 3.5   | 550                                       | —     | EMVH500□RA101MKE0S |
|                          | 220         | KE0          | 0.23                       | 3.5   | 550                                       | —     | EMVH500□RA221MKE0S |
|                          | 220         | LH0          | 0.15                       | 2.3   | 850                                       | —     | EMVH500□RA221MLH0S |
|                          | 330         | KG5          | 0.18                       | 2.7   | 700                                       | —     | EMVH500□RA331MKG5S |
|                          | 330         | LH0          | 0.15                       | 2.3   | 850                                       | —     | EMVH500□RA331MLH0S |
|                          | 470         | MH0          | 0.15                       | 2.3   | 920                                       | —     | EMVH500□RA471MMH0S |
|                          | 10          | F80          | 2.0                        | 100   | 60                                        | —     | EMVH630□RA100MF80G |
| 63                       | 10          | H63          | 2.0                        | 110   | 60                                        | —     | EMVH630ARA100MH63G |
|                          | 22          | HA0          | 0.70                       | 35.0  | 100                                       | —     | EMVH630□RA220MHA0G |
|                          | 33          | HA0          | 0.70                       | 35.0  | 100                                       | —     | EMVH630□RA330MHA0G |
|                          | 33          | JA0          | 0.50                       | 25.0  | 170                                       | —     | EMVH630□RA330MJA0G |
|                          | 47          | HA0          | 0.70                       | 35.0  | 100                                       | —     | EMVH630□RA470MHA0G |
|                          | 47          | JA0          | 0.50                       | 25.0  | 170                                       | —     | EMVH630□RA470MJA0G |
|                          | 100         | KE0          | 0.25                       | 12.5  | 500                                       | —     | EMVH630□RA101MKE0S |
|                          | 220         | KG5          | 0.20                       | 10.0  | 600                                       | —     | EMVH630□RA221MKG5S |
|                          | 330         | LH0          | 0.18                       | 9.0   | 820                                       | —     | EMVH630□RA331MLH0S |
|                          | 470         | LN0          | 0.11                       | 5.5   | 1,100                                     | —     | EMVH630□RA471MLN0S |
| 80                       | 10          | HA0          | 0.75                       | 50.0  | 70                                        | —     | EMVH800□RA100MHA0G |
|                          | 22          | HA0          | 0.75                       | 50.0  | 70                                        | —     | EMVH800□RA220MHA0G |
|                          | 22          | JA0          | 0.55                       | 35.0  | 115                                       | —     | EMVH800□RA220MJA0G |
|                          | 33          | HA0          | 0.75                       | 50.0  | 70                                        | —     | EMVH800□RA330MHA0G |
|                          | 33          | JA0          | 0.55                       | 35.0  | 115                                       | —     | EMVH800□RA330MJA0G |
|                          | 47          | JA0          | 0.55                       | 35.0  | 115                                       | —     | EMVH800□RA470MJA0G |
| 100                      | 10          | HA0          | 0.75                       | 50.0  | 70                                        | —     | EMVH101□RA100MHA0G |
|                          | 22          | HA0          | 0.75                       | 50.0  | 70                                        | —     | EMVH101□RA220MHA0G |
|                          | 22          | JA0          | 0.55                       | 35.0  | 115                                       | —     | EMVH101□RA220MJA0G |
|                          | 33          | JA0          | 0.55                       | 35.0  | 115                                       | —     | EMVH101□RA330MJA0G |
|                          | 47          | KE0          | 0.33                       | 16.5  | 450                                       | —     | EMVH101□RA470MKE0S |
|                          | 68          | KG5          | 0.26                       | 13.0  | 550                                       | —     | EMVH101□RA680MKG5S |
| 100                      | 100         | LH0          | 0.24                       | 12.0  | 650                                       | —     | EMVH101□RA101MLH0S |
|                          | 220         | MN0          | 0.16                       | 8.0   | 950                                       | —     | EMVH101□RA221MMN0S |

□ : Enter the appropriate terminal code.

Production of the products shown in   is scheduled to be discontinued.

\*1: Assembly boards with the designated products attached cannot be cleaned.

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

| Size code  | Capacitance(μF) | Frequency(Hz) | 120  | 1k   | 10k  | 100k |
|------------|-----------------|---------------|------|------|------|------|
| F60 to JA0 | 10              |               | 0.66 | 0.86 | 0.93 | 1.00 |
|            | 22 to 470       |               | 0.93 | 0.97 | 1.00 | 1.00 |
|            | 47 to 100       |               | 0.40 | 0.75 | 0.90 | 1.00 |
| KE0 to MN0 | 220 to 470      |               | 0.50 | 0.85 | 0.94 | 1.00 |
|            | 680 to 1,000    |               | 0.60 | 0.87 | 0.95 | 1.00 |
|            | 2,200 to 3,300  |               | 0.75 | 0.90 | 0.95 | 1.00 |
|            | 4,700           |               | 0.85 | 0.95 | 0.98 | 1.00 |
|            |                 |               |      |      |      |      |

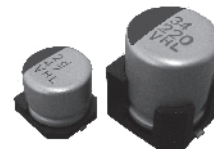
The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.



## Alchip™-MHL Series

- Downsized and Longer life from current MVH series
- Endurance : 2,000 to 4,000 hours at 125°C
- Rated voltage range : 10 to 35V. Nominal capacitance range : 47 to 680μF
- For automobile modules and other high temperature applications
- Solvent resistant type (see PRECAUTIONS AND GUIDELINES)
- Vibration resistant structure
- RoHS2 Compliant
- AEC-Q200 compliant : Please contact Chemi-Con for more details, test data, information.

MHL

↓  
Downsized  
Longer life  
MVH

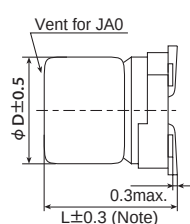
### SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                       |                                                    |      |      |      |                 |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|------|------|------|-----------------|
| Category                                               |                                                                                                                                                                                                                                                                                       |                                                    |      |      |      |                 |
| Temperature Range                                      | -40 to +125℃                                                                                                                                                                                                                                                                          |                                                    |      |      |      |                 |
| Rated Voltage Range                                    | 10 to 35V <sub>dc</sub>                                                                                                                                                                                                                                                               |                                                    |      |      |      |                 |
| Capacitance Tolerance                                  | ± 20%(M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                              |                                                    |      |      |      |                 |
| Leakage Current                                        | I=0.01CV<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 2 minutes)                                                                                                                                                        |                                                    |      |      |      |                 |
| Dissipation Factor (tan δ )                            | Rated voltage(V <sub>dc</sub> )                                                                                                                                                                                                                                                       | 10V                                                | 16V  | 25V  | 35V  | (at 20℃, 120Hz) |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.24                                               | 0.20 | 0.16 | 0.14 |                 |
| Low Temperature Characteristics (Max. impedance Ratio) | Rated voltage(V <sub>dc</sub> )                                                                                                                                                                                                                                                       | 10V                                                | 16V  | 25V  | 35V  | (at 120Hz)      |
|                                                        | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 3                                                  | 2    | 2    | 2    |                 |
|                                                        | Z(-40℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 6                                                  | 4    | 4    | 3    |                 |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for specified time at 125℃.                                                                                                                                |                                                    |      |      |      |                 |
|                                                        | Time                                                                                                                                                                                                                                                                                  | F61 & F80 : 2,000 hours<br>HA0 & JA0 : 4,000 hours |      |      |      |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ± 30% of the initial value                       |      |      |      |                 |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤ 300% of the initial specified value              |      |      |      |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value                      |      |      |      |                 |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 125℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                                    |      |      |      |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ± 30% of the initial value                       |      |      |      |                 |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤ 300% of the initial specified value              |      |      |      |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value                      |      |      |      |                 |

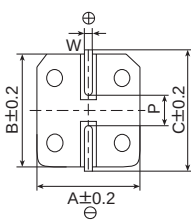
### DIMENSIONS [mm]

- Terminal Code : A

- Size code : F61 to JA0

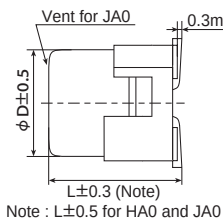


Note : L±0.5 for HA0 and JA0

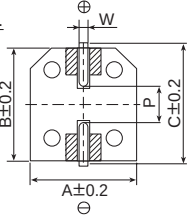


- Terminal Code : G(Vibration resistant structure)

- Size code : F61 to JA0



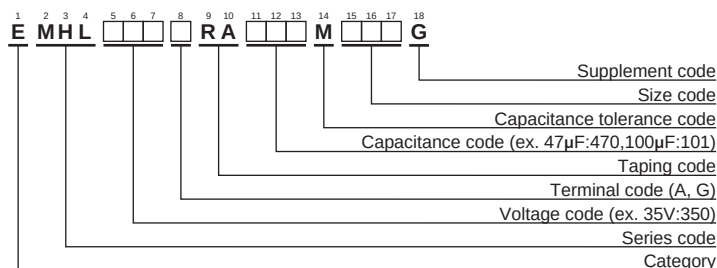
Note : L±0.5 for HA0 and JA0



▨ : Dummy terminals

| Size code | φD  | L    | A    | B    | C    | W          | P   |
|-----------|-----|------|------|------|------|------------|-----|
| F61       | 6.3 | 5.8  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| F80       | 6.3 | 7.7  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| HA0       | 8   | 10.0 | 8.3  | 8.3  | 9.0  | 0.7 to 1.1 | 3.1 |
| JA0       | 10  | 10.0 | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |

### PART NUMBERING SYSTEM



Please refer to "Product code guide (surface mount type)"

### MARKING

EX) 35V47μF



- Rated voltage symbol

| Rated voltage (V <sub>dc</sub> ) | Symbol |
|----------------------------------|--------|
| 10                               | A      |
| 16                               | C      |
| 25                               | E      |
| 35                               | V      |



## Alchip™-MHL Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Size code | ESR<br>(Ω max./100kHz) |       | Rated ripple current<br>(mA rms/125°C, 100kHz) | Part No.             |
|--------------------------|-------------|-----------|------------------------|-------|------------------------------------------------|----------------------|
|                          |             |           | 20°C                   | -40°C |                                                |                      |
| 10                       | 100         | F61       | 1.2                    | 22    | 110                                            | EMHL100 □ RA101MF61G |
|                          | 220         | F80       | 0.60                   | 12    | 220                                            | EMHL100 □ RA221MF80G |
|                          | 330         | HA0       | 0.30                   | 5.5   | 296                                            | EMHL100 □ RA331MHA0G |
|                          | 470         | HA0       | 0.30                   | 5.5   | 296                                            | EMHL100 □ RA471MHA0G |
|                          | 680         | JA0       | 0.20                   | 3.6   | 440                                            | EMHL100 □ RA681MJA0G |
| 16                       | 47          | F61       | 1.2                    | 22    | 110                                            | EMHL160 □ RA470MF61G |
|                          | 100         | F61       | 1.2                    | 22    | 110                                            | EMHL160 □ RA101MF61G |
|                          | 220         | F80       | 0.60                   | 12    | 220                                            | EMHL160 □ RA221MF80G |
|                          | 330         | HA0       | 0.30                   | 5.5   | 296                                            | EMHL160 □ RA331MHA0G |
|                          | 470         | JA0       | 0.20                   | 3.6   | 440                                            | EMHL160 □ RA471MJA0G |
| 25                       | 680         | JA0       | 0.20                   | 3.6   | 440                                            | EMHL160 □ RA681MJA0G |
|                          | 47          | F61       | 1.2                    | 22    | 110                                            | EMHL250 □ RA470MF61G |
|                          | 100         | F80       | 0.60                   | 12    | 220                                            | EMHL250 □ RA101MF80G |
|                          | 220         | HA0       | 0.30                   | 5.5   | 296                                            | EMHL250 □ RA221MHA0G |
|                          | 330         | JA0       | 0.20                   | 3.6   | 440                                            | EMHL250 □ RA331MJA0G |
| 35                       | 47          | F61       | 1.2                    | 22    | 110                                            | EMHL350 □ RA470MF61G |
|                          | 100         | F80       | 0.60                   | 12    | 220                                            | EMHL350 □ RA101MF80G |
|                          | 220         | HA0       | 0.30                   | 5.5   | 296                                            | EMHL350 □ RA221MHA0G |
|                          | 330         | JA0       | 0.20                   | 3.6   | 440                                            | EMHL350 □ RA331MJA0G |

□ : Enter the appropriate terminal code.

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

| Capacitance(μF) | Frequency(Hz) |      |      |      |
|-----------------|---------------|------|------|------|
|                 | 120           | 1k   | 10k  | 100k |
| 47 to 680       | 0.93          | 0.97 | 1.00 | 1.00 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.





## Alchip™-MHB Series

- ESR : Less than MVH
- Endurance : 1,500 to 3,000 hours at 125°C
- Rated voltage range : 10 to 100V
- Solvent resistant type (see PRECAUTIONS AND GUIDELINES)
- Vibration resistant structure
- RoHS2 Compliant
- AEC-Q200 compliant : Please contact Chemi-Con for more details, test data, information.

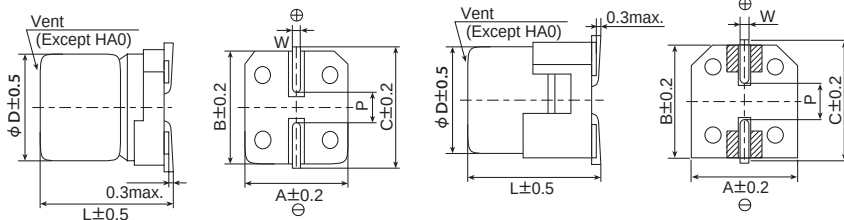
## ◆ SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                     |                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                         |                                       |      |      |      |      |      |      |  |  |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|------|------|------|------|------|------|--|--|
| Category                                               | -40 to +125°C                                                                                                       |                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                         |                                       |      |      |      |      |      |      |  |  |
| Temperature Range                                      |                                                                                                                     |                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                         |                                       |      |      |      |      |      |      |  |  |
| Rated Voltage Range                                    | 10 to 100V <sub>dc</sub>                                                                                            |                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                         |                                       |      |      |      |      |      |      |  |  |
| Capacitance Tolerance                                  | ± 20%(M) (at 20°C, 120Hz)                                                                                           |                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                         |                                       |      |      |      |      |      |      |  |  |
| Leakage Current                                        | HA0 & JA0                                                                                                           | I=0.01CV                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                         |                                       |      |      |      |      |      |      |  |  |
|                                                        | KE0 to MN0                                                                                                          | I=0.03CV                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                         |                                       |      |      |      |      |      |      |  |  |
|                                                        | Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C after 2 minutes) |                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                         |                                       |      |      |      |      |      |      |  |  |
| Dissipation Factor (tan δ)                             | Rated Voltage (V <sub>ac</sub> )                                                                                    | 10V                                                                                                                                                                                                                                                              | 16V                                                                                                                                                                                                                                                                                     | 25V                                   | 35V  | 50V  | 63V  | 80V  | 100V |      |  |  |
|                                                        | tan δ (Max.)                                                                                                        | HA0 & JA0                                                                                                                                                                                                                                                        | 0.24                                                                                                                                                                                                                                                                                    | 0.20                                  | 0.16 | 0.14 | —    | —    | —    | —    |  |  |
|                                                        |                                                                                                                     | KE0 to MN0                                                                                                                                                                                                                                                       | —                                                                                                                                                                                                                                                                                       | —                                     | 0.14 | 0.12 | 0.10 | 0.10 | 0.08 | 0.08 |  |  |
|                                                        | When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase. (at 20°C, 120Hz)   |                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                         |                                       |      |      |      |      |      |      |  |  |
| Low Temperature Characteristics (Max. impedance Ratio) | Rated Voltage (V <sub>ac</sub> )                                                                                    | 10V                                                                                                                                                                                                                                                              | 16V                                                                                                                                                                                                                                                                                     | 25V                                   | 35V  | 50V  | 63V  | 80V  | 100V |      |  |  |
|                                                        | HA0 & JA0                                                                                                           | Z(-25°C)/Z(+20°C)                                                                                                                                                                                                                                                | 3                                                                                                                                                                                                                                                                                       | 2                                     | 2    | 2    | —    | —    | —    | —    |  |  |
|                                                        |                                                                                                                     | Z(-40°C)/Z(+20°C)                                                                                                                                                                                                                                                | 4                                                                                                                                                                                                                                                                                       | 3                                     | 3    | 3    | —    | —    | —    | —    |  |  |
|                                                        | KE0 to MN0                                                                                                          | Z(-25°C)/Z(+20°C)                                                                                                                                                                                                                                                | —                                                                                                                                                                                                                                                                                       | —                                     | 2    | 2    | 2    | 2    | 2    | 2    |  |  |
| Z(-40°C)/Z(+20°C)                                      |                                                                                                                     | —                                                                                                                                                                                                                                                                | —                                                                                                                                                                                                                                                                                       | 4                                     | 4    | 4    | 4    | 4    | 4    |      |  |  |
| (at 120Hz)                                             |                                                                                                                     |                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                         |                                       |      |      |      |      |      |      |  |  |
| Endurance                                              | HA0 & JA0                                                                                                           | The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 2,000 hours at 125°C.                                                                                                            |                                                                                                                                                                                                                                                                                         |                                       |      |      |      |      |      |      |  |  |
|                                                        |                                                                                                                     | Capacitance change                                                                                                                                                                                                                                               | ≤ ± 30% of the initial value                                                                                                                                                                                                                                                            |                                       |      |      |      |      |      |      |  |  |
|                                                        |                                                                                                                     | D.F. (tan δ )                                                                                                                                                                                                                                                    | ≤ 300% of the initial specified value                                                                                                                                                                                                                                                   |                                       |      |      |      |      |      |      |  |  |
|                                                        |                                                                                                                     | Leakage current                                                                                                                                                                                                                                                  | ≤ The initial specified value                                                                                                                                                                                                                                                           |                                       |      |      |      |      |      |      |  |  |
|                                                        | KE0 to MN0                                                                                                          | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for the specified period of time at 125°C. |                                                                                                                                                                                                                                                                                         |                                       |      |      |      |      |      |      |  |  |
|                                                        |                                                                                                                     | Time                                                                                                                                                                                                                                                             | KE0 & KG5 : 1,500hours<br>LH0 & MH0 : 2,000hours<br>KN0 & LNO & MNO : 3,000hours                                                                                                                                                                                                        |                                       |      |      |      |      |      |      |  |  |
|                                                        |                                                                                                                     |                                                                                                                                                                                                                                                                  | Capacitance change                                                                                                                                                                                                                                                                      | ≤ ± 30% of the initial value          |      |      |      |      |      |      |  |  |
|                                                        |                                                                                                                     |                                                                                                                                                                                                                                                                  | D.F. (tan δ )                                                                                                                                                                                                                                                                           | ≤ 300% of the initial specified value |      |      |      |      |      |      |  |  |
|                                                        |                                                                                                                     | Leakage current                                                                                                                                                                                                                                                  | ≤ The initial specified value                                                                                                                                                                                                                                                           |                                       |      |      |      |      |      |      |  |  |
|                                                        |                                                                                                                     | Shelf Life                                                                                                                                                                                                                                                       | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 125°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                       |      |      |      |      |      |      |  |  |
| Capacitance change                                     | ≤ ± 30% of the initial value                                                                                        |                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                         |                                       |      |      |      |      |      |      |  |  |
| D.F. (tan δ )                                          | ≤ 300% of the initial specified value                                                                               |                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                         |                                       |      |      |      |      |      |      |  |  |
| Leakage current                                        | ≤ The initial specified value                                                                                       |                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                         |                                       |      |      |      |      |      |      |  |  |

## ◆ DIMENSIONS [mm]

- Terminal Code : A
- Size code : HA0 to MN0

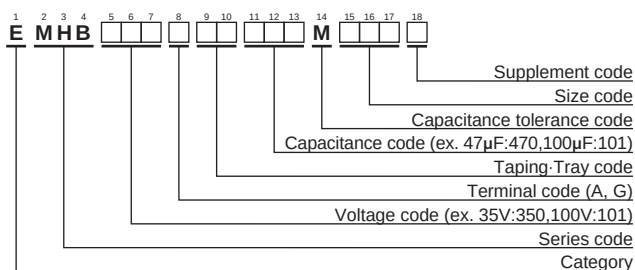
- Terminal Code : G (Vibration resistant structure)
- Size code : HA0 to MN0



▨ : Dummy terminals

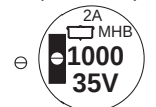
| Size code | φD   | L    | A    | B    | C    | W          | P   |
|-----------|------|------|------|------|------|------------|-----|
| HA0       | 8    | 10.0 | 8.3  | 8.3  | 9.0  | 0.7 to 1.1 | 3.1 |
| JA0       | 10   | 10.0 | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |
| KE0       | 12.5 | 13.5 | 13.0 | 13.0 | 13.7 | 1.0 to 1.3 | 4.2 |
| KG5       | 12.5 | 16.0 | 13.0 | 13.0 | 13.7 | 1.0 to 1.3 | 4.2 |
| KN0       | 12.5 | 21.5 | 13.0 | 13.0 | 13.7 | 1.0 to 1.3 | 4.2 |
| LH0       | 16   | 16.5 | 17.0 | 17.0 | 18.0 | 1.0 to 1.3 | 6.5 |
| LN0       | 16   | 21.5 | 17.0 | 17.0 | 18.0 | 1.0 to 1.3 | 6.5 |
| MH0       | 18   | 16.5 | 19.0 | 19.0 | 20.0 | 1.0 to 1.3 | 6.5 |
| MN0       | 18   | 21.5 | 19.0 | 19.0 | 20.0 | 1.0 to 1.3 | 6.5 |

## ◆ PART NUMBERING SYSTEM



Please refer to "Product code guide (surface mount type)"

## ◆ MARKING

HA0, JA0  
EX) 16V220μFKE0 to MN0  
EX) 35V1,000μF

- Rated voltage symbol (HA0, JA0)

| Rated voltage (V <sub>dc</sub> ) | 10 | 16 | 25 | 35 |
|----------------------------------|----|----|----|----|
| Symbol                           | A  | C  | E  | V  |





## Alchip™-MHB Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Size<br>code | ESR(Initial)<br>(Ω max./100k to 400kHz) |        | ESR(End of life)<br>(Ω max.) |       |        | Rated ripple current<br>(mArms/125°C,<br>100k to 400kHz) | Part No.               |
|--------------------------|-------------|--------------|-----------------------------------------|--------|------------------------------|-------|--------|----------------------------------------------------------|------------------------|
|                          |             |              | 20°C                                    | -40°C  | 100kHz                       |       | 400kHz |                                                          |                        |
|                          |             |              |                                         |        | 20°C                         | -40°C | -40°C  |                                                          |                        |
| 10                       | 330         | HA0          | 0.3                                     | 3.0    | —                            | —     | 6.0    | 240                                                      | EMHB100 □ RA331MHA0G   |
|                          | 470         | JA0          | 0.2                                     | 2.0    | —                            | —     | 4.5    | 330                                                      | EMHB100 □ RA471MJA0G   |
| 16                       | 100         | HA0          | 0.3                                     | 3.0    | —                            | —     | 6.0    | 240                                                      | EMHB160 □ RA101MHA0G   |
|                          | 220         | HA0          | 0.3                                     | 3.0    | —                            | —     | 6.0    | 240                                                      | EMHB160 □ RA221MHA0G   |
| 25                       | 100         | HA0          | 0.3                                     | 3.0    | —                            | —     | 6.0    | 240                                                      | EMHB250 □ RA101MHA0G   |
|                          | 220         | HA0          | 0.3                                     | 3.0    | —                            | —     | 6.0    | 240                                                      | EMHB250 □ RA221MHA0G   |
|                          | 330         | JA0          | 0.2                                     | 2.0    | —                            | —     | 4.5    | 330                                                      | EMHB250 □ RA331MJA0G   |
|                          | 820         | KE0          | 0.060                                   | 0.30   | 0.30                         | 3.7   | —      | 1,320                                                    | EMHB250 □ RA821MKE0S   |
|                          | 1,100       | KG5          | 0.056                                   | 0.28   | 0.28                         | 3.4   | —      | 1,470                                                    | EMHB250 □ RA112MKG5S   |
|                          | (1,500)     | (KN0)        | (0.044)                                 | (0.22) | (0.18)                       | (2.2) | —      | (1,620)                                                  | (EMHB250 □ TR152MKN0S) |
|                          | 1,600       | LH0          | 0.047                                   | 0.24   | 0.24                         | 2.9   | —      | 1,820                                                    | EMHB250 □ RA162MLH0S   |
|                          | 2,200       | MH0          | 0.045                                   | 0.23   | 0.23                         | 2.8   | —      | 2,000                                                    | EMHB250 □ RA222MMH0S   |
|                          | 2,700       | LN0          | 0.034                                   | 0.17   | 0.10                         | 1.3   | —      | 2,280                                                    | EMHB250 □ RA272MLN0S   |
| 35                       | 3,300       | MN0          | 0.032                                   | 0.16   | 0.090                        | 0.60  | —      | 2,490                                                    | EMHB250 □ RA332MMN0S   |
|                          | 47          | HA0          | 0.3                                     | 3.0    | —                            | —     | 6.0    | 240                                                      | EMHB350 □ RA470MHA0G   |
|                          | 100         | HA0          | 0.3                                     | 3.0    | —                            | —     | 6.0    | 240                                                      | EMHB350 □ RA101MHA0G   |
|                          | 100         | JA0          | 0.2                                     | 2.0    | —                            | —     | 4.5    | 330                                                      | EMHB350 □ RA101MJA0G   |
|                          | 220         | JA0          | 0.2                                     | 2.0    | —                            | —     | 4.5    | 330                                                      | EMHB350 □ RA221MJA0G   |
|                          | 560         | KE0          | 0.060                                   | 0.30   | 0.30                         | 3.7   | —      | 1,320                                                    | EMHB350 □ RA561MKE0S   |
|                          | 680         | KG5          | 0.056                                   | 0.28   | 0.28                         | 3.4   | —      | 1,470                                                    | EMHB350 □ RA681MKG5S   |
|                          | (910)       | (KN0)        | (0.044)                                 | (0.22) | (0.18)                       | (2.2) | —      | (1,620)                                                  | (EMHB350 □ TR911MKN0S) |
|                          | 1,000       | LH0          | 0.047                                   | 0.24   | 0.24                         | 2.9   | —      | 1,820                                                    | EMHB350 □ RA102MLH0S   |
| 50                       | 1,300       | MH0          | 0.045                                   | 0.23   | 0.23                         | 2.8   | —      | 2,000                                                    | EMHB350 □ RA132MMH0S   |
|                          | 1,600       | LN0          | 0.034                                   | 0.17   | 0.10                         | 1.3   | —      | 2,280                                                    | EMHB350 □ RA162MLN0S   |
|                          | 2,200       | MN0          | 0.032                                   | 0.16   | 0.090                        | 0.60  | —      | 2,490                                                    | EMHB350 □ RA222MMN0S   |
|                          | 270         | KE0          | 0.11                                    | 0.55   | 0.55                         | 6.6   | —      | 980                                                      | EMHB500 □ RA271MKE0S   |
|                          | 360         | KG5          | 0.10                                    | 0.50   | 0.50                         | 6.0   | —      | 1,090                                                    | EMHB500 □ RA361MKG5S   |
|                          | (470)       | (KN0)        | (0.076)                                 | (0.38) | (0.38)                       | (4.6) | —      | (1,200)                                                  | (EMHB500 □ TR471MKN0S) |
| 63                       | 510         | LH0          | 0.087                                   | 0.44   | 0.44                         | 5.2   | —      | 1,320                                                    | EMHB500 □ RA511MLH0S   |
|                          | 680         | MH0          | 0.087                                   | 0.44   | 0.44                         | 5.2   | —      | 1,420                                                    | EMHB500 □ RA681MMH0S   |
|                          | 820         | LN0          | 0.050                                   | 0.25   | 0.25                         | 3.0   | —      | 2,040                                                    | EMHB500 □ RA821MLN0S   |
|                          | 1,100       | MN0          | 0.050                                   | 0.25   | 0.25                         | 3.0   | —      | 2,240                                                    | EMHB500 □ RA112MMN0S   |
|                          | 200         | KE0          | 0.22                                    | 1.54   | 0.88                         | 14    | —      | 540                                                      | EMHB630 □ RA201MKE0S   |
|                          | 270         | KG5          | 0.17                                    | 1.19   | 0.68                         | 11    | —      | 650                                                      | EMHB630 □ RA271MKG5S   |
| 80                       | (330)       | (KN0)        | (0.13)                                  | (0.94) | (0.53)                       | (8.5) | —      | (830)                                                    | (EMHB630 □ TR331MKN0S) |
|                          | 360         | LH0          | 0.15                                    | 1.05   | 0.60                         | 9.6   | —      | 780                                                      | EMHB630 □ RA361MLH0S   |
|                          | 470         | MH0          | 0.12                                    | 0.84   | 0.48                         | 7.7   | —      | 940                                                      | EMHB630 □ RA471MMH0S   |
|                          | 560         | LN0          | 0.085                                   | 0.58   | 0.19                         | 3.0   | —      | 1,790                                                    | EMHB630 □ RA561MLN0S   |
|                          | 750         | MN0          | 0.070                                   | 0.49   | 0.19                         | 3.0   | —      | 1,910                                                    | EMHB630 □ RA751MMN0S   |
|                          | 130         | KE0          | 0.22                                    | 1.54   | 0.88                         | 14    | —      | 540                                                      | EMHB800 □ RA131MKE0S   |
| 100                      | 160         | KG5          | 0.17                                    | 1.19   | 0.68                         | 11    | —      | 650                                                      | EMHB800 □ RA161MKG5S   |
|                          | (220)       | (KN0)        | (0.13)                                  | (0.94) | (0.53)                       | (8.5) | —      | (830)                                                    | (EMHB800 □ TR221MKN0S) |
|                          | 240         | LH0          | 0.15                                    | 1.05   | 0.60                         | 9.6   | —      | 780                                                      | EMHB800 □ RA241MLH0S   |
|                          | 330         | MH0          | 0.12                                    | 0.84   | 0.48                         | 7.7   | —      | 940                                                      | EMHB800 □ RA331MMH0S   |
|                          | 390         | LN0          | 0.085                                   | 0.58   | 0.19                         | 3.0   | —      | 1,790                                                    | EMHB800 □ RA391MLN0S   |
|                          | 510         | MN0          | 0.070                                   | 0.49   | 0.19                         | 3.0   | —      | 1,910                                                    | EMHB800 □ RA511MMN0S   |
| 100                      | 75          | KE0          | 0.28                                    | 2.24   | 1.1                          | 22    | —      | 480                                                      | EMHB101 □ RA750MKE0S   |
|                          | 100         | KG5          | 0.21                                    | 1.68   | 0.84                         | 17    | —      | 580                                                      | EMHB101 □ RA101MKG5S   |
|                          | (130)       | (KN0)        | (0.17)                                  | (1.32) | (0.66)                       | (13)  | —      | (740)                                                    | (EMHB101 □ TR131MKN0S) |
|                          | 130         | LH0          | 0.18                                    | 1.44   | 0.72                         | 14    | —      | 720                                                      | EMHB101 □ RA131MLH0S   |
|                          | 180         | MH0          | 0.15                                    | 1.20   | 0.60                         | 12    | —      | 840                                                      | EMHB101 □ RA181MMH0S   |
|                          | 220         | LN0          | 0.11                                    | 0.88   | 0.25                         | 3.9   | —      | 1,580                                                    | EMHB101 □ RA221MLN0S   |
| 100                      | 300         | MN0          | 0.091                                   | 0.73   | 0.22                         | 3.9   | —      | 1,690                                                    | EMHB101 □ RA301MMN0S   |

□ : Enter the appropriate terminal code.

() : Second standard

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ● Frequency Multipliers

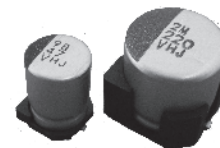
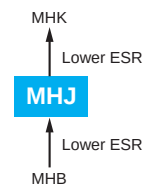
| Size code  | Capacitance(μF) | Frequency(Hz) | 120  | 1k   | 10k  | 100k |
|------------|-----------------|---------------|------|------|------|------|
| HA0 to JA0 | 47 to 470       |               | 0.93 | 0.97 | 1.00 | 1.00 |
|            | 75 to 200       |               | 0.40 | 0.75 | 0.90 | 1.00 |
| KE0 to MN0 | 220 to 560      |               | 0.50 | 0.85 | 0.94 | 1.00 |
|            | 680 to 1,600    |               | 0.60 | 0.87 | 0.95 | 1.00 |
|            | 2,200 to 3,300  |               | 0.75 | 0.90 | 0.95 | 1.00 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

Product specifications in this catalog are subject to change without notice. Request our product specifications before purchase and/or use. Please use our products based on the information contained in this catalog and product specifications.

## Alchip™-MHJ Series

- Endurance : 2,000 to 3,000 hours at 125°C
- Rated voltage range : 10 to 35V
- Nominal capacitance range : 47 to 470μF
- Solvent resistant type (see PRECAUTIONS AND GUIDELINES)
- Vibration resistant structure
- RoHS2 Compliant
- AEC-Q200 compliant : Please contact Chemi-Con for more details, test data, information.



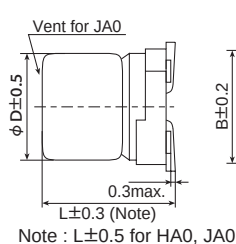
## ◆SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                         |                                      |      |      |
|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------|------|
| Category                                               | -40 to +125°C                                                                                                                                                                                                                                                                           |                                      |      |      |
| Temperature Range                                      | -40 to +125°C                                                                                                                                                                                                                                                                           |                                      |      |      |
| Rated Voltage Range                                    | 10 to 35V <sub>dc</sub>                                                                                                                                                                                                                                                                 |                                      |      |      |
| Capacitance Tolerance                                  | ±20%(M)                                                                                                                                                                                                                                                                                 |                                      |      |      |
| Leakage Current                                        | I=0.01CV<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)                                                                                                                                                                                   |                                      |      |      |
| Dissipation Factor (tan δ)                             | Rated voltage(V <sub>dc</sub> )                                                                                                                                                                                                                                                         | 10V                                  | 16V  | 25V  |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                            | 0.30                                 | 0.23 | 0.18 |
| Low Temperature Characteristics (Max. impedance Ratio) | Rated voltage(V <sub>dc</sub> )                                                                                                                                                                                                                                                         | 10V                                  | 16V  | 25V  |
|                                                        | Z(-25°C)/Z(+20°C)                                                                                                                                                                                                                                                                       | 3                                    | 2    | 2    |
|                                                        | Z(-40°C)/Z(+20°C)                                                                                                                                                                                                                                                                       | 4                                    | 3    | 3    |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 3,000 hours (2,000 hours for F80 size) at 125°C.                                                                                                        |                                      |      |      |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                      | ≤ ±30% of the initial value          |      |      |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                            | ≤300% of the initial specified value |      |      |
|                                                        | Leakage current                                                                                                                                                                                                                                                                         | ≤The initial specified value         |      |      |
|                                                        | ESR after 2,000 hours (Ω max./100kHz)                                                                                                                                                                                                                                                   |                                      | F80  | HA0  |
|                                                        |                                                                                                                                                                                                                                                                                         | 20°C                                 | 3.5  | 0.60 |
|                                                        |                                                                                                                                                                                                                                                                                         | -40°C                                | 40   | 4.5  |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 125°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                      |      |      |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                      | ≤ ±30% of the initial value          |      |      |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                            | ≤300% of the initial specified value |      |      |
|                                                        | Leakage current                                                                                                                                                                                                                                                                         | ≤The initial specified value         |      |      |

## ◆DIMENSIONS [mm]

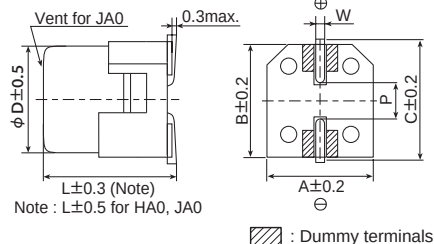
- Terminal Code : A

- Size code : F80 to JA0



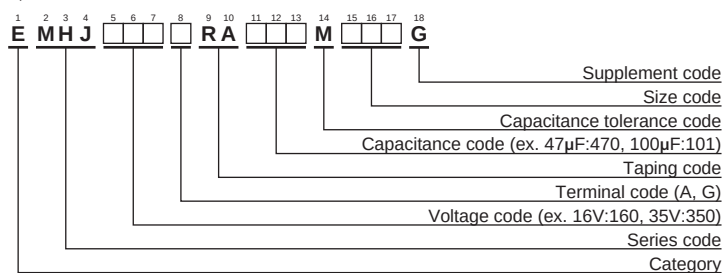
- Terminal Code : G(Vibration resistant structure)

- Size code : F80 to JA0



| Size code | φD  | L    | A    | B    | C    | W          | P   |
|-----------|-----|------|------|------|------|------------|-----|
| F80       | 6.3 | 7.7  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| HA0       | 8   | 10.0 | 8.3  | 8.3  | 9.0  | 0.7 to 1.1 | 3.1 |
| JA0       | 10  | 10.0 | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |

## ◆PART NUMBERING SYSTEM



Please refer to "Product code guide (surface mount type)"

## ◆MARKING

EX) 16V100μF



- Rated voltage symbol

| Rated voltage (V <sub>dc</sub> ) | Symbol |
|----------------------------------|--------|
| 10                               | A      |
| 16                               | C      |
| 25                               | E      |
| 35                               | V      |



## Alchip™-MHJ Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Size code | ESR (Ω max./100kHz) |       | Rated ripple current<br>(mA <sub>rms</sub> /125°C, 100kHz) | Part No.           |
|--------------------------|-------------|-----------|---------------------|-------|------------------------------------------------------------|--------------------|
|                          |             |           | 20°C                | −40°C |                                                            |                    |
| 10                       | 220         | HA0       | 0.15                | 3.0   | 350                                                        | EMHJ100□RA221MHA0G |
|                          | 330         | HA0       | 0.15                | 3.0   | 350                                                        | EMHJ100□RA331MHA0G |
|                          | 330         | JA0       | 0.12                | 2.0   | 550                                                        | EMHJ100□RA331MJA0G |
|                          | 470         | JA0       | 0.12                | 2.0   | 550                                                        | EMHJ100□RA471MJA0G |
| 16                       | 100         | F80       | 0.45                | 5.0   | 220                                                        | EMHJ160□RA101MF80G |
|                          | 100         | HA0       | 0.15                | 3.0   | 350                                                        | EMHJ160□RA101MHA0G |
|                          | 220         | HA0       | 0.15                | 3.0   | 350                                                        | EMHJ160□RA221MHA0G |
|                          | 330         | JA0       | 0.12                | 2.0   | 550                                                        | EMHJ160□RA331MJA0G |
|                          | 470         | JA0       | 0.12                | 2.0   | 550                                                        | EMHJ160□RA471MJA0G |
| 25                       | 100         | HA0       | 0.15                | 3.0   | 350                                                        | EMHJ250□RA101MHA0G |
|                          | 220         | JA0       | 0.12                | 2.0   | 550                                                        | EMHJ250□RA221MJA0G |
|                          | 330         | JA0       | 0.12                | 2.0   | 550                                                        | EMHJ250□RA331MJA0G |
| 35                       | 47          | F80       | 0.45                | 5.0   | 220                                                        | EMHJ350□RA470MF80G |
|                          | 47          | HA0       | 0.15                | 3.0   | 350                                                        | EMHJ350□RA470MHA0G |
|                          | 100         | HA0       | 0.15                | 3.0   | 350                                                        | EMHJ350□RA101MHA0G |
|                          | 220         | JA0       | 0.12                | 2.0   | 550                                                        | EMHJ350□RA221MJA0G |

□ : Enter the appropriate terminal code.

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

| Capacitance(μF) \ Frequency(Hz) | 120  | 1k   | 10k  | 100k |
|---------------------------------|------|------|------|------|
| 47 to 100                       | 0.40 | 0.75 | 0.90 | 1.00 |
| 220 to 470                      | 0.50 | 0.85 | 0.94 | 1.00 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

# Alchip™-MHK Series

- Endurance : 2,000 hours at 125°C
- Specified ESR after endurance
- For automobile modules and other high temperature applications
- Solvent resistant type (see PRECAUTIONS AND GUIDELINES)
- RoHS2 Compliant
- AEC-Q200 compliant : Please contact Chemi-Con for more details, test data, information.

MHK

↑ Lower ESR  
MHJ

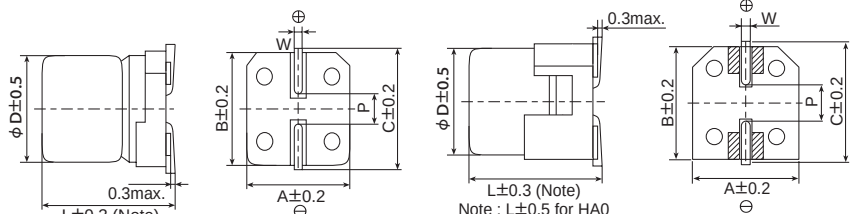


## SPECIFICATIONS

| Items                                                        | Characteristics                                                                                                                                                                                                                                                                       |                                       |                 |
|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-----------------|
| Category                                                     | -40 to +125℃                                                                                                                                                                                                                                                                          |                                       |                 |
| Temperature Range                                            |                                                                                                                                                                                                                                                                                       |                                       |                 |
| Rated Voltage Range                                          | 35V <sub>dc</sub>                                                                                                                                                                                                                                                                     |                                       |                 |
| Capacitance Tolerance                                        | ± 20%(M)                                                                                                                                                                                                                                                                              |                                       | (at 20℃, 120Hz) |
| Leakage Current                                              | I=0.01CV<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)<br>(at 20℃ after 2 minute)                                                                                                                                                      |                                       |                 |
| Dissipation Factor<br>(tan δ )                               | Rated voltage(V <sub>dc</sub> )                                                                                                                                                                                                                                                       | 35V                                   | (at 20℃, 120Hz) |
|                                                              | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.14                                  |                 |
| Low Temperature<br>Characteristics<br>(Max. impedance Ratio) | Rated voltage(V <sub>dc</sub> )                                                                                                                                                                                                                                                       | 35V                                   | (at 120Hz)      |
|                                                              | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 2                                     |                 |
|                                                              | Z(-40℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 3                                     |                 |
| Endurance                                                    | The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 2,000 hours at 125℃.                                                                                                                                   |                                       |                 |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ± 30% of the initial value          |                 |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤ 300% of the initial specified value |                 |
|                                                              | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value         |                 |
|                                                              | ESR(Ω max./-40℃, 400kHz)                                                                                                                                                                                                                                                              | F80                                   | 6.0             |
|                                                              |                                                                                                                                                                                                                                                                                       | HA0                                   | 4.5             |
| Shelf life                                                   | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 125℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                       |                 |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ± 30% of the initial value          |                 |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤ 300% of the initial specified value |                 |
|                                                              | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value         |                 |

## DIMENSIONS [mm]

- Terminal Code : A
- Size code : F80, HA0
- Terminal Code : G(Vibration resistant structure)
- Size code : F80, HA0



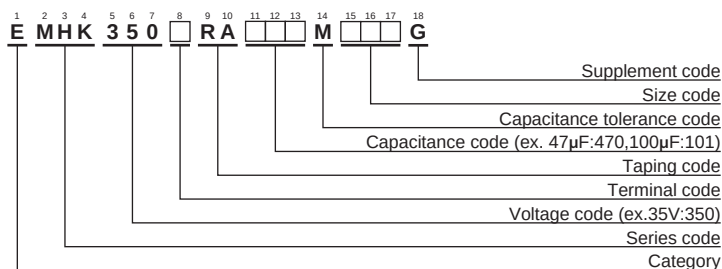
Note : L±0.5 for HA0

Note : L±0.5 for HA0

⊘ : Dummy terminals

| Size code | D   | L    | A   | B   | C   | W          | P   |
|-----------|-----|------|-----|-----|-----|------------|-----|
| F80       | 6.3 | 7.7  | 6.6 | 6.6 | 7.2 | 0.5 to 0.8 | 1.9 |
| HA0       | 8   | 10.0 | 8.3 | 8.3 | 9.0 | 0.7 to 1.1 | 3.1 |

## PART NUMBERING SYSTEM



Please refer to "Product code guide (surface mount type)"

## MARKING

EX) 35V47μF



● Rated voltage symbol

| Rated voltage (V <sub>dc</sub> ) | Symbol |
|----------------------------------|--------|
| 35                               | V      |



## Alchip™-MHK Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Size code | ESR<br>(Ω max./100k to 400kHz) |       | Rated ripple current<br>(mA <sub>rms</sub> /125°C, 100k to 400kHz) | Part No.           |
|--------------------------|-------------|-----------|--------------------------------|-------|--------------------------------------------------------------------|--------------------|
|                          |             |           | 20°C                           | -40°C |                                                                    |                    |
| 35                       | 47          | F80       | 0.30                           | 3.0   | 240                                                                | EMHK350□RA470MF80G |
|                          | 100         | F80       | 0.30                           | 3.0   | 240                                                                | EMHK350□RA101MF80G |
|                          | 220         | HA0       | 0.20                           | 2.0   | 330                                                                | EMHK350□RA221MHA0G |

## ◆RATED RIPPLE CURRENT MULTIPLIERS

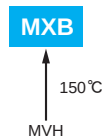
## ●Frequency Multipliers

| Capacitance(μF) \ Frequency(Hz) | 120  | 1k   | 10k  | 100k |
|---------------------------------|------|------|------|------|
| 47 to 100                       | 0.40 | 0.75 | 0.90 | 1.00 |
| 220                             | 0.50 | 0.85 | 0.94 | 1.00 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

## Alchip™-MXB Series

- Endurance : 1,000 hours at 150°C
- Rated voltage range : 25 & 35V, Nominal capacitance range : 330 to 2,400μF
- For automobile modules and other high temperature applications.
- Solvent resistant type (see PRECAUTIONS AND GUIDELINES).
- Vibration resistant structure.
- RoHS2 Compliant
- AEC-Q200 compliant : Please contact Chemi-Con for more details, test data, information.



## ◆ SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                         |                                       |      |  |
|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|------|--|
| Category                                               | -40 to +150°C                                                                                                                                                                                                                                                                           |                                       |      |  |
| Temperature Range                                      |                                                                                                                                                                                                                                                                                         |                                       |      |  |
| Rated Voltage Range                                    | 25, 35V <sub>dc</sub>                                                                                                                                                                                                                                                                   |                                       |      |  |
| Capacitance Tolerance                                  | ± 20%(M) (at 20°C, 120Hz)                                                                                                                                                                                                                                                               |                                       |      |  |
| Leakage Current                                        | I=0.03CV<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C after 2 minutes)                                                                                                                                                         |                                       |      |  |
| Dissipation Factor (tan δ )                            | Rated voltage(V <sub>dc</sub> )                                                                                                                                                                                                                                                         | 25V                                   | 35V  |  |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                            | 0.16                                  | 0.14 |  |
|                                                        | When nominal capacitance exceeds 1,000 μ F, add 0.02 to the value above for each 1,000 μ F increase. (at 20°C, 120Hz)                                                                                                                                                                   |                                       |      |  |
| Low Temperature Characteristics (Max. impedance Ratio) | Rated voltage(V <sub>dc</sub> )                                                                                                                                                                                                                                                         | 25V                                   | 35V  |  |
|                                                        | Z(-25°C)/Z(+20°C)                                                                                                                                                                                                                                                                       | 2                                     | 2    |  |
|                                                        | Z(-40°C)/Z(+20°C)                                                                                                                                                                                                                                                                       | 4                                     | 3    |  |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 1,000 hours at 150°C.                                                                                                                                   |                                       |      |  |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                      | ≤ ± 30% of the initial value          |      |  |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                           | ≤ 300% of the initial specified value |      |  |
|                                                        | Leakage current                                                                                                                                                                                                                                                                         | ≤ The initial specified value         |      |  |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 150°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                       |      |  |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                      | ≤ ± 30% of the initial value          |      |  |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                           | ≤ 300% of the initial specified value |      |  |
|                                                        | Leakage current                                                                                                                                                                                                                                                                         | ≤ The initial specified value         |      |  |

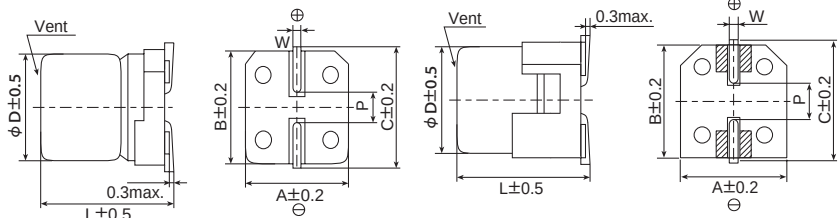
## ◆ DIMENSIONS [mm]

- Terminal Code : A

- Size code : KE0 to MN0

- Terminal Code : G(Vibration resistant structure)

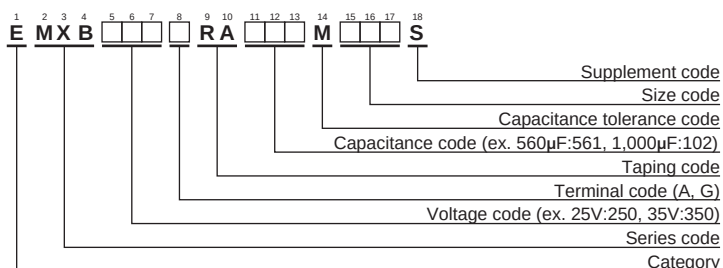
- Size code : KE0 to MN0



▨ : Dummy terminals

| Size code | φD   | L    | A    | B    | C    | W          | P   |
|-----------|------|------|------|------|------|------------|-----|
| KE0       | 12.5 | 13.5 | 13.0 | 13.0 | 13.7 | 1.0 to 1.3 | 4.2 |
| KG5       | 12.5 | 16.0 | 13.0 | 13.0 | 13.7 | 1.0 to 1.3 | 4.2 |
| LH0       | 16   | 16.5 | 17.0 | 17.0 | 18.0 | 1.0 to 1.3 | 6.5 |
| LN0       | 16   | 21.5 | 17.0 | 17.0 | 18.0 | 1.0 to 1.3 | 6.5 |
| MH0       | 18   | 16.5 | 19.0 | 19.0 | 20.0 | 1.0 to 1.3 | 6.5 |
| MN0       | 18   | 21.5 | 19.0 | 19.0 | 20.0 | 1.0 to 1.3 | 6.5 |

## ◆ PART NUMBERING SYSTEM



Please refer to "Product code guide (surface mount type)"

## ◆ MARKING





## Alchip™-MXB Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Size code | ESR (Ω max./100kHz) |       | Rated ripple current<br>(mA <sub>rms</sub> /150°C, 100kHz) | Part No.           |
|--------------------------|-------------|-----------|---------------------|-------|------------------------------------------------------------|--------------------|
|                          |             |           | 20°C                | −40°C |                                                            |                    |
| 25                       | 560         | KE0       | 0.14                | 2.1   | 860                                                        | EMXB250□RA561MKE0S |
|                          | 750         | KG5       | 0.11                | 1.5   | 1,000                                                      | EMXB250□RA751MKG5S |
|                          | 1,000       | LH0       | 0.10                | 1.5   | 1,120                                                      | EMXB250□RA102MLH0S |
|                          | 1,500       | MH0       | 0.10                | 1.5   | 1,210                                                      | EMXB250□RA152MMH0S |
|                          | 1,800       | LN0       | 0.058               | 0.87  | 1,460                                                      | EMXB250□RA182MLN0S |
|                          | 2,400       | MN0       | 0.058               | 0.87  | 1,560                                                      | EMXB250□RA242MMN0S |
| 35                       | 330         | KE0       | 0.27                | 8.1   | 670                                                        | EMXB350□RA331MKE0S |
|                          | 390         | KG5       | 0.21                | 6.3   | 800                                                        | EMXB350□RA391MKG5S |
|                          | 560         | LH0       | 0.16                | 4.8   | 920                                                        | EMXB350□RA561MLH0S |
|                          | 750         | MH0       | 0.13                | 3.9   | 1,000                                                      | EMXB350□RA751MMH0S |
|                          | 910         | LN0       | 0.10                | 3.0   | 1,260                                                      | EMXB350□RA911MLN0S |
|                          | 1,200       | MN0       | 0.084               | 1.7   | 1,320                                                      | EMXB350□RA122MMN0S |

□ : Enter the appropriate terminal code.

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ● Frequency Multipliers

| Capacitance(μF) \ Frequency(Hz) | 120  | 1k   | 10k  | 100k |
|---------------------------------|------|------|------|------|
| 330 to 560                      | 0.50 | 0.85 | 0.94 | 1.00 |
| 750 to 1,800                    | 0.60 | 0.87 | 0.95 | 1.00 |
| 2,400                           | 0.75 | 0.90 | 0.95 | 1.00 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

Please contact us for lifetime estimation.



## Product code guide (Radial lead type)

(Example : KMQ series, 100V-100 $\mu$ F,  $\phi$ 10 $\times$ 16L, Long lead with bulk)

Please refer to the following table

| Contents |  | Code | Series |  | Code | Type        |  | Code | Tol.(%)    |  | Code | Sleeve materia               |  | Terminal plating material | Code |
|----------|--|------|--------|--|------|-------------|--|------|------------|--|------|------------------------------|--|---------------------------|------|
| Polar    |  | E    | KMQ    |  | KMQ  | Radial lead |  | E    | $\pm 20$   |  | M    | PET                          |  | Sn-Bi                     | D    |
|          |  |      | KY     |  | KY-  |             |  |      | -10 to +20 |  | V    |                              |  | Sn                        | S    |
|          |  |      |        |  |      |             |  |      |            |  |      | Sleeveless<br>(Coating case) |  | Sn-Bi                     | G    |
|          |  |      |        |  |      |             |  |      |            |  |      |                              |  | Sn                        | H    |

1

E

Category

234

KMQ

Series code

567

101

Voltage code

8

E

Terminal code

910

LL

Lead forming/  
Taping code

111213

101

Capacitance code

14

M

Capacitance tolerance

151617

J16

Size code

18

S

Supplement code

| Voltage(V) | Code |
|------------|------|
| 6.3        | 6R3  |
| 10         | 100  |
| 25         | 250  |
| 100        | 101  |
| 250        | 251  |
| ⋮          | ⋮    |

| Type                | Contents                  | Code |
|---------------------|---------------------------|------|
| Lead forming (Bulk) | Long Lead                 | LL   |
|                     | Cut(3.5mm)                | C3   |
|                     | Cut(5.0mm)                | C5   |
|                     | Forming Cut               | FC   |
|                     |                           | IJ   |
|                     | Snap-in $\phi$ D=5 to 8   | FM   |
|                     | Snap-in $\phi$ D=10 to 18 | MC   |
| Taping              | Horizontal                | BC   |
|                     |                           | BD   |
|                     | Straight                  | TD   |
|                     | Gradual forming           |      |
|                     | Straight(Skip a hole)     | TE   |
|                     | Forming(F=5.0mm)          | TC   |

| Cap.( $\mu$ F) | Code |
|----------------|------|
| 1.0            | 1R0  |
| 4.7            | 4R7  |
| 10             | 100  |
| 47             | 470  |
| 100            | 101  |
| 470            | 471  |
| 1,000          | 102  |
| ⋮              | ⋮    |

| $\phi$ D(mm) | Code |
|--------------|------|
| 5            | E    |
| 6.3          | F    |
| 8            | H    |
| 10           | J    |
| 12.5         | K    |
| 14.5         | U    |
| 16           | L    |
| 18           | M    |

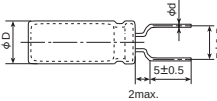
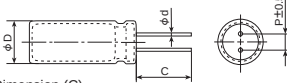
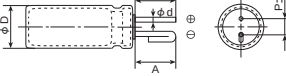
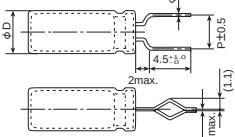
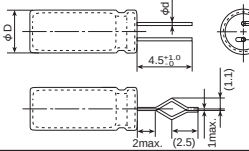
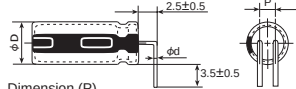
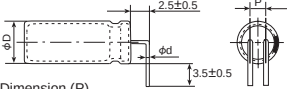
| L(mm) | Code |
|-------|------|
| 11    | 11   |
| 11.5  | B5   |
| 12.5  | C5   |
| 13    | 13   |
| 15    | 15   |
| 16    | 16   |
| 20    | 20   |
| 25    | 25   |
| 30    | 30   |
| 31.5  | N3   |
| 35    | 35   |
| 35.5  | P1   |
| 40    | 40   |
| 45    | 45   |
| 50    | 50   |

Refer to product guide for lead forming and taping specifications.

Refer to product guide for lead forming and taping specifications.

\*Refer to the appendix (Part number) for codes not listed here.

## CUT/FORMED LEAD

| Terminal type                                                                                                                                                                                                                                                                                                                                                                                                       | Terminal type                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Terminal type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |       |          |   |            |               |     |               |            |               |     |               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-------|----------|---|------------|---------------|-----|---------------|------------|---------------|-----|---------------|
| <p>●Lead code : FC (Forming Cut type)<br/>Size : <math>\phi</math>D=5 to 8</p>                                                                                                                                                                                                                                                   | <p>●Lead code : C3 (Cutting type)<br/>Size : <math>\phi</math>D=5 to 18</p>  <p>Dimension (C)</p> <ul style="list-style-type: none"><li><math>\phi</math>D= 5 to 8: C3: <math>3.5 \pm 0.5</math> (Second standard C5: <math>5.0 \pm 0.5</math>)</li><li><math>\phi</math>D=10 to 18: C3: <math>3.5 \pm 0.5</math> (Second standard C5: <math>5.0 \pm 1.0</math>)</li></ul> | <p>●Lead code : IJ (Forming Cut type)<br/>Size : <math>\phi</math>D=10 to 18</p>  <p>Dimension</p> <table><thead><tr><th><math>\phi</math>D</th><th>A · B</th><th><math>\phi</math>d</th><th>P</th></tr></thead><tbody><tr><td>10 to 12.5</td><td><math>3.2 \pm 0.5</math></td><td>0.6</td><td><math>5.0 \pm 0.5</math></td></tr><tr><td>14.5 to 18</td><td><math>3.2 \pm 0.5</math></td><td>0.8</td><td><math>7.5 \pm 0.5</math></td></tr></tbody></table> | $\phi$ D      | A · B | $\phi$ d | P | 10 to 12.5 | $3.2 \pm 0.5$ | 0.6 | $5.0 \pm 0.5$ | 14.5 to 18 | $3.2 \pm 0.5$ | 0.8 | $7.5 \pm 0.5$ |
| $\phi$ D                                                                                                                                                                                                                                                                                                                                                                                                            | A · B                                                                                                                                                                                                                                                                                                                                                                                                                                                         | $\phi$ d                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | P             |       |          |   |            |               |     |               |            |               |     |               |
| 10 to 12.5                                                                                                                                                                                                                                                                                                                                                                                                          | $3.2 \pm 0.5$                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 0.6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | $5.0 \pm 0.5$ |       |          |   |            |               |     |               |            |               |     |               |
| 14.5 to 18                                                                                                                                                                                                                                                                                                                                                                                                          | $3.2 \pm 0.5$                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 0.8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | $7.5 \pm 0.5$ |       |          |   |            |               |     |               |            |               |     |               |
| <p>●Lead code : FM (Snap-in type)<br/>Size : <math>\phi</math>D=5 to 8</p>                                                                                                                                                                                                                                                       | <p>●Lead code : MC (Snap-in type)<br/>Size : <math>\phi</math>D=10 to 18</p>                                                                                                                                                                                                                                                                                               | <p>*1 Please consult with us about other terminal forming.<br/>*2 Please refer to dimensions of each series for gas escape end seal.<br/>*3 Conventionally, lead forming code is used in common by (BC) for two type of the lead bent directions. We added lead forming code (BD) newly and clarified the lead bent directions. Please place an order after the choice for an appropriate lead forming code depending on condition of use.</p>                                                                                                  |               |       |          |   |            |               |     |               |            |               |     |               |
| <p>●Lead code : BC (Horizontal type)*3<br/>Size : <math>\phi</math>D=10 to 18</p>  <p>Dimension (P)</p> <ul style="list-style-type: none"><li><math>\phi</math>10, <math>\phi</math>12.5 : P=5.0<math>\pm</math>0.5</li><li><math>\phi</math>14.5, <math>\phi</math>16, <math>\phi</math>18 : P=7.5<math>\pm</math>0.5</li></ul> | <p>●Lead code : BD (Horizontal type)*3<br/>Size : <math>\phi</math>D=10 to 18</p>  <p>Dimension (P)</p> <ul style="list-style-type: none"><li><math>\phi</math>10, <math>\phi</math>12.5 : P=5.0<math>\pm</math>0.5</li><li><math>\phi</math>14.5, <math>\phi</math>16, <math>\phi</math>18 : P=7.5<math>\pm</math>0.5</li></ul>                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |               |       |          |   |            |               |     |               |            |               |     |               |



# SRG Series

- Low profile :  $\phi 10 \times 12.5\text{mm}$  to  $\phi 18 \times 25\text{mm}$
- Endurance : 2,000 hours at 85°C
- Solvent resistant type (see PRECAUTIONS AND GUIDELINES)
- RoHS2 Compliant

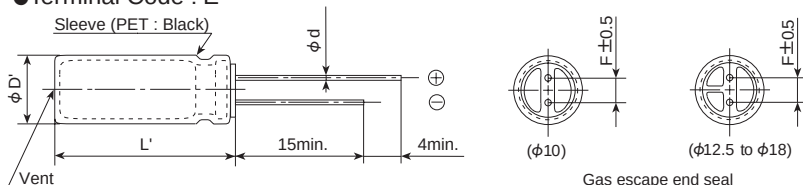


## SPECIFICATIONS

| Items                                                        | Characteristics                                                                                                                                                                                                                                                                      |                                       |      |      |      |      |      |  |
|--------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|------|------|------|------|------|--|
| Category                                                     | -40 to +85℃                                                                                                                                                                                                                                                                          |                                       |      |      |      |      |      |  |
| Temperature Range                                            |                                                                                                                                                                                                                                                                                      |                                       |      |      |      |      |      |  |
| Rated Voltage Range                                          | 6.3 to 50V <sub>dc</sub>                                                                                                                                                                                                                                                             |                                       |      |      |      |      |      |  |
| Capacitance Tolerance                                        | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                            |                                       |      |      |      |      |      |  |
| Leakage Current                                              | I=0.01CV or 3μA, whichever is greater.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 2 minutes)                                                                                                                         |                                       |      |      |      |      |      |  |
| Dissipation Factor<br>(tan δ)                                | Rated voltage (V <sub>ac</sub> )                                                                                                                                                                                                                                                     | 6.3V                                  | 10V  | 16V  | 25V  | 35V  | 50V  |  |
|                                                              | tan δ (Max.)                                                                                                                                                                                                                                                                         | 0.28                                  | 0.24 | 0.20 | 0.16 | 0.14 | 0.12 |  |
|                                                              | When nominal capacitance exceeds 1,000μF, add 0.03 to the value above for each 1,000μF increase. (at 20℃, 120Hz)                                                                                                                                                                     |                                       |      |      |      |      |      |  |
| Low Temperature<br>Characteristics<br>(Max. Impedance Ratio) | Rated voltage (V <sub>ac</sub> )                                                                                                                                                                                                                                                     | 6.3V                                  | 10V  | 16V  | 25V  | 35V  | 50V  |  |
|                                                              | Z (-25℃)/Z (+20℃)                                                                                                                                                                                                                                                                    | 5                                     | 4    | 3    | 2    | 2    | 2    |  |
|                                                              | Z (-40℃)/Z (+20℃)                                                                                                                                                                                                                                                                    | 12                                    | 10   | 8    | 5    | 4    | 3    |  |
| Endurance                                                    | The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 2,000 hours at 85℃.                                                                                                                                   |                                       |      |      |      |      |      |  |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                   | ≤ ±20% of the initial value           |      |      |      |      |      |  |
|                                                              | D.F. (tan δ)                                                                                                                                                                                                                                                                         | ≤ 200% of the initial specified value |      |      |      |      |      |  |
|                                                              | Leakage current                                                                                                                                                                                                                                                                      | ≤ The initial specified value         |      |      |      |      |      |  |
| Shelf Life                                                   | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 85℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                       |      |      |      |      |      |  |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                   | ≤ ±20% of the initial value           |      |      |      |      |      |  |
|                                                              | D.F. (tan δ)                                                                                                                                                                                                                                                                         | ≤ 200% of the initial specified value |      |      |      |      |      |  |
|                                                              | Leakage current                                                                                                                                                                                                                                                                      | ≤ The initial specified value         |      |      |      |      |      |  |

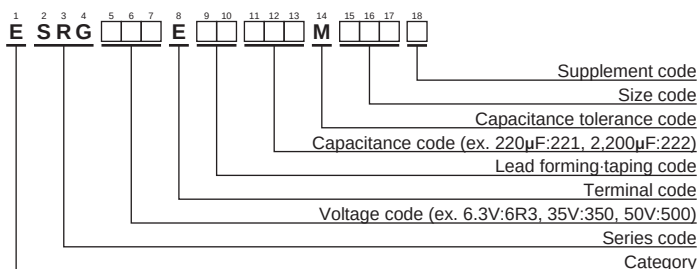
## DIMENSIONS [mm]

### Terminal Code : E



| $\phi D$  | 10 & 12.5                 | 16 & 18 |
|-----------|---------------------------|---------|
| $\phi d$  | 0.6                       | 0.8     |
| F         | 5.0                       | 7.5     |
| $\phi D'$ | $\phi D + 0.5\text{max.}$ |         |
| L'        | L + 1.5max.               |         |

## PART NUMBERING SYSTEM



Please refer to "Product code guide (radial lead type)"



## SRG Series

### ◆STANDARD RATINGS

| WV (V <sub>dc</sub> ) | Cap (μF) | Case code<br>φD×L(mm) | tan δ | Rated ripple current<br>(mA <sub>rms</sub> /85°C, 120Hz) | Part No.           | WV (V <sub>dc</sub> ) | Cap (μF) | Case code<br>φD×L(mm) | tan δ | Rated ripple current<br>(mA <sub>rms</sub> /85°C, 120Hz) | Part No.           |
|-----------------------|----------|-----------------------|-------|----------------------------------------------------------|--------------------|-----------------------|----------|-----------------------|-------|----------------------------------------------------------|--------------------|
| 6.3                   | 4,700    | 16 × 15               | 0.37  | 1,410                                                    | ESRG6R3E□□472ML15S | 25                    | 470      | 10 × 12.5             | 0.16  | 525                                                      | ESRG250E□□471MJC5S |
|                       | 6,800    | 18 × 15               | 0.43  | 1,660                                                    | ESRG6R3E□□682MM15S |                       | 1,000    | 12.5 × 15             | 0.16  | 830                                                      | ESRG250E□□102MK15S |
|                       | 10,000   | 18 × 20               | 0.55  | 2,020                                                    | ESRG6R3E□□103MM20S |                       | 2,200    | 18 × 15               | 0.19  | 1,360                                                    | ESRG250E□□222MM15S |
| 10                    | 1,000    | 10 × 12.5             | 0.24  | 625                                                      | ESRG100E□□102MJC5S |                       | 3,300    | 18 × 20               | 0.22  | 1,720                                                    | ESRG250E□□332MM20S |
|                       | 2,200    | 12.5 × 15             | 0.27  | 970                                                      | ESRG100E□□222MK15S | 35                    | 4,700    | 18 × 25               | 0.25  | 2,070                                                    | ESRG250E□□472MM25S |
|                       | 3,300    | 16 × 15               | 0.30  | 1,310                                                    | ESRG100E□□332ML15S |                       | 330      | 10 × 12.5             | 0.14  | 475                                                      | ESRG350E□□331MJC5S |
|                       | 4,700    | 18 × 15               | 0.33  | 1,560                                                    | ESRG100E□□472MM15S |                       | 470      | 12.5 × 13             | 0.14  | 585                                                      | ESRG350E□□471MK13S |
|                       | 6,800    | 18 × 20               | 0.39  | 1,870                                                    | ESRG100E□□682MM20S |                       | 1,000    | 16 × 15               | 0.14  | 1,010                                                    | ESRG350E□□102ML15S |
|                       | 10,000   | 18 × 25               | 0.51  | 2,370                                                    | ESRG100E□□103MM25S |                       | 2,200    | 18 × 20               | 0.17  | 1,560                                                    | ESRG350E□□222MM20S |
| 16                    | 1,000    | 12.5 × 13             | 0.20  | 715                                                      | ESRG160E□□102MK13S | 50                    | 220      | 10 × 12.5             | 0.12  | 415                                                      | ESRG500E□□221MJC5S |
|                       | 2,200    | 16 × 15               | 0.23  | 1,160                                                    | ESRG160E□□222ML15S |                       | 330      | 12.5 × 13             | 0.12  | 525                                                      | ESRG500E□□331MK13S |
|                       | 3,300    | 18 × 15               | 0.26  | 1,460                                                    | ESRG160E□□332MM15S |                       | 470      | 16 × 15               | 0.12  | 745                                                      | ESRG500E□□471ML15S |
|                       | 4,700    | 18 × 20               | 0.29  | 1,770                                                    | ESRG160E□□472MM20S |                       | 1,000    | 18 × 20               | 0.12  | 1,160                                                    | ESRG500E□□102MM20S |
|                       | 6,800    | 18 × 25               | 0.35  | 2,170                                                    | ESRG160E□□682MM25S |                       |          |                       |       |                                                          |                    |

□□ : Enter the appropriate lead forming or taping code.

### ◆RATED RIPPLE CURRENT MULTIPLIERS

#### ● Frequency Multipliers

| Capacitance(μF) \ Frequency(Hz) | 50   | 120  | 300  | 1k   | 10k  | 100k |
|---------------------------------|------|------|------|------|------|------|
| 220 to 1,000                    | 0.80 | 1.00 | 1.15 | 1.30 | 1.40 | 1.50 |
| 2,200 to                        | 0.85 | 1.00 | 1.03 | 1.05 | 1.08 | 1.08 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.



## KRG Series

- Low profile :  $\phi 10 \times 12.5\text{mm}$  to  $\phi 18 \times 25\text{mm}$
- Endurance : 1,000 hours at 105°C
- Solvent resistant type (see PRECAUTIONS AND GUIDELINES)
- RoHS2 Compliant

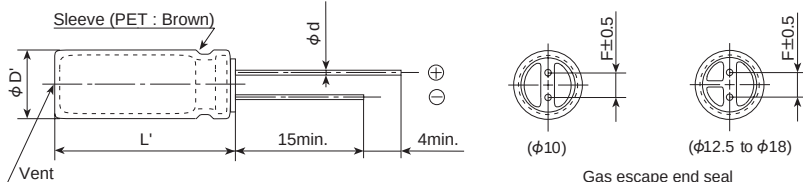


### SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                     |                                       |      |      |      |      |                                       |  |
|--------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|------|------|------|------|---------------------------------------|--|
| Category                                               |                                                                                                                                                                                                                                                                                     |                                       |      |      |      |      |                                       |  |
| Temperature Range                                      | -55 to +105℃                                                                                                                                                                                                                                                                        |                                       |      |      |      |      |                                       |  |
| Rated Voltage Range                                    | 6.3 to 50V <sub>dc</sub>                                                                                                                                                                                                                                                            |                                       |      |      |      |      |                                       |  |
| Capacitance Tolerance                                  | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                           |                                       |      |      |      |      |                                       |  |
| Leakage Current                                        | I=0.01CV or 3μA, whichever is greater.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 2 minutes)                                                                                                                        |                                       |      |      |      |      |                                       |  |
| Dissipation Factor (tan δ )                            | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                    | 6.3V                                  | 10V  | 16V  | 25V  | 35V  | 50V                                   |  |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                        | 0.28                                  | 0.24 | 0.20 | 0.16 | 0.14 | 0.12                                  |  |
|                                                        | When nominal capacitance exceeds 1,000μF, add 0.03 to the value above for each 1,000μF increase. (at 20℃, 120Hz)                                                                                                                                                                    |                                       |      |      |      |      |                                       |  |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                    | 6.3V                                  | 10V  | 16V  | 25V  | 35V  | 50V                                   |  |
|                                                        | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                     | 5                                     | 4    | 3    | 2    | 2    | 2                                     |  |
|                                                        | Z(-40℃)/Z(+20℃)                                                                                                                                                                                                                                                                     | 10                                    | 8    | 6    | 4    | 3    | 3                                     |  |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 1,000 hours at 105℃.                                                                                                                                 |                                       |      |      |      |      |                                       |  |
|                                                        | Rated voltage                                                                                                                                                                                                                                                                       | 6.3 to 16V <sub>dc</sub>              |      |      |      |      | 25 to 50V <sub>dc</sub>               |  |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                  | ≤ ± 25% of the initial value          |      |      |      |      | ≤ ± 20% of the initial value          |  |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                       | ≤ 200% of the initial specified value |      |      |      |      | ≤ 200% of the initial specified value |  |
|                                                        | Leakage current                                                                                                                                                                                                                                                                     | ≤ The initial specified value         |      |      |      |      | ≤ The initial specified value         |  |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 500 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                       |      |      |      |      |                                       |  |
|                                                        | Rated voltage                                                                                                                                                                                                                                                                       | 6.3 to 16V <sub>dc</sub>              |      |      |      |      | 25 to 50V <sub>dc</sub>               |  |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                  | ≤ ± 25% of the initial value          |      |      |      |      | ≤ ± 20% of the initial value          |  |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                       | ≤ 200% of the initial specified value |      |      |      |      | ≤ 200% of the initial specified value |  |
|                                                        | Leakage current                                                                                                                                                                                                                                                                     | ≤ The initial specified value         |      |      |      |      | ≤ The initial specified value         |  |
|                                                        |                                                                                                                                                                                                                                                                                     |                                       |      |      |      |      |                                       |  |

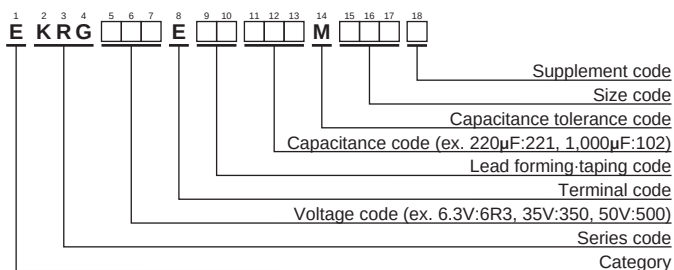
### DIMENSIONS [mm]

#### Terminal Code : E



| φD  | 10 & 12.5  | 16 & 18 |
|-----|------------|---------|
| φd  | 0.6        | 0.8     |
| F   | 5.0        | 7.5     |
| φD' | φD+0.5max. |         |
| L'  | L+1.5max.  |         |

### PART NUMBERING SYSTEM



Please refer to "Product code guide (radial lead type)"

**KRG**Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(mA <sub>rms</sub> /105°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(mA <sub>rms</sub> /105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|--------------------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|--------------------------------------------------------------|--------------------|
| 6.3                      | 4,700       | 16 × 15               | 0.37  | 1,010                                                        | EKRG6R3E□□472ML15S | 25                       | 470         | 10 × 12.5             | 0.16  | 370                                                          | EKRG250E□□471MJC5S |
|                          | 6,800       | 18 × 15               | 0.43  | 1,190                                                        | EKRG6R3E□□682MM15S |                          | 1,000       | 12.5 × 15             | 0.16  | 590                                                          | EKRG250E□□102MK15S |
|                          | 10,000      | 18 × 20               | 0.55  | 1,440                                                        | EKRG6R3E□□103MM20S |                          | 2,200       | 18 × 15               | 0.19  | 970                                                          | EKRG250E□□222MM15S |
| 10                       | 1,000       | 10 × 12.5             | 0.24  | 445                                                          | EKRG100E□□102MJC5S |                          | 3,300       | 18 × 20               | 0.22  | 1,220                                                        | EKRG250E□□332MM20S |
|                          | 2,200       | 12.5 × 15             | 0.27  | 690                                                          | EKRG100E□□222MK15S | 35                       | 4,700       | 18 × 25               | 0.25  | 1,470                                                        | EKRG250E□□472MM25S |
|                          | 3,300       | 16 × 15               | 0.30  | 940                                                          | EKRG100E□□332ML15S |                          | 330         | 10 × 12.5             | 0.14  | 340                                                          | EKRG350E□□331MJC5S |
|                          | 4,700       | 18 × 15               | 0.33  | 1,120                                                        | EKRG100E□□472MM15S |                          | 470         | 12.5 × 13             | 0.14  | 415                                                          | EKRG350E□□471MK13S |
|                          | 6,800       | 18 × 20               | 0.39  | 1,330                                                        | EKRG100E□□682MM20S |                          | 1,000       | 16 × 15               | 0.14  | 720                                                          | EKRG350E□□102ML15S |
|                          | 10,000      | 18 × 25               | 0.51  | 1,700                                                        | EKRG100E□□103MM25S |                          | 2,200       | 18 × 20               | 0.17  | 1,110                                                        | EKRG350E□□222MM20S |
| 16                       | 1,000       | 12.5 × 13             | 0.20  | 515                                                          | EKRG160E□□102MK13S | 50                       | 220         | 10 × 12.5             | 0.12  | 290                                                          | EKRG500E□□221MJC5S |
|                          | 2,200       | 16 × 15               | 0.23  | 830                                                          | EKRG160E□□222ML15S |                          | 330         | 12.5 × 13             | 0.12  | 370                                                          | EKRG500E□□331MK13S |
|                          | 3,300       | 18 × 15               | 0.26  | 1,050                                                        | EKRG160E□□332MM15S |                          | 470         | 16 × 15               | 0.12  | 535                                                          | EKRG500E□□471ML15S |
|                          | 4,700       | 18 × 20               | 0.29  | 1,260                                                        | EKRG160E□□472MM20S |                          | 1,000       | 18 × 20               | 0.12  | 830                                                          | EKRG500E□□102MM20S |
|                          | 6,800       | 18 × 25               | 0.35  | 1,560                                                        | EKRG160E□□682MM25S |                          |             |                       |       |                                                              |                    |

□□ : Enter the appropriate lead forming or taping code.

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

| Capacitance(μF) \ Frequency(Hz) | 50   | 120  | 300  | 1k   | 10k  | 100k |
|---------------------------------|------|------|------|------|------|------|
| 220 to 1,000                    | 0.80 | 1.00 | 1.15 | 1.30 | 1.40 | 1.50 |
| 2,200 to                        | 0.85 | 1.00 | 1.03 | 1.05 | 1.08 | 1.08 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

# KMQ Series

- Downsized from current standard KMG series
- Solvent resistant type except 160 to 450V<sub>dc</sub>  
(see PRECAUTIONS AND GUIDELINES)
- RoHS2 Compliant

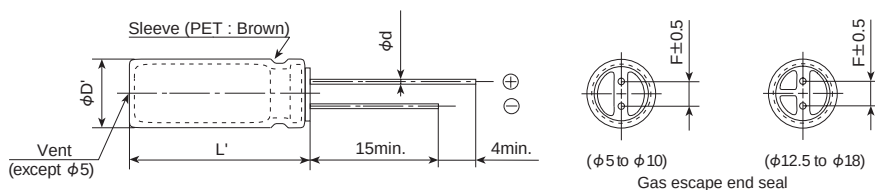


## SPECIFICATIONS

| Items                                                        | Characteristics                                                                                                                                                                                                                                                                         |                                      |      |      |      |      |                            |                                      |             |             |             |      |      |   |
|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------|------|------|------|----------------------------|--------------------------------------|-------------|-------------|-------------|------|------|---|
| Category                                                     | -55 to +105°C(6.3 to 100V <sub>dc</sub> ) -40 to +105°C(160 to 400V <sub>dc</sub> ) -25 to +105°C(450V <sub>dc</sub> )                                                                                                                                                                  |                                      |      |      |      |      |                            |                                      |             |             |             |      |      |   |
| Temperature Range                                            |                                                                                                                                                                                                                                                                                         |                                      |      |      |      |      |                            |                                      |             |             |             |      |      |   |
| Rated Voltage Range                                          | 6.3 to 450V <sub>dc</sub>                                                                                                                                                                                                                                                               |                                      |      |      |      |      |                            |                                      |             |             |             |      |      |   |
| Capacitance Tolerance                                        | ± 20% (M)                                                                                                                                                                                                                                                                               |                                      |      |      |      |      |                            |                                      |             |             |             |      |      |   |
| Leakage Current                                              | 6.3 to 100V <sub>dc</sub>                                                                                                                                                                                                                                                               |                                      |      |      |      |      | 160 to 450V <sub>dc</sub>  |                                      |             |             |             |      |      |   |
|                                                              | I=0.03CV or 4μA, whichever is greater.                                                                                                                                                                                                                                                  |                                      |      |      |      |      | CV≤1,000 I=0.1CV+40 max.   |                                      |             |             |             |      |      |   |
|                                                              |                                                                                                                                                                                                                                                                                         |                                      |      |      |      |      | CV>1,000 I=0.04CV+100 max. |                                      |             |             |             |      |      |   |
|                                                              | Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C after 1 minute)                                                                                                                                                                      |                                      |      |      |      |      |                            |                                      |             |             |             |      |      |   |
| Dissipation Factor<br>(tan δ)                                | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                        | 6.3V                                 | 10V  | 16V  | 25V  | 35V  | 50V                        | 63V                                  | 100V        | 160 to 250V | 350 to 400V | 450V |      |   |
|                                                              | tan δ (Max.)                                                                                                                                                                                                                                                                            | 0.28                                 | 0.24 | 0.20 | 0.16 | 0.14 | 0.12                       | 0.10                                 | 0.08        | 0.20        | 0.24        | 0.24 |      |   |
|                                                              | When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase. (at 20°C, 120Hz)                                                                                                                                                                       |                                      |      |      |      |      |                            |                                      |             |             |             |      |      |   |
| Low Temperature<br>Characteristics<br>(Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                        | 6.3V                                 | 10V  | 16V  | 25V  | 35V  | 50V                        | 63 to 100V                           | 160 to 200V | 250V        | 350V        | 400V | 450V |   |
|                                                              | Z(-25°C)/Z(+20°C)                                                                                                                                                                                                                                                                       | ≤ φ8                                 | 5    | 4    | 3    | 2    | 2                          | 2                                    | 2           | 3           | 3           | 4    | 4    | 6 |
|                                                              |                                                                                                                                                                                                                                                                                         | ≥ φ10                                | 5    | 4    | 3    | 2    | 2                          | 2                                    | 2           | 3           | 3           | 4    | 4    | 6 |
|                                                              | Z(-40°C)/Z(+20°C)                                                                                                                                                                                                                                                                       | ≤ φ8                                 | 10   | 8    | 6    | 4    | 3                          | 3                                    | 3           | 8           | 10          | 8    | 8    | — |
|                                                              |                                                                                                                                                                                                                                                                                         | ≥ φ10                                | 10   | 8    | 6    | 4    | 3                          | 3                                    | 3           | 4           | 4           | 6    | 6    | — |
| (at 120Hz)                                                   |                                                                                                                                                                                                                                                                                         |                                      |      |      |      |      |                            |                                      |             |             |             |      |      |   |
| Endurance                                                    | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 1,000 hours (2,000 hours for φ 10 and more) at 105°C.         |                                      |      |      |      |      |                            |                                      |             |             |             |      |      |   |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                      | ≤ ±20% of the initial value          |      |      |      |      |                            |                                      |             |             |             |      |      |   |
|                                                              | D.F. (tan δ)                                                                                                                                                                                                                                                                            | ≤200% of the initial specified value |      |      |      |      |                            |                                      |             |             |             |      |      |   |
|                                                              | Leakage current                                                                                                                                                                                                                                                                         | ≤The initial specified value         |      |      |      |      |                            |                                      |             |             |             |      |      |   |
| Shelf Life                                                   | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                      |      |      |      |      |                            |                                      |             |             |             |      |      |   |
|                                                              | Rated voltage                                                                                                                                                                                                                                                                           | 6.3 to 100V <sub>dc</sub>            |      |      |      |      |                            | 160 to 450V <sub>dc</sub>            |             |             |             |      |      |   |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                      | ≤ ±20% of the initial value          |      |      |      |      |                            | ≤ ±20% of the initial value          |             |             |             |      |      |   |
|                                                              | D.F. (tan δ)                                                                                                                                                                                                                                                                            | ≤200% of the initial specified value |      |      |      |      |                            | ≤200% of the initial specified value |             |             |             |      |      |   |
|                                                              | Leakage current                                                                                                                                                                                                                                                                         | ≤The initial specified value         |      |      |      |      |                            | ≤500% of the initial specified value |             |             |             |      |      |   |
|                                                              |                                                                                                                                                                                                                                                                                         |                                      |      |      |      |      |                            |                                      |             |             |             |      |      |   |

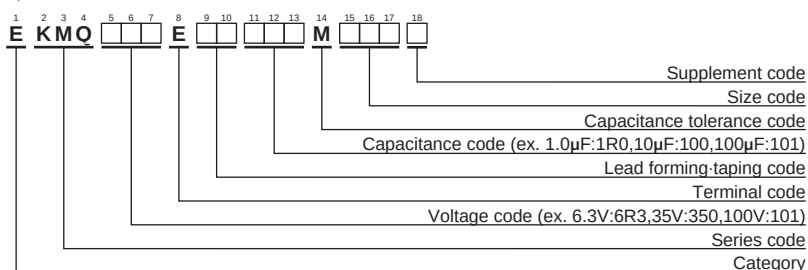
## DIMENSIONS [mm]

- Terminal Code : E



| φD  | 5          | 6.3 | 8   | 10  | 12.5 | 16  | 18  |
|-----|------------|-----|-----|-----|------|-----|-----|
| φd  | 0.5        | 0.5 | 0.6 | 0.6 | 0.6  | 0.8 | 0.8 |
| F   | 2.0        | 2.5 | 3.5 | 5.0 | 5.0  | 7.5 | 7.5 |
| φD' | φD+0.5max. |     |     |     |      |     |     |
| L'  | L+1.5max.  |     |     |     |      |     |     |

## PART NUMBERING SYSTEM



Please refer to "Product code guide (radial lead type)"

## ◆ STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(mA <sub>rms</sub> /<br>105°C, 120Hz) | Part No.            | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ     | Rated ripple<br>current<br>(mA <sub>rms</sub> /<br>105°C, 120Hz) | Part No.            |
|--------------------------|-------------|-----------------------|-------|------------------------------------------------------------------|---------------------|--------------------------|-------------|-----------------------|-----------|------------------------------------------------------------------|---------------------|
| 6.3                      | 1,000       | 8 × 11.5              | 0.28  | 390                                                              | EKMQR63E□□102MHB5D  | 50                       | 220         | 10 × 12.5             | 0.12      | 300                                                              | EKMQR500E□□221MJC5S |
|                          | 2,200       | 10 × 16               | 0.30  | 635                                                              | EKMQR63E□□222MJ16S  |                          | 330         | 10 × 16               | 0.12      | 410                                                              | EKMQR500E□□331MJ16S |
|                          | 3,300       | 10 × 20               | 0.32  | 840                                                              | EKMQR63E□□332MJ20S  |                          | 470         | 10 × 20               | 0.12      | 540                                                              | EKMQR500E□□471MJ20S |
|                          | 4,700       | 12.5 × 20             | 0.34  | 1,090                                                            | EKMQR63E□□472MK20S  |                          | 1,000       | 12.5 × 25             | 0.12      | 950                                                              | EKMQR500E□□102MK25S |
|                          | 6,800       | 12.5 × 25             | 0.38  | 1,350                                                            | EKMQR63E□□682MK25S  |                          | 2,200       | 16 × 31.5             | 0.14      | 1,410                                                            | EKMQR500E□□222MLN3S |
|                          | 10,000      | 16 × 25               | 0.46  | 1,650                                                            | EKMQR63E□□103ML25S  |                          | 3,300       | 18 × 35.5             | 0.16      | 1,770                                                            | EKMQR500E□□332MMP1S |
|                          | 15,000      | 16 × 31.5             | 0.56  | 1,820                                                            | EKMQR63E□□153MLN3S  | 63                       | 22          | 5 × 11                | 0.10      | 71                                                               | EKMQR630E□□220ME11D |
|                          | 22,000      | 18 × 35.5             | 0.70  | 2,280                                                            | EKMQR63E□□223MMP1S  |                          | 33          | 6.3 × 11              | 0.10      | 100                                                              | EKMQR630E□□330MF11D |
| 10                       | 220         | 5 × 11                | 0.24  | 155                                                              | EKMQR100E□□221ME11D |                          | 47          | 6.3 × 11              | 0.10      | 120                                                              | EKMQR630E□□470MF11D |
|                          | 330         | 6.3 × 11              | 0.24  | 210                                                              | EKMQR100E□□331MF11D |                          | 68          | 8 × 11.5              | 0.10      | 155                                                              | EKMQR630E□□680MHB5D |
|                          | 470         | 6.3 × 11              | 0.24  | 250                                                              | EKMQR100E□□471MF11D |                          | 100         | 8 × 11.5              | 0.10      | 200                                                              | EKMQR630E□□101MHB5D |
|                          | 1,000       | 10 × 12.5             | 0.24  | 460                                                              | EKMQR100E□□102MJC5S |                          | 220         | 10 × 16               | 0.10      | 335                                                              | EKMQR630E□□221MJ16S |
|                          | 2,200       | 10 × 16               | 0.26  | 705                                                              | EKMQR100E□□222MJ16S |                          | 330         | 10 × 20               | 0.10      | 510                                                              | EKMQR630E□□331MJ20S |
|                          | 3,300       | 12.5 × 20             | 0.28  | 1,000                                                            | EKMQR100E□□332MK20S |                          | 470         | 12.5 × 20             | 0.10      | 640                                                              | EKMQR630E□□471MK20S |
|                          | 4,700       | 12.5 × 25             | 0.30  | 1,260                                                            | EKMQR100E□□472MK25S | 1,000                    | 16 × 25     | 0.10                  | 930       | EKMQR630E□□102ML25S                                              |                     |
|                          | 6,800       | 16 × 25               | 0.34  | 1,570                                                            | EKMQR100E□□682ML25S | 2,200                    | 18 × 35.5   | 0.12                  | 1,650     | EKMQR630E□□222MMP1S                                              |                     |
|                          | 10,000      | 16 × 31.5             | 0.42  | 1,820                                                            | EKMQR100E□□103MLN3S | 100                      | 1.0         | 5 × 11                | 0.08      | 15                                                               | EKMQR101E□□1R0ME11D |
|                          | 15,000      | 16 × 35.5             | 0.52  | 2,050                                                            | EKMQR100E□□153MLP1S |                          | 2.2         | 5 × 11                | 0.08      | 21                                                               | EKMQR101E□□2R2ME11D |
| 22,000                   | 18 × 40     | 0.66                  | 2,420 | EKMQR100E□□223MM40S                                              | 3.3                 |                          | 5 × 11      | 0.08                  | 29        | EKMQR101E□□3R3ME11D                                              |                     |
| 16                       | 220         | 6.3 × 11              | 0.20  | 190                                                              | EKMQR160E□□221MF11D |                          | 4.7         | 5 × 11                | 0.08      | 32                                                               | EKMQR101E□□4R7ME11D |
|                          | 330         | 6.3 × 11              | 0.20  | 225                                                              | EKMQR160E□□331MF11D |                          | 10          | 5 × 11                | 0.08      | 50                                                               | EKMQR101E□□100ME11D |
|                          | 470         | 8 × 11.5              | 0.20  | 315                                                              | EKMQR160E□□471MHB5D |                          | 22          | 6.3 × 11              | 0.08      | 93                                                               | EKMQR101E□□220MF11D |
|                          | 1,000       | 10 × 12.5             | 0.20  | 500                                                              | EKMQR160E□□102MJC5S |                          | 33          | 8 × 11.5              | 0.08      | 130                                                              | EKMQR101E□□330MHB5D |
|                          | 2,200       | 10 × 20               | 0.22  | 710                                                              | EKMQR160E□□222MJ20S |                          | 47          | 8 × 11.5              | 0.08      | 140                                                              | EKMQR101E□□470MHB5D |
|                          | 3,300       | 12.5 × 25             | 0.24  | 1,170                                                            | EKMQR160E□□332MK25S |                          | 68          | 10 × 12.5             | 0.08      | 190                                                              | EKMQR101E□□680MJC5S |
|                          | 4,700       | 16 × 25               | 0.26  | 1,500                                                            | EKMQR160E□□472ML25S |                          | 100         | 10 × 16               | 0.08      | 240                                                              | EKMQR101E□□101MJ16S |
|                          | 6,800       | 16 × 25               | 0.30  | 1,600                                                            | EKMQR160E□□682ML25S |                          | 220         | 12.5 × 20             | 0.08      | 390                                                              | EKMQR101E□□221MK20S |
| 10,000                   | 16 × 35.5   | 0.38                  | 1,930 | EKMQR160E□□103MLP1S                                              | 330                 |                          | 12.5 × 25   | 0.08                  | 540       | EKMQR101E□□331MK25S                                              |                     |
| 15,000                   | 18 × 40     | 0.48                  | 2,210 | EKMQR160E□□153MM40S                                              | 470                 |                          | 16 × 25     | 0.08                  | 715       | EKMQR101E□□471ML25S                                              |                     |
| 25                       | 100         | 5 × 11                | 0.16  | 125                                                              | EKMQR250E□□101ME11D |                          | 1,000       | 18 × 35.5             | 0.08      | 960                                                              | EKMQR101E□□102MMP1S |
|                          | 220         | 6.3 × 11              | 0.16  | 200                                                              | EKMQR250E□□221MF11D | 160                      | 68          | 12.5 × 20             | 0.20      | 250                                                              | EKMQR161E□□680MK20S |
|                          | 330         | 8 × 11.5              | 0.16  | 310                                                              | EKMQR250E□□331MHB5D |                          | 100         | 12.5 × 25             | 0.20      | 310                                                              | EKMQR161E□□101MK25S |
|                          | 470         | 10 × 12.5             | 0.16  | 380                                                              | EKMQR250E□□471MJC5S |                          | 220         | 16 × 31.5             | 0.20      | 540                                                              | EKMQR161E□□221MLN3S |
|                          | 1,000       | 10 × 16               | 0.16  | 610                                                              | EKMQR250E□□102MJ16S |                          | 330         | 18 × 35.5             | 0.20      | 705                                                              | EKMQR161E□□331MMP1S |
|                          | 2,200       | 12.5 × 25             | 0.18  | 1,090                                                            | EKMQR250E□□222MK25S |                          | 470         | 18 × 40               | 0.20      | 855                                                              | EKMQR161E□□471MM40S |
|                          | 3,300       | 16 × 25               | 0.20  | 1,400                                                            | EKMQR250E□□332ML25S | 200                      | 47          | 12.5 × 20             | 0.20      | 195                                                              | EKMQR201E□□470MK20S |
|                          | 4,700       | 16 × 25               | 0.22  | 1,570                                                            | EKMQR250E□□472ML25S |                          | 68          | 12.5 × 25             | 0.20      | 250                                                              | EKMQR201E□□680MK25S |
| 6,800                    | 16 × 35.5   | 0.26                  | 1,850 | EKMQR250E□□682MLP1S                                              | 100                 |                          | 16 × 25     | 0.20                  | 335       | EKMQR201E□□101ML25S                                              |                     |
| 10,000                   | 18 × 40     | 0.34                  | 2,000 | EKMQR250E□□103MM40S                                              | 220                 |                          | 16 × 35.5   | 0.20                  | 500       | EKMQR201E□□221MLP1S                                              |                     |
| 35                       | 47          | 5 × 11                | 0.14  | 93                                                               | EKMQR350E□□470ME11D |                          | 330         | 18 × 40               | 0.20      | 675                                                              | EKMQR201E□□331MM40S |
|                          | 68          | 6.3 × 11              | 0.14  | 110                                                              | EKMQR350E□□680MF11D | 250                      | 47          | 12.5 × 20             | 0.20      | 190                                                              | EKMQR251E□□470MK20S |
|                          | 100         | 6.3 × 11              | 0.14  | 150                                                              | EKMQR350E□□101MF11D |                          | 68          | 16 × 25               | 0.20      | 270                                                              | EKMQR251E□□680ML25S |
|                          | 220         | 8 × 11.5              | 0.14  | 270                                                              | EKMQR350E□□221MHB5D |                          | 100         | 16 × 25               | 0.20      | 310                                                              | EKMQR251E□□101ML25S |
|                          | 330         | 10 × 12.5             | 0.14  | 350                                                              | EKMQR350E□□331MJC5S |                          | 220         | 18 × 35.5             | 0.20      | 485                                                              | EKMQR251E□□221MMP1S |
|                          | 470         | 10 × 16               | 0.14  | 460                                                              | EKMQR350E□□471MJ16S |                          | 350         | 22                    | 12.5 × 20 | 0.24                                                             | 130                 |
|                          | 1,000       | 12.5 × 20             | 0.14  | 810                                                              | EKMQR350E□□102MK20S | 33                       |             | 12.5 × 25             | 0.24      | 170                                                              | EKMQR351E□□330MK25S |
|                          | 2,200       | 16 × 25               | 0.16  | 1,260                                                            | EKMQR350E□□222ML25S | 47                       |             | 16 × 25               | 0.24      | 230                                                              | EKMQR351E□□470ML25S |
|                          | 3,300       | 16 × 31.5             | 0.18  | 1,500                                                            | EKMQR350E□□332MLN3S | 68                       |             | 16 × 25               | 0.24      | 285                                                              | EKMQR351E□□680ML25S |
|                          | 4,700       | 16 × 35.5             | 0.20  | 1,780                                                            | EKMQR350E□□472MLP1S | 100                      |             | 18 × 31.5             | 0.24      | 375                                                              | EKMQR351E□□101MMN3S |
| 6,800                    | 18 × 40     | 0.24                  | 2,000 | EKMQR350E□□682MM40S                                              | 400                 | 22                       | 12.5 × 25   | 0.24                  | 145       | EKMQR401E□□220MK25S                                              |                     |
| 50                       | 1.0         | 5 × 11                | 0.12  | 13                                                               |                     | EKMQR500E□□1R0ME11D      | 33          | 16 × 25               | 0.24      | 195                                                              | EKMQR401E□□330ML25S |
|                          | 2.2         | 5 × 11                | 0.12  | 20                                                               |                     | EKMQR500E□□2R2ME11D      | 47          | 16 × 25               | 0.24      | 200                                                              | EKMQR401E□□470ML25S |
|                          | 3.3         | 5 × 11                | 0.12  | 25                                                               |                     | EKMQR500E□□3R3ME11D      | 68          | 16 × 31.5             | 0.24      | 240                                                              | EKMQR401E□□680MLN3S |
|                          | 4.7         | 5 × 11                | 0.12  | 30                                                               |                     | EKMQR500E□□4R7ME11D      | 100         | 18 × 35.5             | 0.24      | 310                                                              | EKMQR401E□□101MMP1S |
|                          | 10          | 5 × 11                | 0.12  | 46                                                               | EKMQR500E□□100ME11D | 450                      | 22          | 12.5 × 25             | 0.24      | 100                                                              | EKMQR451E□□220MK25S |
|                          | 22          | 5 × 11                | 0.12  | 68                                                               | EKMQR500E□□220ME11D |                          | 33          | 16 × 25               | 0.24      | 125                                                              | EKMQR451E□□330ML25S |
|                          | 33          | 5 × 11                | 0.12  | 90                                                               | EKMQR500E□□330ME11D |                          | 47          | 16 × 31.5             | 0.24      | 155                                                              | EKMQR451E□□470MLN3S |
|                          | 47          | 6.3 × 11              | 0.12  | 115                                                              | EKMQR500E□□470MF11D |                          | 68          | 18 × 35.5             | 0.24      | 185                                                              | EKMQR451E□□680MMP1S |
|                          | 68          | 6.3 × 11              | 0.12  | 150                                                              | EKMQR500E□□680MF11D |                          | 100         | 18 × 40               | 0.24      | 200                                                              | EKMQR451E□□101MM40S |
|                          | 100         | 8 × 11.5              | 0.12  | 190                                                              | EKMQR500E□□101MHB5D |                          |             |                       |           |                                                                  |                     |

□□ : Enter the appropriate lead forming or taping code.

Production of the products shown in □□□□ is scheduled to be discontinued.

\*1: Assembly boards with the designated products attached cannot be cleaned.



**KMQ**Series◆**RATED RIPPLE CURRENT MULTIPLIERS**

## ● Frequency Multipliers

| Capacitance(μF) \ Frequency(Hz) | 50   | 120  | 300  | 1k   | 10k  | 100k |
|---------------------------------|------|------|------|------|------|------|
| 1.0 to 4.7                      | 0.65 | 1.00 | 1.35 | 1.75 | 2.30 | 2.50 |
| 10 to 68                        | 0.75 | 1.00 | 1.25 | 1.50 | 1.75 | 1.80 |
| 100 to 1,000                    | 0.80 | 1.00 | 1.15 | 1.30 | 1.40 | 1.50 |
| 2,200 to                        | 0.85 | 1.00 | 1.03 | 1.05 | 1.08 | 1.08 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

# KZN Series

- Adoption of innovative high stability electrolyte
- High ripple current and long endurance
- Rated voltage range : 6.3 to 100V<sub>dc</sub>, Capacitance range : 8.2 to 22,000μF
- Endurance with ripple current : 6,000 to 10,000 hours at 105°C
- Non solvent resistant type
- RoHS2 Compliant

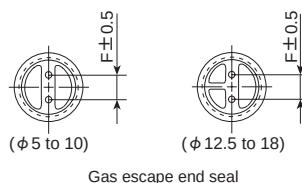
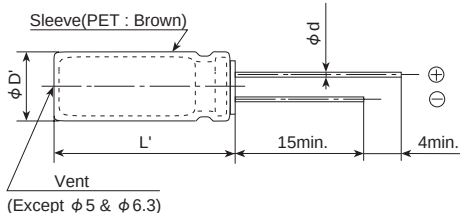


## SPECIFICATIONS

| Items                                                        | Characteristics                                                                                                                                                                                                                                                                     |                          |                                                               |             |             |              |                                      |      |      |      |
|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|---------------------------------------------------------------|-------------|-------------|--------------|--------------------------------------|------|------|------|
| Category                                                     | -40 to +105℃                                                                                                                                                                                                                                                                        |                          |                                                               |             |             |              |                                      |      |      |      |
| Temperature Range                                            |                                                                                                                                                                                                                                                                                     |                          |                                                               |             |             |              |                                      |      |      |      |
| Rated Voltage Range                                          | 6.3 to 100V <sub>dc</sub>                                                                                                                                                                                                                                                           |                          |                                                               |             |             |              |                                      |      |      |      |
| Capacitance Tolerance                                        | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                           |                          |                                                               |             |             |              |                                      |      |      |      |
| Leakage Current                                              | I=0.01CV or 3μA, whichever is greater.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 2 minutes)                                                                                                                        |                          |                                                               |             |             |              |                                      |      |      |      |
| Dissipation Factor<br>(tan δ)                                | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                    | 6.3V                     | 10V                                                           | 16V         | 25V         | 35V          | 50V                                  | 63V  | 80V  | 100V |
|                                                              | tan δ (Max.)                                                                                                                                                                                                                                                                        | 0.22                     | 0.19                                                          | 0.16        | 0.14        | 0.12         | 0.10                                 | 0.09 | 0.09 | 0.08 |
|                                                              | When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase. (at 20℃, 120Hz)                                                                                                                                                                    |                          |                                                               |             |             |              |                                      |      |      |      |
| Low Temperature<br>Characteristics<br>(Max. Impedance Ratio) | Z (-25℃) / Z (+20℃)                                                                                                                                                                                                                                                                 | 2max.                    |                                                               |             |             |              |                                      |      |      |      |
|                                                              | Z (-40℃) / Z (+20℃)                                                                                                                                                                                                                                                                 | 3max. (at 120Hz)         |                                                               |             |             |              |                                      |      |      |      |
| Endurance                                                    | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for the specified period of time at 105℃.                      |                          |                                                               |             |             |              |                                      |      |      |      |
|                                                              | Time                                                                                                                                                                                                                                                                                | Case size                | φ 5& φ 6.3                                                    | φ 8×11.5L   | φ 10×12.5L  | φ 8×15L, 20L | φ 10×16L, 20L, 25L<br>φ 12.5 to φ 18 |      |      |      |
|                                                              |                                                                                                                                                                                                                                                                                     | 6.3V <sub>dc</sub>       | 6,000 hours                                                   | 8,000 hours | 9,000 hours | 9,000 hours  | 10,000 hours                         |      |      |      |
|                                                              |                                                                                                                                                                                                                                                                                     | 10 to 50V <sub>dc</sub>  | 7,000 hours                                                   | 9,000 hours | 9,000 hours | 10,000 hours | 10,000 hours                         |      |      |      |
|                                                              |                                                                                                                                                                                                                                                                                     | 63 to 100V <sub>dc</sub> | 6,000 hours                                                   | 8,000 hours | 9,000 hours | 9,000 hours  | 10,000 hours                         |      |      |      |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                  |                          | ≤ ±25% of the initial value (6.3, 10V <sub>dc</sub> : ≤ ±30%) |             |             |              |                                      |      |      |      |
|                                                              | D.F. (tan δ)                                                                                                                                                                                                                                                                        |                          | ≤200% of the initial specified value                          |             |             |              |                                      |      |      |      |
|                                                              | Leakage current                                                                                                                                                                                                                                                                     |                          | ≤The initial specified value                                  |             |             |              |                                      |      |      |      |
| Shelf Life                                                   | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 500 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                          |                                                               |             |             |              |                                      |      |      |      |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                  |                          | ≤ ±25% of the initial value (6.3, 10V <sub>dc</sub> : ≤ ±30%) |             |             |              |                                      |      |      |      |
|                                                              | D.F. (tan δ)                                                                                                                                                                                                                                                                        |                          | ≤200% of the initial specified value                          |             |             |              |                                      |      |      |      |
|                                                              | Leakage current                                                                                                                                                                                                                                                                     |                          | ≤The initial specified value                                  |             |             |              |                                      |      |      |      |

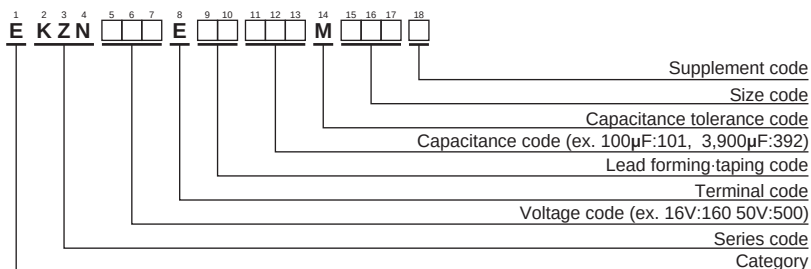
## DIMENSIONS [mm]

- Terminal Code : E



| φ D | 5             | 6.3 | 8   | 10  | 12.5 | 16  | 18  |
|-----|---------------|-----|-----|-----|------|-----|-----|
| φ d | 0.5           | 0.5 | 0.6 | 0.6 | 0.6  | 0.8 | 0.8 |
| F   | 2.0           | 2.5 | 3.5 | 5.0 | 5.0  | 7.5 | 7.5 |
| D'  | φ D + 0.5max. |     |     |     |      |     |     |
| L'  | L + 1.5max.   |     |     |     |      |     |     |

## PART NUMBERING SYSTEM



Please refer to "Product code guide (radial lead type)"



## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | Impedance<br>(Ω max./100kHz) |       | Rated ripple<br>current<br>(mA rms/<br>105°C,<br>100kHz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | Impedance<br>(Ω max./100kHz) |       | Rated ripple<br>current<br>(mA rms/<br>105°C,<br>100kHz) | Part No.           |
|--------------------------|-------------|-----------------------|------------------------------|-------|----------------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|------------------------------|-------|----------------------------------------------------------|--------------------|
|                          |             |                       | 20°C                         | -10°C |                                                          |                    |                          |             |                       | 20°C                         | -10°C |                                                          |                    |
| 6.3                      | 220         | 5×11                  | 0.38                         | 1.2   | 345                                                      | EKZN6R3E□□221ME11D | 16                       | 3,300       | 12.5×30               | 0.018                        | 0.054 | 3,660                                                    | EKZN160E□□332MK30S |
|                          | 470         | 6.3×11                | 0.17                         | 0.51  | 540                                                      | EKZN6R3E□□471MF11D |                          | 3,900       | 12.5×35               | 0.016                        | 0.048 | 4,120                                                    | EKZN160E□□392MK35S |
|                          | 820         | 8×11.5                | 0.075                        | 0.23  | 945                                                      | EKZN6R3E□□821MHB5D |                          | 3,900       | 16×20                 | 0.021                        | 0.063 | 3,330                                                    | EKZN160E□□392ML20S |
|                          | 1,200       | 8×15                  | 0.059                        | 0.18  | 1,250                                                    | EKZN6R3E□□122MH15D |                          | 4,700       | 18×20                 | 0.020                        | 0.060 | 3,450                                                    | EKZN160E□□472MM20S |
|                          | 1,200       | 10×12.5               | 0.053                        | 0.16  | 1,330                                                    | EKZN6R3E□□122MJCS5 |                          | 5,600       | 16×25                 | 0.017                        | 0.051 | 3,810                                                    | EKZN160E□□562ML25S |
|                          | 1,500       | 8×20                  | 0.041                        | 0.13  | 1,500                                                    | EKZN6R3E□□152MH20D |                          | 6,800       | 16×31.5               | 0.016                        | 0.048 | 4,100                                                    | EKZN160E□□682MLN3S |
|                          | 1,800       | 10×16                 | 0.038                        | 0.12  | 1,760                                                    | EKZN6R3E□□182MJ16S |                          | 6,800       | 18×25                 | 0.016                        | 0.048 | 3,880                                                    | EKZN160E□□682MM25S |
|                          | 2,700       | 10×20                 | 0.028                        | 0.084 | 1,960                                                    | EKZN6R3E□□272MJ20S |                          | 8,200       | 16×35.5               | 0.014                        | 0.042 | 4,280                                                    | EKZN160E□□822MLP1S |
|                          | 2,700       | 12.5×16               | 0.035                        | 0.11  | 1,900                                                    | EKZN6R3E□□272MK16S |                          | 8,200       | 18×31.5               | 0.014                        | 0.042 | 4,190                                                    | EKZN160E□□822MMN3S |
|                          | 3,300       | 10×25                 | 0.026                        | 0.072 | 2,250                                                    | EKZN6R3E□□332MJ25S |                          | 10,000      | 16×40                 | 0.013                        | 0.039 | 4,580                                                    | EKZN160E□□103ML40S |
|                          | 3,900       | 12.5×20               | 0.025                        | 0.075 | 2,480                                                    | EKZN6R3E□□392MK20S |                          | 10,000      | 18×35.5               | 0.012                        | 0.036 | 4,380                                                    | EKZN160E□□103MMP1S |
|                          | 5,600       | 12.5×25               | 0.019                        | 0.057 | 2,900                                                    | EKZN6R3E□□562MK25S |                          | 12,000      | 18×40                 | 0.011                        | 0.033 | 4,960                                                    | EKZN160E□□123MM40S |
|                          | 6,800       | 12.5×30               | 0.018                        | 0.054 | 3,450                                                    | EKZN6R3E□□682MK30S | 25                       | 68          | 5×11                  | 0.38                         | 1.2   | 450                                                      | EKZN250E□□680ME11D |
|                          | 6,800       | 16×20                 | 0.021                        | 0.063 | 3,250                                                    | EKZN6R3E□□682ML20S |                          | 150         | 6.3×11                | 0.17                         | 0.51  | 700                                                      | EKZN250E□□151MF11D |
|                          | 8,200       | 12.5×35               | 0.016                        | 0.048 | 3,570                                                    | EKZN6R3E□□822MK35S |                          | 270         | 8×11.5                | 0.075                        | 0.23  | 1,200                                                    | EKZN250E□□271MHB5D |
|                          | 8,200       | 18×20                 | 0.020                        | 0.060 | 3,450                                                    | EKZN6R3E□□822MM20S |                          | 470         | 8×15                  | 0.059                        | 0.18  | 1,600                                                    | EKZN250E□□471MH15D |
|                          | 10,000      | 16×25                 | 0.017                        | 0.051 | 3,630                                                    | EKZN6R3E□□103ML25S |                          | 470         | 10×12.5               | 0.053                        | 0.16  | 1,700                                                    | EKZN250E□□471MJCS5 |
|                          | 12,000      | 16×31.5               | 0.016                        | 0.048 | 4,100                                                    | EKZN6R3E□□123MLN3S |                          | 560         | 8×20                  | 0.041                        | 0.13  | 1,960                                                    | EKZN250E□□561MH20D |
|                          | 12,000      | 18×25                 | 0.016                        | 0.048 | 3,880                                                    | EKZN6R3E□□123MM25S |                          | 680         | 10×16                 | 0.038                        | 0.12  | 2,000                                                    | EKZN250E□□681MJ16S |
|                          | 15,000      | 16×35.5               | 0.014                        | 0.042 | 4,280                                                    | EKZN6R3E□□153MLP1S |                          | 820         | 10×20                 | 0.028                        | 0.084 | 2,500                                                    | EKZN250E□□821MJ20S |
|                          | 15,000      | 18×31.5               | 0.014                        | 0.042 | 4,190                                                    | EKZN6R3E□□153MMN3S |                          | 1,000       | 12.5×16               | 0.035                        | 0.11  | 2,400                                                    | EKZN250E□□102MK16S |
|                          | 18,000      | 16×40                 | 0.013                        | 0.039 | 4,580                                                    | EKZN6R3E□□183ML40S |                          | 1,200       | 10×25                 | 0.026                        | 0.072 | 2,900                                                    | EKZN250E□□122MJ25S |
|                          | 18,000      | 18×35.5               | 0.012                        | 0.036 | 4,380                                                    | EKZN6R3E□□183MMP1S |                          | 1,500       | 12.5×20               | 0.025                        | 0.075 | 2,600                                                    | EKZN250E□□152MK20S |
|                          | 22,000      | 18×40                 | 0.011                        | 0.033 | 4,960                                                    | EKZN6R3E□□223MM40S |                          | 1,800       | 12.5×25               | 0.019                        | 0.057 | 3,200                                                    | EKZN250E□□182MK25S |
| 10                       | 150         | 5×11                  | 0.38                         | 1.2   | 450                                                      | EKZN100E□□151ME11D |                          | 2,200       | 12.5×30               | 0.018                        | 0.054 | 3,660                                                    | EKZN250E□□222MK30S |
|                          | 330         | 6.3×11                | 0.17                         | 0.51  | 700                                                      | EKZN100E□□331MF11D |                          | 2,200       | 16×20                 | 0.021                        | 0.063 | 3,330                                                    | EKZN250E□□222ML20S |
|                          | 560         | 8×11.5                | 0.075                        | 0.23  | 1,200                                                    | EKZN100E□□561MHB5D |                          | 2,700       | 12.5×35               | 0.016                        | 0.048 | 4,120                                                    | EKZN250E□□272MK35S |
|                          | 820         | 8×15                  | 0.059                        | 0.18  | 1,600                                                    | EKZN100E□□821MH15D |                          | 3,300       | 16×25                 | 0.017                        | 0.051 | 3,810                                                    | EKZN250E□□332ML25S |
|                          | 1,000       | 8×20                  | 0.041                        | 0.13  | 1,960                                                    | EKZN100E□□102MH20D |                          | 3,300       | 18×20                 | 0.020                        | 0.060 | 3,450                                                    | EKZN250E□□332MM20S |
|                          | 1,000       | 10×12.5               | 0.053                        | 0.16  | 1,700                                                    | EKZN100E□□102MJCS5 |                          | 4,700       | 16×31.5               | 0.016                        | 0.048 | 4,100                                                    | EKZN250E□□472MLN3S |
|                          | 1,200       | 10×16                 | 0.038                        | 0.12  | 2,000                                                    | EKZN100E□□122MJ16S |                          | 4,700       | 18×25                 | 0.016                        | 0.048 | 3,880                                                    | EKZN250E□□472MM25S |
|                          | 1,800       | 10×20                 | 0.028                        | 0.084 | 2,500                                                    | EKZN100E□□182MJ20S |                          | 5,600       | 16×35.5               | 0.014                        | 0.042 | 4,280                                                    | EKZN250E□□562MLP1S |
|                          | 1,800       | 12.5×16               | 0.035                        | 0.11  | 2,400                                                    | EKZN100E□□182MK16S |                          | 5,600       | 18×31.5               | 0.014                        | 0.042 | 4,190                                                    | EKZN250E□□562MMN3S |
|                          | 2,200       | 10×25                 | 0.026                        | 0.072 | 2,900                                                    | EKZN100E□□222MJ25S |                          | 6,800       | 16×40                 | 0.013                        | 0.039 | 4,580                                                    | EKZN250E□□682ML40S |
|                          | 2,700       | 12.5×20               | 0.025                        | 0.075 | 2,600                                                    | EKZN100E□□272MK20S |                          | 6,800       | 18×35.5               | 0.012                        | 0.036 | 4,380                                                    | EKZN250E□□682MMP1S |
|                          | 3,900       | 12.5×25               | 0.019                        | 0.057 | 3,200                                                    | EKZN100E□□392MK25S |                          | 8,200       | 18×40                 | 0.011                        | 0.033 | 4,960                                                    | EKZN250E□□822MM40S |
|                          | 4,700       | 12.5×30               | 0.018                        | 0.054 | 3,660                                                    | EKZN100E□□472MK30S | 35                       | 47          | 5×11                  | 0.38                         | 1.2   | 450                                                      | EKZN350E□□470ME11D |
|                          | 4,700       | 16×20                 | 0.021                        | 0.063 | 3,330                                                    | EKZN100E□□472ML20S |                          | 100         | 6.3×11                | 0.17                         | 0.51  | 700                                                      | EKZN350E□□101MF11D |
|                          | 5,600       | 12.5×35               | 0.016                        | 0.048 | 4,120                                                    | EKZN100E□□562MK35S |                          | 180         | 8×11.5                | 0.075                        | 0.23  | 1,200                                                    | EKZN350E□□181MHB5D |
|                          | 5,600       | 18×20                 | 0.020                        | 0.060 | 3,450                                                    | EKZN100E□□562MM20S |                          | 220         | 8×15                  | 0.059                        | 0.18  | 1,600                                                    | EKZN350E□□221MH15D |
|                          | 6,800       | 16×25                 | 0.017                        | 0.051 | 3,810                                                    | EKZN100E□□682ML25S |                          | 270         | 10×12.5               | 0.053                        | 0.16  | 1,700                                                    | EKZN350E□□271MJCS5 |
|                          | 8,200       | 16×31.5               | 0.016                        | 0.048 | 4,100                                                    | EKZN100E□□822MLN3S |                          | 330         | 8×20                  | 0.041                        | 0.13  | 1,960                                                    | EKZN350E□□331MH20D |
|                          | 8,200       | 18×25                 | 0.016                        | 0.048 | 3,880                                                    | EKZN100E□□822MM25S |                          | 390         | 10×16                 | 0.038                        | 0.12  | 2,000                                                    | EKZN350E□□391MJ16S |
|                          | 10,000      | 16×35.5               | 0.014                        | 0.042 | 4,280                                                    | EKZN100E□□103MLP1S |                          | 470         | 10×20                 | 0.028                        | 0.084 | 2,500                                                    | EKZN350E□□471MJ20S |
|                          | 10,000      | 18×31.5               | 0.014                        | 0.042 | 4,190                                                    | EKZN100E□□103MMN3S |                          | 560         | 12.5×16               | 0.035                        | 0.11  | 2,400                                                    | EKZN350E□□561MK16S |
|                          | 12,000      | 16×40                 | 0.013                        | 0.039 | 4,580                                                    | EKZN100E□□123ML40S |                          | 680         | 10×25                 | 0.026                        | 0.072 | 2,900                                                    | EKZN350E□□681MJ25S |
|                          | 12,000      | 18×35.5               | 0.012                        | 0.036 | 4,380                                                    | EKZN100E□□123MMP1S |                          | 820         | 12.5×20               | 0.025                        | 0.075 | 2,600                                                    | EKZN350E□□821MK20S |
|                          | 15,000      | 18×40                 | 0.011                        | 0.033 | 4,960                                                    | EKZN100E□□153MM40S |                          | 1,200       | 12.5×25               | 0.019                        | 0.057 | 3,200                                                    | EKZN350E□□122MK25S |
| 16                       | 120         | 5×11                  | 0.38                         | 1.2   | 450                                                      | EKZN160E□□121ME11D |                          | 1,500       | 12.5×30               | 0.018                        | 0.054 | 3,660                                                    | EKZN350E□□152MK30S |
|                          | 270         | 6.3×11                | 0.17                         | 0.51  | 700                                                      | EKZN160E□□271MF11D |                          | 1,500       | 16×20                 | 0.021                        | 0.063 | 3,330                                                    | EKZN350E□□152ML20S |
|                          | 470         | 8×11.5                | 0.075                        | 0.23  | 1,200                                                    | EKZN160E□□471MHB5D |                          | 1,800       | 12.5×35               | 0.016                        | 0.048 | 4,120                                                    | EKZN350E□□182MK35S |
|                          | 680         | 8×15                  | 0.059                        | 0.18  | 1,600                                                    | EKZN160E□□681MH15D |                          | 1,800       | 16×25                 | 0.017                        | 0.051 | 3,810                                                    | EKZN350E□□182ML25S |
|                          | 680         | 10×12.5               | 0.053                        | 0.16  | 1,700                                                    | EKZN160E□□681MJCS5 |                          | 1,800       | 18×20                 | 0.020                        | 0.060 | 3,450                                                    | EKZN350E□□182MM20S |
|                          | 820         | 8×20                  | 0.041                        | 0.13  | 1,960                                                    | EKZN160E□□821MH20D |                          | 2,700       | 16×31.5               | 0.016                        | 0.048 | 4,100                                                    | EKZN350E□□272MLN3S |
|                          | 1,000       | 10×16                 | 0.038                        | 0.12  | 2,000                                                    | EKZN160E□□102MJ16S |                          | 2,700       | 18×25                 | 0.016                        | 0.048 | 3,880                                                    | EKZN350E□□272MM25S |
|                          | 1,500       | 10×20                 | 0.028                        | 0.084 | 2,500                                                    | EKZN160E□□152MJ20S |                          | 3,300       | 16×35.5               | 0.014                        | 0.042 | 4,280                                                    | EKZN350E□□332MLP1S |
|                          | 1,500       | 12.5×16               | 0.035                        | 0.11  | 2,400                                                    | EKZN160E□□152MK16S |                          | 3,300       | 18×31.5               | 0.014                        | 0.042 | 4,190                                                    | EKZN350E□□332MMN3S |
|                          | 1,800       | 10×25                 | 0.026                        | 0.072 | 2,900                                                    | EKZN160E□□182MJ25S |                          | 3,900       | 16×40                 | 0.013                        | 0.039 | 4,580                                                    | EKZN350E□□392ML40S |
|                          | 2,200       | 12.5×20               | 0.025                        | 0.075 | 2,600                                                    | EKZN160E□□222MK20S |                          | 3,900       | 18×35.5               | 0.012                        | 0.036 | 4,380                                                    | EKZN350E□□392MMP1S |
|                          | 2,700       | 12.5×25               | 0.019                        | 0.057 | 3,200                                                    | EKZN160E□□272MK25S |                          | 4,700       | 18×40                 | 0.011                        | 0.033 | 4,960                                                    | EKZN350E□□472MM40S |

□ □ : Enter the appropriate lead forming or taping code.

Production of the products shown in   is scheduled to be discontinued.



## ◆ STANDARD RATINGS

| VV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | Impedance<br>(Ω max./100kHz) |       | Rated<br>ripple<br>current<br>(mA rms/<br>105°C,<br>100kHz) | Part No.           | VV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | Impedance<br>(Ω max./100kHz) |       | Rated<br>ripple<br>current<br>(mA rms/<br>105°C,<br>100kHz) | Part No.           |
|--------------------------|-------------|-----------------------|------------------------------|-------|-------------------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|------------------------------|-------|-------------------------------------------------------------|--------------------|
|                          |             |                       | 20°C                         | -10°C |                                                             |                    |                          |             |                       | 20°C                         | -10°C |                                                             |                    |
| 50                       | 27          | 5×11                  | 0.40                         | 1.3   | 450                                                         | EKZN500E□□270ME11D | 80                       | 120         | 10×16                 | 0.090                        | 0.36  | 1,150                                                       | EKZN800E□□121MJ16S |
|                          | 56          | 6.3×11                | 0.18                         | 0.54  | 700                                                         | EKZN500E□□560MF11D |                          | 150         | 10×16                 | 0.090                        | 0.36  | 1,150                                                       | EKZN800E□□151MJ16S |
|                          | 100         | 8×11.5                | 0.085                        | 0.26  | 1,200                                                       | EKZN500E□□101MHB5D |                          | 180         | 10×20                 | 0.068                        | 0.28  | 1,570                                                       | EKZN800E□□181MJ20S |
|                          | 120         | 8×15                  | 0.065                        | 0.20  | 1,600                                                       | EKZN500E□□121MH15D |                          | 180         | 12.5×16               | 0.090                        | 0.27  | 1,430                                                       | EKZN800E□□181MK16S |
|                          | 150         | 10×12.5               | 0.073                        | 0.22  | 1,280                                                       | EKZN500E□□151MJC5S |                          | 220         | 10×20                 | 0.068                        | 0.28  | 1,570                                                       | EKZN800E□□221MJ20S |
|                          | 180         | 8×20                  | 0.049                        | 0.16  | 1,960                                                       | EKZN500E□□181MH20D |                          | 220         | 10×25                 | 0.055                        | 0.22  | 1,780                                                       | EKZN800E□□221MJ25S |
|                          | 220         | 10×16                 | 0.053                        | 0.16  | 1,650                                                       | EKZN500E□□221MJ16S |                          | 220         | 12.5×16               | 0.090                        | 0.27  | 1,430                                                       | EKZN800E□□221MK16S |
|                          | 330         | 10×20                 | 0.038                        | 0.12  | 2,060                                                       | EKZN500E□□331MJ20S |                          | 270         | 10×25                 | 0.055                        | 0.22  | 1,780                                                       | EKZN800E□□271MJ25S |
|                          | 330         | 12.5×16               | 0.045                        | 0.14  | 2,160                                                       | EKZN500E□□331MK16S |                          | 270         | 12.5×20               | 0.048                        | 0.15  | 1,800                                                       | EKZN800E□□271MK20S |
|                          | 390         | 10×25                 | 0.032                        | 0.10  | 2,420                                                       | EKZN500E□□391MJ25S |                          | 330         | 12.5×20               | 0.048                        | 0.15  | 1,800                                                       | EKZN800E□□331MK20S |
|                          | 470         | 12.5×20               | 0.032                        | 0.10  | 2,300                                                       | EKZN500E□□471MK20S |                          | 390         | 12.5×25               | 0.038                        | 0.12  | 2,210                                                       | EKZN800E□□391MK25S |
|                          | 680         | 12.5×25               | 0.025                        | 0.080 | 2,800                                                       | EKZN500E□□681MK25S |                          | 470         | 12.5×30               | 0.033                        | 0.11  | 2,520                                                       | EKZN800E□□471MK30S |
|                          | 820         | 12.5×30               | 0.023                        | 0.074 | 3,370                                                       | EKZN500E□□821MK30S |                          | 470         | 16×20                 | 0.036                        | 0.12  | 2,150                                                       | EKZN800E□□471ML20S |
|                          | 820         | 16×20                 | 0.026                        | 0.084 | 3,070                                                       | EKZN500E□□821ML20S |                          | 560         | 12.5×35               | 0.026                        | 0.078 | 2,860                                                       | EKZN800E□□561MK35S |
|                          | 1,000       | 12.5×35               | 0.021                        | 0.067 | 3,810                                                       | EKZN500E□□102MK35S |                          | 680         | 12.5×40               | 0.026                        | 0.078 | 3,150                                                       | EKZN800E□□681MK40S |
|                          | 1,200       | 16×25                 | 0.022                        | 0.070 | 3,510                                                       | EKZN500E□□122ML25S |                          | 680         | 16×25                 | 0.028                        | 0.084 | 2,620                                                       | EKZN800E□□681ML25S |
|                          | 1,200       | 18×20                 | 0.025                        | 0.075 | 3,120                                                       | EKZN500E□□122MM20S |                          | 680         | 18×20                 | 0.032                        | 0.096 | 2,280                                                       | EKZN800E□□681MM20S |
|                          | 1,500       | 16×31.5               | 0.019                        | 0.057 | 4,030                                                       | EKZN500E□□152MLN3S |                          | 820         | 16×31.5               | 0.022                        | 0.066 | 2,900                                                       | EKZN800E□□821MLN3S |
|                          | 1,500       | 18×25                 | 0.021                        | 0.063 | 3,530                                                       | EKZN500E□□152MM25S |                          | 820         | 18×25                 | 0.027                        | 0.081 | 2,750                                                       | EKZN800E□□821MM25S |
|                          | 1,800       | 16×35.5               | 0.016                        | 0.048 | 4,220                                                       | EKZN500E□□182MLP1S |                          | 1,000       | 18×25                 | 0.027                        | 0.081 | 2,750                                                       | EKZN800E□□102MM25S |
|                          | 2,200       | 16×40                 | 0.014                        | 0.042 | 4,500                                                       | EKZN500E□□222ML40S |                          | 1,000       | 16×35.5               | 0.020                        | 0.060 | 3,150                                                       | EKZN800E□□102MLP1S |
|                          | 2,200       | 18×31.5               | 0.016                        | 0.048 | 4,080                                                       | EKZN500E□□222MMN3S |                          | 1,200       | 16×40                 | 0.018                        | 0.054 | 3,710                                                       | EKZN800E□□122ML40S |
|                          | 2,700       | 18×35.5               | 0.013                        | 0.039 | 4,270                                                       | EKZN500E□□272MMP1S |                          | 1,200       | 18×31.5               | 0.020                        | 0.060 | 3,150                                                       | EKZN800E□□122MMN3S |
|                          | 3,300       | 18×40                 | 0.012                        | 0.036 | 4,850                                                       | EKZN500E□□332MM40S |                          | 1,500       | 18×35.5               | 0.018                        | 0.054 | 3,710                                                       | EKZN800E□□152MMP1S |
| 63                       | 18          | 5×11                  | 0.52                         | 2.3   | 240                                                         | EKZN630E□□180ME11D | 100                      | 8.2         | 5×11                  | 0.72                         | 3.2   | 235                                                         | EKZN101E□□8R2ME11D |
|                          | 39          | 6.3×11                | 0.24                         | 1.1   | 420                                                         | EKZN630E□□390MF11D |                          | 18          | 6.3×11                | 0.34                         | 1.5   | 390                                                         | EKZN101E□□180MF11D |
|                          | 68          | 8×11.5                | 0.15                         | 0.68  | 720                                                         | EKZN630E□□680MHB5D |                          | 33          | 8×11.5                | 0.20                         | 0.90  | 650                                                         | EKZN101E□□330MHB5D |
|                          | 100         | 8×15                  | 0.10                         | 0.45  | 990                                                         | EKZN630E□□101MH15D |                          | 47          | 8×15                  | 0.14                         | 0.63  | 820                                                         | EKZN101E□□470MH15D |
|                          | 120         | 8×20                  | 0.077                        | 0.35  | 1,200                                                       | EKZN630E□□121MH20D |                          | 56          | 8×20                  | 0.12                         | 0.54  | 1,090                                                       | EKZN101E□□560MH20D |
|                          | 120         | 10×12.5               | 0.090                        | 0.36  | 990                                                         | EKZN630E□□121MJC5S |                          | 56          | 10×12.5               | 0.14                         | 0.56  | 860                                                         | EKZN101E□□560MJC5S |
|                          | 180         | 10×16                 | 0.061                        | 0.25  | 1,200                                                       | EKZN630E□□181MJ16S |                          | 82          | 10×16                 | 0.090                        | 0.36  | 1,150                                                       | EKZN101E□□820MJ16S |
|                          | 270         | 10×20                 | 0.045                        | 0.18  | 1,570                                                       | EKZN630E□□271MJ20S |                          | 100         | 10×20                 | 0.068                        | 0.28  | 1,570                                                       | EKZN101E□□101MJ20S |
|                          | 270         | 12.5×16               | 0.058                        | 0.18  | 1,570                                                       | EKZN630E□□271MK16S |                          | 120         | 10×20                 | 0.068                        | 0.28  | 1,570                                                       | EKZN101E□□121MJ20S |
|                          | 330         | 10×25                 | 0.037                        | 0.12  | 1,990                                                       | EKZN630E□□331MJ25S |                          | 120         | 12.5×16               | 0.090                        | 0.27  | 1,430                                                       | EKZN101E□□121MK16S |
|                          | 390         | 12.5×20               | 0.033                        | 0.10  | 1,990                                                       | EKZN630E□□391MK20S |                          | 150         | 10×25                 | 0.055                        | 0.22  | 1,780                                                       | EKZN101E□□151MJ25S |
|                          | 560         | 12.5×25               | 0.026                        | 0.080 | 2,460                                                       | EKZN630E□□561MK25S |                          | 180         | 12.5×20               | 0.048                        | 0.15  | 1,800                                                       | EKZN101E□□181MK20S |
|                          | 680         | 12.5×30               | 0.024                        | 0.075 | 2,760                                                       | EKZN630E□□681MK30S |                          | 220         | 12.5×25               | 0.038                        | 0.12  | 2,210                                                       | EKZN101E□□221MK25S |
|                          | 680         | 16×20                 | 0.027                        | 0.085 | 2,380                                                       | EKZN630E□□681ML20S |                          | 270         | 12.5×30               | 0.033                        | 0.11  | 2,520                                                       | EKZN101E□□271MK30S |
|                          | 820         | 12.5×35               | 0.022                        | 0.068 | 3,040                                                       | EKZN630E□□821MK35S |                          | 270         | 16×20                 | 0.036                        | 0.12  | 2,150                                                       | EKZN101E□□271ML20S |
|                          | 820         | 18×20                 | 0.026                        | 0.078 | 2,530                                                       | EKZN630E□□821MM20S |                          | 330         | 16×20                 | 0.036                        | 0.12  | 2,150                                                       | EKZN101E□□331ML20S |
|                          | 1,000       | 16×25                 | 0.024                        | 0.072 | 2,890                                                       | EKZN630E□□102ML25S |                          | 390         | 12.5×35               | 0.026                        | 0.078 | 2,860                                                       | EKZN101E□□391MK35S |
|                          | 1,200       | 16×31.5               | 0.020                        | 0.060 | 3,280                                                       | EKZN630E□□122MLN3S |                          | 390         | 16×25                 | 0.028                        | 0.084 | 2,620                                                       | EKZN101E□□391ML25S |
|                          | 1,200       | 18×25                 | 0.022                        | 0.066 | 2,930                                                       | EKZN630E□□122MM25S |                          | 390         | 18×20                 | 0.032                        | 0.096 | 2,280                                                       | EKZN101E□□391MM20S |
|                          | 1,500       | 16×35.5               | 0.018                        | 0.054 | 3,440                                                       | EKZN630E□□152MLP1S |                          | 470         | 12.5×40               | 0.026                        | 0.078 | 3,150                                                       | EKZN101E□□471MK40S |
|                          | 1,500       | 18×31.5               | 0.018                        | 0.054 | 3,380                                                       | EKZN630E□□152MMN3S |                          | 470         | 16×31.5               | 0.022                        | 0.066 | 2,900                                                       | EKZN101E□□471MLN3S |
|                          | 1,800       | 16×40                 | 0.016                        | 0.048 | 3,690                                                       | EKZN630E□□182ML40S |                          | 560         | 16×31.5               | 0.022                        | 0.066 | 2,900                                                       | EKZN101E□□561MLN3S |
|                          | 1,800       | 18×35.5               | 0.017                        | 0.051 | 3,550                                                       | EKZN630E□□182MMP1S |                          | 560         | 16×35.5               | 0.020                        | 0.060 | 3,150                                                       | EKZN101E□□561MLP1S |
|                          | 2,200       | 18×40                 | 0.015                        | 0.045 | 3,930                                                       | EKZN630E□□222MM40S |                          | 560         | 18×25                 | 0.027                        | 0.081 | 2,750                                                       | EKZN101E□□561MM25S |
| 80                       | 12          | 5×11                  | 0.72                         | 3.2   | 235                                                         | EKZN800E□□120ME11D |                          | 680         | 16×35.5               | 0.020                        | 0.060 | 3,150                                                       | EKZN101E□□681MLP1S |
|                          | 27          | 6.3×11                | 0.34                         | 1.5   | 390                                                         | EKZN800E□□270MF11D |                          | 680         | 16×40                 | 0.018                        | 0.054 | 3,710                                                       | EKZN101E□□681MMN3S |
|                          | 47          | 8×11.5                | 0.20                         | 0.90  | 650                                                         | EKZN800E□□470MHB5D |                          | 680         | 18×31.5               | 0.020                        | 0.060 | 3,150                                                       | EKZN101E□□681ML40S |
|                          | 68          | 8×15                  | 0.14                         | 0.63  | 820                                                         | EKZN800E□□680MH15D |                          | 820         | 16×40                 | 0.018                        | 0.054 | 3,710                                                       | EKZN101E□□821ML40S |
|                          | 82          | 8×20                  | 0.12                         | 0.54  | 1,090                                                       | EKZN800E□□820MH20D |                          | 820         | 18×35.5               | 0.018                        | 0.054 | 3,710                                                       | EKZN101E□□821MMP1S |
|                          | 82          | 10×12.5               | 0.14                         | 0.56  | 860                                                         | EKZN800E□□820MJC5S |                          | 1,000       | 18×40                 | 0.017                        | 0.051 | 4,060                                                       | EKZN101E□□102MM40S |
|                          | 100         | 10×12.5               | 0.14                         | 0.56  | 860                                                         | EKZN800E□□101MJC5S |                          |             |                       |                              |       |                                                             |                    |
|                          |             |                       |                              |       |                                                             |                    |                          |             |                       |                              |       |                                                             |                    |
|                          |             |                       |                              |       |                                                             |                    |                          |             |                       |                              |       |                                                             |                    |
|                          |             |                       |                              |       |                                                             |                    |                          |             |                       |                              |       |                                                             |                    |
|                          |             |                       |                              |       |                                                             |                    |                          |             |                       |                              |       |                                                             |                    |
|                          |             |                       |                              |       |                                                             |                    |                          |             |                       |                              |       |                                                             |                    |

□ □ : Enter the appropriate lead forming or taping code.

Production of the products shown in   is scheduled to be discontinued.

**KZN**Series◆**RATED RIPPLE CURRENT MULTIPLIERS**

## ● Frequency Multipliers

| Capacitance(μF) \ Frequency(Hz) | 120  | 1k   | 10k  | 100k |
|---------------------------------|------|------|------|------|
| 8.2 to 180                      | 0.40 | 0.75 | 0.90 | 1.00 |
| 220 to 560                      | 0.50 | 0.85 | 0.94 | 1.00 |
| 680 to 1,800                    | 0.60 | 0.87 | 0.95 | 1.00 |
| 2,200 to 3,900                  | 0.75 | 0.90 | 0.95 | 1.00 |
| 4,700 to 22,000                 | 0.85 | 0.95 | 0.98 | 1.00 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

# KZM Series

- Long-Life version of KZH series
- Endurance with ripple current : 6,000 to 10,000 hours at 105°C
- Newly innovative electrolyte is employed to minimize ESR
- Rated voltage range : 6.3 to 50V<sub>dc</sub>, Nominal capacitance range : 27 to 10,000μF
- Non solvent resistant type
- RoHS2 Compliant

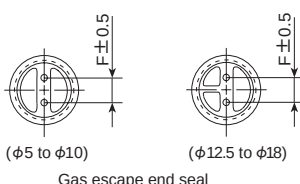
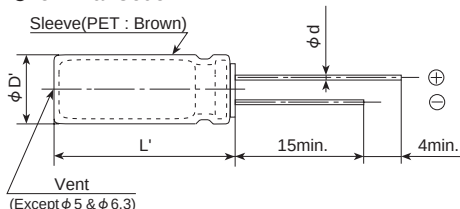


## SPECIFICATIONS

| Items                                                        | Characteristics                                                                                                                                                                                                                                                                     |                                                                          |      |      |      |      |      |  |
|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|------|------|------|------|------|--|
| Category                                                     | -40 to +105℃                                                                                                                                                                                                                                                                        |                                                                          |      |      |      |      |      |  |
| Temperature Range                                            |                                                                                                                                                                                                                                                                                     |                                                                          |      |      |      |      |      |  |
| Rated Voltage Range                                          | 6.3 to 50V <sub>dc</sub>                                                                                                                                                                                                                                                            |                                                                          |      |      |      |      |      |  |
| Capacitance Tolerance                                        | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                           |                                                                          |      |      |      |      |      |  |
| Leakage Current                                              | I=0.01CV or 3μA, whichever is greater.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 2 minutes)                                                                                                                        |                                                                          |      |      |      |      |      |  |
| Dissipation Factor<br>(tan δ )                               | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                    | 6.3V                                                                     | 10V  | 16V  | 25V  | 35V  | 50V  |  |
|                                                              | tan δ (Max.)                                                                                                                                                                                                                                                                        | 0.22                                                                     | 0.19 | 0.16 | 0.14 | 0.12 | 0.10 |  |
|                                                              | When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase. (at 20℃, 120Hz)                                                                                                                                                                    |                                                                          |      |      |      |      |      |  |
| Low Temperature<br>Characteristics<br>(Max. Impedance Ratio) | Z (-25℃) / Z (+20℃)                                                                                                                                                                                                                                                                 | 2max.                                                                    |      |      |      |      |      |  |
|                                                              | Z (-40℃) / Z (+20℃)                                                                                                                                                                                                                                                                 | 3max.                                                                    |      |      |      |      |      |  |
| Endurance                                                    | (at 120Hz)                                                                                                                                                                                                                                                                          |                                                                          |      |      |      |      |      |  |
|                                                              | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for the specified period of time at 105℃.                      |                                                                          |      |      |      |      |      |  |
|                                                              | Time                                                                                                                                                                                                                                                                                | φ 5 & φ 6.3 : 6,000hours   φ 8 : 8,000hours   φ 10 to φ 18 : 10,000hours |      |      |      |      |      |  |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                  | ≤ ± 25% of the initial value (6.3, 10V <sub>dc</sub> : ≤ ± 30%)          |      |      |      |      |      |  |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                       | ≤200% of the initial specified value                                     |      |      |      |      |      |  |
| Shelf Life                                                   | Leakage current                                                                                                                                                                                                                                                                     | ≤ The initial specified value                                            |      |      |      |      |      |  |
|                                                              | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 500 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                                                          |      |      |      |      |      |  |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                  | ≤ ± 25% of the initial value (6.3, 10V <sub>dc</sub> : ≤ ± 30%)          |      |      |      |      |      |  |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                       | ≤200% of the initial specified value                                     |      |      |      |      |      |  |
|                                                              | Leakage current                                                                                                                                                                                                                                                                     | ≤ The initial specified value                                            |      |      |      |      |      |  |

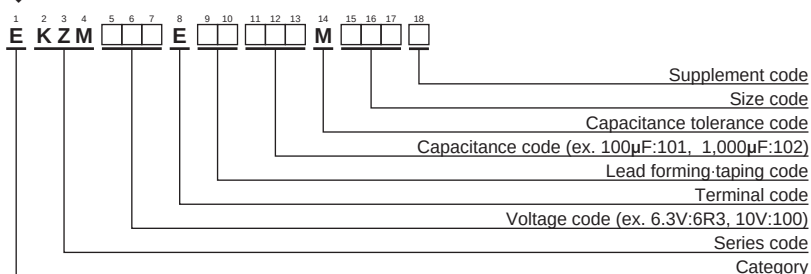
## DIMENSIONS [mm]

- Terminal Code : E



| φD  | 5          | 6.3 | 8   | 10  | 12.5 | 16  | 18  |
|-----|------------|-----|-----|-----|------|-----|-----|
| φd  | 0.5        | 0.5 | 0.6 | 0.6 | 0.6  | 0.8 | 0.8 |
| F   | 2.0        | 2.5 | 3.5 | 5.0 | 5.0  | 7.5 | 7.5 |
| φD' | φD+0.5max. |     |     |     |      |     |     |
| L'  | L+1.5max.  |     |     |     |      |     |     |

## PART NUMBERING SYSTEM



Please refer to "Product code guide (radial lead type)"

## RATED RIPPLE CURRENT MULTIPLIERS

- Frequency Multipliers

| Capacitance(μF) | Frequency(Hz) | 120  | 1k   | 10k  | 100k |
|-----------------|---------------|------|------|------|------|
| 27 to 180       |               | 0.40 | 0.75 | 0.90 | 1.00 |
| 220 to 560      |               | 0.50 | 0.85 | 0.94 | 1.00 |
| 680 to 1,800    |               | 0.60 | 0.87 | 0.95 | 1.00 |
| 2,200 to 3,900  |               | 0.75 | 0.90 | 0.95 | 1.00 |
| 4,700 to 10,000 |               | 0.85 | 0.95 | 0.98 | 1.00 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.





## KZM Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Impedance<br>(Ω max./100kHz) |       | Rated ripple current<br>(mA <sub>rms</sub> /105°C, 100kHz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|------------------------------|-------|------------------------------------------------------------|--------------------|
|                          |             |                       |       | 20°C                         | -10°C |                                                            |                    |
| 6.3                      | 220         | 5×11                  | 0.22  | 0.22                         | 0.80  | 345                                                        | EKZM6R3E□□221ME11D |
|                          | 470         | 6.3×11                | 0.22  | 0.094                        | 0.35  | 540                                                        | EKZM6R3E□□471MF11D |
|                          | 820         | 8×11.5                | 0.22  | 0.056                        | 0.19  | 945                                                        | EKZM6R3E□□821MHB5D |
|                          | 1,200       | 8×15                  | 0.22  | 0.045                        | 0.15  | 1,250                                                      | EKZM6R3E□□122MH15D |
|                          | 1,200       | 10×12.5               | 0.22  | 0.039                        | 0.14  | 1,330                                                      | EKZM6R3E□□122MJC5S |
|                          | 1,500       | 8×20                  | 0.22  | 0.029                        | 0.11  | 1,500                                                      | EKZM6R3E□□152MH20D |
|                          | 1,800       | 10×16                 | 0.22  | 0.028                        | 0.10  | 1,760                                                      | EKZM6R3E□□182MJ16S |
|                          | 2,200       | 10×20                 | 0.24  | 0.020                        | 0.060 | 1,960                                                      | EKZM6R3E□□222MJ20S |
|                          | 2,700       | 10×25                 | 0.24  | 0.018                        | 0.054 | 2,250                                                      | EKZM6R3E□□272MJ25S |
|                          | 3,900       | 12.5×20               | 0.26  | 0.017                        | 0.043 | 2,480                                                      | EKZM6R3E□□392MK20S |
|                          | 4,700       | 12.5×25               | 0.28  | 0.015                        | 0.038 | 2,900                                                      | EKZM6R3E□□472MK25S |
|                          | 5,600       | 12.5×30               | 0.30  | 0.013                        | 0.033 | 3,450                                                      | EKZM6R3E□□562MK30S |
|                          | 6,800       | 12.5×35               | 0.32  | 0.012                        | 0.031 | 3,570                                                      | EKZM6R3E□□682MK35S |
|                          | 6,800       | 16×20                 | 0.32  | 0.015                        | 0.038 | 3,250                                                      | EKZM6R3E□□682ML20S |
| 10                       | 150         | 5×11                  | 0.19  | 0.22                         | 0.80  | 345                                                        | EKZM100E□□151ME11D |
|                          | 330         | 6.3×11                | 0.19  | 0.094                        | 0.35  | 540                                                        | EKZM100E□□331MF11D |
|                          | 680         | 8×11.5                | 0.19  | 0.056                        | 0.19  | 945                                                        | EKZM100E□□681MHB5D |
|                          | 1,000       | 8×15                  | 0.19  | 0.045                        | 0.15  | 1,250                                                      | EKZM100E□□102MH15D |
|                          | 1,000       | 10×12.5               | 0.19  | 0.039                        | 0.14  | 1,330                                                      | EKZM100E□□102MJC5S |
|                          | 1,500       | 8×20                  | 0.19  | 0.029                        | 0.11  | 1,500                                                      | EKZM100E□□152MH20D |
|                          | 1,500       | 10×16                 | 0.19  | 0.028                        | 0.10  | 1,760                                                      | EKZM100E□□152MJ16S |
|                          | 1,800       | 10×20                 | 0.19  | 0.020                        | 0.060 | 1,960                                                      | EKZM100E□□182MJ20S |
|                          | 2,200       | 10×25                 | 0.21  | 0.018                        | 0.054 | 2,250                                                      | EKZM100E□□222MJ25S |
|                          | 3,300       | 12.5×20               | 0.23  | 0.017                        | 0.043 | 2,480                                                      | EKZM100E□□332MK20S |
|                          | 3,900       | 12.5×25               | 0.23  | 0.015                        | 0.038 | 2,900                                                      | EKZM100E□□392MK25S |
|                          | 4,700       | 12.5×30               | 0.25  | 0.013                        | 0.033 | 3,450                                                      | EKZM100E□□472MK30S |
|                          | 4,700       | 16×20                 | 0.25  | 0.015                        | 0.038 | 3,250                                                      | EKZM100E□□472ML20S |
|                          | 5,600       | 12.5×35               | 0.27  | 0.012                        | 0.031 | 3,570                                                      | EKZM100E□□562MK35S |
| 16                       | 6,800       | 16×25                 | 0.29  | 0.013                        | 0.035 | 3,630                                                      | EKZM100E□□682ML25S |
|                          | 8,200       | 18×25                 | 0.33  | 0.012                        | 0.031 | 3,650                                                      | EKZM100E□□822MM25S |
|                          | 100         | 5×11                  | 0.16  | 0.22                         | 0.80  | 345                                                        | EKZM160E□□101ME11D |
|                          | 220         | 6.3×11                | 0.16  | 0.094                        | 0.35  | 540                                                        | EKZM160E□□221MF11D |
|                          | 470         | 8×11.5                | 0.16  | 0.056                        | 0.19  | 945                                                        | EKZM160E□□471MHB5D |
|                          | 680         | 8×15                  | 0.16  | 0.045                        | 0.15  | 1,250                                                      | EKZM160E□□681MH15D |
|                          | 680         | 10×12.5               | 0.16  | 0.039                        | 0.14  | 1,330                                                      | EKZM160E□□681MJC5S |
|                          | 1,000       | 8×20                  | 0.16  | 0.029                        | 0.11  | 1,500                                                      | EKZM160E□□102MH20D |
|                          | 1,000       | 10×16                 | 0.16  | 0.028                        | 0.10  | 1,760                                                      | EKZM160E□□102MJ16S |
|                          | 1,500       | 10×20                 | 0.16  | 0.020                        | 0.060 | 1,960                                                      | EKZM160E□□152MJ20S |
|                          | 1,800       | 10×25                 | 0.16  | 0.018                        | 0.054 | 2,250                                                      | EKZM160E□□182MJ25S |
|                          | 2,200       | 12.5×20               | 0.18  | 0.017                        | 0.043 | 2,480                                                      | EKZM160E□□222MK20S |
|                          | 2,700       | 12.5×25               | 0.18  | 0.015                        | 0.038 | 2,900                                                      | EKZM160E□□272MK25S |
|                          | 3,300       | 12.5×30               | 0.20  | 0.013                        | 0.033 | 3,450                                                      | EKZM160E□□332MK30S |
|                          | 3,300       | 16×20                 | 0.20  | 0.015                        | 0.038 | 3,250                                                      | EKZM160E□□332ML20S |
|                          | 3,900       | 12.5×35               | 0.20  | 0.012                        | 0.031 | 3,570                                                      | EKZM160E□□392MK35S |
|                          | 4,700       | 16×25                 | 0.22  | 0.013                        | 0.035 | 3,630                                                      | EKZM160E□□472ML25S |
|                          | 5,600       | 18×25                 | 0.24  | 0.012                        | 0.031 | 3,650                                                      | EKZM160E□□562MM25S |

□□ : Enter the appropriate lead forming or taping code.

Production of the products shown in □□□□ is scheduled to be discontinued.





## KZM Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Impedance<br>(Ω max./100kHz) |       | Rated ripple current<br>(mA <sub>rms</sub> /105°C, 100kHz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|------------------------------|-------|------------------------------------------------------------|--------------------|
|                          |             |                       |       | 20°C                         | -10°C |                                                            |                    |
| 25                       | 68          | 5×11                  | 0.14  | 0.22                         | 0.80  | 345                                                        | EKZM250E□□680ME11D |
|                          | 150         | 6.3×11                | 0.14  | 0.094                        | 0.35  | 540                                                        | EKZM250E□□151MF11D |
|                          | 330         | 8×11.5                | 0.14  | 0.056                        | 0.19  | 945                                                        | EKZM250E□□331MHB5D |
|                          | 390         | 8×15                  | 0.14  | 0.045                        | 0.15  | 1,250                                                      | EKZM250E□□391MH15D |
|                          | 470         | 10×12.5               | 0.14  | 0.039                        | 0.14  | 1,330                                                      | EKZM250E□□471MJC5S |
|                          | 560         | 8×20                  | 0.14  | 0.029                        | 0.11  | 1,500                                                      | EKZM250E□□561MH20D |
|                          | 680         | 10×16                 | 0.14  | 0.028                        | 0.10  | 1,760                                                      | EKZM250E□□681MJ16S |
|                          | 820         | 10×20                 | 0.14  | 0.020                        | 0.060 | 1,960                                                      | EKZM250E□□821MJ20S |
|                          | 1,000       | 10×25                 | 0.14  | 0.018                        | 0.054 | 2,250                                                      | EKZM250E□□102MJ25S |
|                          | 1,500       | 12.5×20               | 0.14  | 0.017                        | 0.043 | 2,480                                                      | EKZM250E□□152MK20S |
|                          | 1,800       | 12.5×25               | 0.14  | 0.015                        | 0.038 | 2,900                                                      | EKZM250E□□182MK25S |
|                          | 2,200       | 12.5×30               | 0.16  | 0.013                        | 0.033 | 3,450                                                      | EKZM250E□□222MK30S |
|                          | 2,200       | 16×20                 | 0.16  | 0.015                        | 0.038 | 3,250                                                      | EKZM250E□□222ML20S |
|                          | 2,700       | 12.5×35               | 0.16  | 0.012                        | 0.031 | 3,570                                                      | EKZM250E□□272MK35S |
|                          | 3,300       | 16×25                 | 0.18  | 0.013                        | 0.035 | 3,630                                                      | EKZM250E□□332ML25S |
|                          | 3,900       | 18×25                 | 0.18  | 0.012                        | 0.031 | 3,650                                                      | EKZM250E□□392MM25S |
| 35                       | 47          | 5×11                  | 0.12  | 0.22                         | 0.80  | 345                                                        | EKZM350E□□470ME11D |
|                          | 100         | 6.3×11                | 0.12  | 0.094                        | 0.35  | 540                                                        | EKZM350E□□101MF11D |
|                          | 220         | 8×11.5                | 0.12  | 0.056                        | 0.19  | 945                                                        | EKZM350E□□221MHB5D |
|                          | 270         | 8×15                  | 0.12  | 0.045                        | 0.15  | 1,250                                                      | EKZM350E□□271MH15D |
|                          | 330         | 10×12.5               | 0.12  | 0.039                        | 0.14  | 1,330                                                      | EKZM350E□□331MJC5S |
|                          | 390         | 8×20                  | 0.12  | 0.029                        | 0.11  | 1,500                                                      | EKZM350E□□391MH20D |
|                          | 470         | 10×16                 | 0.12  | 0.028                        | 0.10  | 1,760                                                      | EKZM350E□□471MJ16S |
|                          | 560         | 10×20                 | 0.12  | 0.020                        | 0.060 | 1,960                                                      | EKZM350E□□561MJ20S |
|                          | 680         | 10×25                 | 0.12  | 0.018                        | 0.054 | 2,250                                                      | EKZM350E□□681MJ25S |
|                          | 1,000       | 12.5×20               | 0.12  | 0.017                        | 0.043 | 2,480                                                      | EKZM350E□□102MK20S |
|                          | 1,200       | 12.5×25               | 0.12  | 0.015                        | 0.038 | 2,900                                                      | EKZM350E□□122MK25S |
|                          | 1,500       | 12.5×30               | 0.12  | 0.013                        | 0.033 | 3,450                                                      | EKZM350E□□152MK30S |
|                          | 1,500       | 16×20                 | 0.12  | 0.015                        | 0.038 | 3,250                                                      | EKZM350E□□152ML20S |
|                          | 1,800       | 12.5×35               | 0.12  | 0.012                        | 0.031 | 3,570                                                      | EKZM350E□□182MK35S |
|                          | 2,200       | 16×25                 | 0.14  | 0.013                        | 0.035 | 3,630                                                      | EKZM350E□□222ML25S |
|                          | 2,700       | 18×25                 | 0.14  | 0.012                        | 0.031 | 3,650                                                      | EKZM350E□□272MM25S |
| 50                       | 27          | 5×11                  | 0.10  | 0.34                         | 1.18  | 238                                                        | EKZM500E□□270ME11D |
|                          | 56          | 6.3×11                | 0.10  | 0.14                         | 0.50  | 385                                                        | EKZM500E□□560MF11D |
|                          | 100         | 8×11.5                | 0.10  | 0.074                        | 0.22  | 724                                                        | EKZM500E□□101MHB5D |
|                          | 120         | 8×15                  | 0.10  | 0.061                        | 0.18  | 950                                                        | EKZM500E□□121MH15D |
|                          | 150         | 10×12.5               | 0.10  | 0.061                        | 0.18  | 979                                                        | EKZM500E□□151MJC5S |
|                          | 180         | 8×20                  | 0.10  | 0.046                        | 0.14  | 1,190                                                      | EKZM500E□□181MH20D |
|                          | 220         | 10×16                 | 0.10  | 0.042                        | 0.12  | 1,370                                                      | EKZM500E□□221MJ16S |
|                          | 270         | 10×20                 | 0.10  | 0.030                        | 0.090 | 1,580                                                      | EKZM500E□□271MJ20S |
|                          | 330         | 10×25                 | 0.10  | 0.028                        | 0.085 | 1,870                                                      | EKZM500E□□331MJ25S |
|                          | 470         | 12.5×20               | 0.10  | 0.027                        | 0.068 | 2,050                                                      | EKZM500E□□471MK20S |
|                          | 560         | 12.5×25               | 0.10  | 0.023                        | 0.059 | 2,410                                                      | EKZM500E□□561MK25S |
|                          | 680         | 12.5×30               | 0.10  | 0.021                        | 0.052 | 2,860                                                      | EKZM500E□□681MK30S |
|                          | 820         | 12.5×35               | 0.10  | 0.019                        | 0.051 | 2,960                                                      | EKZM500E□□821MK35S |
|                          | 820         | 16×20                 | 0.10  | 0.023                        | 0.059 | 2,730                                                      | EKZM500E□□821ML20S |
|                          | 1,000       | 16×25                 | 0.10  | 0.021                        | 0.056 | 3,010                                                      | EKZM500E□□102ML25S |
|                          | 1,500       | 18×25                 | 0.10  | 0.019                        | 0.051 | 3,290                                                      | EKZM500E□□152MM25S |

□□ : Enter the appropriate lead forming or taping code.

Production of the products shown in □□□□ is scheduled to be discontinued.

# KZH Series

- Newly innovative electrolyte is employed to minimize impedance
- Endurance with ripple current: 5,000 to 6,000 hours at 105°C
- Non solvent resistant type
- RoHS2 Compliant

KZM  
↑ Longer life  
**KZH**  
↑ Lower Z  
KZE

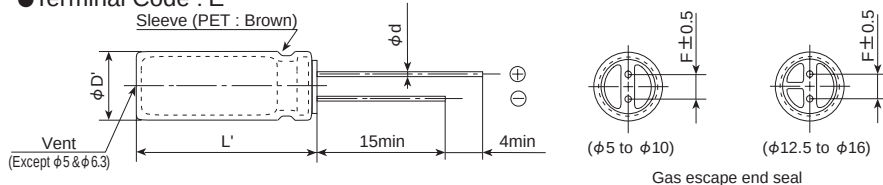


## SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                     |                                                                 |      |      |      |      |  |
|--------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|------|------|------|------|--|
| Category                                               | -40 to +105℃                                                                                                                                                                                                                                                                        |                                                                 |      |      |      |      |  |
| Temperature Range                                      |                                                                                                                                                                                                                                                                                     |                                                                 |      |      |      |      |  |
| Rated Voltage Range                                    | 6.3 to 35V <sub>dc</sub>                                                                                                                                                                                                                                                            |                                                                 |      |      |      |      |  |
| Capacitance Tolerance                                  | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                           |                                                                 |      |      |      |      |  |
| Leakage Current                                        | I=0.01CV or 3μA, whichever is greater.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 2 minutes)                                                                                                                        |                                                                 |      |      |      |      |  |
| Dissipation Factor (tan δ )                            | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                    | 6.3V                                                            | 10V  | 16V  | 25V  | 35V  |  |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                        | 0.22                                                            | 0.19 | 0.16 | 0.14 | 0.12 |  |
|                                                        | When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase. (at 20℃, 120Hz)                                                                                                                                                                    |                                                                 |      |      |      |      |  |
| Low Temperature Characteristics (Max. Impedance Ratio) | Z (-25℃) / Z (+20℃)                                                                                                                                                                                                                                                                 | 2max.                                                           |      |      |      |      |  |
|                                                        | Z (-40℃) / Z (+20℃)                                                                                                                                                                                                                                                                 | 3max.                                                           |      |      |      |      |  |
| Endurance                                              | (at 120Hz)                                                                                                                                                                                                                                                                          |                                                                 |      |      |      |      |  |
|                                                        | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage)for the specified period of time at 105℃.                       |                                                                 |      |      |      |      |  |
|                                                        | Time                                                                                                                                                                                                                                                                                | φ 5 & φ 6.3 : 5,000hours φ 8 to φ 16 : 6,000hours               |      |      |      |      |  |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                  | ≤ ± 25% of the initial value (6.3, 10V <sub>dc</sub> : ≤ ± 30%) |      |      |      |      |  |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                       | ≤ 200% of the initial specified value                           |      |      |      |      |  |
| Shelf Life                                             | Leakage current                                                                                                                                                                                                                                                                     | ≤ The initial specified value                                   |      |      |      |      |  |
|                                                        | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 500 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                                                 |      |      |      |      |  |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                  | ≤ ± 25% of the initial value (6.3, 10V <sub>dc</sub> : ≤ ± 30%) |      |      |      |      |  |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                       | ≤ 200% of the initial specified value                           |      |      |      |      |  |
|                                                        | Leakage current                                                                                                                                                                                                                                                                     | ≤ The initial specified value                                   |      |      |      |      |  |

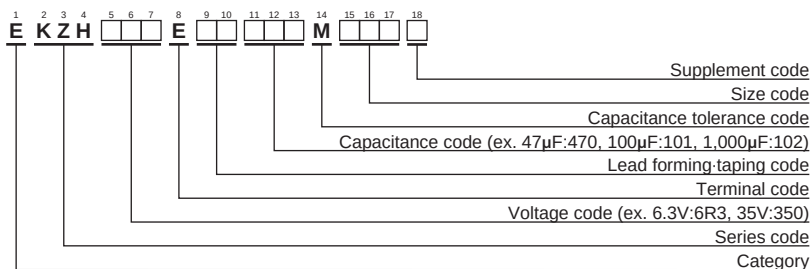
## DIMENSIONS [mm]

### Terminal Code : E



| φD  | 5          | 6.3 | 8   | 10  | 12.5 | 16  |
|-----|------------|-----|-----|-----|------|-----|
| φd  | 0.5        | 0.5 | 0.6 | 0.6 | 0.6  | 0.8 |
| F   | 2.0        | 2.5 | 3.5 | 5.0 | 5.0  | 7.5 |
| φD' | φD+0.5max. |     |     |     |      |     |
| L'  | L+1.5max.  |     |     |     |      |     |

## PART NUMBERING SYSTEM



Please refer to "Product code guide (radial lead type)"



## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | Impedance<br>(Ω max./100kHz) |       | Rated<br>ripple<br>current<br>(mA <sub>rms</sub> /105°C, 100kHz) | Part No.           |
|--------------------------|-------------|-----------------------|------------------------------|-------|------------------------------------------------------------------|--------------------|
|                          |             |                       | 20°C                         | -10°C |                                                                  |                    |
| 6.3                      | 220         | 5×11                  | 0.24                         | 0.80  | 330                                                              | EKZH6R3E□□221ME11D |
|                          | 470         | 6.3×11                | 0.11                         | 0.35  | 500                                                              | EKZH6R3E□□471MF11D |
|                          | 820         | 8×11.5                | 0.062                        | 0.19  | 900                                                              | EKZH6R3E□□821MHB5D |
|                          | 1,200       | 8×15                  | 0.048                        | 0.15  | 1,210                                                            | EKZH6R3E□□122MH15D |
|                          | 1,200       | 10×12.5               | 0.045                        | 0.14  | 1,240                                                            | EKZH6R3E□□122MJC5S |
|                          | 1,500       | 8×20                  | 0.033                        | 0.11  | 1,410                                                            | EKZH6R3E□□152MH20D |
|                          | 1,800       | 10×16                 | 0.032                        | 0.10  | 1,650                                                            | EKZH6R3E□□182MJ16S |
|                          | 2,200       | 10×20                 | 0.020                        | 0.060 | 1,960                                                            | EKZH6R3E□□222MJ20S |
|                          | 2,700       | 10×25                 | 0.018                        | 0.054 | 2,250                                                            | EKZH6R3E□□272MJ25S |
|                          | 3,900       | 12.5×20               | 0.017                        | 0.043 | 2,480                                                            | EKZH6R3E□□392MK20S |
|                          | 4,700       | 12.5×25               | 0.015                        | 0.038 | 2,900                                                            | EKZH6R3E□□472MK25S |
|                          | 5,600       | 12.5×30               | 0.013                        | 0.033 | 3,450                                                            | EKZH6R3E□□562MK30S |
|                          | 6,800       | 12.5×35               | 0.012                        | 0.031 | 3,570                                                            | EKZH6R3E□□682MK35S |
|                          | 6,800       | 16×20                 | 0.015                        | 0.038 | 3,250                                                            | EKZH6R3E□□682ML20S |
|                          | 8,200       | 16×25                 | 0.013                        | 0.035 | 3,630                                                            | EKZH6R3E□□822ML25S |
| 10                       | 150         | 5×11                  | 0.24                         | 0.80  | 330                                                              | EKZH100E□□151ME11D |
|                          | 330         | 6.3×11                | 0.11                         | 0.35  | 500                                                              | EKZH100E□□331MF11D |
|                          | 680         | 8×11.5                | 0.062                        | 0.19  | 900                                                              | EKZH100E□□681MHB5D |
|                          | 1,000       | 8×15                  | 0.048                        | 0.15  | 1,210                                                            | EKZH100E□□102MH15D |
|                          | 1,000       | 10×12.5               | 0.045                        | 0.14  | 1,240                                                            | EKZH100E□□102MJC5S |
|                          | 1,500       | 8×20                  | 0.033                        | 0.11  | 1,410                                                            | EKZH100E□□152MH20D |
|                          | 1,500       | 10×16                 | 0.032                        | 0.10  | 1,650                                                            | EKZH100E□□152MJ16S |
|                          | 1,800       | 10×20                 | 0.020                        | 0.060 | 1,960                                                            | EKZH100E□□182MJ20S |
|                          | 2,200       | 10×25                 | 0.018                        | 0.054 | 2,250                                                            | EKZH100E□□222MJ25S |
|                          | 3,300       | 12.5×20               | 0.017                        | 0.043 | 2,480                                                            | EKZH100E□□332MK20S |
|                          | 3,900       | 12.5×25               | 0.015                        | 0.038 | 2,900                                                            | EKZH100E□□392MK25S |
|                          | 4,700       | 12.5×30               | 0.013                        | 0.033 | 3,450                                                            | EKZH100E□□472MK30S |
|                          | 4,700       | 16×20                 | 0.015                        | 0.038 | 3,250                                                            | EKZH100E□□472ML20S |
|                          | 5,600       | 12.5×35               | 0.012                        | 0.031 | 3,570                                                            | EKZH100E□□562MK35S |
|                          | 6,800       | 16×25                 | 0.013                        | 0.035 | 3,630                                                            | EKZH100E□□682ML25S |
| 16                       | 100         | 5×11                  | 0.24                         | 0.80  | 330                                                              | EKZH160E□□101ME11D |
|                          | 220         | 6.3×11                | 0.11                         | 0.35  | 500                                                              | EKZH160E□□221MF11D |
|                          | 470         | 8×11.5                | 0.062                        | 0.19  | 900                                                              | EKZH160E□□471MHB5D |
|                          | 680         | 8×15                  | 0.048                        | 0.15  | 1,210                                                            | EKZH160E□□681MH15D |
|                          | 680         | 10×12.5               | 0.045                        | 0.14  | 1,240                                                            | EKZH160E□□681MJC5S |
|                          | 1,000       | 8×20                  | 0.033                        | 0.11  | 1,410                                                            | EKZH160E□□102MH20D |
|                          | 1,000       | 10×16                 | 0.032                        | 0.10  | 1,650                                                            | EKZH160E□□102MJ16S |
|                          | 1,500       | 10×20                 | 0.020                        | 0.060 | 1,960                                                            | EKZH160E□□152MJ20S |
| 25                       | 1,800       | 10×25                 | 0.018                        | 0.054 | 2,250                                                            | EKZH160E□□182MJ25S |
|                          | 2,200       | 12.5×20               | 0.017                        | 0.043 | 2,480                                                            | EKZH160E□□222MK20S |
|                          | 2,700       | 12.5×25               | 0.015                        | 0.038 | 2,900                                                            | EKZH160E□□272MK25S |
|                          | 3,300       | 12.5×30               | 0.013                        | 0.033 | 3,450                                                            | EKZH160E□□332MK30S |
|                          | 3,300       | 16×20                 | 0.015                        | 0.038 | 3,250                                                            | EKZH160E□□332ML20S |
|                          | 3,900       | 12.5×35               | 0.012                        | 0.031 | 3,570                                                            | EKZH160E□□392MK35S |
|                          | 4,700       | 16×25                 | 0.013                        | 0.035 | 3,630                                                            | EKZH160E□□472ML25S |
| 35                       | 68          | 5×11                  | 0.24                         | 0.80  | 330                                                              | EKZH250E□□680ME11D |
|                          | 150         | 6.3×11                | 0.11                         | 0.35  | 500                                                              | EKZH250E□□151MF11D |
|                          | 330         | 8×11.5                | 0.062                        | 0.19  | 900                                                              | EKZH250E□□331MHB5D |
|                          | 390         | 8×15                  | 0.048                        | 0.15  | 1,210                                                            | EKZH250E□□391MH15D |
|                          | 470         | 10×12.5               | 0.045                        | 0.14  | 1,240                                                            | EKZH250E□□471MJC5S |
|                          | 560         | 8×20                  | 0.033                        | 0.11  | 1,410                                                            | EKZH250E□□561MH20D |
|                          | 680         | 10×16                 | 0.032                        | 0.10  | 1,650                                                            | EKZH250E□□681MJ16S |
|                          | 820         | 10×20                 | 0.020                        | 0.060 | 1,960                                                            | EKZH250E□□821MJ20S |
|                          | 1,000       | 10×25                 | 0.018                        | 0.054 | 2,250                                                            | EKZH250E□□102MJ25S |
|                          | 1,500       | 12.5×20               | 0.017                        | 0.043 | 2,480                                                            | EKZH250E□□152MK20S |
|                          | 1,800       | 12.5×25               | 0.015                        | 0.038 | 2,900                                                            | EKZH250E□□182MK25S |
|                          | 2,200       | 12.5×30               | 0.013                        | 0.033 | 3,450                                                            | EKZH250E□□222MK30S |
|                          | 2,200       | 16×20                 | 0.015                        | 0.038 | 3,250                                                            | EKZH250E□□222ML20S |
|                          | 2,700       | 12.5×35               | 0.012                        | 0.031 | 3,570                                                            | EKZH250E□□272MK35S |
|                          | 3,300       | 16×25                 | 0.013                        | 0.035 | 3,630                                                            | EKZH250E□□332ML25S |
| 50                       | 47          | 5×11                  | 0.24                         | 0.80  | 330                                                              | EKZH350E□□470ME11D |
|                          | 100         | 6.3×11                | 0.11                         | 0.35  | 500                                                              | EKZH350E□□101MF11D |
|                          | 220         | 8×11.5                | 0.062                        | 0.19  | 900                                                              | EKZH350E□□221MHB5D |
|                          | 270         | 8×15                  | 0.048                        | 0.15  | 1,210                                                            | EKZH350E□□271MH15D |
|                          | 330         | 10×12.5               | 0.045                        | 0.14  | 1,240                                                            | EKZH350E□□331MJC5S |
|                          | 390         | 8×20                  | 0.033                        | 0.11  | 1,410                                                            | EKZH350E□□391MH20D |
|                          | 470         | 10×16                 | 0.032                        | 0.10  | 1,650                                                            | EKZH350E□□471MJ16S |
|                          | 560         | 10×20                 | 0.020                        | 0.060 | 1,960                                                            | EKZH350E□□561MJ20S |
|                          | 680         | 10×25                 | 0.018                        | 0.054 | 2,250                                                            | EKZH350E□□681MJ25S |
|                          | 1,000       | 12.5×20               | 0.017                        | 0.043 | 2,480                                                            | EKZH350E□□102MK20S |
|                          | 1,200       | 12.5×25               | 0.015                        | 0.038 | 2,900                                                            | EKZH350E□□122MK25S |
|                          | 1,500       | 12.5×30               | 0.013                        | 0.033 | 3,450                                                            | EKZH350E□□152MK30S |
|                          | 1,500       | 16×20                 | 0.015                        | 0.038 | 3,250                                                            | EKZH350E□□152ML20S |
|                          | 1,800       | 12.5×35               | 0.012                        | 0.031 | 3,570                                                            | EKZH350E□□182MK35S |
|                          | 2,200       | 16×25                 | 0.013                        | 0.035 | 3,630                                                            | EKZH350E□□222ML25S |

□□ : Enter the appropriate lead forming or taping code.

Production of the products shown in   is scheduled to be discontinued.

## ◆RATED RIPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

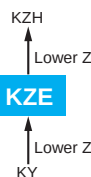
| Capacitance(μF) | Frequency(kHz) |      |      |      |
|-----------------|----------------|------|------|------|
|                 | 120            | 1k   | 10k  | 100k |
| 0.47 to 150     | 0.40           | 0.75 | 0.90 | 1.00 |
| 220 to 560      | 0.50           | 0.85 | 0.94 | 1.00 |
| 680 to 1,800    | 0.60           | 0.87 | 0.95 | 1.00 |
| 2,200 to 3,900  | 0.75           | 0.90 | 0.95 | 1.00 |
| 4,700 to 8,200  | 0.85           | 0.95 | 0.98 | 1.00 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.



## KZE Series

- Newly innovative electrolyte is employed to minimize impedance
- Endurance with ripple current: 2,000 to 5,000 hours at 105°C
- Non solvent resistant type
- RoHS2 Compliant

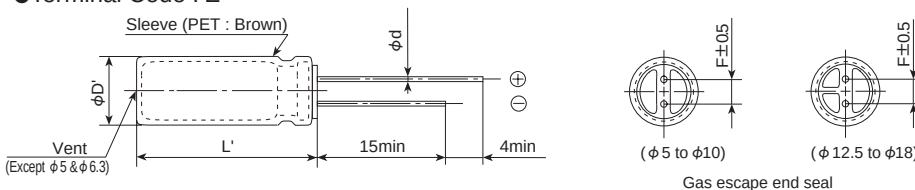


### SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                     |                                                                                               |      |      |      |      |      |      |      |      |  |
|--------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|--|
| Category                                               | -40 to +105℃                                                                                                                                                                                                                                                                        |                                                                                               |      |      |      |      |      |      |      |      |  |
| Temperature Range                                      | -40 to +105℃                                                                                                                                                                                                                                                                        |                                                                                               |      |      |      |      |      |      |      |      |  |
| Rated Voltage Range                                    | 6.3 to 100V <sub>dc</sub>                                                                                                                                                                                                                                                           |                                                                                               |      |      |      |      |      |      |      |      |  |
| Capacitance Tolerance                                  | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                           |                                                                                               |      |      |      |      |      |      |      |      |  |
| Leakage Current                                        | I=0.01CV or 3μA, whichever is greater.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 2 minutes)                                                                                                                        |                                                                                               |      |      |      |      |      |      |      |      |  |
| Dissipation Factor (tan δ )                            | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                    | 6.3V                                                                                          | 10V  | 16V  | 25V  | 35V  | 50V  | 63V  | 80V  | 100V |  |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                        | 0.22                                                                                          | 0.19 | 0.16 | 0.14 | 0.12 | 0.10 | 0.09 | 0.09 | 0.08 |  |
|                                                        | When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase. (at 20℃, 120Hz)                                                                                                                                                                    |                                                                                               |      |      |      |      |      |      |      |      |  |
| Low Temperature Characteristics (Max. Impedance Ratio) | Z (-25℃) / Z (+20℃)                                                                                                                                                                                                                                                                 | 2max.                                                                                         |      |      |      |      |      |      |      |      |  |
|                                                        | Z (-40℃) / Z (+20℃)                                                                                                                                                                                                                                                                 | 3max.                                                                                         |      |      |      |      |      |      |      |      |  |
| Endurance                                              | (at 120Hz)                                                                                                                                                                                                                                                                          |                                                                                               |      |      |      |      |      |      |      |      |  |
|                                                        | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for the specified period of time at 105℃.                      |                                                                                               |      |      |      |      |      |      |      |      |  |
|                                                        | Time                                                                                                                                                                                                                                                                                | φ 5 & φ 6.3 : 2,000hours   φ 8 : 3,000hours   φ 10 : 4,000hours   φ 12.5 to φ 18 : 5,000hours |      |      |      |      |      |      |      |      |  |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                  | ≤ ± 25% of the initial value                                                                  |      |      |      |      |      |      |      |      |  |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                       | ≤ 200% of the initial specified value                                                         |      |      |      |      |      |      |      |      |  |
| Shelf Life                                             | Leakage current                                                                                                                                                                                                                                                                     | ≤ The initial specified value                                                                 |      |      |      |      |      |      |      |      |  |
|                                                        | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 500 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                                                                               |      |      |      |      |      |      |      |      |  |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                  | ≤ ± 25% of the initial value                                                                  |      |      |      |      |      |      |      |      |  |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                       | ≤ 200% of the initial specified value                                                         |      |      |      |      |      |      |      |      |  |
|                                                        | Leakage current                                                                                                                                                                                                                                                                     | ≤ The initial specified value                                                                 |      |      |      |      |      |      |      |      |  |

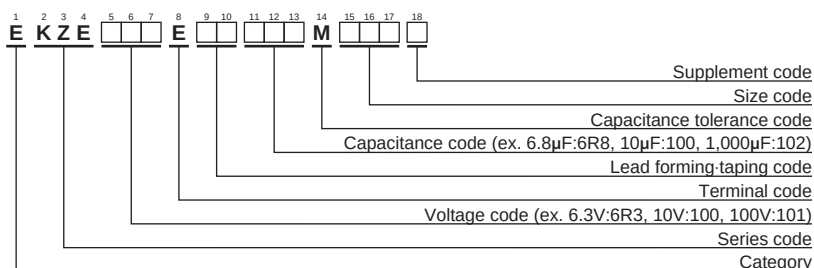
### DIMENSIONS [mm]

#### Terminal Code : E



| φD  | 5           | 6.3 | 8   | 10, 12.5 | 16, 18 |
|-----|-------------|-----|-----|----------|--------|
| φd  | 0.5         | 0.5 | 0.6 | 0.6      | 0.8    |
| F   | 2.0         | 2.5 | 3.5 | 5.0      | 7.5    |
| φD' | φ D+0.5max. |     |     |          |        |
| L'  | L+1.5max.   |     |     |          |        |

### PART NUMBERING SYSTEM



Please refer to "Product code guide (radial lead type)"



## ◆ STANDARD RATINGS

| VV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | Impedance<br>(Ω max./100kHz) |       | Rated<br>ripple<br>current<br>(mA rms/<br>105°C,<br>100kHz) | Part No.           |
|--------------------------|-------------|-----------------------|------------------------------|-------|-------------------------------------------------------------|--------------------|
|                          |             |                       | 20°C                         | -10°C |                                                             |                    |
| 6.3                      | 150         | 5×11                  | 0.30                         | 1.0   | 250                                                         | EKZE6R3E□□151ME11D |
|                          | 330         | 6.3×11                | 0.13                         | 0.41  | 405                                                         | EKZE6R3E□□331MF11D |
|                          | 560         | 8×11.5                | 0.072                        | 0.22  | 760                                                         | EKZE6R3E□□561MHB5D |
|                          | 820         | 8×15                  | 0.056                        | 0.17  | 995                                                         | EKZE6R3E□□821MH15D |
|                          | 1,000       | 10×12.5               | 0.053                        | 0.16  | 1,030                                                       | EKZE6R3E□□102MJCS5 |
|                          | 1,200       | 8×20                  | 0.041                        | 0.13  | 1,250                                                       | EKZE6R3E□□122MH20D |
|                          | 1,200       | 10×16                 | 0.038                        | 0.12  | 1,430                                                       | EKZE6R3E□□122MJ16S |
|                          | 1,500       | 10×20                 | 0.023                        | 0.069 | 1,820                                                       | EKZE6R3E□□152MJ20S |
|                          | 2,200       | 10×25                 | 0.022                        | 0.066 | 2,150                                                       | EKZE6R3E□□222MJ25S |
|                          | 3,300       | 12.5×20               | 0.021                        | 0.053 | 2,360                                                       | EKZE6R3E□□332MK20S |
|                          | 3,900       | 12.5×25               | 0.018                        | 0.045 | 2,770                                                       | EKZE6R3E□□392MK25S |
|                          | 4,700       | 12.5×30               | 0.016                        | 0.041 | 3,290                                                       | EKZE6R3E□□472MK30S |
|                          | 5,600       | 12.5×35               | 0.015                        | 0.039 | 3,400                                                       | EKZE6R3E□□562MK35S |
|                          | 5,600       | 16×20                 | 0.018                        | 0.045 | 3,140                                                       | EKZE6R3E□□562ML20S |
| 10                       | 6,800       | 16×25                 | 0.016                        | 0.043 | 3,460                                                       | EKZE6R3E□□682ML25S |
|                          | 100         | 5×11                  | 0.30                         | 1.0   | 250                                                         | EKZE100E□□101ME11D |
|                          | 220         | 6.3×11                | 0.13                         | 0.41  | 405                                                         | EKZE100E□□221MF11D |
|                          | 470         | 8×11.5                | 0.072                        | 0.22  | 760                                                         | EKZE100E□□471MHB5D |
|                          | 680         | 8×15                  | 0.056                        | 0.17  | 995                                                         | EKZE100E□□681MH15D |
|                          | 680         | 10×12.5               | 0.053                        | 0.16  | 1,030                                                       | EKZE100E□□681MJCS5 |
|                          | 1,000       | 8×20                  | 0.041                        | 0.13  | 1,250                                                       | EKZE100E□□102MH20D |
|                          | 1,000       | 10×16                 | 0.038                        | 0.12  | 1,430                                                       | EKZE100E□□102MJ16S |
|                          | 1,200       | 10×20                 | 0.023                        | 0.069 | 1,820                                                       | EKZE100E□□122MJ20S |
|                          | 1,500       | 10×25                 | 0.022                        | 0.066 | 2,150                                                       | EKZE100E□□152MJ25S |
|                          | 2,200       | 12.5×20               | 0.021                        | 0.053 | 2,360                                                       | EKZE100E□□222MK20S |
|                          | 3,300       | 12.5×25               | 0.018                        | 0.045 | 2,770                                                       | EKZE100E□□332MK25S |
|                          | 3,900       | 12.5×30               | 0.016                        | 0.041 | 3,290                                                       | EKZE100E□□392MK30S |
|                          | 3,900       | 16×20                 | 0.018                        | 0.045 | 3,140                                                       | EKZE100E□□392ML20S |
| 16                       | 4,700       | 12.5×35               | 0.015                        | 0.039 | 3,400                                                       | EKZE100E□□472MK35S |
|                          | 5,600       | 16×25                 | 0.016                        | 0.043 | 3,460                                                       | EKZE100E□□562ML25S |
|                          | 56          | 5×11                  | 0.30                         | 1.0   | 250                                                         | EKZE160E□□560ME11D |
|                          | 120         | 6.3×11                | 0.13                         | 0.41  | 405                                                         | EKZE160E□□121MF11D |
|                          | 330         | 8×11.5                | 0.072                        | 0.22  | 760                                                         | EKZE160E□□331MHB5D |
|                          | 470         | 8×15                  | 0.056                        | 0.17  | 995                                                         | EKZE160E□□471MH15D |
|                          | 470         | 10×12.5               | 0.053                        | 0.16  | 1,030                                                       | EKZE160E□□471MJCS5 |
|                          | 680         | 8×20                  | 0.041                        | 0.13  | 1,250                                                       | EKZE160E□□681MH20D |
|                          | 680         | 10×16                 | 0.038                        | 0.12  | 1,430                                                       | EKZE160E□□681MJ16S |
|                          | 1,000       | 10×20                 | 0.023                        | 0.069 | 1,820                                                       | EKZE160E□□102MJ20S |
|                          | 1,200       | 10×25                 | 0.022                        | 0.066 | 2,150                                                       | EKZE160E□□122MJ25S |
|                          | 1,500       | 12.5×20               | 0.021                        | 0.053 | 2,360                                                       | EKZE160E□□152MK20S |
|                          | 2,200       | 12.5×25               | 0.018                        | 0.045 | 2,770                                                       | EKZE160E□□222MK25S |
|                          | 2,700       | 12.5×30               | 0.016                        | 0.041 | 3,290                                                       | EKZE160E□□272MK30S |
| 25                       | 2,700       | 16×20                 | 0.018                        | 0.045 | 3,140                                                       | EKZE160E□□272ML20S |
|                          | 3,300       | 12.5×35               | 0.015                        | 0.039 | 3,400                                                       | EKZE160E□□332MK35S |
|                          | 3,900       | 16×25                 | 0.016                        | 0.043 | 3,460                                                       | EKZE160E□□392ML25S |
|                          | 47          | 5×11                  | 0.30                         | 1.0   | 250                                                         | EKZE250E□□470ME11D |
|                          | 100         | 6.3×11                | 0.13                         | 0.41  | 405                                                         | EKZE250E□□101MF11D |
|                          | 220         | 8×11.5                | 0.072                        | 0.22  | 760                                                         | EKZE250E□□221MHB5D |
|                          | 330         | 8×15                  | 0.056                        | 0.17  | 995                                                         | EKZE250E□□331MH15D |
|                          | 330         | 10×12.5               | 0.053                        | 0.16  | 1,030                                                       | EKZE250E□□331MJCS5 |
|                          | 470         | 8×20                  | 0.041                        | 0.13  | 1,250                                                       | EKZE250E□□471MH20D |
|                          | 470         | 10×16                 | 0.038                        | 0.12  | 1,430                                                       | EKZE250E□□471MJ16S |
|                          | 680         | 10×20                 | 0.023                        | 0.069 | 1,820                                                       | EKZE250E□□681MJ20S |
|                          | 820         | 10×25                 | 0.022                        | 0.066 | 2,150                                                       | EKZE250E□□821MJ25S |
|                          | 1,000       | 12.5×20               | 0.021                        | 0.053 | 2,360                                                       | EKZE250E□□102MK20S |
|                          | 1,500       | 12.5×25               | 0.018                        | 0.045 | 2,770                                                       | EKZE250E□□152MK25S |
| 35                       | 1,800       | 12.5×30               | 0.016                        | 0.041 | 3,290                                                       | EKZE250E□□182MK30S |
|                          | 1,800       | 16×20                 | 0.018                        | 0.045 | 3,140                                                       | EKZE250E□□182ML20S |
|                          | 2,200       | 12.5×35               | 0.015                        | 0.039 | 3,400                                                       | EKZE250E□□222MK35S |
|                          | 2,700       | 16×25                 | 0.016                        | 0.043 | 3,460                                                       | EKZE250E□□272ML25S |
|                          | 33          | 5×11                  | 0.30                         | 1.0   | 250                                                         | EKZE350E□□330ME11D |
|                          | 56          | 6.3×11                | 0.13                         | 0.41  | 405                                                         | EKZE350E□□560MF11D |
|                          | 150         | 8×11.5                | 0.072                        | 0.22  | 760                                                         | EKZE350E□□151MHB5D |
|                          | 220         | 8×15                  | 0.056                        | 0.17  | 995                                                         | EKZE350E□□221MH15D |
|                          | 220         | 10×12.5               | 0.053                        | 0.16  | 1,030                                                       | EKZE350E□□221MJCS5 |
|                          | 270         | 8×20                  | 0.041                        | 0.13  | 1,250                                                       | EKZE350E□□270MH20D |
|                          | 330         | 10×16                 | 0.038                        | 0.12  | 1,430                                                       | EKZE350E□□330MJ16S |
|                          | 470         | 10×20                 | 0.023                        | 0.069 | 1,820                                                       | EKZE350E□□470MJ20S |
|                          | 560         | 10×25                 | 0.022                        | 0.066 | 2,150                                                       | EKZE350E□□560MJ25S |
|                          | 680         | 12.5×20               | 0.021                        | 0.053 | 2,360                                                       | EKZE350E□□680MK20S |
| 50                       | 1,000       | 12.5×25               | 0.018                        | 0.045 | 2,770                                                       | EKZE350E□□102MK25S |
|                          | 1,200       | 12.5×30               | 0.016                        | 0.041 | 3,290                                                       | EKZE350E□□122MK30S |
|                          | 1,200       | 16×20                 | 0.018                        | 0.045 | 3,140                                                       | EKZE350E□□122ML20S |
|                          | 1,500       | 12.5×35               | 0.015                        | 0.039 | 3,400                                                       | EKZE350E□□152MK35S |
|                          | 1,800       | 16×25                 | 0.016                        | 0.043 | 3,460                                                       | EKZE350E□□182ML25S |
|                          | 22          | 5×11                  | 0.34                         | 1.18  | 238                                                         | EKZE500E□□220ME11D |
|                          | 56          | 6.3×11                | 0.14                         | 0.50  | 385                                                         | EKZE500E□□560MF11D |
|                          | 100         | 8×11.5                | 0.074                        | 0.22  | 724                                                         | EKZE500E□□101MHB5D |
|                          | 120         | 8×15                  | 0.061                        | 0.18  | 950                                                         | EKZE500E□□121MH15D |
|                          | 150         | 10×12.5               | 0.061                        | 0.18  | 979                                                         | EKZE500E□□151MJCS5 |
|                          | 180         | 8×20                  | 0.046                        | 0.14  | 1,190                                                       | EKZE500E□□181MH20D |
|                          | 220         | 10×16                 | 0.042                        | 0.12  | 1,370                                                       | EKZE500E□□221MJ16S |
|                          | 270         | 10×20                 | 0.030                        | 0.090 | 1,580                                                       | EKZE500E□□271MJ20S |
|                          | 330         | 10×25                 | 0.028                        | 0.085 | 1,870                                                       | EKZE500E□□331MJ25S |
| 63                       | 470         | 12.5×20               | 0.027                        | 0.068 | 2,050                                                       | EKZE500E□□471MK20S |
|                          | 560         | 12.5×25               | 0.023                        | 0.059 | 2,410                                                       | EKZE500E□□561MK25S |
|                          | 680         | 12.5×30               | 0.021                        | 0.052 | 2,860                                                       | EKZE500E□□681MK30S |
|                          | 820         | 12.5×35               | 0.019                        | 0.051 | 2,960                                                       | EKZE500E□□821MK35S |
|                          | 820         | 16×20                 | 0.023                        | 0.059 | 2,730                                                       | EKZE500E□□821ML20S |
|                          | 1,000       | 16×25                 | 0.021                        | 0.056 | 3,010                                                       | EKZE500E□□102ML25S |
|                          | 15          | 5×11                  | 0.88                         | 3.5   | 165                                                         | EKZE630E□□150ME11D |
|                          | 33          | 6.3×11                | 0.35                         | 1.4   | 265                                                         | EKZE630E□□330MF11D |
|                          | 56          | 8×11.5                | 0.22                         | 0.88  | 500                                                         | EKZE630E□□560MHB5D |
|                          | 82          | 8×15                  | 0.16                         | 0.64  | 665                                                         | EKZE630E□□820MH15D |
|                          | 82          | 10×12.5               | 0.11                         | 0.44  | 690                                                         | EKZE630E□□820MJCS5 |
|                          | 120         | 8×20                  | 0.12                         | 0.48  | 820                                                         | EKZE630E□□121MH20D |
|                          | 120         | 10×16                 | 0.076                        | 0.31  | 950                                                         | EKZE630E□□121MJ16S |
|                          | 180         | 10×20                 | 0.056                        | 0.23  | 1,150                                                       | EKZE630E□□181MJ20S |
| 80                       | 180         | 12.5×16               | 0.072                        | 0.29  | 1,150                                                       | EKZE630E□□181MK16S |
|                          | 220         | 10×25                 | 0.046                        | 0.19  | 1,350                                                       | EKZE630E□□221MJ25S |
|                          | 270         | 12.5×20               | 0.041                        | 0.13  | 1,500                                                       | EKZE630E□□271MK20S |
|                          | 390         | 12.5×25               | 0.031                        | 0.093 | 1,900                                                       | EKZE630E□□391MK25S |
|                          | 470         | 12.5×30               | 0.028                        | 0.084 | 2,300                                                       | EKZE630E□□471MK30S |
|                          | 470         | 16×20                 | 0.032                        | 0.096 | 2,000                                                       | EKZE630E□□471ML20S |
|                          | 560         | 12.5×35               | 0.024                        | 0.072 | 2,500                                                       | EKZE630E□□561MK35S |
|                          | 680         | 12.5×40               | 0.021                        | 0.063 | 2,800                                                       | EKZE630E□□681MK40S |
|                          | 680         | 16×25                 | 0.025                        | 0.075 | 2,600                                                       | EKZE630E□□681ML25S |
|                          | 680         | 18×20                 | 0.030                        | 0.090 | 2,500                                                       | EKZE630E□□681MM20S |
|                          | 820         | 16×31.5               | 0.021                        | 0.063 | 2,850                                                       | EKZE630E□□821MLN3S |
|                          | 820         | 18×25                 | 0.024                        | 0.072 | 2,800                                                       | EKZE630E□□821MM25S |
|                          | 1,000       | 16×35.5               | 0.019                        | 0.057 | 2,900                                                       | EKZE630E□□102MLP1S |
|                          | 1,200       | 16×40                 | 0.018                        | 0.054 | 3,400                                                       | EKZE630E□□122ML40S |
| 80                       | 1,200       | 18×31.5               | 0.020                        | 0.060 | 3,300                                                       | EKZE630E□□122MMN3S |
|                          | 1,500       | 18×35.5               | 0.018                        | 0.054 | 3,400                                                       | EKZE630E□□152MMP1S |
|                          | 1,800       | 18×40                 | 0.017                        | 0.051 | 3,500                                                       | EKZE630E□□182MM40S |
|                          | 68          | 10×12.5               | 0.17                         | 0.66  | 480                                                         | EKZE800E□□680MJCS5 |
|                          | 100         | 10×16                 | 0.11                         | 0.47  | 600                                                         | EKZE800E□□101MJ16S |
|                          | 120         | 10×20                 | 0.084                        | 0.34  | 800                                                         | EKZE800E□□121MJ20S |
|                          | 150         | 10×25                 | 0.069                        | 0.28  | 900                                                         | EKZE800E□□151MJ25S |
|                          | 150         | 12.5×16               | 0.11                         | 0.34  | 750                                                         | EKZE800E□□151MK16S |
|                          | 220         | 12.5×20               | 0.062                        | 0.18  | 1,100                                                       | EKZE800E□□221MK20S |
|                          | 330         | 12.5×25               | 0.047                        | 0.14  | 1,250                                                       | EKZE800E□□331MK25S |
|                          | 330         | 16×20                 | 0.048                        | 0.15  | 1,350                                                       | EKZE800E□□331ML20S |
|                          | 390         | 12.5×30               | 0.042                        | 0.13  | 1,500                                                       | EKZE800E□□391MK30S |
|                          | 470         | 12.5×35               | 0.036                        | 0.11  | 1,650                                                       | EKZE800E□□471MK35S |
|                          | 470         | 16×25                 | 0.038                        | 0.12  | 1,700                                                       | EKZE800E□□471ML25S |
|                          | 470         | 18×20                 | 0.045                        | 0.14  | 1,500                                                       | EKZE800E□□471MM20S |
| 80                       | 560         | 12.5×40               | 0.032                        | 0.095 | 1,800                                                       | EKZE800E□□561MK40S |
|                          | 680         | 16×31.5               | 0.032                        | 0.095 | 1,850                                                       | EKZE800E□□681MLN3S |
|                          | 680         | 18×25                 | 0.036                        | 0.11  | 1,750                                                       | EKZE800E□□681MM25S |
|                          | 680         | 18×25                 | 0.036                        | 0.11  | 1,750                                                       | EKZE800E□□681MM25S |

□□ : Enter the appropriate lead forming or taping code.

Production of the products shown in □□□□ is scheduled to be discontinued.

Product specifications in this catalog are subject to change without notice. Request our product specifications before purchase and/or use. Please use our products based on the information contained in this catalog and product specifications.



## KZE Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | Impedance<br>(Ω max./100kHz) |       | Rated<br>ripple<br>current<br>(mA <sub>rms</sub> /105°C, 100kHz) | Part No.           |
|--------------------------|-------------|-----------------------|------------------------------|-------|------------------------------------------------------------------|--------------------|
|                          |             |                       | 20°C                         | -10°C |                                                                  |                    |
| 80                       | 820         | 16×35.5               | 0.029                        | 0.086 | 2,000                                                            | EKZE800E□□821MLP1S |
|                          | 820         | 18×31.5               | 0.030                        | 0.090 | 1,900                                                            | EKZE800E□□821MMN3S |
|                          | 1,000       | 16×40                 | 0.027                        | 0.081 | 2,200                                                            | EKZE800E□□102ML40S |
|                          | 1,000       | 18×35.5               | 0.027                        | 0.081 | 2,200                                                            | EKZE800E□□102MMP1S |
|                          | 1,200       | 18×40                 | 0.026                        | 0.077 | 2,700                                                            | EKZE800E□□122MM40S |
| 100                      | 6.8         | 5×11                  | 1.4                          | 5.6   | 125                                                              | EKZE101E□□6R8ME11D |
|                          | 15          | 6.3×11                | 0.57                         | 2.3   | 205                                                              | EKZE101E□□150MF11D |
|                          | 27          | 8×11.5                | 0.36                         | 1.4   | 355                                                              | EKZE101E□□270MHB5D |
|                          | 39          | 8×15                  | 0.25                         | 1.0   | 450                                                              | EKZE101E□□390MH15D |
|                          | 47          | 10×12.5               | 0.17                         | 0.66  | 480                                                              | EKZE101E□□470MJC5S |
|                          | 56          | 8×20                  | 0.19                         | 0.76  | 565                                                              | EKZE101E□□560MH20D |
|                          | 68          | 10×16                 | 0.11                         | 0.47  | 600                                                              | EKZE101E□□680MJ16S |
|                          | 82          | 10×20                 | 0.084                        | 0.34  | 800                                                              | EKZE101E□□820MJ20S |
|                          | 100         | 12.5×16               | 0.11                         | 0.34  | 750                                                              | EKZE101E□□101MK16S |
|                          | 120         | 10×25                 | 0.069                        | 0.28  | 900                                                              | EKZE101E□□121MJ25S |
| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | Impedance<br>(Ω max./100kHz) |       | Rated<br>ripple<br>current<br>(mA <sub>rms</sub> /105°C, 100kHz) | Part No.           |
|                          |             |                       | 20°C                         | -10°C |                                                                  |                    |
| 100                      | 150         | 12.5×20               | 0.062                        | 0.18  | 1,100                                                            | EKZE101E□□151MK20S |
|                          | 220         | 12.5×25               | 0.047                        | 0.14  | 1,250                                                            | EKZE101E□□221MK25S |
|                          | 220         | 16×20                 | 0.048                        | 0.15  | 1,350                                                            | EKZE101E□□221ML20S |
|                          | 270         | 12.5×30               | 0.042                        | 0.13  | 1,500                                                            | EKZE101E□□271MK30S |
|                          | 330         | 12.5×35               | 0.036                        | 0.11  | 1,650                                                            | EKZE101E□□331MK35S |
|                          | 330         | 16×25                 | 0.038                        | 0.12  | 1,700                                                            | EKZE101E□□331ML25S |
|                          | 330         | 18×20                 | 0.045                        | 0.14  | 1,500                                                            | EKZE101E□□331MM20S |
|                          | 390         | 12.5×40               | 0.032                        | 0.095 | 1,800                                                            | EKZE101E□□391MK40S |
|                          | 470         | 16×31.5               | 0.032                        | 0.095 | 1,850                                                            | EKZE101E□□471MLN3S |
|                          | 470         | 18×25                 | 0.036                        | 0.11  | 1,750                                                            | EKZE101E□□471MM25S |
|                          | 560         | 16×35.5               | 0.029                        | 0.086 | 2,000                                                            | EKZE101E□□561MLP1S |
|                          | 560         | 18×31.5               | 0.030                        | 0.090 | 1,900                                                            | EKZE101E□□561MMN3S |
|                          | 680         | 16×40                 | 0.027                        | 0.081 | 2,200                                                            | EKZE101E□□681ML40S |
|                          | 680         | 18×35.5               | 0.027                        | 0.081 | 2,200                                                            | EKZE101E□□681MMP1S |
|                          | 820         | 18×40                 | 0.026                        | 0.077 | 2,700                                                            | EKZE101E□□821MM40S |

□□ : Enter the appropriate lead forming or taping code.

Production of the products shown in    is scheduled to be discontinued.

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

| Capacitance(μF) | Frequency(Hz) |      |      |      |
|-----------------|---------------|------|------|------|
|                 | 120           | 1k   | 10k  | 100k |
| 6.8 to 180      | 0.40          | 0.75 | 0.90 | 1.00 |
| 220 to 560      | 0.50          | 0.85 | 0.94 | 1.00 |
| 680 to 1,800    | 0.60          | 0.87 | 0.95 | 1.00 |
| 2,200 to 3,900  | 0.75          | 0.90 | 0.95 | 1.00 |
| 4,700 to        | 0.85          | 0.95 | 0.98 | 1.00 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.



# KYC Series

Upgrade!

- New highly reliable electrolyte is employed to minimize ESR and maximize ripple current.
- For motorcycle ACG starter.
- Endurance with ripple current : 3,000 to 5,000 hours at 105°C
- Rated voltage range : 16 to 100V, Capacitance range : 68 to 12,000μF
- Non solvent resistant type
- RoHS2 Compliant
- AEC-Q200 compliant : Please contact Chemi-Con for more details, test data, information.



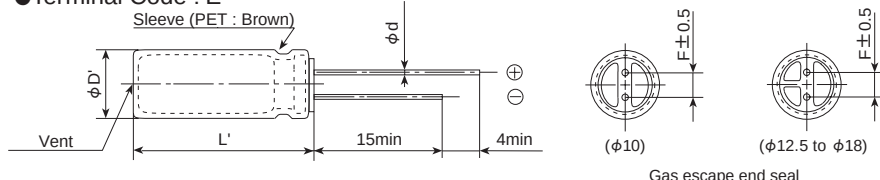
## SPECIFICATIONS

| Items                                                        | Characteristics                                                                                                                                                                                                                                                                     |                                       |      |      |      |      |      |      |  |
|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|------|------|------|------|------|------|--|
| Category                                                     | -40 to +105℃                                                                                                                                                                                                                                                                        |                                       |      |      |      |      |      |      |  |
| Temperature Range                                            |                                                                                                                                                                                                                                                                                     |                                       |      |      |      |      |      |      |  |
| Rated Voltage Range                                          | 16 to 100V <sub>dc</sub>                                                                                                                                                                                                                                                            |                                       |      |      |      |      |      |      |  |
| Capacitance Tolerance                                        | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                           |                                       |      |      |      |      |      |      |  |
| Leakage Current                                              | I=0.01CV or 3μA, whichever is greater.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 2 minutes)                                                                                                                        |                                       |      |      |      |      |      |      |  |
| Dissipation Factor<br>(tan δ )                               | Rated voltage (V <sub>ac</sub> )                                                                                                                                                                                                                                                    | 16V                                   | 25V  | 35V  | 50V  | 63V  | 80V  | 100V |  |
|                                                              | tan δ (Max.)                                                                                                                                                                                                                                                                        | 0.16                                  | 0.14 | 0.12 | 0.10 | 0.09 | 0.09 | 0.08 |  |
|                                                              | When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase. (at 20℃, 120Hz)                                                                                                                                                                    |                                       |      |      |      |      |      |      |  |
| Low Temperature<br>Characteristics<br>(Max. Impedance Ratio) | Rated voltage (V <sub>ac</sub> )                                                                                                                                                                                                                                                    | 16V                                   | 25V  | 35V  | 50V  | 63V  | 80V  | 100V |  |
|                                                              | Z (-25℃) / Z (+20℃)                                                                                                                                                                                                                                                                 | 3                                     | 2    | 2    | 2    | 2    | 2    | 2    |  |
|                                                              | Z (-40℃) / Z (+20℃)                                                                                                                                                                                                                                                                 | 8                                     | 5    | 4    | 3    | 3    | 3    | 3    |  |
| Endurance                                                    | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 5,000 hours (3,000 hours for ϕ 10) at 105℃.                |                                       |      |      |      |      |      |      |  |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                  | ≤ ± 25% of the initial value          |      |      |      |      |      |      |  |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                       | ≤ 200% of the initial specified value |      |      |      |      |      |      |  |
|                                                              | Leakage current                                                                                                                                                                                                                                                                     | ≤ The initial specified value         |      |      |      |      |      |      |  |
| Shelf Life                                                   | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 500 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                       |      |      |      |      |      |      |  |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                  | ≤ ± 25% of the initial value          |      |      |      |      |      |      |  |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                       | ≤ 200% of the initial specified value |      |      |      |      |      |      |  |
|                                                              | Leakage current                                                                                                                                                                                                                                                                     | ≤ The initial specified value         |      |      |      |      |      |      |  |

\*Note: If any doubts arises, measure the leakage current after carrying out the following voltage treatment.  
Voltage treatment: DC rated voltage is applied to the capacitors for 30 to 60 minutes at room temperature.

## DIMENSIONS [mm]

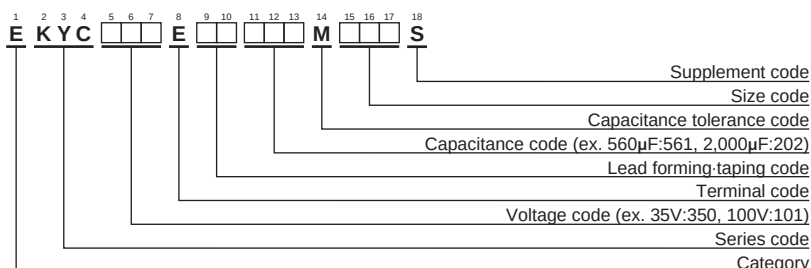
### Terminal Code : E



| φD  | 10         | 12.5 | 16  | 18  |
|-----|------------|------|-----|-----|
| φd  | 0.6        | 0.6  | 0.8 | 0.8 |
| F   | 5.0        | 5.0  | 7.5 | 7.5 |
| φD' | φD+0.5max. |      |     |     |
| L'  | L+1.5max.  |      |     |     |

Gas escape end seal

## PART NUMBERING SYSTEM



Please refer to "Product code guide (radial lead type)"

KYC series is the product, based on AEC-Q200 standard, for specific applications or market such as compact mobility.  
Please contact us when selecting KYC series for the important applications related to automotive or its safety.





## ◆STANDARD RATINGS

| WV<br>(V <sub>ac</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | ESR<br>(Ω max./<br>20°C,<br>100kHz) | Rated<br>ripple<br>current<br>(mA <sub>rms</sub> /105°C,<br>100kHz) | Part No.           | WV<br>(V <sub>ac</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | ESR<br>(Ω max./<br>20°C,<br>100kHz) | Rated<br>ripple<br>current<br>(mA <sub>rms</sub> /105°C,<br>100kHz) | Part No.           |
|--------------------------|-------------|-----------------------|-------------------------------------|---------------------------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------------------------------------|---------------------------------------------------------------------|--------------------|
| 16                       | 910         | 10×12.5               | 0.14                                | 1,120                                                               | EKYC160E□□911MJCS5 | 63                       | 470         | 12.5×20               | 0.050                               | 2,150                                                               | EKYC630E□□471MK20S |
|                          | 1,300       | 10×16                 | 0.10                                | 1,570                                                               | EKYC160E□□132MJ16S |                          | 680         | 12.5×25               | 0.037                               | 2,820                                                               | EKYC630E□□681MK25S |
|                          | 2,000       | 10×20                 | 0.065                               | 1,940                                                               | EKYC160E□□202MJ20S |                          | 820         | 16×20                 | 0.038                               | 2,530                                                               | EKYC630E□□821ML20S |
|                          | 3,300       | 12.5×20               | 0.050                               | 2,150                                                               | EKYC160E□□332MK20S |                          | 910         | 12.5×30               | 0.029                               | 3,120                                                               | EKYC630E□□911MK30S |
|                          | 4,700       | 12.5×25               | 0.037                               | 2,820                                                               | EKYC160E□□472MK25S |                          | 1,000       | 12.5×35               | 0.025                               | 3,300                                                               | EKYC630E□□102MK35S |
|                          | 5,600       | 12.5×30               | 0.029                               | 3,120                                                               | EKYC160E□□562MK30S |                          | 1,200       | 16×25                 | 0.031                               | 3,240                                                               | EKYC630E□□122ML25S |
|                          | 5,600       | 16×20                 | 0.038                               | 2,530                                                               | EKYC160E□□562ML20S |                          | 1,200       | 18×20                 | 0.037                               | 2,700                                                               | EKYC630E□□122MM20S |
|                          | 6,800       | 18×20                 | 0.037                               | 2,700                                                               | EKYC160E□□682MM20S |                          | 1,300       | 12.5×40               | 0.021                               | 3,600                                                               | EKYC630E□□132MK40S |
|                          | 7,500       | 16×25                 | 0.031                               | 3,240                                                               | EKYC160E□□752ML25S |                          | 1,500       | 16×30                 | 0.025                               | 3,580                                                               | EKYC630E□□152ML30S |
|                          | 9,100       | 16×30                 | 0.025                               | 3,580                                                               | EKYC160E□□912ML30S |                          | 1,600       | 18×25                 | 0.030                               | 3,350                                                               | EKYC630E□□162MM25S |
|                          | 10,000      | 18×25                 | 0.030                               | 3,350                                                               | EKYC160E□□103MM25S |                          | 1,800       | 16×35                 | 0.022                               | 3,800                                                               | EKYC630E□□182ML35S |
|                          | 12,000      | 18×30                 | 0.024                               | 3,710                                                               | EKYC160E□□123MM30S |                          | 2,000       | 18×30                 | 0.024                               | 3,700                                                               | EKYC630E□□202MM30S |
| 25                       | 560         | 10×12.5               | 0.14                                | 1,120                                                               | EKYC250E□□561MJCS5 | 80                       | 2,400       | 16×40                 | 0.018                               | 4,100                                                               | EKYC630E□□242ML40S |
|                          | 820         | 10×16                 | 0.10                                | 1,570                                                               | EKYC250E□□821MJ16S |                          | 2,400       | 18×35                 | 0.021                               | 4,000                                                               | EKYC630E□□242MM35S |
|                          | 1,300       | 10×20                 | 0.065                               | 1,940                                                               | EKYC250E□□132MJ20S |                          | 3,300       | 18×40                 | 0.017                               | 4,300                                                               | EKYC630E□□332MM40S |
|                          | 2,000       | 12.5×20               | 0.050                               | 2,150                                                               | EKYC250E□□202MK20S |                          | 100         | 10×12.5               | 0.14                                | 1,120                                                               | EKYC800E□□101MJCS5 |
|                          | 3,000       | 12.5×25               | 0.037                               | 2,820                                                               | EKYC250E□□302MK25S |                          | 150         | 10×16                 | 0.10                                | 1,570                                                               | EKYC800E□□151MJ16S |
|                          | 3,600       | 16×20                 | 0.038                               | 2,530                                                               | EKYC250E□□362ML20S |                          | 220         | 10×20                 | 0.065                               | 1,940                                                               | EKYC800E□□221MJ20S |
|                          | 3,900       | 12.5×30               | 0.029                               | 3,120                                                               | EKYC250E□□392MK30S |                          | 330         | 12.5×20               | 0.050                               | 2,150                                                               | EKYC800E□□331MK20S |
|                          | 4,700       | 18×20                 | 0.037                               | 2,700                                                               | EKYC250E□□472MM20S |                          | 470         | 12.5×25               | 0.037                               | 2,820                                                               | EKYC800E□□471MK25S |
|                          | 5,100       | 16×25                 | 0.031                               | 3,240                                                               | EKYC250E□□512ML25S |                          | 620         | 16×20                 | 0.038                               | 2,530                                                               | EKYC800E□□621ML20S |
|                          | 6,200       | 16×30                 | 0.025                               | 3,580                                                               | EKYC250E□□622ML30S |                          | 680         | 12.5×30               | 0.029                               | 3,120                                                               | EKYC800E□□681MK30S |
|                          | 6,200       | 18×25                 | 0.030                               | 3,350                                                               | EKYC250E□□622MM25S |                          | 680         | 12.5×35               | 0.025                               | 3,300                                                               | EKYC800E□□681MK35S |
|                          | 8,200       | 18×30                 | 0.024                               | 3,710                                                               | EKYC250E□□822MM30S |                          | 820         | 18×20                 | 0.037                               | 2,700                                                               | EKYC800E□□821MM20S |
| 35                       | 390         | 10×12.5               | 0.14                                | 1,120                                                               | EKYC350E□□391MJCS5 | 100                      | 910         | 16×25                 | 0.031                               | 3,240                                                               | EKYC800E□□911ML25S |
|                          | 560         | 10×16                 | 0.10                                | 1,570                                                               | EKYC350E□□561MJ16S |                          | 1,000       | 12.5×40               | 0.021                               | 3,600                                                               | EKYC800E□□102MK40S |
|                          | 820         | 10×20                 | 0.065                               | 1,940                                                               | EKYC350E□□821MJ20S |                          | 1,200       | 16×30                 | 0.025                               | 3,580                                                               | EKYC800E□□122ML30S |
|                          | 1,300       | 12.5×20               | 0.050                               | 2,150                                                               | EKYC350E□□132MK20S |                          | 1,200       | 18×25                 | 0.030                               | 3,350                                                               | EKYC800E□□122MM25S |
|                          | 1,800       | 12.5×25               | 0.037                               | 2,820                                                               | EKYC350E□□182MK25S |                          | 1,300       | 16×35                 | 0.022                               | 3,800                                                               | EKYC800E□□132ML35S |
|                          | 2,200       | 16×20                 | 0.038                               | 2,530                                                               | EKYC350E□□222ML20S |                          | 1,500       | 18×30                 | 0.024                               | 3,700                                                               | EKYC800E□□152MM30S |
|                          | 2,400       | 12.5×30               | 0.029                               | 3,120                                                               | EKYC350E□□242MK30S |                          | 1,800       | 16×40                 | 0.018                               | 4,100                                                               | EKYC800E□□182ML40S |
|                          | 3,000       | 18×20                 | 0.037                               | 2,700                                                               | EKYC350E□□302MM20S |                          | 1,800       | 18×35                 | 0.021                               | 4,000                                                               | EKYC800E□□182MM35S |
|                          | 3,300       | 16×25                 | 0.031                               | 3,240                                                               | EKYC350E□□332ML25S |                          | 2,400       | 18×40                 | 0.017                               | 4,300                                                               | EKYC800E□□242MM40S |
|                          | 3,900       | 16×30                 | 0.025                               | 3,580                                                               | EKYC350E□□392ML30S |                          | 68          | 10×12.5               | 0.14                                | 1,120                                                               | EKYC101E□□680MJCS5 |
|                          | 4,300       | 18×25                 | 0.030                               | 3,350                                                               | EKYC350E□□432MM25S |                          | 100         | 10×16                 | 0.10                                | 1,570                                                               | EKYC101E□□101MJ16S |
|                          | 5,100       | 18×30                 | 0.024                               | 3,710                                                               | EKYC350E□□512MM30S |                          | 150         | 10×20                 | 0.065                               | 1,940                                                               | EKYC101E□□151MJ20S |
| 50                       | 180         | 10×12.5               | 0.14                                | 1,120                                                               | EKYC500E□□181MJCS5 | 100                      | 220         | 12.5×20               | 0.050                               | 2,150                                                               | EKYC101E□□221MK20S |
|                          | 300         | 10×16                 | 0.10                                | 1,570                                                               | EKYC500E□□301MJ16S |                          | 330         | 12.5×25               | 0.037                               | 2,820                                                               | EKYC101E□□331MK25S |
|                          | 430         | 10×20                 | 0.065                               | 1,940                                                               | EKYC500E□□431MJ20S |                          | 390         | 12.5×30               | 0.029                               | 3,120                                                               | EKYC101E□□391MK30S |
|                          | 680         | 12.5×20               | 0.050                               | 2,150                                                               | EKYC500E□□681MK20S |                          | 390         | 16×20                 | 0.038                               | 2,530                                                               | EKYC101E□□391ML20S |
|                          | 910         | 12.5×25               | 0.037                               | 2,820                                                               | EKYC500E□□911MK25S |                          | 470         | 12.5×35               | 0.025                               | 3,300                                                               | EKYC101E□□471MK35S |
|                          | 1,200       | 16×20                 | 0.038                               | 2,530                                                               | EKYC500E□□122ML20S |                          | 560         | 12.5×40               | 0.021                               | 3,600                                                               | EKYC101E□□561MK40S |
|                          | 1,300       | 12.5×30               | 0.029                               | 3,120                                                               | EKYC500E□□132MK30S |                          | 560         | 16×25                 | 0.031                               | 3,240                                                               | EKYC101E□□561ML25S |
|                          | 1,500       | 18×20                 | 0.037                               | 2,700                                                               | EKYC500E□□152MM20S |                          | 560         | 18×20                 | 0.037                               | 2,700                                                               | EKYC101E□□561MM20S |
|                          | 1,600       | 16×25                 | 0.031                               | 3,240                                                               | EKYC500E□□162ML25S |                          | 680         | 16×30                 | 0.025                               | 3,580                                                               | EKYC101E□□681ML30S |
|                          | 2,000       | 16×30                 | 0.025                               | 3,580                                                               | EKYC500E□□202ML30S |                          | 820         | 16×35                 | 0.022                               | 3,800                                                               | EKYC101E□□821ML35S |
|                          | 2,200       | 18×25                 | 0.030                               | 3,350                                                               | EKYC500E□□222MM25S |                          | 820         | 18×25                 | 0.030                               | 3,350                                                               | EKYC101E□□821MM25S |
|                          | 2,700       | 18×30                 | 0.024                               | 3,710                                                               | EKYC500E□□272MM30S |                          | 1,000       | 18×30                 | 0.024                               | 3,700                                                               | EKYC101E□□102MM30S |
| 63                       | 150         | 10×12.5               | 0.14                                | 1,120                                                               | EKYC630E□□151MJCS5 | 100                      | 1,200       | 16×40                 | 0.018                               | 4,100                                                               | EKYC101E□□122ML40S |
|                          | 220         | 10×16                 | 0.10                                | 1,570                                                               | EKYC630E□□221MJ16S |                          | 1,200       | 18×35                 | 0.021                               | 4,000                                                               | EKYC101E□□122MM35S |
|                          | 330         | 10×20                 | 0.065                               | 1,940                                                               | EKYC630E□□331MJ20S |                          | 1,500       | 18×40                 | 0.017                               | 4,300                                                               | EKYC101E□□152MM40S |

□□ : Enter the appropriate lead forming or taping code.

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

| Capacitance(μF) | Frequency(Hz) | 120  | 1k   | 10k  | 100k |
|-----------------|---------------|------|------|------|------|
| 68 to 150       |               | 0.40 | 0.75 | 0.90 | 1.00 |
| 180 to 220      |               | 0.40 | 0.82 | 0.93 | 1.00 |
| 300 to 560      |               | 0.50 | 0.85 | 0.94 | 1.00 |
| 620 to 2,000    |               | 0.60 | 0.87 | 0.95 | 1.00 |
| 2,200 to 4,300  |               | 0.75 | 0.90 | 0.95 | 1.00 |
| 4,700 to 12,000 |               | 0.85 | 0.95 | 0.98 | 1.00 |

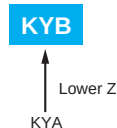
The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

KYC series is the product, based on AEC-Q200 standard, for specific applications or market such as compact mobility. Please contact us when selecting KYC series for the important applications related to automotive or its safety.



# KYB Series

- Low impedance, high ripple and long life from KYA series
- Newly innovative electrolyte is employed to minimize impedance
- Endurance with ripple current : 4,000 to 10,000 hours at 105°C
- Non solvent resistant type
- RoHS2 Compliant

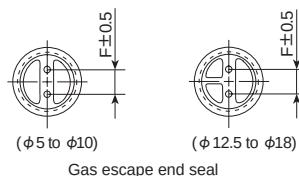
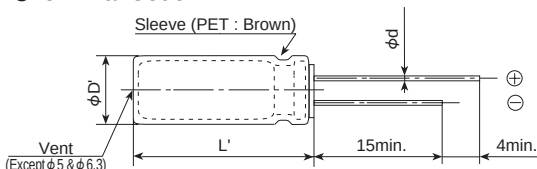


## SPECIFICATIONS

| Items                                                        | Characteristics                                                                                                                                                                                                                                                                     |                                                           |      |      |      |      |      |      |                                                            |      |  |
|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|------|------|------|------|------|------|------------------------------------------------------------|------|--|
| Category                                                     | -40 to +105℃                                                                                                                                                                                                                                                                        |                                                           |      |      |      |      |      |      |                                                            |      |  |
| Temperature Range                                            |                                                                                                                                                                                                                                                                                     |                                                           |      |      |      |      |      |      |                                                            |      |  |
| Rated Voltage Range                                          | 6.3 to 100V <sub>dc</sub>                                                                                                                                                                                                                                                           |                                                           |      |      |      |      |      |      |                                                            |      |  |
| Capacitance Tolerance                                        | ±20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                            |                                                           |      |      |      |      |      |      |                                                            |      |  |
| Leakage Current                                              | I=0.01CV or 3μA, whichever is greater.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 2 minutes)                                                                                                                        |                                                           |      |      |      |      |      |      |                                                            |      |  |
| Dissipation Factor<br>(tan δ)                                | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                    | 6.3V                                                      | 10V  | 16V  | 25V  | 35V  | 50V  | 63V  | 80V                                                        | 100V |  |
|                                                              | tan δ (Max.)                                                                                                                                                                                                                                                                        | 0.22                                                      | 0.19 | 0.16 | 0.14 | 0.12 | 0.10 | 0.09 | 0.09                                                       | 0.08 |  |
|                                                              | When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase. (at 20℃, 120Hz)                                                                                                                                                                    |                                                           |      |      |      |      |      |      |                                                            |      |  |
| Low Temperature<br>Characteristics<br>(Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                    | 6.3V                                                      | 10V  | 16V  | 25V  | 35V  | 50V  | 63V  | 80V                                                        | 100V |  |
|                                                              | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                     | 4                                                         | 3    | 2    | 2    | 2    | 2    | 2    | 2                                                          | 2    |  |
|                                                              | Z(-40℃)/Z(+20℃)                                                                                                                                                                                                                                                                     | 8                                                         | 6    | 4    | 3    | 3    | 3    | 3    | 3                                                          | 3    |  |
| Endurance                                                    | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for the specified period of time at 105℃.                      |                                                           |      |      |      |      |      |      |                                                            |      |  |
|                                                              | Rated Voltage(V <sub>dc</sub> )                                                                                                                                                                                                                                                     | 6.3 to 10V <sub>dc</sub>                                  |      |      |      |      |      |      | 16 to 100V <sub>dc</sub>                                   |      |  |
|                                                              | Time                                                                                                                                                                                                                                                                                | φ5: 4,000hours φ6.3 & 8: 6,000hours φ10 to 18: 8,000hours |      |      |      |      |      |      | φ5: 5,000hours φ6.3 & 8: 7,000hours φ10 to 18: 10,000hours |      |  |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                  | ≤ ±30% of the initial value                               |      |      |      |      |      |      | ≤ ±25% of the initial value                                |      |  |
|                                                              | D.F. (tan δ)                                                                                                                                                                                                                                                                        | ≤200% of the initial specified value                      |      |      |      |      |      |      | ≤200% of the initial specified value                       |      |  |
|                                                              | Leakage current                                                                                                                                                                                                                                                                     | ≤The initial specified value                              |      |      |      |      |      |      | ≤The initial specified value                               |      |  |
| Shelf Life                                                   | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 500 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                                           |      |      |      |      |      |      |                                                            |      |  |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                  | ≤ ±25% of the initial value                               |      |      |      |      |      |      |                                                            |      |  |
|                                                              | D.F. (tan δ)                                                                                                                                                                                                                                                                        | ≤200% of the initial specified value                      |      |      |      |      |      |      |                                                            |      |  |
|                                                              | Leakage current                                                                                                                                                                                                                                                                     | ≤The initial specified value                              |      |      |      |      |      |      |                                                            |      |  |

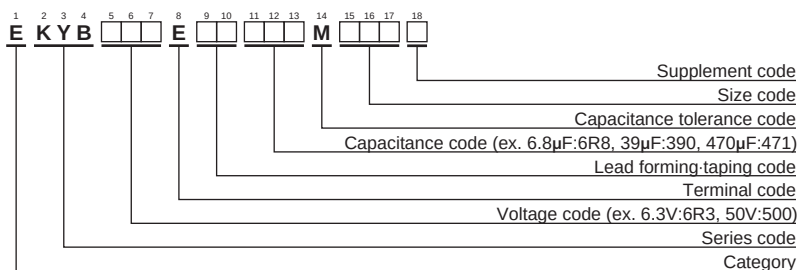
## DIMENSIONS [mm]

- Terminal Code : E



| φD  | 5          | 6.3 | 8   | 10  | 12.5 | 16  | 18  |
|-----|------------|-----|-----|-----|------|-----|-----|
| φd  | 0.5        | 0.5 | 0.6 | 0.6 | 0.6  | 0.8 | 0.8 |
| F   | 2.0        | 2.5 | 3.5 | 5.0 | 5.0  | 7.5 | 7.5 |
| φD' | φD+0.5max. |     |     |     |      |     |     |
| L'  | L+1.5max.  |     |     |     |      |     |     |

## PART NUMBERING SYSTEM



Please refer to "Product code guide (radial lead type)"



KYB Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | Impedance<br>(Ω max./100kHz) |       | Rated ripple<br>current<br>(mA rms/<br>105°C,<br>100kHz) | Part No.           |
|--------------------------|-------------|-----------------------|------------------------------|-------|----------------------------------------------------------|--------------------|
|                          |             |                       | 20°C                         | -10°C |                                                          |                    |
| 6.3                      | 180         | 5×11                  | 0.29                         | 1.2   | 340                                                      | EKYB6R3E□□181ME11D |
|                          | 390         | 6.3×11                | 0.15                         | 0.60  | 540                                                      | EKYB6R3E□□391MF11D |
|                          | 820         | 8×11.5                | 0.087                        | 0.35  | 840                                                      | EKYB6R3E□□821MHB5D |
|                          | 1,200       | 8×15                  | 0.069                        | 0.28  | 1,050                                                    | EKYB6R3E□□122MH15D |
|                          | 1,200       | 10×12.5               | 0.064                        | 0.26  | 1,050                                                    | EKYB6R3E□□122MJCS5 |
|                          | 1,500       | 8×20                  | 0.060                        | 0.24  | 1,210                                                    | EKYB6R3E□□152MH20D |
|                          | 1,800       | 10×16                 | 0.049                        | 0.20  | 1,400                                                    | EKYB6R3E□□182MJ16S |
|                          | 2,200       | 10×20                 | 0.037                        | 0.15  | 1,650                                                    | EKYB6R3E□□222MJ20S |
|                          | 2,700       | 10×25                 | 0.031                        | 0.13  | 1,910                                                    | EKYB6R3E□□272MJ25S |
|                          | 3,300       | 10×30                 | 0.027                        | 0.11  | 2,230                                                    | EKYB6R3E□□332MJ30S |
|                          | 3,900       | 12.5×20               | 0.027                        | 0.11  | 2,230                                                    | EKYB6R3E□□392MK20S |
|                          | 4,700       | 12.5×25               | 0.024                        | 0.096 | 2,530                                                    | EKYB6R3E□□472MK25S |
|                          | 6,800       | 12.5×30               | 0.021                        | 0.084 | 2,860                                                    | EKYB6R3E□□682MK30S |
|                          | 6,800       | 16×20                 | 0.025                        | 0.10  | 2,610                                                    | EKYB6R3E□□682ML20S |
|                          | 8,200       | 12.5×35               | 0.018                        | 0.072 | 3,140                                                    | EKYB6R3E□□822MK35S |
|                          | 8,200       | 18×20                 | 0.021                        | 0.084 | 3,000                                                    | EKYB6R3E□□822MM20S |
|                          | 10,000      | 12.5×40               | 0.017                        | 0.068 | 3,640                                                    | EKYB6R3E□□103MK40S |
|                          | 10,000      | 16×25                 | 0.020                        | 0.080 | 3,140                                                    | EKYB6R3E□□103ML25S |
|                          | 12,000      | 16×31.5               | 0.016                        | 0.064 | 3,610                                                    | EKYB6R3E□□123MLN3S |
|                          | 12,000      | 18×25                 | 0.017                        | 0.068 | 3,530                                                    | EKYB6R3E□□123MM25S |
|                          | 15,000      | 16×35.5               | 0.014                        | 0.056 | 4,080                                                    | EKYB6R3E□□153MLP1S |
|                          | 15,000      | 18×31.5               | 0.014                        | 0.056 | 4,220                                                    | EKYB6R3E□□153MMN3S |
| 10                       | 120         | 5×11                  | 0.29                         | 1.2   | 340                                                      | EKYB100E□□121ME11D |
|                          | 330         | 6.3×11                | 0.15                         | 0.60  | 540                                                      | EKYB100E□□331MF11D |
|                          | 560         | 8×11.5                | 0.087                        | 0.35  | 840                                                      | EKYB100E□□561MHB5D |
|                          | 820         | 8×15                  | 0.069                        | 0.28  | 1,050                                                    | EKYB100E□□821MH15D |
|                          | 1,000       | 8×20                  | 0.060                        | 0.24  | 1,210                                                    | EKYB100E□□102MH20D |
|                          | 1,000       | 10×12.5               | 0.064                        | 0.26  | 1,050                                                    | EKYB100E□□102MJCS5 |
|                          | 1,200       | 10×16                 | 0.049                        | 0.20  | 1,400                                                    | EKYB100E□□122MJ16S |
|                          | 1,800       | 10×20                 | 0.037                        | 0.15  | 1,650                                                    | EKYB100E□□182MJ20S |
|                          | 2,200       | 10×25                 | 0.031                        | 0.13  | 1,910                                                    | EKYB100E□□222MJ25S |
|                          | 2,700       | 10×30                 | 0.027                        | 0.11  | 2,230                                                    | EKYB100E□□272MJ30S |
|                          | 2,700       | 12.5×20               | 0.027                        | 0.11  | 2,230                                                    | EKYB100E□□272MK20S |
|                          | 3,900       | 12.5×25               | 0.024                        | 0.096 | 2,530                                                    | EKYB100E□□392MK25S |
|                          | 4,700       | 12.5×30               | 0.021                        | 0.084 | 2,860                                                    | EKYB100E□□472MK30S |
|                          | 4,700       | 16×20                 | 0.025                        | 0.10  | 2,610                                                    | EKYB100E□□472ML20S |
|                          | 5,600       | 12.5×35               | 0.018                        | 0.072 | 3,140                                                    | EKYB100E□□562MK35S |
|                          | 6,800       | 12.5×40               | 0.017                        | 0.068 | 3,640                                                    | EKYB100E□□682MK40S |
|                          | 6,800       | 16×25                 | 0.020                        | 0.080 | 3,140                                                    | EKYB100E□□682ML25S |
|                          | 6,800       | 18×20                 | 0.021                        | 0.084 | 3,000                                                    | EKYB100E□□682MM20S |
|                          | 8,200       | 16×31.5               | 0.016                        | 0.064 | 3,610                                                    | EKYB100E□□822MLN3S |
|                          | 8,200       | 18×25                 | 0.017                        | 0.068 | 3,530                                                    | EKYB100E□□822MM25S |
|                          | 10,000      | 16×35.5               | 0.014                        | 0.056 | 4,080                                                    | EKYB100E□□103MLP1S |
|                          | 10,000      | 18×31.5               | 0.014                        | 0.056 | 4,220                                                    | EKYB100E□□103MMN3S |
| 16                       | 120         | 5×11                  | 0.29                         | 1.2   | 340                                                      | EKYB160E□□121ME11D |
|                          | 270         | 6.3×11                | 0.15                         | 0.60  | 540                                                      | EKYB160E□□271MF11D |
|                          | 470         | 8×11.5                | 0.087                        | 0.35  | 840                                                      | EKYB160E□□471MHB5D |
|                          | 680         | 8×15                  | 0.069                        | 0.28  | 1,050                                                    | EKYB160E□□681MH15D |
|                          | 680         | 10×12.5               | 0.064                        | 0.26  | 1,050                                                    | EKYB160E□□681MJCS5 |
|                          | 820         | 8×20                  | 0.060                        | 0.24  | 1,210                                                    | EKYB160E□□821MH20D |
|                          | 1,000       | 10×16                 | 0.049                        | 0.20  | 1,400                                                    | EKYB160E□□102MJ16S |
|                          | 1,500       | 10×20                 | 0.037                        | 0.15  | 1,650                                                    | EKYB160E□□152MJ20S |
|                          | 1,800       | 10×25                 | 0.031                        | 0.13  | 1,910                                                    | EKYB160E□□182MJ25S |
|                          | 2,200       | 10×30                 | 0.027                        | 0.11  | 2,230                                                    | EKYB160E□□222MJ30S |
|                          | 2,200       | 12.5×20               | 0.027                        | 0.11  | 2,230                                                    | EKYB160E□□222MK20S |
|                          | 3,300       | 12.5×25               | 0.024                        | 0.096 | 2,530                                                    | EKYB160E□□332MK25S |
|                          | 3,900       | 12.5×30               | 0.021                        | 0.084 | 2,860                                                    | EKYB160E□□392MK30S |
|                          | 3,900       | 16×20                 | 0.025                        | 0.10  | 2,610                                                    | EKYB160E□□392ML20S |
|                          | 4,700       | 12.5×35               | 0.018                        | 0.072 | 3,140                                                    | EKYB160E□□472MK35S |
|                          | 4,700       | 18×20                 | 0.021                        | 0.084 | 3,000                                                    | EKYB160E□□472MM20S |
|                          | 5,600       | 16×25                 | 0.020                        | 0.080 | 3,140                                                    | EKYB160E□□562ML25S |
|                          | 6,800       | 16×31.5               | 0.016                        | 0.064 | 3,610                                                    | EKYB160E□□682MLN3S |
|                          | 6,800       | 18×25                 | 0.017                        | 0.068 | 3,530                                                    | EKYB160E□□682MM25S |
|                          | 8,200       | 16×35.5               | 0.014                        | 0.056 | 4,080                                                    | EKYB160E□□822MLP1S |
|                          | 8,200       | 18×31.5               | 0.014                        | 0.056 | 4,220                                                    | EKYB160E□□822MMN3S |
| 25                       | 4,700       | 12.5×35               | 0.018                        | 0.072 | 3,140                                                    | EKYB250E□□472MK35S |
|                          | 4,700       | 18×20                 | 0.021                        | 0.084 | 3,000                                                    | EKYB250E□□472MM20S |
|                          | 5,600       | 12.5×40               | 0.017                        | 0.068 | 3,640                                                    | EKYB250E□□562MK40S |
|                          | 5,600       | 16×25                 | 0.020                        | 0.080 | 3,140                                                    | EKYB250E□□562ML25S |
|                          | 6,800       | 16×31.5               | 0.016                        | 0.064 | 3,610                                                    | EKYB250E□□682MLN3S |
|                          | 6,800       | 18×25                 | 0.017                        | 0.068 | 3,530                                                    | EKYB250E□□682MM25S |
|                          | 8,200       | 16×35.5               | 0.014                        | 0.056 | 4,080                                                    | EKYB250E□□822MLP1S |
|                          | 8,200       | 18×31.5               | 0.014                        | 0.056 | 4,220                                                    | EKYB250E□□822MMN3S |
|                          | 10,000      | 16×40                 | 0.013                        | 0.052 | 4,220                                                    | EKYB250E□□103ML40S |
|                          | 10,000      | 18×35.5               | 0.012                        | 0.048 | 4,280                                                    | EKYB250E□□103MMP1S |
|                          | 12,000      | 18×40                 | 0.011                        | 0.044 | 4,700                                                    | EKYB250E□□123MM40S |
|                          | 82          | 5×11                  | 0.29                         | 1.2   | 340                                                      | EKYB500E□□820ME11D |
|                          | 150         | 6.3×11                | 0.15                         | 0.60  | 540                                                      | EKYB500E□□151MF11D |
|                          | 330         | 8×11.5                | 0.087                        | 0.35  | 840                                                      | EKYB500E□□331MHB5D |
|                          | 390         | 8×15                  | 0.069                        | 0.28  | 1,050                                                    | EKYB500E□□391MH15D |
|                          | 470         | 10×12.5               | 0.064                        | 0.26  | 1,050                                                    | EKYB500E□□471MJCS5 |
|                          | 560         | 8×20                  | 0.060                        | 0.24  | 1,210                                                    | EKYB500E□□561MH20D |
|                          | 680         | 10×16                 | 0.049                        | 0.20  | 1,400                                                    | EKYB500E□□681MJ16S |
|                          | 1,000       | 10×20                 | 0.037                        | 0.15  | 1,650                                                    | EKYB500E□□102MJ20S |
|                          | 1,200       | 10×25                 | 0.031                        | 0.13  | 1,910                                                    | EKYB500E□□122MJ25S |
|                          | 1,500       | 10×30                 | 0.027                        | 0.11  | 2,230                                                    | EKYB500E□□152MJ30S |
|                          | 1,500       | 12.5×20               | 0.027                        | 0.11  | 2,230                                                    | EKYB500E□□152MK20S |
|                          | 2,200       | 12.5×25               | 0.024                        | 0.096 | 2,530                                                    | EKYB500E□□222MK25S |
| 35                       | 2,700       | 12.5×30               | 0.021                        | 0.084 | 2,860                                                    | EKYB350E□□272MK30S |
|                          | 2,700       | 16×20                 | 0.025                        | 0.10  | 2,610                                                    | EKYB350E□□272ML20S |
|                          | 3,300       | 12.5×35               | 0.018                        | 0.072 | 3,140                                                    | EKYB350E□□332MK35S |
|                          | 3,300       | 18×20                 | 0.021                        | 0.084 | 3,000                                                    | EKYB350E□□332MM20S |
|                          | 3,900       | 12.5×40               | 0.017                        | 0.068 | 3,640                                                    | EKYB350E□□392MK40S |
|                          | 3,900       | 16×25                 | 0.020                        | 0.080 | 3,140                                                    | EKYB350E□□392ML25S |
|                          | 4,700       | 16×31.5               | 0.016                        | 0.064 | 3,610                                                    | EKYB350E□□472MLN3S |
|                          | 4,700       | 18×25                 | 0.017                        | 0.068 | 3,530                                                    | EKYB350E□□472MM25S |
|                          | 5,600       | 16×35.5               | 0.014                        | 0.056 | 4,080                                                    | EKYB350E□□562MLP1S |
|                          | 5,600       | 18×31.5               | 0.014                        | 0.056 | 4,220                                                    | EKYB350E□□562MMN3S |
|                          | 6,800       | 16×40                 | 0.013                        | 0.052 | 4,220                                                    | EKYB350E□□682ML40S |
|                          | 6,800       | 18×31.5               | 0.012                        | 0.048 | 4,280                                                    | EKYB350E□□682MMP1S |
|                          | 8,200       | 18×35.5               | 0.012                        | 0.048 | 4,280                                                    | EKYB350E□□822MMP1S |
|                          | 47          | 5×11                  | 0.29                         | 1.2   | 340                                                      | EKYB350E□□470ME11D |
|                          | 100         | 6.3×11                | 0.15                         | 0.60  | 540                                                      | EKYB350E□□101MF11D |
|                          | 180         | 8×11.5                | 0.087                        | 0.35  | 840                                                      | EKYB350E□□181MHB5D |
|                          | 270         | 8×15                  | 0.069                        | 0.28  | 1,050                                                    | EKYB350E□□271MH15D |
|                          | 330         | 8×20                  | 0.060                        | 0.24  | 1,210                                                    | EKYB350E□□331MH20D |
|                          | 330         | 10×12.5               | 0.064                        | 0.26  | 1,050                                                    | EKYB350E□□331MJCS5 |
|                          | 470         | 10×16                 | 0.049                        | 0.20  | 1,400                                                    | EKYB350E□□471MJ16S |
|                          | 680         | 10×20                 | 0.037                        | 0.15  | 1,650                                                    | EKYB350E□□681MJ20S |
|                          | 820         | 10×25                 | 0.031                        | 0.13  | 1,910                                                    | EKYB350E□□821MJ25S |
| 50                       | 1,000       | 10×30                 | 0.027                        | 0.11  | 2,230                                                    | EKYB350E□□102MJ30S |
|                          | 1,000       | 12.5×20               | 0.027                        | 0.11  | 2,230                                                    | EKYB350E□□102MK20S |
|                          | 1,500       | 12.5×25               | 0.024                        | 0.096 | 2,530                                                    | EKYB350E□□152MK25S |
|                          | 1,800       | 12.5×30               | 0.021                        | 0.084 | 2,860                                                    | EKYB350E□□182MK30S |
|                          | 1,800       | 16×20                 | 0.025                        | 0.10  | 2,610                                                    | EKYB350E□□182ML20S |
|                          | 2,200       | 12.5×35               | 0.018                        | 0.072 | 3,140                                                    | EKYB350E□□222MK35S |
|                          | 2,200       | 18×20                 | 0.021                        | 0.084 | 3,000                                                    | EKYB350E□□222MM20S |
|                          | 2,700       | 12.5×40               | 0.017                        | 0.068 | 3,640                                                    | EKYB350E□□272MK40S |
|                          | 2,700       | 16×25                 | 0.020                        | 0.080 | 3,140                                                    | EKYB350E□□272ML25S |
|                          | 3,300       | 16×31.5               | 0.016                        | 0.064 | 3,610                                                    | EKYB350E□□332MLN3S |
|                          | 3,300       | 18×25                 | 0.017                        | 0.068 | 3,530                                                    | EKYB350E□□332MM25S |
|                          | 3,900       | 16×35.5               | 0.014                        | 0.056 | 4,080                                                    | EKYB350E□□392MLP1S |
|                          | 4,700       | 16×40                 | 0.013                        | 0.052 | 4,220                                                    | EKYB350E□□472ML40S |
|                          | 4,700       | 18×31.5               | 0.014                        | 0.056 | 4,220                                                    | EKYB350E□□472MMN3S |
|                          | 5,600       | 18×35.5               | 0.012                        | 0.048 | 4,280                                                    | EKYB350E□□562MMP1S |
|                          | 27          | 5×11                  | 0.48                         | 2.0   | 238                                                      | EKYB500E□□270ME11D |
|                          | 56          | 6.3×11                | 0.20                         | 0.80  | 385                                                      | EKYB500E□□560MF11D |
|                          | 100         | 8×11.5                | 0.12                         | 0.48  | 620                                                      | EKYB500E□□101MHB5D |
|                          | 150         | 8×15                  | 0.093                        | 0.38  | 810                                                      | EKYB500E□□151MH15D |
|                          | 150         | 10×12.5               | 0.10                         | 0.40  | 810                                                      | EKYB500E□□151MJCS5 |

□ □ : Enter the appropriate lead forming or taping code.

Production of the products shown in   is scheduled to be discontinued.



## KYB Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | Impedance<br>(Ω max./100kHz) |       | Rated<br>ripple<br>current<br>(mA rms/<br>105°C,<br>100kHz) | Part No.           |
|--------------------------|-------------|-----------------------|------------------------------|-------|-------------------------------------------------------------|--------------------|
|                          |             |                       | 20°C                         | -10°C |                                                             |                    |
| 50                       | 180         | 8×20                  | 0.075                        | 0.30  | 980                                                         | EKYB500E□□181MH20D |
|                          | 220         | 10×16                 | 0.069                        | 0.28  | 1,100                                                       | EKYB500E□□221MJ16S |
|                          | 270         | 10×20                 | 0.055                        | 0.22  | 1,300                                                       | EKYB500E□□271MJ20S |
|                          | 390         | 10×25                 | 0.043                        | 0.18  | 1,600                                                       | EKYB500E□□391MJ25S |
|                          | 470         | 10×30                 | 0.038                        | 0.16  | 1,820                                                       | EKYB500E□□471MJ30S |
|                          | 470         | 12.5×20               | 0.034                        | 0.14  | 1,820                                                       | EKYB500E□□471MK20S |
|                          | 680         | 12.5×25               | 0.030                        | 0.12  | 2,100                                                       | EKYB500E□□681MK25S |
|                          | 820         | 12.5×30               | 0.025                        | 0.10  | 2,450                                                       | EKYB500E□□821MK30S |
|                          | 820         | 16×20                 | 0.028                        | 0.12  | 2,350                                                       | EKYB500E□□821ML20S |
|                          | 1,000       | 12.5×35               | 0.021                        | 0.084 | 2,800                                                       | EKYB500E□□102MK35S |
|                          | 1,000       | 18×20                 | 0.025                        | 0.10  | 2,600                                                       | EKYB500E□□102MM20S |
|                          | 1,200       | 12.5×40               | 0.019                        | 0.076 | 3,100                                                       | EKYB500E□□122MK40S |
|                          | 1,200       | 16×25                 | 0.024                        | 0.096 | 2,750                                                       | EKYB500E□□122ML25S |
|                          | 1,500       | 16×31.5               | 0.019                        | 0.076 | 3,150                                                       | EKYB500E□□152MLN3S |
|                          | 1,500       | 18×25                 | 0.021                        | 0.084 | 2,890                                                       | EKYB500E□□152MM25S |
|                          | 1,800       | 16×35.5               | 0.016                        | 0.064 | 3,550                                                       | EKYB500E□□182MLP1S |
|                          | 2,200       | 16×40                 | 0.014                        | 0.056 | 3,900                                                       | EKYB500E□□222ML40S |
|                          | 2,200       | 18×31.5               | 0.014                        | 0.056 | 3,800                                                       | EKYB500E□□222MMN3S |
|                          | 2,700       | 18×35.5               | 0.013                        | 0.052 | 4,100                                                       | EKYB500E□□272MMP1S |
|                          | 2,700       | 18×35.5               | 0.013                        | 0.052 | 4,100                                                       | EKYB500E□□272MMP1S |
| 63                       | 18          | 5×11                  | 0.50                         | 2.0   | 220                                                         | EKYB630E□□180ME11D |
|                          | 33          | 6.3×11                | 0.25                         | 1.0   | 350                                                         | EKYB630E□□330MF11D |
|                          | 56          | 8×11.5                | 0.16                         | 0.64  | 530                                                         | EKYB630E□□560MHB5D |
|                          | 82          | 8×15                  | 0.12                         | 0.48  | 700                                                         | EKYB630E□□820MH15D |
|                          | 120         | 8×20                  | 0.085                        | 0.34  | 880                                                         | EKYB630E□□121MH20D |
|                          | 120         | 10×12.5               | 0.11                         | 0.44  | 725                                                         | EKYB630E□□121MJC5S |
|                          | 180         | 10×16                 | 0.073                        | 0.30  | 1,050                                                       | EKYB630E□□181MJ16S |
|                          | 220         | 10×20                 | 0.055                        | 0.22  | 1,300                                                       | EKYB630E□□221MJ20S |
|                          | 330         | 10×25                 | 0.045                        | 0.18  | 1,550                                                       | EKYB630E□□331MJ25S |
|                          | 390         | 10×30                 | 0.040                        | 0.16  | 1,780                                                       | EKYB630E□□391MJ30S |
|                          | 390         | 12.5×20               | 0.036                        | 0.15  | 1,780                                                       | EKYB630E□□391MK20S |
|                          | 560         | 12.5×25               | 0.030                        | 0.12  | 2,100                                                       | EKYB630E□□561MK25S |
|                          | 680         | 12.5×30               | 0.026                        | 0.11  | 2,415                                                       | EKYB630E□□681MK30S |
|                          | 680         | 16×20                 | 0.028                        | 0.12  | 2,250                                                       | EKYB630E□□681ML20S |
|                          | 820         | 12.5×35               | 0.022                        | 0.088 | 2,700                                                       | EKYB630E□□821MK35S |
|                          | 820         | 18×20                 | 0.028                        | 0.12  | 2,500                                                       | EKYB630E□□821MM20S |
|                          | 1,000       | 12.5×40               | 0.020                        | 0.080 | 3,000                                                       | EKYB630E□□102MK40S |
|                          | 1,000       | 16×25                 | 0.025                        | 0.10  | 2,730                                                       | EKYB630E□□102ML25S |
|                          | 1,200       | 16×31.5               | 0.020                        | 0.080 | 3,000                                                       | EKYB630E□□122MLN3S |
|                          | 1,200       | 18×25                 | 0.022                        | 0.088 | 2,800                                                       | EKYB630E□□122MM25S |
| 80                       | 1,500       | 16×35.5               | 0.018                        | 0.072 | 3,200                                                       | EKYB630E□□152MLP1S |
|                          | 1,500       | 18×31.5               | 0.018                        | 0.072 | 3,300                                                       | EKYB630E□□152MMN3S |
|                          | 1,800       | 16×40                 | 0.016                        | 0.064 | 3,590                                                       | EKYB630E□□182ML40S |
|                          | 1,800       | 18×35.5               | 0.017                        | 0.068 | 3,570                                                       | EKYB630E□□182MMP1S |
|                          | 2,200       | 18×40                 | 0.016                        | 0.064 | 3,670                                                       | EKYB630E□□222MM40S |
|                          | 12          | 5×11                  | 0.80                         | 3.2   | 163                                                         | EKYB800E□□120ME11D |
|                          | 22          | 6.3×11                | 0.43                         | 1.8   | 267                                                         | EKYB800E□□220MF11D |
|                          | 39          | 8×11.5                | 0.18                         | 0.72  | 462                                                         | EKYB800E□□390MHB5D |
|                          | 56          | 8×15                  | 0.14                         | 0.56  | 585                                                         | EKYB800E□□560MH15D |
|                          | 82          | 8×20                  | 0.11                         | 0.44  | 735                                                         | EKYB800E□□820MH20D |
|                          | 82          | 10×12.5               | 0.14                         | 0.56  | 624                                                         | EKYB800E□□820MJC5S |
|                          | 120         | 10×16                 | 0.10                         | 0.40  | 780                                                         | EKYB800E□□121MJ16S |
|                          | 180         | 10×20                 | 0.075                        | 0.30  | 1,040                                                       | EKYB800E□□181MJ20S |
|                          | 220         | 10×25                 | 0.060                        | 0.24  | 1,170                                                       | EKYB800E□□221MJ25S |
|                          | 270         | 10×30                 | 0.053                        | 0.22  | 1,350                                                       | EKYB800E□□271MJ30S |
|                          | 270         | 12.5×20               | 0.048                        | 0.20  | 1,430                                                       | EKYB800E□□271MK20S |
|                          | 390         | 12.5×25               | 0.039                        | 0.16  | 1,620                                                       | EKYB800E□□391MK25S |
|                          | 470         | 12.5×30               | 0.033                        | 0.14  | 1,950                                                       | EKYB800E□□471MK30S |
|                          | 470         | 16×20                 | 0.036                        | 0.15  | 1,750                                                       | EKYB800E□□471ML20S |
|                          | 560         | 12.5×35               | 0.026                        | 0.11  | 2,250                                                       | EKYB800E□□561MK35S |
| 100                      | 560         | 18×20                 | 0.032                        | 0.13  | 2,100                                                       | EKYB800E□□561MM20S |
|                          | 680         | 12.5×40               | 0.024                        | 0.096 | 2,450                                                       | EKYB800E□□681MK40S |
|                          | 680         | 16×25                 | 0.028                        | 0.12  | 2,250                                                       | EKYB800E□□681ML25S |
|                          | 820         | 16×31.5               | 0.022                        | 0.088 | 2,400                                                       | EKYB800E□□821MLN3S |
|                          | 820         | 18×25                 | 0.027                        | 0.11  | 2,270                                                       | EKYB800E□□821MM25S |
|                          | 1,000       | 16×35.5               | 0.020                        | 0.080 | 2,600                                                       | EKYB800E□□102MLP1S |
|                          | 1,200       | 16×40                 | 0.018                        | 0.072 | 2,900                                                       | EKYB800E□□122ML40S |
|                          | 1,200       | 18×31.5               | 0.020                        | 0.080 | 2,550                                                       | EKYB800E□□122MMN3S |
|                          | 1,500       | 18×35.5               | 0.018                        | 0.072 | 3,050                                                       | EKYB800E□□152MMP1S |
|                          | 6.8         | 5×11                  | 0.80                         | 3.2   | 163                                                         | EKYB101E□□6R8ME11D |
|                          | 15          | 6.3×11                | 0.43                         | 1.8   | 267                                                         | EKYB101E□□150MF11D |
|                          | 27          | 8×11.5                | 0.18                         | 0.72  | 462                                                         | EKYB101E□□270MHB5D |
|                          | 39          | 8×15                  | 0.14                         | 0.56  | 585                                                         | EKYB101E□□390MH15D |
|                          | 56          | 8×20                  | 0.11                         | 0.44  | 735                                                         | EKYB101E□□560MH20D |
|                          | 56          | 10×12.5               | 0.14                         | 0.56  | 624                                                         | EKYB101E□□560MJC5S |
|                          | 82          | 10×16                 | 0.10                         | 0.40  | 780                                                         | EKYB101E□□820MJ16S |
|                          | 100         | 10×20                 | 0.075                        | 0.30  | 1,040                                                       | EKYB101E□□101MJ20S |
|                          | 120         | 10×25                 | 0.060                        | 0.24  | 1,170                                                       | EKYB101E□□121MJ25S |
|                          | 150         | 10×30                 | 0.053                        | 0.22  | 1,350                                                       | EKYB101E□□151MJ30S |
|                          | 180         | 12.5×20               | 0.048                        | 0.20  | 1,430                                                       | EKYB101E□□181MK20S |
|                          | 220         | 12.5×25               | 0.039                        | 0.16  | 1,620                                                       | EKYB101E□□221MK25S |
|                          | 270         | 12.5×30               | 0.033                        | 0.14  | 1,950                                                       | EKYB101E□□271MK30S |
|                          | 270         | 16×20                 | 0.036                        | 0.15  | 1,750                                                       | EKYB101E□□271ML20S |
|                          | 330         | 16×25                 | 0.028                        | 0.12  | 2,250                                                       | EKYB101E□□331ML25S |
|                          | 390         | 12.5×35               | 0.026                        | 0.11  | 2,250                                                       | EKYB101E□□391MK35S |
|                          | 390         | 18×20                 | 0.032                        | 0.13  | 2,100                                                       | EKYB101E□□391MM20S |
|                          | 470         | 12.5×40               | 0.024                        | 0.096 | 2,450                                                       | EKYB101E□□471MK40S |
|                          | 470         | 16×31.5               | 0.022                        | 0.088 | 2,400                                                       | EKYB101E□□471MLN3S |
|                          | 560         | 16×35.5               | 0.020                        | 0.080 | 2,600                                                       | EKYB101E□□561MLP1S |
|                          | 560         | 18×25                 | 0.027                        | 0.11  | 2,270                                                       | EKYB101E□□561MM25S |
|                          | 680         | 16×40                 | 0.018                        | 0.072 | 2,900                                                       | EKYB101E□□681ML40S |
|                          | 680         | 18×31.5               | 0.020                        | 0.080 | 2,550                                                       | EKYB101E□□681MMN3S |
|                          | 820         | 18×35.5               | 0.018                        | 0.072 | 3,050                                                       | EKYB101E□□821MMP1S |
|                          | 1,000       | 18×40                 | 0.017                        | 0.068 | 3,510                                                       | EKYB101E□□102MM40S |

□ □ : Enter the appropriate lead forming or taping code.

Production of the products shown in   is scheduled to be discontinued.

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ● Frequency Multipliers

| Capacitance(μF) | Frequency(Hz) |      |      |      |
|-----------------|---------------|------|------|------|
|                 | 120           | 1k   | 10k  | 100k |
| 6.8 to 180      | 0.40          | 0.75 | 0.90 | 1.00 |
| 220 to 560      | 0.50          | 0.85 | 0.94 | 1.00 |
| 680 to 1,800    | 0.60          | 0.87 | 0.95 | 1.00 |
| 2,200 to 3,900  | 0.75          | 0.90 | 0.95 | 1.00 |
| 4,700 to        | 0.85          | 0.95 | 0.98 | 1.00 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.



# KYA Series

- Downsized from KY series
- Newly innovative electrolyte is employed to minimize impedance
- Endurance with ripple current : 4,000 to 10,000 hours at 105°C
- Non solvent resistant type
- RoHS2 Compliant

KYA

↓  
Downsized  
↑  
KY

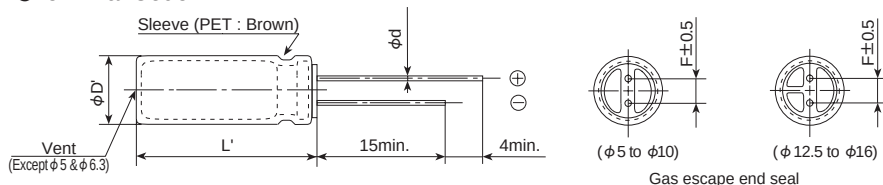


## SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                       |                               |                                      |      |      |                      |      |                           |      |  |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|--------------------------------------|------|------|----------------------|------|---------------------------|------|--|
| Category                                               | Temperature Range                                                                                                                                                                                                                                                                     |                               |                                      |      |      |                      |      |                           |      |  |
| Rated Voltage Range                                    | -40 to +105°C                                                                                                                                                                                                                                                                         |                               |                                      |      |      |                      |      |                           |      |  |
| Capacitance Tolerance                                  | 6.3 to 100V <sub>dc</sub>                                                                                                                                                                                                                                                             |                               |                                      |      |      |                      |      |                           |      |  |
| Leakage Current                                        | ± 20% (M) (at 20°C, 120Hz)                                                                                                                                                                                                                                                            |                               |                                      |      |      |                      |      |                           |      |  |
| Dissipation Factor (tan δ )                            | I=0.01CV or 3μA, whichever is greater.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C after 2 minutes)                                                                                                                         |                               |                                      |      |      |                      |      |                           |      |  |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 6.3V                          | 10V                                  | 16V  | 25V  | 35V                  | 50V  | 63V                       | 100V |  |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.22                          | 0.19                                 | 0.16 | 0.14 | 0.12                 | 0.10 | 0.09                      | 0.08 |  |
|                                                        | When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase. (at 20°C, 120Hz)                                                                                                                                                                     |                               |                                      |      |      |                      |      |                           |      |  |
| Endurance                                              | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 6.3V                          | 10V                                  | 16V  | 25V  | 35V                  | 50V  | 63V                       | 100V |  |
|                                                        | Z(-25°C)/Z(+20°C)                                                                                                                                                                                                                                                                     | 4                             | 3                                    | 2    | 2    | 2                    | 2    | 2                         | 2    |  |
|                                                        | Z(-40°C)/Z(+20°C)                                                                                                                                                                                                                                                                     | 8                             | 6                                    | 4    | 3    | 3                    | 3    | 3                         | 3    |  |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for the specified period of time at 105°C.                      |                               |                                      |      |      |                      |      |                           |      |  |
|                                                        | Time                                                                                                                                                                                                                                                                                  | 6.3 to 10V <sub>dc</sub>      | φ5 & 6.3 : 4,000hours                |      |      | φ8 & 10 : 6,000hours |      | φ12.5 to 16 : 8,000hours  |      |  |
|                                                        |                                                                                                                                                                                                                                                                                       | 16 to 100V <sub>dc</sub>      | φ5 & 6.3 : 5,000hours                |      |      | φ8 & 10 : 7,000hours |      | φ12.5 to 16 : 10,000hours |      |  |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    |                               | ≤ ±25% of the initial value          |      |      |                      |      |                           |      |  |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                         |                               | ≤200% of the initial specified value |      |      |                      |      |                           |      |  |
| Shelf Life                                             | Leakage current                                                                                                                                                                                                                                                                       |                               | ≤ The initial specified value        |      |      |                      |      |                           |      |  |
|                                                        | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 500 hours at 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                               |                                      |      |      |                      |      |                           |      |  |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    |                               | ≤ ±25% of the initial value          |      |      |                      |      |                           |      |  |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                         |                               | ≤200% of the initial specified value |      |      |                      |      |                           |      |  |
| Leakage current                                        |                                                                                                                                                                                                                                                                                       | ≤ The initial specified value |                                      |      |      |                      |      |                           |      |  |

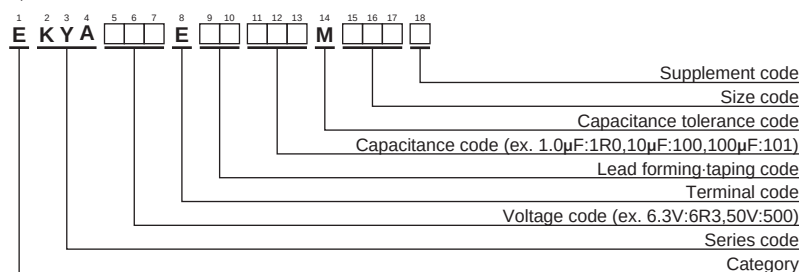
## DIMENSIONS [mm]

- Terminal Code : E



| φD  | 5          | 6.3 | 8   | 10  | 12.5 | 16  |
|-----|------------|-----|-----|-----|------|-----|
| φd  | 0.5        | 0.5 | 0.6 | 0.6 | 0.6  | 0.8 |
| F   | 2.0        | 2.5 | 3.5 | 5.0 | 5.0  | 7.5 |
| φD' | φD+0.5max. |     |     |     |      |     |
| L'  | L+1.5max.  |     |     |     |      |     |

## PART NUMBERING SYSTEM



Please refer to "Product code guide (radial lead type)"



KYA Series

## ◆ STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | Impedance<br>(Ω max./100kHz) |       | Rated ripple<br>current<br>(mA rms/<br>105°C,<br>100kHz) | Part No.           |
|--------------------------|-------------|-----------------------|------------------------------|-------|----------------------------------------------------------|--------------------|
|                          |             |                       | 20°C                         | -10°C |                                                          |                    |
| 6.3                      | 100         | 5×11                  | 0.90                         | 3.6   | 150                                                      | EKYA6R3E□□101ME11D |
|                          | 180         | 5×11                  | 0.40                         | 1.6   | 250                                                      | EKYA6R3E□□181ME11D |
|                          | 220         | 5×11                  | 0.40                         | 1.6   | 250                                                      | EKYA6R3E□□221ME11D |
|                          | 330         | 6.3×11                | 0.22                         | 0.87  | 400                                                      | EKYA6R3E□□331MF11D |
|                          | 470         | 6.3×11                | 0.22                         | 0.87  | 400                                                      | EKYA6R3E□□471MF11D |
|                          | 820         | 8×11.5                | 0.13                         | 0.52  | 640                                                      | EKYA6R3E□□821MHB5D |
|                          | 1,200       | 10×12.5               | 0.080                        | 0.32  | 865                                                      | EKYA6R3E□□122MJCS5 |
|                          | 1,200       | 8×15                  | 0.087                        | 0.35  | 840                                                      | EKYA6R3E□□122MH15D |
|                          | 1,500       | 8×20                  | 0.069                        | 0.27  | 1,050                                                    | EKYA6R3E□□152MH20D |
|                          | 1,800       | 10×16                 | 0.060                        | 0.24  | 1,300                                                    | EKYA6R3E□□182MJ16S |
|                          | 2,700       | 10×20                 | 0.046                        | 0.18  | 1,400                                                    | EKYA6R3E□□272MJ20S |
|                          | 3,300       | 10×25                 | 0.042                        | 0.17  | 1,650                                                    | EKYA6R3E□□332MJ25S |
|                          | 3,900       | 12.5×20               | 0.035                        | 0.12  | 1,900                                                    | EKYA6R3E□□392MK20S |
|                          | 4,700       | 12.5×25               | 0.027                        | 0.089 | 2,230                                                    | EKYA6R3E□□472MK25S |
|                          | 5,600       | 12.5×25               | 0.027                        | 0.089 | 2,230                                                    | EKYA6R3E□□562MK25S |
|                          | 10,000      | 16×25                 | 0.021                        | 0.060 | 2,930                                                    | EKYA6R3E□□103MLN3S |
|                          | 12,000      | 16×31.5               | 0.017                        | 0.050 | 3,450                                                    | EKYA6R3E□□123MLN3S |
|                          | 15,000      | 16×35.5               | 0.015                        | 0.044 | 3,610                                                    | EKYA6R3E□□153MLP1S |
| 10                       | 100         | 5×11                  | 0.90                         | 3.6   | 150                                                      | EKYA100E□□101ME11D |
|                          | 120         | 5×11                  | 0.40                         | 1.6   | 250                                                      | EKYA100E□□121ME11D |
|                          | 330         | 6.3×11                | 0.22                         | 0.87  | 400                                                      | EKYA100E□□331MF11D |
|                          | 560         | 8×11.5                | 0.13                         | 0.52  | 640                                                      | EKYA100E□□561MHB5D |
|                          | 820         | 8×15                  | 0.087                        | 0.35  | 840                                                      | EKYA100E□□821MH15D |
|                          | 820         | 10×12.5               | 0.080                        | 0.32  | 865                                                      | EKYA100E□□821MJCS5 |
|                          | 1,000       | 10×12.5               | 0.080                        | 0.32  | 865                                                      | EKYA100E□□102MJCS5 |
|                          | 1,200       | 8×20                  | 0.069                        | 0.27  | 1,050                                                    | EKYA100E□□122MH20D |
|                          | 1,200       | 10×16                 | 0.060                        | 0.24  | 1,300                                                    | EKYA100E□□122MJ16S |
|                          | 1,800       | 10×20                 | 0.046                        | 0.18  | 1,400                                                    | EKYA100E□□182MJ20S |
|                          | 2,200       | 10×25                 | 0.042                        | 0.17  | 1,650                                                    | EKYA100E□□222MJ25S |
|                          | 3,300       | 12.5×20               | 0.035                        | 0.12  | 1,900                                                    | EKYA100E□□332MK20S |
| 16                       | 3,900       | 12.5×25               | 0.027                        | 0.089 | 2,230                                                    | EKYA100E□□392MK25S |
|                          | 6,800       | 16×25                 | 0.021                        | 0.060 | 2,930                                                    | EKYA100E□□682ML25S |
|                          | 10,000      | 16×31.5               | 0.017                        | 0.050 | 3,450                                                    | EKYA100E□□103MLN3S |
|                          | 12,000      | 16×35.5               | 0.015                        | 0.044 | 3,610                                                    | EKYA100E□□123MLP1S |
|                          | 47          | 5×11                  | 0.40                         | 1.6   | 250                                                      | EKYA160E□□470ME11D |
|                          | 100         | 5×11                  | 0.40                         | 1.6   | 250                                                      | EKYA160E□□101ME11D |
|                          | 220         | 6.3×11                | 0.22                         | 0.87  | 400                                                      | EKYA160E□□221MF11D |
|                          | 270         | 6.3×11                | 0.22                         | 0.87  | 400                                                      | EKYA160E□□271MF11D |
|                          | 470         | 8×11.5                | 0.13                         | 0.52  | 640                                                      | EKYA160E□□471MHB5D |
|                          | 680         | 8×15                  | 0.087                        | 0.35  | 840                                                      | EKYA160E□□681MH15D |
|                          | 680         | 10×12.5               | 0.080                        | 0.32  | 865                                                      | EKYA160E□□681MJCS5 |
|                          | 820         | 8×20                  | 0.069                        | 0.27  | 1,050                                                    | EKYA160E□□821MH20D |
| 25                       | 1,000       | 10×16                 | 0.060                        | 0.24  | 1,300                                                    | EKYA160E□□102MJ16S |
|                          | 1,500       | 10×20                 | 0.046                        | 0.18  | 1,400                                                    | EKYA160E□□152MJ20S |
|                          | 1,800       | 10×25                 | 0.042                        | 0.17  | 1,650                                                    | EKYA160E□□182MJ25S |
|                          | 2,200       | 12.5×20               | 0.035                        | 0.12  | 1,900                                                    | EKYA160E□□222MK20S |
|                          | 3,300       | 12.5×25               | 0.027                        | 0.089 | 2,230                                                    | EKYA160E□□332MK25S |
|                          | 4,700       | 16×25                 | 0.021                        | 0.060 | 2,930                                                    | EKYA160E□□472ML25S |
|                          | 5,600       | 16×25                 | 0.021                        | 0.060 | 2,930                                                    | EKYA160E□□562ML25S |
|                          | 6,800       | 16×31.5               | 0.017                        | 0.050 | 3,450                                                    | EKYA160E□□682MLN3S |
|                          | 8,200       | 16×31.5               | 0.017                        | 0.050 | 3,450                                                    | EKYA160E□□822MLN3S |
|                          | 10,000      | 16×35.5               | 0.015                        | 0.044 | 3,610                                                    | EKYA160E□□103MLP1S |
|                          | 33          | 5×11                  | 0.40                         | 1.6   | 250                                                      | EKYA250E□□330ME11D |
|                          | 47          | 5×11                  | 0.40                         | 1.6   | 250                                                      | EKYA250E□□470ME11D |
| 25                       | 68          | 5×11                  | 0.40                         | 1.6   | 250                                                      | EKYA250E□□680ME11D |
|                          | 150         | 6.3×11                | 0.22                         | 0.87  | 400                                                      | EKYA250E□□151MF11D |
|                          | 330         | 8×11.5                | 0.13                         | 0.52  | 640                                                      | EKYA250E□□331MHB5D |
|                          | 390         | 8×15                  | 0.087                        | 0.35  | 840                                                      | EKYA250E□□391MH15D |
|                          | 470         | 10×12.5               | 0.080                        | 0.32  | 865                                                      | EKYA250E□□471MJCS5 |
|                          | 560         | 8×20                  | 0.069                        | 0.27  | 1,050                                                    | EKYA250E□□561MH20D |
|                          | 680         | 10×16                 | 0.060                        | 0.24  | 1,300                                                    | EKYA250E□□681MJ16S |
|                          | 1,000       | 10×20                 | 0.046                        | 0.18  | 1,400                                                    | EKYA250E□□102MJ20S |
|                          | 1,200       | 10×25                 | 0.042                        | 0.17  | 1,650                                                    | EKYA250E□□122MJ25S |
|                          | 1,500       | 12.5×20               | 0.035                        | 0.12  | 1,900                                                    | EKYA250E□□152MK20S |
|                          | 2,200       | 12.5×25               | 0.027                        | 0.089 | 2,230                                                    | EKYA250E□□222MK25S |
|                          | 3,300       | 16×25                 | 0.021                        | 0.060 | 2,930                                                    | EKYA250E□□332ML25S |
| 25                       | 3,900       | 16×31.5               | 0.017                        | 0.050 | 3,450                                                    | EKYA250E□□392MLN3S |
|                          | 4,700       | 16×35.5               | 0.015                        | 0.044 | 3,610                                                    | EKYA250E□□472MLP1S |
|                          | 33          | 5×11                  | 0.40                         | 1.6   | 250                                                      | EKYA350E□□330ME11D |
|                          | 47          | 5×11                  | 0.40                         | 1.6   | 250                                                      | EKYA350E□□470ME11D |
|                          | 100         | 6.3×11                | 0.22                         | 0.87  | 400                                                      | EKYA350E□□101MF11D |
|                          | 220         | 8×11.5                | 0.13                         | 0.52  | 640                                                      | EKYA350E□□221MHB5D |
|                          | 270         | 8×15                  | 0.087                        | 0.35  | 840                                                      | EKYA350E□□271MH15D |
|                          | 330         | 10×12.5               | 0.080                        | 0.32  | 865                                                      | EKYA350E□□331MJCS5 |
|                          | 390         | 8×20                  | 0.069                        | 0.27  | 1,050                                                    | EKYA350E□□391MH20D |
|                          | 470         | 10×16                 | 0.060                        | 0.24  | 1,300                                                    | EKYA350E□□471MJ16S |
|                          | 680         | 10×20                 | 0.046                        | 0.18  | 1,400                                                    | EKYA350E□□681MJ20S |
|                          | 820         | 10×25                 | 0.042                        | 0.17  | 1,650                                                    | EKYA350E□□821MJ25S |
| 35                       | 1,000       | 12.5×20               | 0.035                        | 0.12  | 1,900                                                    | EKYA350E□□102MK20S |
|                          | 1,500       | 12.5×25               | 0.027                        | 0.089 | 2,230                                                    | EKYA350E□□152MK25S |
|                          | 2,200       | 16×25                 | 0.021                        | 0.060 | 2,930                                                    | EKYA350E□□222ML25S |
|                          | 2,700       | 16×25                 | 0.021                        | 0.060 | 2,930                                                    | EKYA350E□□272ML25S |
|                          | 3,300       | 16×31.5               | 0.017                        | 0.050 | 3,450                                                    | EKYA350E□□332MLN3S |
|                          | 3,900       | 16×35.5               | 0.015                        | 0.044 | 3,610                                                    | EKYA350E□□392MLP1S |
|                          | 1.0         | 5×11                  | 4.0                          | 16    | 30                                                       | EKYA500E□□1R0ME11D |
|                          | 2.2         | 5×11                  | 2.5                          | 10    | 43                                                       | EKYA500E□□2R2ME11D |
|                          | 3.3         | 5×11                  | 2.2                          | 8.8   | 53                                                       | EKYA500E□□3R3ME11D |
|                          | 4.7         | 5×11                  | 1.9                          | 7.6   | 88                                                       | EKYA500E□□4R7ME11D |
|                          | 10          | 5×11                  | 1.5                          | 6.0   | 100                                                      | EKYA500E□□100ME11D |
|                          | 22          | 5×11                  | 0.70                         | 2.8   | 180                                                      | EKYA500E□□220ME11D |
| 50                       | 27          | 5×11                  | 0.70                         | 2.8   | 250                                                      | EKYA500E□□270ME11D |
|                          | 47          | 6.3×11                | 0.30                         | 1.2   | 295                                                      | EKYA500E□□470MF11D |
|                          | 56          | 6.3×11                | 0.30                         | 1.2   | 295                                                      | EKYA500E□□560MF11D |
|                          | 100         | 8×11.5                | 0.17                         | 0.68  | 555                                                      | EKYA500E□□101MHB5D |
|                          | 150         | 8×15                  | 0.12                         | 0.48  | 730                                                      | EKYA500E□□151MH15D |
|                          | 180         | 10×12.5               | 0.12                         | 0.48  | 760                                                      | EKYA500E□□181MJCS5 |
|                          | 180         | 8×20                  | 0.091                        | 0.36  | 910                                                      | EKYA500E□□181MH20D |
|                          | 220         | 10×16                 | 0.084                        | 0.34  | 1,050                                                    | EKYA500E□□221MJ16S |
|                          | 330         | 10×20                 | 0.060                        | 0.24  | 1,220                                                    | EKYA500E□□331MJ20S |
|                          | 470         | 10×25                 | 0.055                        | 0.22  | 1,440                                                    | EKYA500E□□471MJ25S |
|                          | 470         | 12.5×20               | 0.045                        | 0.15  | 1,660                                                    | EKYA500E□□471MK20S |
|                          | 560         | 12.5×20               | 0.045                        | 0.15  | 1,660                                                    | EKYA500E□□561MK20S |
| 63                       | 820         | 12.5×25               | 0.034                        | 0.11  | 1,950                                                    | EKYA500E□□821MK25S |
|                          | 1,000       | 16×25                 | 0.025                        | 0.075 | 2,555                                                    | EKYA500E□□102ML25S |
|                          | 1,200       | 16×25                 | 0.025                        | 0.075 | 2,555                                                    | EKYA500E□□122ML25S |
|                          | 1,800       | 16×31.5               | 0.022                        | 0.066 | 3,010                                                    | EKYA500E□□182MLN3S |
|                          | 2,200       | 16×35.5               | 0.019                        | 0.057 | 3,150                                                    | EKYA500E□□222MLP1S |
|                          | 10          | 5×11                  | 0.88                         | 3.5   | 173                                                      | EKYA630E□□100ME11D |
|                          | 15          | 5×11                  | 0.88                         | 3.5   | 173                                                      | EKYA630E□□150ME11D |
|                          | 33          | 6.3×11                | 0.35                         | 1.4   | 278                                                      | EKYA630E□□330MF11D |
|                          | 56          | 8×11.5                | 0.22                         | 0.88  | 500                                                      | EKYA630E□□560MHB5D |
|                          | 82          | 8×15                  | 0.16                         | 0.64  | 665                                                      | EKYA630E□□820MH15D |
|                          | 100         | 10×12.5               | 0.11                         | 0.44  | 725                                                      | EKYA630E□□101MJCS5 |
|                          | 120         | 8×20                  | 0.12                         | 0.48  | 820                                                      | EKYA630E□□121MH20D |
| 63                       | 120         | 10×16                 | 0.076                        | 0.31  | 950                                                      | EKYA630E□□121MJ16S |
|                          | 220         | 10×20                 | 0.056                        | 0.23  | 1,200                                                    | EKYA630E□□221MJ20S |
|                          | 330         | 10×25                 | 0.046                        | 0.19  | 1,350                                                    | EKYA630E□□331MJ25S |
|                          | 330         | 12.5×20               | 0.041                        | 0.13  | 1,570                                                    | EKYA630E□□331MK20S |
|                          | 390         | 12.5×20               | 0.041                        | 0.13  | 1,570                                                    | EKYA630E□□391MK20S |
|                          | 470         | 12.5×25               | 0.031                        | 0.093 | 1,990                                                    | EKYA630E□□471MK25S |
|                          | 560         | 12.5×25               | 0.031                        | 0.093 | 1,990                                                    | EKYA630E□□561MK25S |
|                          | 1,000       | 16×25                 | 0.025                        | 0.075 | 2,730                                                    | EKYA630E□□102ML25S |
|                          | 1,200       | 16×31.5               | 0.021                        | 0.063 | 2,850                                                    | EKYA630E□□122MLN3S |
|                          | 1,500       | 16×35.5               | 0.019                        | 0.057 | 2,900                                                    | EKYA630E□□152MLP1S |
|                          | 1.0         | 5×11                  | 4.5                          | 15    | 20                                                       | EKYA101E□□1R0ME11D |
|                          | 2.2         | 5×11                  | 3.0                          | 13    | 30                                                       | EKYA101E□□2R2ME11D |
| 100                      | 3.3         | 5×11                  | 2.7                          | 11    | 40                                                       | EKYA101E□□3R3ME11D |
|                          | 4.7         | 5×11                  | 2.5                          | 10    | 65                                                       | EKYA101E□□4R7ME11D |
|                          | 6.8         | 5×11                  | 1.4                          | 5.6   | 125                                                      | EKYA101E□□6R8ME11D |
|                          |             |                       |                              |       |                                                          |                    |

□□ : Enter the appropriate lead form or taping code.

Production of the products shown in □□□□ is scheduled to be discontinued.

Product specifications in this catalog are subject to change without notice. Request our product specifications before purchase and/or use. Please use our products based on the information contained in this catalog and product specifications.



## KYA Series

### ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | Impedance<br>(Ω max./100kHz) |       | Rated<br>ripple<br>current<br>(mA <sub>rms</sub> /105°C,<br>100kHz) | Part No.           |
|--------------------------|-------------|-----------------------|------------------------------|-------|---------------------------------------------------------------------|--------------------|
|                          |             |                       | 20°C                         | -10°C |                                                                     |                    |
| 100                      | 10          | 6.3×11                | 0.57                         | 2.3   | 205                                                                 | EKYA101E□□100MF11D |
|                          | 15          | 6.3×11                | 0.57                         | 2.3   | 205                                                                 | EKYA101E□□150MF11D |
|                          | 27          | 8×11.5                | 0.36                         | 1.4   | 355                                                                 | EKYA101E□□270MHB5D |
|                          | 39          | 8×15                  | 0.25                         | 1.0   | 450                                                                 | EKYA101E□□390MH15D |
|                          | 47          | 10×12.5               | 0.17                         | 0.66  | 480                                                                 | EKYA101E□□470MJC5S |
|                          | 56          | 8×20                  | 0.19                         | 0.76  | 565                                                                 | EKYA101E□□560MH20D |
|                          | 68          | 10×16                 | 0.11                         | 0.47  | 600                                                                 | EKYA101E□□680MJ16S |
|                          | 100         | 10×20                 | 0.084                        | 0.34  | 800                                                                 | EKYA101E□□101MJ20S |
|                          | 150         | 10×25                 | 0.069                        | 0.28  | 900                                                                 | EKYA101E□□151MJ25S |
|                          | 180         | 12.5×20               | 0.062                        | 0.18  | 1,100                                                               | EKYA101E□□181MK20S |
|                          | 220         | 12.5×25               | 0.047                        | 0.14  | 1,250                                                               | EKYA101E□□221MK25S |
|                          | 330         | 16×25                 | 0.038                        | 0.12  | 1,700                                                               | EKYA101E□□331ML25S |
|                          | 470         | 16×31.5               | 0.032                        | 0.095 | 1,850                                                               | EKYA101E□□471MLN3S |
|                          | 560         | 16×35.5               | 0.029                        | 0.086 | 2,000                                                               | EKYA101E□□561MLP1S |

□□ : Enter the appropriate lead forming or taping code.

Production of the products shown in □□□□ is scheduled to be discontinued.

### ◆RATED RIPPLE CURRENT MULTIPLIERS

#### ● Frequency Multipliers

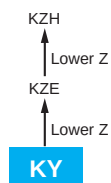
| Capacitance(μF) | Frequency(Hz) |      |      |      |
|-----------------|---------------|------|------|------|
|                 | 120           | 1k   | 10k  | 100k |
| 1.0 to 180      | 0.40          | 0.75 | 0.90 | 1.00 |
| 220 to 560      | 0.50          | 0.85 | 0.94 | 1.00 |
| 680 to 1,800    | 0.60          | 0.87 | 0.95 | 1.00 |
| 2,200 to 3,900  | 0.75          | 0.90 | 0.95 | 1.00 |
| 4,700 to        | 0.85          | 0.95 | 0.98 | 1.00 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.



# KY Series

- Newly innovative electrolyte is employed to minimize ESR
- Endurance with ripple current : 6,000 to 10,000 hours at 105°C
- Non solvent resistant type
- RoHS2 Compliant

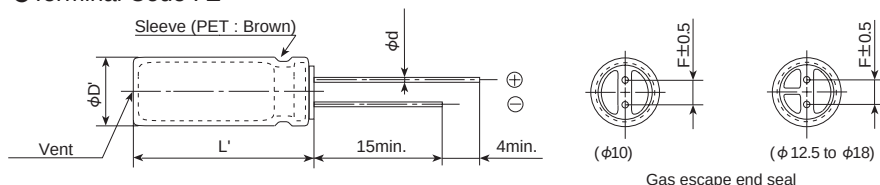


## SPECIFICATIONS

| Items                                                        | Characteristics                                                                                                                                                                                                                                                                     |                              |                                                |      |      |      |      |      |      |      |            |
|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|------------------------------------------------|------|------|------|------|------|------|------|------------|
| Category                                                     | -40 to +105℃                                                                                                                                                                                                                                                                        |                              |                                                |      |      |      |      |      |      |      |            |
| Temperature Range                                            |                                                                                                                                                                                                                                                                                     |                              |                                                |      |      |      |      |      |      |      |            |
| Rated Voltage Range                                          | 6.3 to 100V <sub>dc</sub>                                                                                                                                                                                                                                                           |                              |                                                |      |      |      |      |      |      |      |            |
| Capacitance Tolerance                                        | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                           |                              |                                                |      |      |      |      |      |      |      |            |
| Leakage Current                                              | I=0.01CV or 3μA, whichever is greater.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 2 minutes)                                                                                                                        |                              |                                                |      |      |      |      |      |      |      |            |
| Dissipation Factor<br>(tan δ )                               | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                    | 6.3V                         | 10V                                            | 16V  | 25V  | 35V  | 50V  | 63V  | 80V  | 100V |            |
|                                                              | tan δ (Max.)                                                                                                                                                                                                                                                                        | 0.22                         | 0.19                                           | 0.16 | 0.14 | 0.12 | 0.10 | 0.09 | 0.09 | 0.08 |            |
|                                                              | When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase. (at 20℃, 120Hz)                                                                                                                                                                    |                              |                                                |      |      |      |      |      |      |      |            |
| Low Temperature<br>Characteristics<br>(Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                    | 6.3V                         | 10V                                            | 16V  | 25V  | 35V  | 50V  | 63V  | 80V  | 100V |            |
|                                                              | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                     | 4                            | 3                                              | 2    | 2    | 2    | 2    | 2    | 2    | 2    |            |
|                                                              | Z(-40℃)/Z(+20℃)                                                                                                                                                                                                                                                                     | 8                            | 6                                              | 4    | 3    | 3    | 3    | 3    | 3    | 3    | (at 120Hz) |
| Endurance                                                    | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for the specified period of time at 105℃.                      |                              |                                                |      |      |      |      |      |      |      |            |
|                                                              | Time                                                                                                                                                                                                                                                                                | 6.3 to 10V <sub>dc</sub>     | φ 10 : 6,000hours   φ 12.5 to 18 : 8,000hours  |      |      |      |      |      |      |      |            |
|                                                              |                                                                                                                                                                                                                                                                                     | 16 to 100V <sub>dc</sub>     | φ 10 : 7,000hours   φ 12.5 to 18 : 10,000hours |      |      |      |      |      |      |      |            |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                  |                              | ≤ ±25% of the initial value                    |      |      |      |      |      |      |      |            |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                       |                              | ≤200% of the initial specified value           |      |      |      |      |      |      |      |            |
| Leakage current                                              |                                                                                                                                                                                                                                                                                     | ≤The initial specified value |                                                |      |      |      |      |      |      |      |            |
| Shelf Life                                                   | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 500 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                              |                                                |      |      |      |      |      |      |      |            |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                  |                              | ≤ ±25% of the initial value                    |      |      |      |      |      |      |      |            |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                       |                              | ≤200% of the initial specified value           |      |      |      |      |      |      |      |            |
|                                                              | Leakage current                                                                                                                                                                                                                                                                     |                              | ≤The initial specified value                   |      |      |      |      |      |      |      |            |

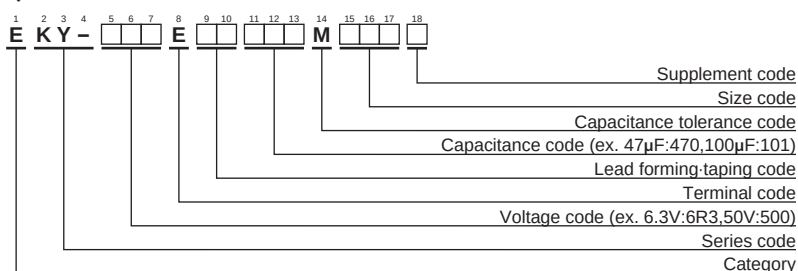
## DIMENSIONS [mm]

- Terminal Code : E



| φD  | 10         | 12.5 | 16  | 18  |
|-----|------------|------|-----|-----|
| φd  | 0.6        | 0.6  | 0.8 | 0.8 |
| F   | 5.0        | 5.0  | 7.5 | 7.5 |
| φD' | φD+0.5max. |      |     |     |
| L'  | L+1.5max.  |      |     |     |

## PART NUMBERING SYSTEM



Please refer to "Product code guide (radial lead type)"



## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | Impedance<br>(Ω max./100kHz) |       | Rated<br>ripple<br>current<br>(mA <sub>rms</sub> /105°C,<br>100kHz) | Part No.           |
|--------------------------|-------------|-----------------------|------------------------------|-------|---------------------------------------------------------------------|--------------------|
|                          |             |                       | 20°C                         | -10°C |                                                                     |                    |
| 6.3                      | 820         | 10×12.5               | 0.080                        | 0.32  | 865                                                                 | EKY-6R3E□□821MJCS5 |
|                          | 1,200       | 10×16                 | 0.060                        | 0.24  | 1,210                                                               | EKY-6R3E□□122MJ16S |
|                          | 1,500       | 10×20                 | 0.046                        | 0.18  | 1,400                                                               | EKY-6R3E□□152MJ20S |
|                          | 1,800       | 12.5×15               | 0.049                        | 0.16  | 1,450                                                               | EKY-6R3E□□182MK15S |
|                          | 2,200       | 10×25                 | 0.042                        | 0.17  | 1,650                                                               | EKY-6R3E□□222MJ25S |
|                          | 2,700       | 10×30                 | 0.031                        | 0.12  | 1,910                                                               | EKY-6R3E□□272MJ30S |
|                          | 2,700       | 16×15                 | 0.042                        | 0.12  | 1,940                                                               | EKY-6R3E□□272ML15S |
|                          | 3,300       | 12.5×20               | 0.035                        | 0.12  | 1,900                                                               | EKY-6R3E□□332MK20S |
|                          | 3,900       | 12.5×25               | 0.027                        | 0.089 | 2,230                                                               | EKY-6R3E□□392MK25S |
|                          | 3,900       | 18×15                 | 0.043                        | 0.11  | 2,210                                                               | EKY-6R3E□□392MM15S |
|                          | 4,700       | 12.5×30               | 0.024                        | 0.078 | 2,650                                                               | EKY-6R3E□□472MK30S |
|                          | 5,600       | 12.5×35               | 0.020                        | 0.065 | 2,880                                                               | EKY-6R3E□□562MK35S |
|                          | 5,600       | 16×20                 | 0.027                        | 0.078 | 2,530                                                               | EKY-6R3E□□562ML20S |
|                          | 6,800       | 12.5×40               | 0.017                        | 0.056 | 3,350                                                               | EKY-6R3E□□682MK40S |
|                          | 6,800       | 16×25                 | 0.021                        | 0.060 | 2,930                                                               | EKY-6R3E□□682ML25S |
|                          | 6,800       | 18×20                 | 0.026                        | 0.067 | 2,860                                                               | EKY-6R3E□□682MM20S |
|                          | 8,200       | 16×31.5               | 0.017                        | 0.050 | 3,450                                                               | EKY-6R3E□□822MLN3S |
|                          | 10,000      | 16×35.5               | 0.015                        | 0.044 | 3,610                                                               | EKY-6R3E□□103MLP1S |
|                          | 10,000      | 18×25                 | 0.019                        | 0.049 | 3,140                                                               | EKY-6R3E□□103MM25S |
|                          | 12,000      | 16×40                 | 0.013                        | 0.038 | 4,080                                                               | EKY-6R3E□□123ML40S |
| 10                       | 12,000      | 18×31.5               | 0.015                        | 0.040 | 4,170                                                               | EKY-6R3E□□123MMN3S |
|                          | 15,000      | 18×35.5               | 0.014                        | 0.038 | 4,220                                                               | EKY-6R3E□□153MMP1S |
|                          | 18,000      | 18×40                 | 0.012                        | 0.032 | 4,280                                                               | EKY-6R3E□□183MM40S |
|                          | 680         | 10×12.5               | 0.080                        | 0.32  | 865                                                                 | EKY-100E□□681MJCS5 |
|                          | 1,000       | 10×16                 | 0.060                        | 0.24  | 1,210                                                               | EKY-100E□□102MJ16S |
|                          | 1,200       | 10×20                 | 0.046                        | 0.18  | 1,400                                                               | EKY-100E□□122MJ20S |
|                          | 1,500       | 10×25                 | 0.042                        | 0.17  | 1,650                                                               | EKY-100E□□152MJ25S |
|                          | 1,500       | 12.5×15               | 0.049                        | 0.16  | 1,450                                                               | EKY-100E□□152MK15S |
|                          | 2,200       | 10×30                 | 0.031                        | 0.12  | 1,910                                                               | EKY-100E□□222MJ30S |
|                          | 2,200       | 12.5×20               | 0.035                        | 0.12  | 1,900                                                               | EKY-100E□□222MK20S |
|                          | 2,200       | 16×15                 | 0.042                        | 0.12  | 1,940                                                               | EKY-100E□□222ML15S |
|                          | 2,700       | 18×15                 | 0.043                        | 0.11  | 2,210                                                               | EKY-100E□□272MM15S |
|                          | 3,300       | 12.5×25               | 0.027                        | 0.089 | 2,230                                                               | EKY-100E□□332MK25S |
|                          | 3,900       | 12.5×30               | 0.024                        | 0.078 | 2,650                                                               | EKY-100E□□392MK30S |
|                          | 3,900       | 16×20                 | 0.027                        | 0.078 | 2,530                                                               | EKY-100E□□392ML20S |
|                          | 4,700       | 12.5×35               | 0.020                        | 0.065 | 2,880                                                               | EKY-100E□□472MK35S |
|                          | 5,600       | 16×25                 | 0.021                        | 0.060 | 2,930                                                               | EKY-100E□□562ML25S |
|                          | 5,600       | 18×20                 | 0.026                        | 0.067 | 2,860                                                               | EKY-100E□□562MM20S |
|                          | 6,800       | 16×31.5               | 0.017                        | 0.050 | 3,450                                                               | EKY-100E□□682MLN3S |
|                          | 6,800       | 18×25                 | 0.019                        | 0.049 | 3,140                                                               | EKY-100E□□682MM25S |
| 16                       | 8,200       | 16×35.5               | 0.015                        | 0.044 | 3,610                                                               | EKY-100E□□822MLP1S |
|                          | 8,200       | 18×31.5               | 0.015                        | 0.040 | 4,170                                                               | EKY-100E□□822MMN3S |
|                          | 10,000      | 16×40                 | 0.013                        | 0.038 | 4,080                                                               | EKY-100E□□103ML40S |
|                          | 10,000      | 18×35.5               | 0.014                        | 0.038 | 4,220                                                               | EKY-100E□□103MMP1S |
|                          | 12,000      | 18×40                 | 0.012                        | 0.032 | 4,280                                                               | EKY-100E□□123MM40S |
|                          | 470         | 10×12.5               | 0.080                        | 0.32  | 865                                                                 | EKY-160E□□471MJCS5 |
|                          | 680         | 10×16                 | 0.060                        | 0.24  | 1,210                                                               | EKY-160E□□681MJ16S |
|                          | 1,000       | 10×20                 | 0.046                        | 0.18  | 1,400                                                               | EKY-160E□□102MJ20S |
|                          | 1,000       | 12.5×15               | 0.049                        | 0.16  | 1,450                                                               | EKY-160E□□102MK15S |
|                          | 1,200       | 10×25                 | 0.042                        | 0.17  | 1,650                                                               | EKY-160E□□122MJ25S |
|                          | 1,500       | 10×30                 | 0.031                        | 0.12  | 1,910                                                               | EKY-160E□□152MJ30S |
|                          | 1,500       | 12.5×20               | 0.035                        | 0.12  | 1,900                                                               | EKY-160E□□152MK20S |
|                          | 1,500       | 16×15                 | 0.042                        | 0.12  | 1,940                                                               | EKY-160E□□152ML15S |
|                          | 2,200       | 12.5×25               | 0.027                        | 0.089 | 2,230                                                               | EKY-160E□□222MK25S |
|                          | 2,200       | 18×15                 | 0.043                        | 0.11  | 2,210                                                               | EKY-160E□□222MM15S |
|                          | 2,700       | 12.5×30               | 0.024                        | 0.078 | 2,650                                                               | EKY-160E□□272MK30S |
|                          | 2,700       | 16×20                 | 0.027                        | 0.078 | 2,530                                                               | EKY-160E□□272ML20S |
|                          | 3,300       | 12.5×35               | 0.020                        | 0.065 | 2,880                                                               | EKY-160E□□332MK35S |
|                          | 3,900       | 12.5×40               | 0.017                        | 0.056 | 3,350                                                               | EKY-160E□□392MK40S |
|                          | 3,900       | 16×25                 | 0.021                        | 0.060 | 2,930                                                               | EKY-160E□□392ML25S |
| 16                       | 3,900       | 18×20                 | 0.026                        | 0.067 | 2,860                                                               | EKY-160E□□392MM20S |
|                          | 4,700       | 16×31.5               | 0.017                        | 0.050 | 3,450                                                               | EKY-160E□□472MLN3S |
|                          | 4,700       | 18×25                 | 0.019                        | 0.049 | 3,140                                                               | EKY-160E□□472MM25S |
|                          | 5,600       | 16×35.5               | 0.015                        | 0.044 | 3,610                                                               | EKY-160E□□562MLP1S |
|                          | 5,600       | 18×31.5               | 0.015                        | 0.040 | 4,170                                                               | EKY-160E□□562MMN3S |
|                          | 6,800       | 16×40                 | 0.013                        | 0.038 | 4,080                                                               | EKY-160E□□682ML40S |
|                          | 470         | 10×12.5               | 0.12                         | 0.48  | 760                                                                 | EKY-500E□□151MJCS5 |
|                          | 220         | 10×16                 | 0.084                        | 0.34  | 1,050                                                               | EKY-500E□□221MJ16S |
|                          | 270         | 10×20                 | 0.060                        | 0.24  | 1,220                                                               | EKY-500E□□271MJ20S |
|                          | 270         | 12.5×15               | 0.061                        | 0.20  | 1,260                                                               | EKY-500E□□271MK15S |
|                          | 330         | 10×25                 | 0.055                        | 0.22  | 1,440                                                               | EKY-500E□□331MJ25S |
|                          | 470         | 10×30                 | 0.043                        | 0.17  | 1,690                                                               | EKY-500E□□471MJ30S |
|                          | 470         | 12.5×20               | 0.045                        | 0.15  | 1,660                                                               | EKY-500E□□471MK20S |
|                          | 470         | 16×15                 | 0.055                        | 0.17  | 1,690                                                               | EKY-500E□□471ML15S |
|                          | 560         | 12.5×25               | 0.034                        | 0.11  | 1,950                                                               | EKY-500E□□561MK25S |
|                          | 560         | 18×15                 | 0.054                        | 0.15  | 1,930                                                               | EKY-500E□□561MM15S |
|                          | 680         | 12.5×30               | 0.030                        | 0.10  | 2,310                                                               | EKY-500E□□681MK30S |
|                          | 820         | 12.5×35               | 0.025                        | 0.083 | 2,510                                                               | EKY-500E□□821MK35S |
|                          | 820         | 16×20                 | 0.034                        | 0.10  | 2,210                                                               | EKY-500E□□821ML20S |
|                          | 1,000       | 12.5×40               | 0.021                        | 0.069 | 2,920                                                               | EKY-500E□□102MK40S |
| 50                       | 1,000       | 16×25                 | 0.025                        | 0.075 | 2,555                                                               | EKY-500E□□102ML25S |
|                          | 1,000       | 18×20                 | 0.036                        | 0.097 | 2,490                                                               | EKY-500E□□102MM20S |
|                          | 1,200       | 16×31.5               | 0.022                        | 0.066 | 3,010                                                               | EKY-500E□□122MLN3S |
|                          | 1,200       | 18×25                 | 0.026                        | 0.070 | 2,740                                                               | EKY-500E□□122MM25S |
|                          | 1,500       | 16×35.5               | 0.019                        | 0.057 | 3,150                                                               | EKY-500E□□152MLP1S |

□□ : Enter the appropriate lead forming or taping code.



## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | Impedance<br>(Ω max./100kHz) |       | Rated<br>ripple<br>current<br>(mA rms/<br>105°C,<br>100kHz) | Part No.           |
|--------------------------|-------------|-----------------------|------------------------------|-------|-------------------------------------------------------------|--------------------|
|                          |             |                       | 20°C                         | -10°C |                                                             |                    |
| 50                       | 1,800       | 16×40                 | 0.016                        | 0.048 | 3,710                                                       | EKY-500E□□182ML40S |
|                          | 1,800       | 18×31.5               | 0.021                        | 0.057 | 3,635                                                       | EKY-500E□□182MMN3S |
|                          | 2,200       | 18×35.5               | 0.017                        | 0.046 | 3,680                                                       | EKY-500E□□222MMP1S |
|                          | 2,700       | 18×40                 | 0.014                        | 0.038 | 3,800                                                       | EKY-500E□□272MM40S |
| 63                       | 82          | 10×12.5               | 0.11                         | 0.44  | 690                                                         | EKY-630E□□820MJC5S |
|                          | 120         | 10×16                 | 0.076                        | 0.31  | 950                                                         | EKY-630E□□121MJ16S |
|                          | 180         | 10×20                 | 0.056                        | 0.23  | 1,150                                                       | EKY-630E□□181MJ20S |
|                          | 180         | 12.5×16               | 0.072                        | 0.29  | 1,150                                                       | EKY-630E□□181MK16S |
|                          | 220         | 10×25                 | 0.046                        | 0.19  | 1,350                                                       | EKY-630E□□221MJ25S |
|                          | 270         | 12.5×20               | 0.041                        | 0.13  | 1,500                                                       | EKY-630E□□271MK20S |
|                          | 390         | 12.5×25               | 0.031                        | 0.093 | 1,900                                                       | EKY-630E□□391MK25S |
|                          | 470         | 12.5×30               | 0.028                        | 0.084 | 2,300                                                       | EKY-630E□□471MK30S |
|                          | 470         | 16×20                 | 0.032                        | 0.096 | 2,000                                                       | EKY-630E□□471ML20S |
|                          | 560         | 12.5×35               | 0.024                        | 0.072 | 2,500                                                       | EKY-630E□□561MK35S |
|                          | 680         | 12.5×40               | 0.021                        | 0.063 | 2,800                                                       | EKY-630E□□681MK40S |
|                          | 680         | 16×25                 | 0.025                        | 0.075 | 2,600                                                       | EKY-630E□□681ML25S |
|                          | 680         | 18×20                 | 0.030                        | 0.090 | 2,500                                                       | EKY-630E□□681MM20S |
|                          | 820         | 16×31.5               | 0.021                        | 0.063 | 2,850                                                       | EKY-630E□□821MLN3S |
|                          | 820         | 18×25                 | 0.024                        | 0.072 | 2,800                                                       | EKY-630E□□821MM25S |
| 80                       | 1,000       | 16×35.5               | 0.019                        | 0.057 | 2,900                                                       | EKY-630E□□102MLP1S |
|                          | 1,200       | 16×40                 | 0.018                        | 0.054 | 3,400                                                       | EKY-630E□□122ML40S |
|                          | 1,200       | 18×31.5               | 0.020                        | 0.060 | 3,300                                                       | EKY-630E□□122MMN3S |
|                          | 1,500       | 18×35.5               | 0.018                        | 0.054 | 3,400                                                       | EKY-630E□□152MMP1S |
|                          | 1,800       | 18×40                 | 0.017                        | 0.051 | 3,500                                                       | EKY-630E□□182MM40S |
|                          | 68          | 10×12.5               | 0.17                         | 0.66  | 480                                                         | EKY-800E□□680MJC5S |
|                          | 100         | 10×16                 | 0.11                         | 0.47  | 600                                                         | EKY-800E□□101MJ16S |
|                          | 120         | 10×20                 | 0.084                        | 0.34  | 800                                                         | EKY-800E□□121MJ20S |
| 80                       | 150         | 10×25                 | 0.069                        | 0.28  | 900                                                         | EKY-800E□□151MJ25S |
|                          | 150         | 12.5×16               | 0.11                         | 0.34  | 750                                                         | EKY-800E□□151MK16S |
|                          | 220         | 12.5×20               | 0.062                        | 0.18  | 1,100                                                       | EKY-800E□□221MK20S |
|                          | 330         | 12.5×25               | 0.047                        | 0.14  | 1,250                                                       | EKY-800E□□331MK25S |
|                          | 330         | 16×20                 | 0.048                        | 0.15  | 1,350                                                       | EKY-800E□□331ML20S |
|                          | 390         | 12.5×30               | 0.042                        | 0.13  | 1,500                                                       | EKY-800E□□391MK30S |
|                          | 470         | 12.5×35               | 0.036                        | 0.11  | 1,650                                                       | EKY-800E□□471MK35S |
|                          | 470         | 16×25                 | 0.038                        | 0.12  | 1,700                                                       | EKY-800E□□471ML25S |
|                          | 470         | 18×20                 | 0.045                        | 0.14  | 1,500                                                       | EKY-800E□□471MM20S |
|                          | 560         | 12.5×40               | 0.032                        | 0.095 | 1,800                                                       | EKY-800E□□561MK40S |
|                          | 680         | 12.5×40               | 0.032                        | 0.095 | 1,850                                                       | EKY-800E□□681MLN3S |
|                          | 680         | 16×31.5               | 0.032                        | 0.095 | 1,850                                                       | EKY-800E□□681MLN3S |
|                          | 820         | 16×35.5               | 0.029                        | 0.086 | 2,000                                                       | EKY-800E□□821MLP1S |
|                          | 820         | 18×31.5               | 0.030                        | 0.090 | 1,900                                                       | EKY-800E□□821MMN3S |
|                          | 1,000       | 16×40                 | 0.027                        | 0.081 | 2,200                                                       | EKY-800E□□102ML40S |
|                          | 1,000       | 18×35.5               | 0.027                        | 0.081 | 2,200                                                       | EKY-800E□□102MMP1S |
| 100                      | 1,200       | 18×40                 | 0.026                        | 0.077 | 2,700                                                       | EKY-800E□□122MM40S |
|                          | 47          | 10×12.5               | 0.17                         | 0.66  | 480                                                         | EKY-101E□□470MJC5S |
|                          | 68          | 10×16                 | 0.11                         | 0.47  | 600                                                         | EKY-101E□□680MJ16S |
|                          | 82          | 10×20                 | 0.084                        | 0.34  | 800                                                         | EKY-101E□□820MJ20S |
|                          | 100         | 12.5×16               | 0.11                         | 0.34  | 750                                                         | EKY-101E□□101MK16S |
|                          | 120         | 10×25                 | 0.069                        | 0.28  | 900                                                         | EKY-101E□□121MJ25S |
|                          | 150         | 12.5×20               | 0.062                        | 0.18  | 1,100                                                       | EKY-101E□□151MK20S |
|                          | 220         | 12.5×25               | 0.047                        | 0.14  | 1,250                                                       | EKY-101E□□221MK25S |
|                          | 220         | 16×20                 | 0.048                        | 0.15  | 1,350                                                       | EKY-101E□□221ML20S |
|                          | 270         | 12.5×30               | 0.042                        | 0.13  | 1,500                                                       | EKY-101E□□271MK30S |
|                          | 330         | 12.5×35               | 0.036                        | 0.11  | 1,650                                                       | EKY-101E□□331MK35S |
|                          | 330         | 16×25                 | 0.038                        | 0.12  | 1,700                                                       | EKY-101E□□331ML25S |
|                          | 330         | 18×20                 | 0.045                        | 0.14  | 1,500                                                       | EKY-101E□□331MM20S |
|                          | 390         | 12.5×40               | 0.032                        | 0.095 | 1,800                                                       | EKY-101E□□391MK40S |
|                          | 470         | 16×31.5               | 0.032                        | 0.095 | 1,850                                                       | EKY-101E□□471MLN3S |
|                          | 470         | 18×25                 | 0.036                        | 0.11  | 1,750                                                       | EKY-101E□□471MM25S |
|                          | 560         | 16×35.5               | 0.029                        | 0.086 | 2,000                                                       | EKY-101E□□561MLP1S |
|                          | 560         | 18×31.5               | 0.030                        | 0.090 | 1,900                                                       | EKY-101E□□561MMN3S |
|                          | 680         | 16×40                 | 0.027                        | 0.081 | 2,200                                                       | EKY-101E□□681ML40S |
|                          | 680         | 18×35.5               | 0.027                        | 0.081 | 2,200                                                       | EKY-101E□□681MMP1S |
|                          | 820         | 18×40                 | 0.026                        | 0.077 | 2,700                                                       | EKY-101E□□821MM40S |

□ □ : Enter the appropriate lead forming or taping code.

## ◆RATED RIPLE CURRENT MULTIPLIERS

### ●Frequency Multipliers

| Capacitance(μF) | Frequency(Hz) | 120  | 1k   | 10k  | 100k |
|-----------------|---------------|------|------|------|------|
| 47 to 180       |               | 0.40 | 0.75 | 0.90 | 1.00 |
| 220 to 560      |               | 0.50 | 0.85 | 0.94 | 1.00 |
| 680 to 1,800    |               | 0.60 | 0.87 | 0.95 | 1.00 |
| 2,200 to 3,900  |               | 0.75 | 0.90 | 0.95 | 1.00 |
| 4,700 to        |               | 0.85 | 0.95 | 0.98 | 1.00 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.



## LZA Series

- Adoption of innovative electrolyte and new technologies
- Very low impedance at high frequency
- Endurance with ripple current: 4,000 to 7,000 hours at 105°C
- Solvent resistant type (see PRECAUTIONS AND GUIDELINES)
- RoHS2 Compliant
- AEC-Q200 compliant : Please contact Chemi-Con for more details, test data, information.

LZA

↑ Lower Z  
Downsized  
LXZ

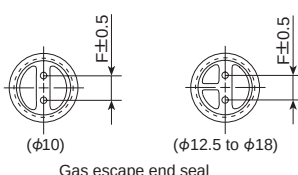
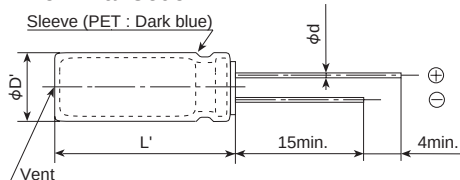


### SPECIFICATIONS

| Items                                                        | Characteristics                                                                                                                                                                                                                                                                       |                                      |      |                     |                                            |                           |                                      |
|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------|---------------------|--------------------------------------------|---------------------------|--------------------------------------|
| Category                                                     | -55 to +105℃                                                                                                                                                                                                                                                                          |                                      |      |                     |                                            |                           |                                      |
| Temperature Range                                            |                                                                                                                                                                                                                                                                                       |                                      |      |                     |                                            |                           |                                      |
| Rated Voltage Range                                          | 6.3 to 35V <sub>dc</sub>                                                                                                                                                                                                                                                              |                                      |      |                     |                                            |                           |                                      |
| Capacitance Tolerance                                        | ±20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                              |                                      |      |                     |                                            |                           |                                      |
| Leakage Current                                              | I=0.01CV or 3μA, whichever is greater.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 2 minutes)                                                                                                                          |                                      |      |                     |                                            |                           |                                      |
| Dissipation Factor<br>(tan δ)                                | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 6.3V                                 | 10V  | 16V                 | 25V                                        | 35V                       |                                      |
|                                                              | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.22                                 | 0.19 | 0.16                | 0.14                                       | 0.12                      |                                      |
|                                                              | When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase. (at 20℃, 120Hz)                                                                                                                                                                      |                                      |      |                     |                                            |                           |                                      |
| Low Temperature<br>Characteristics<br>(Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 6.3V                                 | 10V  | 16V                 | 25V                                        | 35V                       |                                      |
|                                                              | Z(-55℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 4                                    | 3    | 3                   | 3                                          | 3                         |                                      |
| (at 120Hz)                                                   |                                                                                                                                                                                                                                                                                       |                                      |      |                     |                                            |                           |                                      |
| Endurance                                                    | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for the specified period of time at 105℃.                        |                                      |      |                     |                                            |                           |                                      |
|                                                              | Time                                                                                                                                                                                                                                                                                  | φ 10 : 4,000hours                    |      | φ 12.5 : 5,000hours |                                            | φ 16 to φ 18 : 7,000hours |                                      |
|                                                              | Rated voltage                                                                                                                                                                                                                                                                         | 6.3 to 10V <sub>dc</sub> ( φ 10)     |      |                     | 6.3 to 10V <sub>dc</sub> ( φ 12.5 to φ 18) |                           | 16 to 35V <sub>dc</sub>              |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±30% of the initial value          |      |                     | ≤ ±20% of the initial value                |                           | ≤ ±20% of the initial value          |
|                                                              | D.F.(tan δ)                                                                                                                                                                                                                                                                           | ≤300% of the initial specified value |      |                     | ≤200% of the initial specified value       |                           | ≤200% of the initial specified value |
|                                                              | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value         |      |                     | ≤The initial specified value               |                           | ≤The initial specified value         |
|                                                              |                                                                                                                                                                                                                                                                                       |                                      |      |                     |                                            |                           |                                      |
| Shelf Life                                                   | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                      |      |                     |                                            |                           |                                      |
|                                                              | Rated voltage                                                                                                                                                                                                                                                                         | 6.3 to 10V <sub>dc</sub> ( φ 10)     |      |                     | 6.3 to 10V <sub>dc</sub> ( φ 12.5 to φ 18) |                           | 16 to 35V <sub>dc</sub>              |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±30% of the initial value          |      |                     | ≤ ±20% of the initial value                |                           | ≤ ±20% of the initial value          |
|                                                              | D.F.(tan δ)                                                                                                                                                                                                                                                                           | ≤300% of the initial specified value |      |                     | ≤200% of the initial specified value       |                           | ≤200% of the initial specified value |
|                                                              | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value         |      |                     | ≤The initial specified value               |                           | ≤The initial specified value         |
|                                                              |                                                                                                                                                                                                                                                                                       |                                      |      |                     |                                            |                           |                                      |

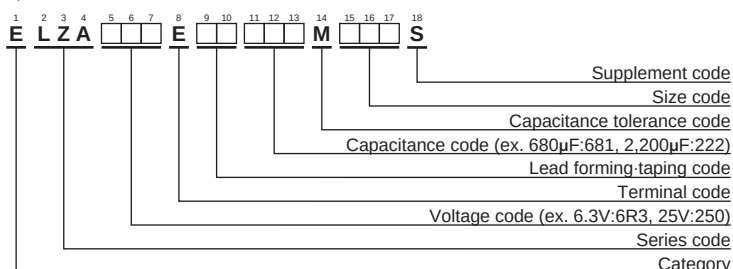
### DIMENSIONS [mm]

#### Terminal Code : E



| φD  | 10         | 12.5 | 16  | 18  |
|-----|------------|------|-----|-----|
| φd  | 0.6        | 0.6  | 0.8 | 0.8 |
| F   | 5.0        | 5.0  | 7.5 | 7.5 |
| φD' | φD+0.5max. |      |     |     |
| L'  | L+1.5max.  |      |     |     |

### PART NUMBERING SYSTEM



Please refer to "Product code guide (radial lead type)"



### ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | Impedance<br>(Ω max./<br>20°C, 100kHz) | Rated ripple<br>current<br>(mA <sub>rms</sub> /105°C, 100kHz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | Impedance<br>(Ω max./<br>20°C, 100kHz) | Rated ripple<br>current<br>(mA <sub>rms</sub> /105°C, 100kHz) | Part No.           |
|--------------------------|-------------|-----------------------|----------------------------------------|---------------------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|----------------------------------------|---------------------------------------------------------------|--------------------|
| 6.3                      | 1,500       | 10 × 12.5             | 0.063                                  | 960                                                           | ELZA6R3E□□152MJC5S | 16                       | 3,300       | 12.5 × 25             | 0.022                                  | 2,350                                                         | ELZA160E□□332MK25S |
|                          | 1,800       | 10 × 16               | 0.049                                  | 1,240                                                         | ELZA6R3E□□182MJ16S |                          | 3,900       | 16 × 20               | 0.026                                  | 2,330                                                         | ELZA160E□□392ML20S |
|                          | 2,700       | 10 × 20               | 0.035                                  | 1,550                                                         | ELZA6R3E□□272MJ20S |                          | 5,600       | 16 × 25               | 0.019                                  | 2,760                                                         | ELZA160E□□562ML25S |
|                          | 3,300       | 10 × 25               | 0.033                                  | 1,740                                                         | ELZA6R3E□□332MJ25S |                          | 5,600       | 18 × 20               | 0.025                                  | 2,640                                                         | ELZA160E□□562MM20S |
|                          | 4,700       | 12.5 × 20             | 0.029                                  | 1,890                                                         | ELZA6R3E□□472MK20S |                          | 8,200       | 18 × 25               | 0.018                                  | 2,850                                                         | ELZA160E□□822MM25S |
|                          | 6,800       | 12.5 × 25             | 0.022                                  | 2,350                                                         | ELZA6R3E□□682MK25S | 25                       | 470         | 10 × 12.5             | 0.063                                  | 960                                                           | ELZA250E□□471MJC5S |
|                          | 6,800       | 16 × 20               | 0.026                                  | 2,330                                                         | ELZA6R3E□□682ML20S |                          | 680         | 10 × 16               | 0.049                                  | 1,240                                                         | ELZA250E□□681MJ16S |
|                          | 8,200       | 18 × 20               | 0.025                                  | 2,640                                                         | ELZA6R3E□□822MM20S |                          | 1,000       | 10 × 20               | 0.035                                  | 1,550                                                         | ELZA250E□□102MJ20S |
|                          | 10,000      | 16 × 25               | 0.019                                  | 2,760                                                         | ELZA6R3E□□103ML25S |                          | 1,200       | 10 × 25               | 0.033                                  | 1,740                                                         | ELZA250E□□122MJ25S |
|                          | 12,000      | 18 × 25               | 0.018                                  | 2,850                                                         | ELZA6R3E□□123MM25S |                          | 1,500       | 12.5 × 20             | 0.029                                  | 1,890                                                         | ELZA250E□□152MK20S |
| 10                       | 1,000       | 10 × 12.5             | 0.063                                  | 960                                                           | ELZA100E□□102MJC5S |                          | 2,200       | 12.5 × 25             | 0.022                                  | 2,350                                                         | ELZA250E□□222MK25S |
|                          | 1,500       | 10 × 16               | 0.049                                  | 1,240                                                         | ELZA100E□□152MJ16S |                          | 2,700       | 16 × 20               | 0.026                                  | 2,330                                                         | ELZA250E□□272ML20S |
|                          | 2,200       | 10 × 20               | 0.035                                  | 1,550                                                         | ELZA100E□□222MJ20S |                          | 3,300       | 18 × 20               | 0.025                                  | 2,640                                                         | ELZA250E□□332MM20S |
|                          | 2,700       | 10 × 25               | 0.033                                  | 1,740                                                         | ELZA100E□□272MJ25S |                          | 3,900       | 16 × 25               | 0.019                                  | 2,760                                                         | ELZA250E□□392ML25S |
|                          | 3,300       | 12.5 × 20             | 0.029                                  | 1,890                                                         | ELZA100E□□332MK20S |                          | 4,700       | 18 × 25               | 0.018                                  | 2,850                                                         | ELZA250E□□472MM25S |
|                          | 4,700       | 12.5 × 25             | 0.022                                  | 2,350                                                         | ELZA100E□□472MK25S | 35                       | 330         | 10 × 12.5             | 0.063                                  | 960                                                           | ELZA350E□□331MJC5S |
|                          | 4,700       | 16 × 20               | 0.026                                  | 2,330                                                         | ELZA100E□□472ML20S |                          | 470         | 10 × 16               | 0.049                                  | 1,240                                                         | ELZA350E□□471MJ16S |
|                          | 6,800       | 16 × 25               | 0.019                                  | 2,760                                                         | ELZA100E□□682ML25S |                          | 680         | 10 × 20               | 0.035                                  | 1,550                                                         | ELZA350E□□681MJ20S |
|                          | 6,800       | 18 × 20               | 0.025                                  | 2,640                                                         | ELZA100E□□682MM20S |                          | 820         | 10 × 25               | 0.033                                  | 1,740                                                         | ELZA350E□□821MJ25S |
|                          | 8,200       | 18 × 25               | 0.018                                  | 2,850                                                         | ELZA100E□□822MM25S |                          | 1,000       | 12.5 × 20             | 0.029                                  | 1,890                                                         | ELZA350E□□102MK20S |
| 16                       | 820         | 10 × 12.5             | 0.063                                  | 960                                                           | ELZA160E□□821MJC5S |                          | 1,500       | 12.5 × 25             | 0.022                                  | 2,350                                                         | ELZA350E□□152MK25S |
|                          | 1,000       | 10 × 16               | 0.049                                  | 1,240                                                         | ELZA160E□□102MJ16S |                          | 1,800       | 16 × 20               | 0.026                                  | 2,330                                                         | ELZA350E□□182ML20S |
|                          | 1,500       | 10 × 20               | 0.035                                  | 1,550                                                         | ELZA160E□□152MJ20S |                          | 2,200       | 18 × 20               | 0.025                                  | 2,640                                                         | ELZA350E□□222MM20S |
|                          | 1,800       | 10 × 25               | 0.033                                  | 1,740                                                         | ELZA160E□□182MJ25S |                          | 2,700       | 16 × 25               | 0.019                                  | 2,760                                                         | ELZA350E□□272ML25S |
|                          | 2,200       | 12.5 × 20             | 0.029                                  | 1,890                                                         | ELZA160E□□222MK20S |                          | 3,300       | 18 × 25               | 0.018                                  | 2,850                                                         | ELZA350E□□332MM25S |
|                          |             |                       |                                        |                                                               |                    |                          |             |                       |                                        |                                                               |                    |

□ □ : Enter the appropriate lead forming or taping code.

### ◆RATED RIPPLE CURRENT MULTIPLIERS

#### ● Frequency Multipliers

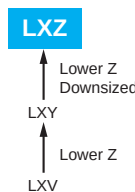
| Capacitance(μF) | Frequency(Hz) |      |      |      |
|-----------------|---------------|------|------|------|
|                 | 120           | 1k   | 10k  | 100k |
| 330 to 470      | 0.50          | 0.85 | 0.94 | 1.00 |
| 680 to 1,800    | 0.60          | 0.87 | 0.95 | 1.00 |
| 2,200 to 3,900  | 0.75          | 0.90 | 0.95 | 1.00 |
| 4,700 to 12,000 | 0.85          | 0.95 | 0.98 | 1.00 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.



## LXZ Series Upgrade!

- Adoption of innovative electrolyte and new technologies
- Very low impedance at high frequency
- Endurance with ripple current: 2,000 to 8,000 hours at 105°C
- Solvent resistant type (see PRECAUTIONS AND GUIDELINES)
- RoHS2 Compliant
- AEC-Q200 compliant : Please contact Chemi-Con for more details, test data, information.

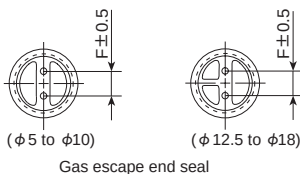
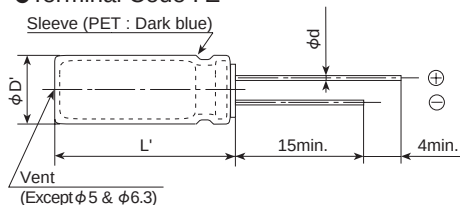


### SPECIFICATIONS

| Items                          | Characteristics                                                                                                                                                                                                                                                                       |                                                                                                         |      |      |      |      |      |      |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|
| Category                       | -55 to +105℃                                                                                                                                                                                                                                                                          |                                                                                                         |      |      |      |      |      |      |
| Temperature Range              |                                                                                                                                                                                                                                                                                       |                                                                                                         |      |      |      |      |      |      |
| Rated Voltage Range            | 6.3 to 63V <sub>dc</sub>                                                                                                                                                                                                                                                              |                                                                                                         |      |      |      |      |      |      |
| Capacitance Tolerance          | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                             |                                                                                                         |      |      |      |      |      |      |
| Leakage Current                | I=0.01CV or 3μA, whichever is greater.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 2 minutes)                                                                                                                          |                                                                                                         |      |      |      |      |      |      |
| Dissipation Factor<br>(tan δ ) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 6.3V                                                                                                    | 10V  | 16V  | 25V  | 35V  | 50V  | 63V  |
|                                | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.22                                                                                                    | 0.19 | 0.16 | 0.14 | 0.12 | 0.10 | 0.08 |
|                                | When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase. (at 20℃, 120Hz)                                                                                                                                                                      |                                                                                                         |      |      |      |      |      |      |
| Endurance                      | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for the specified period of time at 105℃.                        |                                                                                                         |      |      |      |      |      |      |
|                                | Time                                                                                                                                                                                                                                                                                  | φ5 & 6.3 : 2,000hours   φ8 : 3,000hours   φ10 : 5,000hours   φ12.5 : 7,000hours   φ16 & 18 : 8,000hours |      |      |      |      |      |      |
|                                | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ± 20% of the initial value                                                                            |      |      |      |      |      |      |
|                                | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤200% of the initial specified value                                                                    |      |      |      |      |      |      |
|                                | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value                                                                            |      |      |      |      |      |      |
| Shelf Life                     | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                                                                                         |      |      |      |      |      |      |
|                                | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ± 20% of the initial value                                                                            |      |      |      |      |      |      |
|                                | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤200% of the initial specified value                                                                    |      |      |      |      |      |      |
|                                | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value                                                                            |      |      |      |      |      |      |

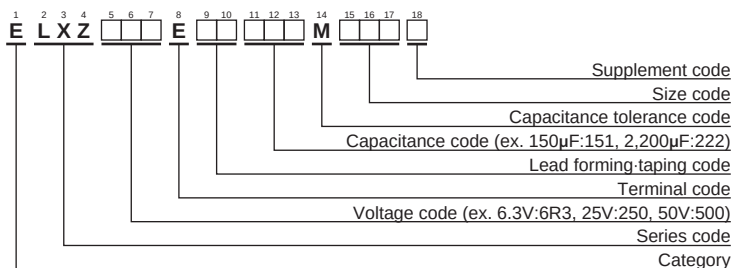
### DIMENSIONS [mm]

#### Terminal Code : E



| φD  | 5          | 6.3 | 8   | 10  | 12.5 | 16  | 18  |
|-----|------------|-----|-----|-----|------|-----|-----|
| φd  | 0.5        | 0.5 | 0.6 | 0.6 | 0.6  | 0.8 | 0.8 |
| F   | 2.0        | 2.5 | 3.5 | 5.0 | 5.0  | 7.5 | 7.5 |
| φD' | φD+0.5max. |     |     |     |      |     |     |
| L'  | L+1.5max.  |     |     |     |      |     |     |

### PART NUMBERING SYSTEM



Please refer to "Product code guide (radial lead type)"





## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | Impedance<br>(Ω max./100kHz) |       | Rated<br>ripple<br>current<br>(mA <sub>rms</sub> /105°C,<br>100kHz) | Part No.           |
|--------------------------|-------------|-----------------------|------------------------------|-------|---------------------------------------------------------------------|--------------------|
|                          |             |                       | 20°C                         | -10°C |                                                                     |                    |
| 6.3                      | 150         | 5×11.5                | 0.50                         | 1.0   | 175                                                                 | ELXZ6R3E□□151MEB5D |
|                          | 330         | 6.3×11.5              | 0.25                         | 0.50  | 290                                                                 | ELXZ6R3E□□331MFB5D |
|                          | 470         | 6.3×15                | 0.18                         | 0.36  | 400                                                                 | ELXZ6R3E□□471MF15D |
|                          | 680         | 8×12                  | 0.12                         | 0.24  | 555                                                                 | ELXZ6R3E□□681MH12D |
|                          | 820         | 10×12.5               | 0.090                        | 0.18  | 760                                                                 | ELXZ6R3E□□821MJC5S |
|                          | 1,000       | 8×15                  | 0.090                        | 0.18  | 730                                                                 | ELXZ6R3E□□102MH15D |
|                          | 1,200       | 8×20                  | 0.080                        | 0.16  | 810                                                                 | ELXZ6R3E□□122MH20D |
|                          | 1,200       | 10×16                 | 0.068                        | 0.136 | 1,050                                                               | ELXZ6R3E□□122MJ16S |
|                          | 1,500       | 10×20                 | 0.052                        | 0.104 | 1,220                                                               | ELXZ6R3E□□152MJ20S |
|                          | 2,200       | 10×25                 | 0.045                        | 0.090 | 1,440                                                               | ELXZ6R3E□□222MJ25S |
|                          | 2,700       | 10×30                 | 0.037                        | 0.074 | 1,690                                                               | ELXZ6R3E□□272MJ30S |
|                          | 3,300       | 12.5×20               | 0.038                        | 0.076 | 1,660                                                               | ELXZ6R3E□□332MK20S |
|                          | 3,900       | 12.5×25               | 0.030                        | 0.060 | 1,950                                                               | ELXZ6R3E□□392MK25S |
|                          | 4,700       | 12.5×30               | 0.025                        | 0.050 | 2,310                                                               | ELXZ6R3E□□472MK30S |
|                          | 5,600       | 12.5×35               | 0.022                        | 0.044 | 2,510                                                               | ELXZ6R3E□□562MK35S |
|                          | 5,600       | 16×20                 | 0.029                        | 0.058 | 2,210                                                               | ELXZ6R3E□□562ML20S |
|                          | 6,800       | 12.5×40               | 0.017                        | 0.034 | 2,870                                                               | ELXZ6R3E□□682MK40S |
|                          | 6,800       | 16×25                 | 0.022                        | 0.044 | 2,560                                                               | ELXZ6R3E□□682ML25S |
|                          | 6,800       | 18×20                 | 0.028                        | 0.056 | 2,490                                                               | ELXZ6R3E□□682MM20S |
|                          | 8,200       | 16×30                 | 0.019                        | 0.038 | 3,010                                                               | ELXZ6R3E□□822ML30S |
| 10                       | 100         | 5×11.5                | 0.50                         | 1.0   | 175                                                                 | ELXZ100E□□101MEB5D |
|                          | 220         | 6.3×11.5              | 0.25                         | 0.50  | 290                                                                 | ELXZ100E□□221MFB5D |
|                          | 330         | 6.3×15                | 0.18                         | 0.36  | 400                                                                 | ELXZ100E□□331MF15D |
|                          | 470         | 8×12                  | 0.12                         | 0.24  | 555                                                                 | ELXZ100E□□471MH12D |
|                          | 680         | 8×15                  | 0.090                        | 0.18  | 730                                                                 | ELXZ100E□□681MH15D |
|                          | 680         | 10×12.5               | 0.090                        | 0.18  | 760                                                                 | ELXZ100E□□681MJC5S |
|                          | 1,000       | 8×20                  | 0.080                        | 0.16  | 810                                                                 | ELXZ100E□□102MH20D |
|                          | 1,000       | 10×16                 | 0.068                        | 0.136 | 1,050                                                               | ELXZ100E□□102MJ16S |
|                          | 1,200       | 10×20                 | 0.052                        | 0.104 | 1,220                                                               | ELXZ100E□□122MJ20S |
|                          | 1,500       | 10×25                 | 0.045                        | 0.090 | 1,440                                                               | ELXZ100E□□152MJ25S |
|                          | 1,800       | 10×30                 | 0.037                        | 0.074 | 1,690                                                               | ELXZ100E□□182MJ30S |
|                          | 2,200       | 10×30                 | 0.037                        | 0.074 | 1,690                                                               | ELXZ100E□□222MJ30S |
|                          | 2,200       | 12.5×20               | 0.038                        | 0.076 | 1,660                                                               | ELXZ100E□□222MK20S |
|                          | 3,300       | 12.5×25               | 0.030                        | 0.060 | 1,950                                                               | ELXZ100E□□332MK25S |
|                          | 3,900       | 12.5×30               | 0.025                        | 0.050 | 2,310                                                               | ELXZ100E□□392MK30S |
|                          | 3,900       | 16×20                 | 0.029                        | 0.058 | 2,210                                                               | ELXZ100E□□392ML20S |
|                          | 4,700       | 12.5×35               | 0.022                        | 0.044 | 2,510                                                               | ELXZ100E□□472MK35S |
|                          | 5,600       | 12.5×40               | 0.017                        | 0.034 | 2,870                                                               | ELXZ100E□□562MK40S |
|                          | 5,600       | 16×25                 | 0.022                        | 0.044 | 2,560                                                               | ELXZ100E□□562ML25S |
|                          | 5,600       | 18×20                 | 0.028                        | 0.056 | 2,490                                                               | ELXZ100E□□562MM20S |
| 16                       | 6,800       | 16×30                 | 0.019                        | 0.038 | 3,010                                                               | ELXZ100E□□682ML30S |
|                          | 6,800       | 18×25                 | 0.020                        | 0.040 | 2,740                                                               | ELXZ100E□□682MM25S |
|                          | 8,200       | 16×35                 | 0.017                        | 0.034 | 3,150                                                               | ELXZ100E□□822ML35S |
|                          | 8,200       | 18×30                 | 0.018                        | 0.036 | 3,330                                                               | ELXZ100E□□822MM30S |
|                          | 10,000      | 16×40                 | 0.015                        | 0.030 | 3,710                                                               | ELXZ100E□□103ML40S |
|                          | 10,000      | 18×35                 | 0.016                        | 0.032 | 3,680                                                               | ELXZ100E□□103MM35S |
|                          | 12,000      | 18×40                 | 0.015                        | 0.030 | 3,800                                                               | ELXZ100E□□123MM40S |
|                          | 47          | 5×11.5                | 0.50                         | 1.0   | 175                                                                 | ELXZ160E□□470MEB5D |
|                          | 100         | 6.3×11.5              | 0.25                         | 0.50  | 290                                                                 | ELXZ160E□□101MFB5D |
|                          | 220         | 6.3×15                | 0.18                         | 0.36  | 400                                                                 | ELXZ160E□□221MF15D |
|                          | 330         | 8×12                  | 0.12                         | 0.24  | 555                                                                 | ELXZ160E□□331MH12D |
|                          | 470         | 8×15                  | 0.090                        | 0.18  | 730                                                                 | ELXZ160E□□471MH15D |
|                          | 470         | 10×12.5               | 0.090                        | 0.18  | 760                                                                 | ELXZ160E□□471MJC5S |
|                          | 560         | 8×20                  | 0.080                        | 0.16  | 810                                                                 | ELXZ160E□□561MH20D |
|                          | 680         | 10×16                 | 0.068                        | 0.136 | 1,050                                                               | ELXZ160E□□681MJ16S |
|                          | 1,000       | 10×20                 | 0.052                        | 0.104 | 1,220                                                               | ELXZ160E□□102MJ20S |
|                          | 1,200       | 10×25                 | 0.045                        | 0.090 | 1,440                                                               | ELXZ160E□□122MJ25S |
|                          | 1,500       | 10×30                 | 0.037                        | 0.074 | 1,690                                                               | ELXZ160E□□152MJ30S |
|                          | 1,500       | 12.5×20               | 0.038                        | 0.076 | 1,660                                                               | ELXZ160E□□152MK20S |
|                          | 2,200       | 12.5×25               | 0.030                        | 0.060 | 1,950                                                               | ELXZ160E□□222MK25S |
|                          | 2,700       | 12.5×30               | 0.025                        | 0.050 | 2,310                                                               | ELXZ160E□□272MK30S |
| 25                       | 2,700       | 16×20                 | 0.029                        | 0.058 | 2,210                                                               | ELXZ160E□□272ML20S |
|                          | 3,300       | 12.5×35               | 0.022                        | 0.044 | 2,510                                                               | ELXZ160E□□332MK35S |
|                          | 3,900       | 12.5×40               | 0.017                        | 0.034 | 2,870                                                               | ELXZ160E□□392MK40S |
|                          | 3,900       | 16×25                 | 0.022                        | 0.044 | 2,560                                                               | ELXZ160E□□392ML25S |
|                          | 3,900       | 18×20                 | 0.028                        | 0.056 | 2,490                                                               | ELXZ160E□□392MM20S |
|                          | 4,700       | 16×30                 | 0.019                        | 0.038 | 3,010                                                               | ELXZ160E□□472ML30S |
|                          | 4,700       | 18×25                 | 0.020                        | 0.040 | 2,740                                                               | ELXZ160E□□472MM25S |
|                          | 5,600       | 16×35                 | 0.017                        | 0.034 | 3,150                                                               | ELXZ160E□□562ML35S |
|                          | 5,600       | 18×30                 | 0.018                        | 0.036 | 3,330                                                               | ELXZ160E□□562MM30S |
|                          | 6,800       | 16×40                 | 0.015                        | 0.030 | 3,710                                                               | ELXZ160E□□682ML40S |
|                          | 6,800       | 18×35                 | 0.016                        | 0.032 | 3,680                                                               | ELXZ160E□□682MM35S |
|                          | 8,200       | 16×40                 | 0.015                        | 0.030 | 3,800                                                               | ELXZ160E□□822ML40S |
|                          | 47          | 5×11.5                | 0.50                         | 1.0   | 175                                                                 | ELXZ250E□□470MEB5D |
|                          | 100         | 6.3×11.5              | 0.25                         | 0.50  | 290                                                                 | ELXZ250E□□101MFB5D |
|                          | 150         | 6.3×15                | 0.18                         | 0.36  | 400                                                                 | ELXZ250E□□151MF15D |
|                          | 220         | 8×12                  | 0.12                         | 0.24  | 555                                                                 | ELXZ250E□□221MH12D |
|                          | 330         | 8×15                  | 0.090                        | 0.18  | 730                                                                 | ELXZ250E□□331MH15D |
|                          | 330         | 10×12.5               | 0.090                        | 0.18  | 760                                                                 | ELXZ250E□□331MJC5S |
|                          | 390         | 8×20                  | 0.080                        | 0.16  | 810                                                                 | ELXZ250E□□391MH20D |
|                          | 470         | 10×16                 | 0.068                        | 0.136 | 1,050                                                               | ELXZ250E□□471MJ16S |
|                          | 680         | 10×20                 | 0.052                        | 0.104 | 1,220                                                               | ELXZ250E□□681MJ20S |
| 35                       | 820         | 10×25                 | 0.045                        | 0.090 | 1,440                                                               | ELXZ250E□□821MJ25S |
|                          | 1,000       | 10×30                 | 0.037                        | 0.074 | 1,690                                                               | ELXZ250E□□102MJ30S |
|                          | 1,000       | 12.5×20               | 0.038                        | 0.076 | 1,660                                                               | ELXZ250E□□102MK20S |
|                          | 1,500       | 12.5×25               | 0.030                        | 0.060 | 1,950                                                               | ELXZ250E□□152MK25S |
|                          | 1,800       | 12.5×30               | 0.025                        | 0.050 | 2,310                                                               | ELXZ250E□□182MK30S |
|                          | 1,800       | 16×20                 | 0.029                        | 0.058 | 2,210                                                               | ELXZ250E□□182ML20S |
|                          | 2,200       | 12.5×35               | 0.022                        | 0.044 | 2,510                                                               | ELXZ250E□□222MK35S |
|                          | 2,200       | 18×20                 | 0.028                        | 0.056 | 2,490                                                               | ELXZ250E□□222MM20S |
|                          | 2,700       | 12.5×40               | 0.017                        | 0.034 | 2,870                                                               | ELXZ250E□□272MK40S |
|                          | 2,700       | 16×25                 | 0.022                        | 0.044 | 2,560                                                               | ELXZ250E□□272ML25S |
|                          | 3,300       | 16×30                 | 0.019                        | 0.038 | 3,010                                                               | ELXZ250E□□332ML30S |
|                          | 3,300       | 18×20                 | 0.028                        | 0.056 | 2,490                                                               | ELXZ250E□□332MM20S |
|                          | 3,300       | 18×25                 | 0.020                        | 0.040 | 2,740                                                               | ELXZ250E□□332MM25S |
|                          | 3,900       | 16×35                 | 0.017                        | 0.034 | 3,150                                                               | ELXZ250E□□392ML35S |
|                          | 3,900       | 18×30                 | 0.018                        | 0.036 | 3,330                                                               | ELXZ250E□□392MM30S |
|                          | 4,700       | 16×40                 | 0.015                        | 0.030 | 3,710                                                               | ELXZ250E□□472ML40S |
|                          | 4,700       | 18×35                 | 0.016                        | 0.032 | 3,680                                                               | ELXZ250E□□472MM35S |
|                          | 5,600       | 18×40                 | 0.015                        | 0.030 | 3,800                                                               | ELXZ250E□□562MM40S |
|                          | 33          | 5×11.5                | 0.50                         | 1.0   | 175                                                                 | ELXZ350E□□330MEB5D |
|                          | 56          | 6.3×11.5              | 0.25                         | 0.50  | 290                                                                 | ELXZ350E□□560MFB5D |
| 6.3                      | 100         | 6.3×15                | 0.18                         | 0.36  | 400                                                                 | ELXZ350E□□101MF15D |
|                          | 150         | 8×12                  | 0.12                         | 0.24  | 555                                                                 | ELXZ350E□□151MH12D |
|                          | 220         | 8×15                  | 0.090                        | 0.18  | 730                                                                 | ELXZ350E□□221MH15D |
|                          | 220         | 10×12.5               | 0.090                        | 0.18  | 760                                                                 | ELXZ350E□□221MJC5S |
|                          | 270         | 8×20                  | 0.080                        | 0.16  | 810                                                                 | ELXZ350E□□271MH20D |
|                          | 330         | 10×16                 | 0.068                        | 0.136 | 1,050                                                               | ELXZ350E□□331MJ16S |
|                          | 470         | 10×20                 | 0.052                        | 0.104 | 1,220                                                               | ELXZ350E□□471MJ20S |
|                          | 560         | 10×20                 | 0.052                        | 0.104 | 1,220                                                               | ELXZ350E□□561MJ20S |
|                          | 560         | 10×25                 | 0.045                        | 0.090 | 1,440                                                               | ELXZ350E□□561MJ25S |
|                          | 680         | 10×30                 | 0.037                        | 0.074 | 1,690                                                               | ELXZ350E□□681MJ30S |
|                          | 680         | 12.5×20               | 0.038                        | 0.076 | 1,660                                                               | ELXZ350E□□681MK20S |
|                          | 1,000       | 12.5×25               | 0.030                        | 0.060 | 1,950                                                               | ELXZ350E□□102MK20S |
|                          | 1,000       | 12.5×30               | 0.025                        | 0.050 | 2,310                                                               | ELXZ350E□□122MK30S |
|                          | 1,200       | 16×20                 | 0.029                        | 0.058 | 2,210                                                               | ELXZ350E□□122ML20S |
|                          | 1,500       | 12.5×35               | 0.022                        | 0.044 | 2,510                                                               | ELXZ350E□□152MK35S |
|                          | 1,800       | 12.5×40               | 0.017                        | 0.034 | 2,870                                                               | ELXZ350E□□182MK40S |
|                          | 1,800       | 16×25                 | 0.022                        | 0.044 | 2,560                                                               | ELXZ350E□□182ML25S |
|                          | 1,800       | 18×20                 | 0.028                        | 0.056 | 2,490                                                               | ELXZ350E□□182MM20S |
|                          | 2,200       | 16×30                 | 0.019                        | 0.038 | 3,010                                                               | ELXZ350E□□222ML30S |
|                          | 2,200       | 18×20                 | 0.028                        | 0.056 | 2,490                                                               | ELXZ350E□□222MM20S |
| 16                       | 2,200       | 18×25                 | 0.020                        | 0.040 | 2,740                                                               | ELXZ350E□□222MM25S |
|                          | 2,700       | 16×35                 | 0.017                        | 0.034 | 3,150                                                               | ELXZ350E□□272ML35S |
|                          | 2,700       | 16×35                 | 0.017                        | 0.034 | 3,150                                                               | ELXZ350E□□272ML35S |

□□ : Enter the appropriate lead forming or taping code.

Production of the products shown in   is scheduled to be discontinued.





## ◆STANDARD RATINGS

| VV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | Impedance<br>(Ω max./100kHz) |       | Rated<br>ripple<br>current<br>(mA <sub>rms</sub> /105°C, 100kHz) | Part No.           |
|--------------------------|-------------|-----------------------|------------------------------|-------|------------------------------------------------------------------|--------------------|
|                          |             |                       | 20°C                         | -10°C |                                                                  |                    |
| 35                       | 2,700       | 18×30                 | 0.018                        | 0.036 | 3,330                                                            | ELXZ350E□□272MM30S |
|                          | 3,300       | 16×40                 | 0.015                        | 0.030 | 3,710                                                            | ELXZ350E□□332ML40S |
|                          | 3,300       | 18×35                 | 0.016                        | 0.032 | 3,680                                                            | ELXZ350E□□332MM35S |
|                          | 3,900       | 18×40                 | 0.015                        | 0.030 | 3,800                                                            | ELXZ350E□□392MM40S |
|                          | 4,700       | 18×40                 | 0.015                        | 0.030 | 3,800                                                            | ELXZ350E□□472MM40S |
| 50                       | 22          | 5×11.5                | 0.90                         | 1.8   | 155                                                              | ELXZ500E□□220MEB5D |
|                          | 47          | 6.3×11.5              | 0.45                         | 0.90  | 260                                                              | ELXZ500E□□470MFB5D |
|                          | 68          | 6.3×15                | 0.31                         | 0.62  | 360                                                              | ELXZ500E□□680MF15D |
|                          | 100         | 8×12                  | 0.22                         | 0.44  | 485                                                              | ELXZ500E□□101MH12D |
|                          | 120         | 8×15                  | 0.16                         | 0.32  | 635                                                              | ELXZ500E□□121MH15D |
|                          | 120         | 10×12.5               | 0.16                         | 0.32  | 620                                                              | ELXZ500E□□121MJC5S |
|                          | 180         | 8×20                  | 0.12                         | 0.24  | 730                                                              | ELXZ500E□□181MH20D |
|                          | 180         | 10×16                 | 0.13                         | 0.26  | 850                                                              | ELXZ500E□□181MJ16S |
|                          | 220         | 10×20                 | 0.088                        | 0.18  | 1,050                                                            | ELXZ500E□□221MJ20S |
|                          | 330         | 10×25                 | 0.073                        | 0.15  | 1,250                                                            | ELXZ500E□□331MJ25S |
|                          | 390         | 10×30                 | 0.054                        | 0.11  | 1,500                                                            | ELXZ500E□□391MJ30S |
|                          | 390         | 12.5×20               | 0.059                        | 0.12  | 1,480                                                            | ELXZ500E□□391MK20S |
|                          | 470         | 12.5×20               | 0.059                        | 0.12  | 1,480                                                            | ELXZ500E□□471MK20S |
|                          | 560         | 12.5×25               | 0.044                        | 0.088 | 1,840                                                            | ELXZ500E□□561MK25S |
|                          | 680         | 12.5×30               | 0.039                        | 0.078 | 2,220                                                            | ELXZ500E□□681MK30S |
|                          | 680         | 16×20                 | 0.048                        | 0.096 | 1,840                                                            | ELXZ500E□□681ML20S |
|                          | 820         | 12.5×35               | 0.033                        | 0.066 | 2,290                                                            | ELXZ500E□□821MK35S |
|                          | 820         | 18×20                 | 0.042                        | 0.084 | 1,980                                                            | ELXZ500E□□821MM20S |
|                          | 1,000       | 12.5×40               | 0.029                        | 0.058 | 2,500                                                            | ELXZ500E□□102MK40S |
|                          | 1,000       | 16×25                 | 0.034                        | 0.068 | 2,240                                                            | ELXZ500E□□102ML25S |
|                          | 1,200       | 16×30                 | 0.028                        | 0.056 | 2,700                                                            | ELXZ500E□□122ML30S |
|                          | 1,200       | 18×25                 | 0.029                        | 0.058 | 2,610                                                            | ELXZ500E□□122MM25S |
|                          | 1,500       | 16×35                 | 0.025                        | 0.050 | 2,800                                                            | ELXZ500E□□152ML35S |
|                          | 1,800       | 16×40                 | 0.021                        | 0.042 | 3,200                                                            | ELXZ500E□□182ML40S |
|                          | 1,800       | 18×30                 | 0.025                        | 0.050 | 3,000                                                            | ELXZ500E□□182MM30S |
|                          | 2,200       | 18×35                 | 0.023                        | 0.046 | 3,100                                                            | ELXZ500E□□222MM35S |
| 50                       | 2,700       | 18×40                 | 0.020                        | 0.040 | 3,400                                                            | ELXZ500E□□272MM40S |
|                          | 12          | 5×11.5                | 1.9                          | 4.0   | 145                                                              | ELXZ630E□□120MEB5D |
|                          | 22          | 6.3×11.5              | 1.0                          | 2.0   | 240                                                              | ELXZ630E□□220MFB5D |
|                          | 39          | 6.3×15                | 0.61                         | 1.4   | 330                                                              | ELXZ630E□□390MF15D |
|                          | 68          | 8×12                  | 0.34                         | 0.75  | 405                                                              | ELXZ630E□□680MH12D |
|                          | 100         | 8×15                  | 0.27                         | 0.65  | 535                                                              | ELXZ630E□□101MH15D |
|                          | 100         | 10×12.5               | 0.255                        | 0.51  | 540                                                              | ELXZ630E□□101MJC5S |
|                          | 120         | 10×16                 | 0.19                         | 0.38  | 600                                                              | ELXZ630E□□121MJ16S |
|                          | 150         | 8×20                  | 0.21                         | 0.52  | 690                                                              | ELXZ630E□□151MH20D |
|                          | 180         | 10×20                 | 0.145                        | 0.29  | 890                                                              | ELXZ630E□□181MJ20S |
|                          | 220         | 10×25                 | 0.13                         | 0.26  | 1,050                                                            | ELXZ630E□□221MJ25S |
|                          | 330         | 10×30                 | 0.090                        | 0.18  | 1,300                                                            | ELXZ630E□□331MJ30S |
|                          | 330         | 12.5×20               | 0.085                        | 0.17  | 1,290                                                            | ELXZ630E□□331MK20S |
|                          | 390         | 12.5×25               | 0.070                        | 0.14  | 1,720                                                            | ELXZ630E□□391MK25S |
|                          | 470         | 12.5×30               | 0.055                        | 0.11  | 2,090                                                            | ELXZ630E□□471MK30S |
|                          | 470         | 16×20                 | 0.059                        | 0.12  | 1,770                                                            | ELXZ630E□□471ML20S |
|                          | 680         | 12.5×35               | 0.047                        | 0.094 | 2,270                                                            | ELXZ630E□□681MK35S |
|                          | 680         | 16×25                 | 0.050                        | 0.10  | 2,160                                                            | ELXZ630E□□681ML25S |
|                          | 680         | 18×20                 | 0.055                        | 0.11  | 2,290                                                            | ELXZ630E□□681MM20S |
|                          | 820         | 12.5×40               | 0.042                        | 0.084 | 2,560                                                            | ELXZ630E□□821MK40S |
|                          | 820         | 16×30                 | 0.043                        | 0.086 | 2,670                                                            | ELXZ630E□□821ML30S |
|                          | 820         | 18×25                 | 0.043                        | 0.086 | 2,590                                                            | ELXZ630E□□821MM25S |
|                          | 1,000       | 16×30                 | 0.043                        | 0.086 | 2,670                                                            | ELXZ630E□□102ML30S |
|                          | 1,000       | 16×35                 | 0.036                        | 0.072 | 2,770                                                            | ELXZ630E□□102ML35S |
|                          | 1,200       | 16×40                 | 0.030                        | 0.060 | 2,850                                                            | ELXZ630E□□122ML40S |
|                          | 1,200       | 18×30                 | 0.032                        | 0.064 | 2,950                                                            | ELXZ630E□□122MM30S |
|                          | 1,500       | 18×35                 | 0.030                        | 0.060 | 3,100                                                            | ELXZ630E□□152MM35S |
|                          | 1,800       | 18×40                 | 0.025                        | 0.050 | 3,210                                                            | ELXZ630E□□182MM40S |
|                          | 2,200       | 18×40                 | 0.025                        | 0.050 | 3,210                                                            | ELXZ630E□□222MM40S |
|                          | 3,300       | 18×40                 | 0.021                        | 0.042 | 3,900                                                            | ELXZ630E□□332MM40S |

□ □ : Enter the appropriate lead forming or taping code.

Production of the products shown in   is scheduled to be discontinued.

## ◆RATED RIPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

| Capacitance(μF) | Frequency(Hz) |      |      |      |
|-----------------|---------------|------|------|------|
|                 | 120           | 1k   | 10k  | 100k |
| 12 to 180       | 0.40          | 0.75 | 0.90 | 1.00 |
| 220 to 560      | 0.50          | 0.85 | 0.94 | 1.00 |
| 680 to 1,800    | 0.60          | 0.87 | 0.95 | 1.00 |
| 2,200 to 3,900  | 0.75          | 0.90 | 0.95 | 1.00 |
| 4,700 to 18,000 | 0.85          | 0.95 | 0.98 | 1.00 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

# LXY Series

- Adoption of innovative electrolyte and new technologies
- Endurance with ripple current : 2,000 to 8,000 hours at 105°C
- Solvent resistant type (see PRECAUTIONS AND GUIDELINES)
- RoHS2 Compliant
- AEC-Q200 compliant : Please contact Chemi-Con for more details, test data, information.

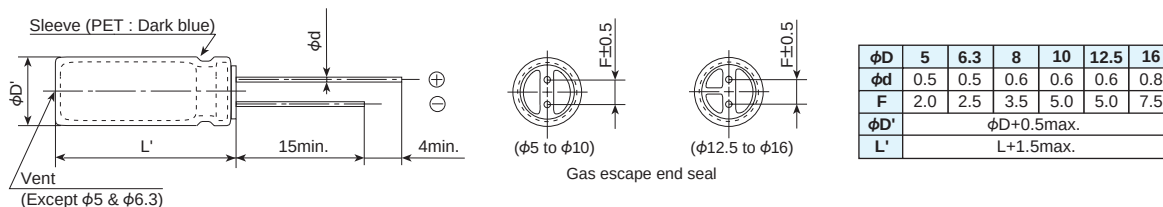


## SPECIFICATIONS

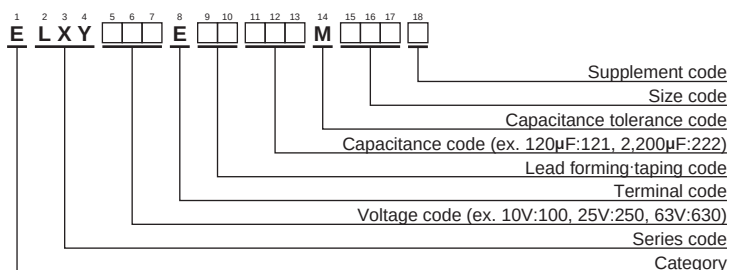
| Items                                                        | Characteristics                                                                                                                                                                                                                                                                       |                                                                                                      |      |      |      |      |      |            |
|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|------|------|------|------|------|------------|
| Category                                                     | -55 to +105℃                                                                                                                                                                                                                                                                          |                                                                                                      |      |      |      |      |      |            |
| Temperature Range                                            | -55 to +105℃                                                                                                                                                                                                                                                                          |                                                                                                      |      |      |      |      |      |            |
| Rated Voltage Range                                          | 10 to 63V <sub>dc</sub>                                                                                                                                                                                                                                                               |                                                                                                      |      |      |      |      |      |            |
| Capacitance Tolerance                                        | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                             |                                                                                                      |      |      |      |      |      |            |
| Leakage Current                                              | I=0.01CV or 3μA, whichever is greater.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 2 minutes)                                                                                                                          |                                                                                                      |      |      |      |      |      |            |
| Dissipation Factor<br>(tan δ )                               | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 10V                                                                                                  | 16V  | 25V  | 35V  | 50V  | 63V  |            |
|                                                              | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.19                                                                                                 | 0.16 | 0.14 | 0.12 | 0.10 | 0.10 |            |
|                                                              | When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase. (at 20℃, 120Hz)                                                                                                                                                                      |                                                                                                      |      |      |      |      |      |            |
| Low Temperature<br>Characteristics<br>(Max. Impedance Ratio) | Z(-55℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 10 to 50V <sub>dc</sub> : 3max.                                                                      |      |      |      |      |      | (at 120Hz) |
|                                                              |                                                                                                                                                                                                                                                                                       | 63V <sub>dc</sub> : 6max.                                                                            |      |      |      |      |      |            |
| Endurance                                                    | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for the specified period of time at 105℃.                        |                                                                                                      |      |      |      |      |      |            |
|                                                              | Time                                                                                                                                                                                                                                                                                  | φ 5 & 6.3 : 2,000hours φ 8 : 3,000hours φ 10 : 5,000hours φ 12.5 : 7,000hours φ 16 & 18 : 8,000hours |      |      |      |      |      |            |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ± 20% of the initial value                                                                         |      |      |      |      |      |            |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤200% of the initial specified value                                                                 |      |      |      |      |      |            |
|                                                              | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value                                                                         |      |      |      |      |      |            |
| Shelf Life                                                   | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                                                                                      |      |      |      |      |      |            |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ± 20% of the initial value                                                                         |      |      |      |      |      |            |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤200% of the initial specified value                                                                 |      |      |      |      |      |            |
|                                                              | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value                                                                         |      |      |      |      |      |            |

## DIMENSIONS [mm]

### Terminal Code : E



## PART NUMBERING SYSTEM



Please refer to "Product code guide (radial lead type)"

## RATED RIPPLE CURRENT MULTIPLIERS

### Frequency Multipliers

| Capacitance(μF) | Frequency(Hz) | 120  | 1k   | 10k  | 100k |
|-----------------|---------------|------|------|------|------|
| 10 to 180       |               | 0.40 | 0.75 | 0.90 | 1.00 |
| 220 to 560      |               | 0.50 | 0.85 | 0.94 | 1.00 |
| 680 to 1,800    |               | 0.60 | 0.87 | 0.95 | 1.00 |
| 2,200 to 3,900  |               | 0.75 | 0.90 | 0.95 | 1.00 |
| 4,700 to 8,200  |               | 0.85 | 0.95 | 0.98 | 1.00 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.



LXY Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | Impedance<br>(Ω max./100kHz) |       | Rated<br>ripple<br>current<br>(mA <sub>rms</sub> /105°C,<br>100kHz) | Part No.           |
|--------------------------|-------------|-----------------------|------------------------------|-------|---------------------------------------------------------------------|--------------------|
|                          |             |                       | 20°C                         | -10°C |                                                                     |                    |
| 10                       | 82          | 5×11.5                | 0.75                         | 1.5   | 163                                                                 | ELXY100E□□820MEB5D |
|                          | 180         | 6.3×11.5              | 0.35                         | 0.70  | 273                                                                 | ELXY100E□□181MFB5D |
|                          | 220         | 6.3×15                | 0.25                         | 0.50  | 390                                                                 | ELXY100E□□221MF15D |
|                          | 330         | 8×12                  | 0.17                         | 0.34  | 445                                                                 | ELXY100E□□331MH12D |
|                          | 390         | 10×12.5               | 0.12                         | 0.24  | 625                                                                 | ELXY100E□□391MJC5S |
|                          | 470         | 8×15                  | 0.13                         | 0.26  | 555                                                                 | ELXY100E□□471MH15D |
|                          | 680         | 8×20                  | 0.095                        | 0.19  | 740                                                                 | ELXY100E□□681MH20D |
|                          | 680         | 10×16                 | 0.084                        | 0.17  | 825                                                                 | ELXY100E□□681MJ16S |
|                          | 1,000       | 10×20                 | 0.062                        | 0.13  | 1,040                                                               | ELXY100E□□102MJ20S |
|                          | 1,200       | 10×25                 | 0.052                        | 0.11  | 1,260                                                               | ELXY100E□□122MJ25S |
|                          | 1,500       | 10×30                 | 0.044                        | 0.088 | 1,440                                                               | ELXY100E□□152MJ30S |
|                          | 1,800       | 12.5×20               | 0.046                        | 0.092 | 1,340                                                               | ELXY100E□□182MK20S |
|                          | 2,200       | 12.5×25               | 0.034                        | 0.068 | 1,690                                                               | ELXY100E□□222MK25S |
|                          | 2,700       | 12.5×30               | 0.030                        | 0.060 | 1,950                                                               | ELXY100E□□272MK30S |
|                          | 3,300       | 12.5×35               | 0.024                        | 0.048 | 2,220                                                               | ELXY100E□□332MK35S |
|                          | 3,300       | 16×20                 | 0.038                        | 0.076 | 1,630                                                               | ELXY100E□□332ML20S |
|                          | 3,900       | 12.5×40               | 0.022                        | 0.044 | 2,390                                                               | ELXY100E□□392MK40S |
|                          | 3,900       | 16×25                 | 0.028                        | 0.056 | 2,070                                                               | ELXY100E□□392ML25S |
| 16                       | 56          | 5×11.5                | 0.75                         | 1.5   | 163                                                                 | ELXY160E□□560MEB5D |
|                          | 120         | 6.3×11.5              | 0.35                         | 0.70  | 273                                                                 | ELXY160E□□121MFB5D |
|                          | 180         | 6.3×15                | 0.25                         | 0.50  | 390                                                                 | ELXY160E□□181MF15D |
|                          | 270         | 8×12                  | 0.17                         | 0.34  | 445                                                                 | ELXY160E□□271MH12D |
|                          | 270         | 10×12.5               | 0.12                         | 0.24  | 625                                                                 | ELXY160E□□271MJC5S |
|                          | 330         | 8×15                  | 0.13                         | 0.26  | 555                                                                 | ELXY160E□□331MH15D |
|                          | 470         | 8×20                  | 0.095                        | 0.19  | 740                                                                 | ELXY160E□□471MH20D |
|                          | 470         | 10×16                 | 0.084                        | 0.17  | 825                                                                 | ELXY160E□□471MJ16S |
|                          | 680         | 10×20                 | 0.062                        | 0.13  | 1,040                                                               | ELXY160E□□681MJ20S |
|                          | 820         | 10×25                 | 0.052                        | 0.11  | 1,260                                                               | ELXY160E□□821MJ25S |
|                          | 1,200       | 10×30                 | 0.044                        | 0.088 | 1,440                                                               | ELXY160E□□122MJ30S |
|                          | 1,200       | 12.5×20               | 0.046                        | 0.092 | 1,340                                                               | ELXY160E□□122MK20S |
|                          | 1,500       | 12.5×25               | 0.034                        | 0.068 | 1,690                                                               | ELXY160E□□152MK25S |
|                          | 2,200       | 12.5×30               | 0.030                        | 0.060 | 1,950                                                               | ELXY160E□□222MK30S |
|                          | 2,200       | 16×20                 | 0.038                        | 0.076 | 1,630                                                               | ELXY160E□□222ML20S |
|                          | 2,700       | 12.5×35               | 0.024                        | 0.048 | 2,220                                                               | ELXY160E□□272MK35S |
|                          | 2,700       | 16×25                 | 0.028                        | 0.056 | 2,070                                                               | ELXY160E□□272ML25S |
|                          | 3,300       | 12.5×40               | 0.022                        | 0.044 | 2,390                                                               | ELXY160E□□332MK40S |
| 25                       | 39          | 5×11.5                | 0.75                         | 1.5   | 163                                                                 | ELXY250E□□390MEB5D |
|                          | 82          | 6.3×11.5              | 0.35                         | 0.70  | 273                                                                 | ELXY250E□□820MFB5D |
|                          | 120         | 6.3×15                | 0.25                         | 0.50  | 390                                                                 | ELXY250E□□121MF15D |
|                          | 150         | 8×12                  | 0.17                         | 0.34  | 445                                                                 | ELXY250E□□151MH12D |
|                          | 180         | 10×12.5               | 0.12                         | 0.24  | 625                                                                 | ELXY250E□□181MJC5S |
|                          | 220         | 8×15                  | 0.13                         | 0.26  | 555                                                                 | ELXY250E□□221MH15D |
|                          | 330         | 8×20                  | 0.095                        | 0.19  | 740                                                                 | ELXY250E□□331MH20D |
|                          | 330         | 10×16                 | 0.084                        | 0.17  | 825                                                                 | ELXY250E□□331MJ16S |
|                          | 470         | 10×20                 | 0.062                        | 0.13  | 1,040                                                               | ELXY250E□□471MJ20S |
|                          | 560         | 10×25                 | 0.052                        | 0.11  | 1,260                                                               | ELXY250E□□561MJ25S |
|                          | 820         | 10×30                 | 0.044                        | 0.088 | 1,440                                                               | ELXY250E□□821MJ30S |
|                          | 820         | 12.5×20               | 0.046                        | 0.092 | 1,340                                                               | ELXY250E□□821MK20S |
|                          | 1,000       | 12.5×25               | 0.034                        | 0.068 | 1,690                                                               | ELXY250E□□102MK25S |
|                          | 1,500       | 12.5×30               | 0.030                        | 0.060 | 1,950                                                               | ELXY250E□□152MK30S |
|                          | 1,500       | 16×20                 | 0.038                        | 0.076 | 1,630                                                               | ELXY250E□□152ML20S |
|                          | 1,800       | 12.5×35               | 0.024                        | 0.048 | 2,220                                                               | ELXY250E□□182MK35S |
|                          | 1,800       | 16×25                 | 0.028                        | 0.056 | 2,070                                                               | ELXY250E□□182ML25S |
|                          | 2,200       | 12.5×40               | 0.022                        | 0.044 | 2,390                                                               | ELXY250E□□222MK40S |
| 35                       | 27          | 5×11.5                | 0.75                         | 1.5   | 163                                                                 | ELXY350E□□270MEB5D |
|                          | 56          | 6.3×11.5              | 0.35                         | 0.70  | 273                                                                 | ELXY350E□□560MFB5D |
|                          | 82          | 6.3×15                | 0.25                         | 0.50  | 390                                                                 | ELXY350E□□820MF15D |
|                          | 120         | 8×12                  | 0.17                         | 0.34  | 445                                                                 | ELXY350E□□121MH12D |
|                          | 120         | 10×12.5               | 0.12                         | 0.24  | 625                                                                 | ELXY350E□□121MJC5S |
|                          | 180         | 8×15                  | 0.13                         | 0.26  | 555                                                                 | ELXY350E□□181MH15D |
|                          | 220         | 8×20                  | 0.095                        | 0.19  | 740                                                                 | ELXY350E□□221MH20D |
|                          | 220         | 10×16                 | 0.084                        | 0.17  | 825                                                                 | ELXY350E□□221MJ16S |
|                          | 330         | 10×20                 | 0.062                        | 0.13  | 1,040                                                               | ELXY350E□□331MJ20S |
|                          | 390         | 10×25                 | 0.052                        | 0.11  | 1,260                                                               | ELXY350E□□391MJ25S |
|                          | 560         | 10×30                 | 0.044                        | 0.088 | 1,440                                                               | ELXY350E□□561MJ30S |
|                          | 560         | 12.5×20               | 0.046                        | 0.092 | 1,340                                                               | ELXY350E□□561MK20S |
|                          | 680         | 12.5×25               | 0.034                        | 0.068 | 1,690                                                               | ELXY350E□□681MK25S |
|                          | 1,000       | 12.5×30               | 0.030                        | 0.060 | 1,950                                                               | ELXY350E□□102MK30S |
|                          | 1,000       | 16×20                 | 0.038                        | 0.076 | 1,630                                                               | ELXY350E□□102ML20S |
|                          | 1,200       | 12.5×35               | 0.024                        | 0.048 | 2,220                                                               | ELXY350E□□122MK35S |
|                          | 1,200       | 16×25                 | 0.028                        | 0.056 | 2,070                                                               | ELXY350E□□122ML25S |
|                          | 1,500       | 12.5×40               | 0.022                        | 0.044 | 2,390                                                               | ELXY350E□□152MK40S |
| 50                       | 18          | 5×11.5                | 1.2                          | 2.4   | 129                                                                 | ELXY500E□□180MEB5D |
|                          | 39          | 6.3×11.5              | 0.54                         | 1.1   | 219                                                                 | ELXY500E□□390MFB5D |
|                          | 56          | 6.3×15                | 0.34                         | 0.68  | 310                                                                 | ELXY500E□□560MF15D |
|                          | 68          | 8×12                  | 0.30                         | 0.60  | 340                                                                 | ELXY500E□□680MH12D |
|                          | 82          | 8×15                  | 0.20                         | 0.40  | 470                                                                 | ELXY500E□□820MH15D |
|                          | 82          | 10×12.5               | 0.20                         | 0.40  | 480                                                                 | ELXY500E□□820MJC5S |
|                          | 120         | 8×20                  | 0.14                         | 0.28  | 610                                                                 | ELXY500E□□121MH20D |
|                          | 120         | 10×16                 | 0.13                         | 0.26  | 755                                                                 | ELXY500E□□121MJ16S |
|                          | 180         | 10×20                 | 0.088                        | 0.18  | 945                                                                 | ELXY500E□□181MJ20S |
|                          | 220         | 10×25                 | 0.073                        | 0.15  | 1,150                                                               | ELXY500E□□221MJ25S |
|                          | 330         | 10×30                 | 0.054                        | 0.11  | 1,260                                                               | ELXY500E□□331MJ30S |
|                          | 330         | 12.5×20               | 0.059                        | 0.12  | 1,190                                                               | ELXY500E□□331MK20S |
|                          | 470         | 12.5×25               | 0.044                        | 0.088 | 1,490                                                               | ELXY500E□□471MK25S |
|                          | 560         | 12.5×30               | 0.039                        | 0.078 | 1,720                                                               | ELXY500E□□561MK30S |
|                          | 680         | 12.5×35               | 0.033                        | 0.066 | 1,890                                                               | ELXY500E□□681MK35S |
|                          | 680         | 16×20                 | 0.050                        | 0.10  | 1,420                                                               | ELXY500E□□681ML20S |
|                          | 820         | 12.5×40               | 0.029                        | 0.058 | 2,030                                                               | ELXY500E□□821MK40S |
|                          | 820         | 16×25                 | 0.034                        | 0.068 | 1,880                                                               | ELXY500E□□821ML25S |
| 63                       | 10          | 5×11.5                | 1.9                          | 4.8   | 103                                                                 | ELXY630E□□100MEB5D |
|                          | 18          | 6.3×11.5              | 1.0                          | 2.5   | 161                                                                 | ELXY630E□□180MFB5D |
|                          | 33          | 6.3×15                | 0.61                         | 1.6   | 233                                                                 | ELXY630E□□330MF15D |
|                          | 47          | 8×12                  | 0.47                         | 1.2   | 274                                                                 | ELXY630E□□470MH12D |
|                          | 56          | 10×12.5               | 0.27                         | 0.68  | 418                                                                 | ELXY630E□□560MJC5S |
|                          | 68          | 8×15                  | 0.34                         | 0.85  | 360                                                                 | ELXY630E□□680MH15D |
|                          | 68          | 10×16                 | 0.21                         | 0.53  | 525                                                                 | ELXY630E□□680MJ16S |
|                          | 82          | 8×20                  | 0.21                         | 0.53  | 500                                                                 | ELXY630E□□820MH20D |
|                          | 120         | 10×20                 | 0.16                         | 0.40  | 650                                                                 | ELXY630E□□121MJ20S |
|                          | 150         | 10×25                 | 0.13                         | 0.33  | 783                                                                 | ELXY630E□□151MJ25S |
|                          | 180         | 10×30                 | 0.10                         | 0.25  | 960                                                                 | ELXY630E□□181MJ30S |
|                          | 220         | 12.5×20               | 0.11                         | 0.28  | 870                                                                 | ELXY630E□□221MK20S |
|                          | 270         | 12.5×25               | 0.074                        | 0.19  | 1,150                                                               | ELXY630E□□271MK25S |
|                          | 330         | 16×20                 | 0.085                        | 0.22  | 1,100                                                               | ELXY630E□□331ML20S |
|                          | 390         | 12.5×30               | 0.068                        | 0.17  | 1,280                                                               | ELXY630E□□391MK30S |
|                          | 470         | 12.5×35               | 0.063                        | 0.16  | 1,390                                                               | ELXY630E□□471MK35S |
|                          | 470         | 16×25                 | 0.055                        | 0.14  | 1,480                                                               | ELXY630E□□471ML25S |
|                          | 560         | 12.5×40               | 0.051                        | 0.13  | 1,530                                                               | ELXY630E□□561MK40S |

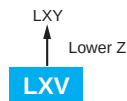
□ □ : Enter the appropriate lead forming or taping code.

Production of the products shown in   is scheduled to be discontinued.



## LXV Series

- Low impedance
- Endurance with ripple current : 2,000 to 5,000 hours at 105°C
- Solvent resistant type (see PRECAUTIONS AND GUIDELINES)
- RoHS2 Compliant
- AEC-Q200 compliant : Please contact Chemi-Con for more details, test data, information.

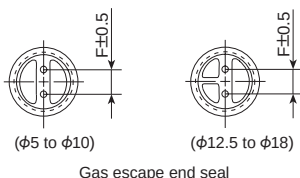
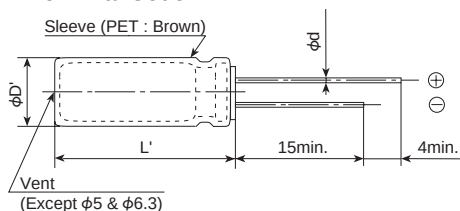


### SPECIFICATIONS

| Items                              | Characteristics                                                                                                                                                                                                                                                                       |                                                                           |      |      |                                   |      |      |            |      |      |
|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|------|------|-----------------------------------|------|------|------------|------|------|
| Category                           | -55 to +105℃                                                                                                                                                                                                                                                                          |                                                                           |      |      |                                   |      |      |            |      |      |
| Temperature Range                  | -55 to +105℃                                                                                                                                                                                                                                                                          |                                                                           |      |      |                                   |      |      |            |      |      |
| Rated Voltage Range                | 6.3 to 100V <sub>dc</sub>                                                                                                                                                                                                                                                             |                                                                           |      |      |                                   |      |      |            |      |      |
| Capacitance Tolerance              | ±20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                              |                                                                           |      |      |                                   |      |      |            |      |      |
| Leakage Current                    | I=0.01CV or 3μA, whichever is greater.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 2 minutes)                                                                                                                          |                                                                           |      |      |                                   |      |      |            |      |      |
| Dissipation Factor<br>(tan δ )     | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 6.3V                                                                      | 10V  | 16V  | 25V                               | 35V  | 50V  | 63V        | 80V  | 100V |
|                                    | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.22                                                                      | 0.19 | 0.16 | 0.14                              | 0.12 | 0.10 | 0.10       | 0.09 | 0.08 |
|                                    | When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase. (at 20℃, 120Hz)                                                                                                                                                                      |                                                                           |      |      |                                   |      |      |            |      |      |
| Low Temperature<br>Characteristics | Capacitance change Δ C (-55℃ /+20℃)                                                                                                                                                                                                                                                   |                                                                           |      |      | 0.7min.                           |      |      | (at 120Hz) |      |      |
|                                    | Max. impedance ratio (-55℃ /+20℃)                                                                                                                                                                                                                                                     |                                                                           |      |      | 3max.(6.3V <sub>dc</sub> : 4max.) |      |      |            |      |      |
| Endurance                          | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for the specified period of time at 105℃.                        |                                                                           |      |      |                                   |      |      |            |      |      |
|                                    | Time                                                                                                                                                                                                                                                                                  | φ 5 to 6.3 : 2,000hours   φ 8 &10: 3,000hours   φ 12.5to φ 18: 5,000hours |      |      |                                   |      |      |            |      |      |
|                                    | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±20% of the initial value                                               |      |      |                                   |      |      |            |      |      |
|                                    | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤200% of the initial specified value                                      |      |      |                                   |      |      |            |      |      |
|                                    | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value                                              |      |      |                                   |      |      |            |      |      |
| Shelf Life                         | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                                                           |      |      |                                   |      |      |            |      |      |
|                                    | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±20% of the initial value                                               |      |      |                                   |      |      |            |      |      |
|                                    | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤200% of the initial specified value                                      |      |      |                                   |      |      |            |      |      |
|                                    | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value                                              |      |      |                                   |      |      |            |      |      |

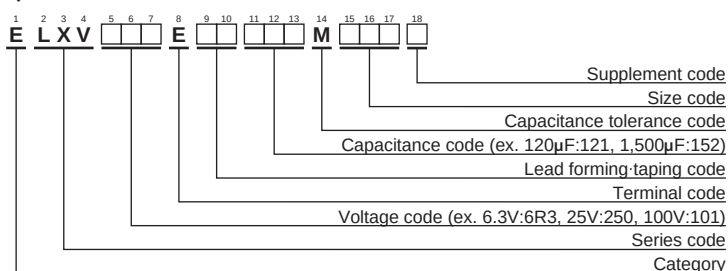
### DIMENSIONS [mm]

#### Terminal Code : E



| φD  | 5          | 6.3 | 8   | 10  | 12.5 | 16  | 18  |
|-----|------------|-----|-----|-----|------|-----|-----|
| φd  | 0.5        | 0.5 | 0.6 | 0.6 | 0.6  | 0.8 | 0.8 |
| F   | 2.0        | 2.5 | 3.5 | 5.0 | 5.0  | 7.5 | 7.5 |
| φD' | φD+0.5max. |     |     |     |      |     |     |
| L'  | L+1.5max.  |     |     |     |      |     |     |

### PART NUMBERING SYSTEM



Please refer to "Product code guide (radial lead type)"





## ◆STANDARD RATINGS

| VV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | Impedance<br>(Ω max./100kHz) |       | Rated<br>ripple<br>current<br>(mA <sub>rms</sub> /105°C,<br>100kHz) | Part No.           | VV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | Impedance<br>(Ω max./100kHz) |       | Rated<br>ripple<br>current<br>(mA <sub>rms</sub> /105°C,<br>100kHz) | Part No.           |
|--------------------------|-------------|-----------------------|------------------------------|-------|---------------------------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|------------------------------|-------|---------------------------------------------------------------------|--------------------|
|                          |             |                       | 20°C                         | -10°C |                                                                     |                    |                          |             |                       | 20°C                         | -10°C |                                                                     |                    |
| 6.3                      | 120         | 5×11.5                | 0.72                         | 1.8   | 165                                                                 | ELXV6R3E□□121MEB5D | 16                       | 2,700       | 12.5×35               | 0.027                        | 0.068 | 2,230                                                               | ELXV160E□□272MK35S |
|                          | 220         | 6.3×11.5              | 0.38                         | 0.95  | 255                                                                 | ELXV6R3E□□221MFB5D |                          | 2,700       | 16×25                 | 0.028                        | 0.070 | 2,190                                                               | ELXV160E□□272ML25S |
|                          | 330         | 6.3×15                | 0.27                         | 0.68  | 330                                                                 | ELXV6R3E□□331MF15D |                          | 3,300       | 12.5×40               | 0.024                        | 0.060 | 2,460                                                               | ELXV160E□□332MK40S |
|                          | 390         | 8×12                  | 0.20                         | 0.50  | 415                                                                 | ELXV6R3E□□391MH12D |                          | 3,300       | 18×20                 | 0.036                        | 0.090 | 1,940                                                               | ELXV160E□□332MM20S |
|                          | 470         | 10×12.5               | 0.12                         | 0.30  | 635                                                                 | ELXV6R3E□□471MJ35S |                          | 3,900       | 16×30                 | 0.025                        | 0.063 | 2,510                                                               | ELXV160E□□392ML30S |
|                          | 560         | 8×15                  | 0.16                         | 0.40  | 495                                                                 | ELXV6R3E□□561MH15D |                          | 3,900       | 18×25                 | 0.027                        | 0.068 | 2,350                                                               | ELXV160E□□392MM25S |
|                          | 680         | 10×16                 | 0.084                        | 0.21  | 825                                                                 | ELXV6R3E□□681MJ16S |                          | 4,700       | 16×35                 | 0.022                        | 0.055 | 2,770                                                               | ELXV160E□□472ML35S |
|                          | 820         | 8×20                  | 0.11                         | 0.28  | 640                                                                 | ELXV6R3E□□821MH20D |                          | 4,700       | 18×30                 | 0.024                        | 0.060 | 2,720                                                               | ELXV160E□□472MM30S |
|                          | 1,200       | 10×20                 | 0.062                        | 0.16  | 1,060                                                               | ELXV6R3E□□122MJ20S |                          | 5,600       | 16×40                 | 0.018                        | 0.045 | 3,110                                                               | ELXV160E□□562ML40S |
|                          | 1,500       | 10×25                 | 0.052                        | 0.13  | 1,260                                                               | ELXV6R3E□□152MJ25S |                          | 6,800       | 18×35                 | 0.021                        | 0.053 | 3,050                                                               | ELXV160E□□682MM35S |
|                          | 2,200       | 10×30                 | 0.044                        | 0.11  | 1,450                                                               | ELXV6R3E□□222MJ30S |                          | 8,200       | 18×40                 | 0.017                        | 0.043 | 3,300                                                               | ELXV160E□□822MM40S |
|                          | 2,200       | 12.5×20               | 0.046                        | 0.12  | 1,360                                                               | ELXV6R3E□□222MK20S | 25                       | 39          | 5×11.5                | 0.72                         | 1.8   | 165                                                                 | ELXV250E□□390MEB5D |
|                          | 2,700       | 12.5×25               | 0.034                        | 0.085 | 1,700                                                               | ELXV6R3E□□272MK25S |                          | 82          | 6.3×11.5              | 0.38                         | 0.95  | 255                                                                 | ELXV250E□□820MFB5D |
|                          | 3,900       | 12.5×30               | 0.030                        | 0.075 | 1,980                                                               | ELXV6R3E□□392MK30S |                          | 120         | 6.3×15                | 0.27                         | 0.68  | 330                                                                 | ELXV250E□□121MF15D |
|                          | 3,900       | 16×20                 | 0.038                        | 0.095 | 1,770                                                               | ELXV6R3E□□392ML20S |                          | 150         | 8×12                  | 0.20                         | 0.50  | 415                                                                 | ELXV250E□□151MH12D |
|                          | 4,700       | 12.5×35               | 0.027                        | 0.068 | 2,230                                                               | ELXV6R3E□□472MK35S |                          | 180         | 10×12.5               | 0.12                         | 0.30  | 635                                                                 | ELXV250E□□181MJ35S |
|                          | 5,600       | 12.5×40               | 0.024                        | 0.060 | 2,460                                                               | ELXV6R3E□□562MK40S |                          | 220         | 8×15                  | 0.16                         | 0.40  | 495                                                                 | ELXV250E□□221MH15D |
|                          | 5,600       | 16×25                 | 0.028                        | 0.070 | 2,190                                                               | ELXV6R3E□□562ML25S |                          | 330         | 8×20                  | 0.11                         | 0.28  | 640                                                                 | ELXV250E□□331MH20D |
|                          | 5,600       | 18×20                 | 0.036                        | 0.090 | 1,940                                                               | ELXV6R3E□□562MM20S |                          | 330         | 10×16                 | 0.084                        | 0.21  | 825                                                                 | ELXV250E□□331MJ16S |
|                          | 6,800       | 16×30                 | 0.025                        | 0.063 | 2,510                                                               | ELXV6R3E□□682ML30S |                          | 470         | 10×20                 | 0.062                        | 0.16  | 1,060                                                               | ELXV250E□□471MJ20S |
|                          | 6,800       | 18×25                 | 0.027                        | 0.068 | 2,350                                                               | ELXV6R3E□□682MM25S |                          | 560         | 10×25                 | 0.052                        | 0.13  | 1,260                                                               | ELXV250E□□561MJ25S |
|                          | 8,200       | 16×35                 | 0.022                        | 0.055 | 2,770                                                               | ELXV6R3E□□822ML35S |                          | 820         | 10×30                 | 0.044                        | 0.11  | 1,450                                                               | ELXV250E□□821MJ30S |
|                          | 10,000      | 16×40                 | 0.018                        | 0.045 | 3,110                                                               | ELXV6R3E□□103ML40S |                          | 820         | 12.5×20               | 0.046                        | 0.12  | 1,360                                                               | ELXV250E□□821MK20S |
|                          | 10,000      | 18×30                 | 0.024                        | 0.060 | 2,720                                                               | ELXV6R3E□□103MM30S |                          | 1,000       | 12.5×25               | 0.034                        | 0.085 | 1,700                                                               | ELXV250E□□102MK25S |
|                          | 12,000      | 18×35                 | 0.021                        | 0.053 | 3,050                                                               | ELXV6R3E□□123MM35S |                          | 1,500       | 12.5×30               | 0.030                        | 0.075 | 1,980                                                               | ELXV250E□□152MK30S |
|                          | 15,000      | 18×40                 | 0.017                        | 0.043 | 3,300                                                               | ELXV6R3E□□153MM40S |                          | 1,500       | 16×20                 | 0.038                        | 0.095 | 1,770                                                               | ELXV250E□□152ML20S |
|                          | 82          | 5×11.5                | 0.72                         | 1.8   | 165                                                                 | ELXV100E□□820MEB5D |                          | 1,800       | 12.5×35               | 0.027                        | 0.068 | 2,230                                                               | ELXV250E□□182MK35S |
|                          | 180         | 6.3×11.5              | 0.38                         | 0.95  | 255                                                                 | ELXV100E□□181MFB5D |                          | 1,800       | 16×25                 | 0.028                        | 0.070 | 2,190                                                               | ELXV250E□□182ML25S |
|                          | 270         | 6.3×15                | 0.27                         | 0.68  | 330                                                                 | ELXV100E□□271MF15D |                          | 2,200       | 12.5×40               | 0.024                        | 0.060 | 2,460                                                               | ELXV250E□□222MK40S |
|                          | 330         | 8×12                  | 0.20                         | 0.50  | 415                                                                 | ELXV100E□□331MH12D |                          | 2,200       | 18×20                 | 0.036                        | 0.090 | 1,940                                                               | ELXV250E□□222MM20S |
| 10                       | 390         | 10×12.5               | 0.12                         | 0.30  | 635                                                                 | ELXV100E□□391MJ35S |                          | 2,700       | 16×30                 | 0.025                        | 0.063 | 2,510                                                               | ELXV250E□□272ML30S |
|                          | 470         | 8×15                  | 0.16                         | 0.40  | 495                                                                 | ELXV100E□□471MH15D |                          | 2,700       | 18×25                 | 0.027                        | 0.068 | 2,350                                                               | ELXV250E□□272MM25S |
|                          | 680         | 8×20                  | 0.11                         | 0.28  | 640                                                                 | ELXV100E□□681MH20D |                          | 3,300       | 16×35                 | 0.022                        | 0.055 | 2,770                                                               | ELXV250E□□332ML35S |
|                          | 680         | 10×16                 | 0.084                        | 0.21  | 825                                                                 | ELXV100E□□681MJ16S |                          | 3,300       | 18×30                 | 0.024                        | 0.060 | 2,720                                                               | ELXV250E□□332MM30S |
|                          | 1,000       | 10×20                 | 0.062                        | 0.16  | 1,060                                                               | ELXV100E□□102MJ20S |                          | 3,900       | 16×40                 | 0.018                        | 0.045 | 3,110                                                               | ELXV250E□□392ML40S |
|                          | 1,200       | 10×25                 | 0.052                        | 0.13  | 1,260                                                               | ELXV100E□□122MJ25S |                          | 3,900       | 18×35                 | 0.021                        | 0.053 | 3,050                                                               | ELXV250E□□392MM35S |
|                          | 1,500       | 10×30                 | 0.044                        | 0.11  | 1,450                                                               | ELXV100E□□152MJ30S |                          | 4,700       | 18×40                 | 0.017                        | 0.043 | 3,300                                                               | ELXV250E□□472MM40S |
|                          | 1,800       | 12.5×20               | 0.046                        | 0.12  | 1,360                                                               | ELXV100E□□182MK20S | 35                       | 27          | 5×11.5                | 0.72                         | 1.8   | 165                                                                 | ELXV350E□□270MEB5D |
|                          | 2,200       | 12.5×25               | 0.034                        | 0.085 | 1,700                                                               | ELXV100E□□222MK25S |                          | 56          | 6.3×11.5              | 0.38                         | 0.95  | 255                                                                 | ELXV350E□□560MFB5D |
|                          | 2,700       | 12.5×30               | 0.030                        | 0.075 | 1,980                                                               | ELXV100E□□272MK30S |                          | 82          | 6.3×15                | 0.27                         | 0.68  | 330                                                                 | ELXV350E□□820MF15D |
|                          | 3,300       | 12.5×35               | 0.027                        | 0.068 | 2,230                                                               | ELXV100E□□332MK35S |                          | 120         | 8×12                  | 0.20                         | 0.50  | 415                                                                 | ELXV350E□□121MH12D |
|                          | 3,300       | 16×20                 | 0.038                        | 0.095 | 1,770                                                               | ELXV100E□□332ML20S |                          | 120         | 10×12.5               | 0.12                         | 0.30  | 635                                                                 | ELXV350E□□121MJ35S |
|                          | 3,900       | 12.5×40               | 0.024                        | 0.060 | 2,460                                                               | ELXV100E□□392MK40S |                          | 180         | 8×15                  | 0.16                         | 0.40  | 495                                                                 | ELXV350E□□181MH15D |
|                          | 3,900       | 16×25                 | 0.028                        | 0.070 | 2,190                                                               | ELXV100E□□392ML25S |                          | 220         | 8×20                  | 0.11                         | 0.28  | 640                                                                 | ELXV350E□□221MH20D |
|                          | 3,900       | 18×20                 | 0.036                        | 0.090 | 1,940                                                               | ELXV100E□□392MM20S |                          | 220         | 10×16                 | 0.084                        | 0.21  | 825                                                                 | ELXV350E□□221MJ16S |
|                          | 4,700       | 18×25                 | 0.027                        | 0.068 | 2,350                                                               | ELXV100E□□472MM25S |                          | 330         | 10×20                 | 0.062                        | 0.16  | 1,060                                                               | ELXV350E□□331MJ20S |
|                          | 5,600       | 16×30                 | 0.025                        | 0.063 | 2,510                                                               | ELXV100E□□562ML30S |                          | 390         | 10×25                 | 0.052                        | 0.13  | 1,260                                                               | ELXV350E□□391MJ25S |
|                          | 6,800       | 16×35                 | 0.022                        | 0.055 | 2,770                                                               | ELXV100E□□682ML35S |                          | 560         | 10×30                 | 0.044                        | 0.11  | 1,450                                                               | ELXV350E□□561MJ30S |
|                          | 6,800       | 18×30                 | 0.024                        | 0.060 | 2,720                                                               | ELXV100E□□682MM30S |                          | 560         | 12.5×20               | 0.046                        | 0.12  | 1,360                                                               | ELXV350E□□561MK20S |
|                          | 8,200       | 16×40                 | 0.018                        | 0.045 | 3,110                                                               | ELXV100E□□822ML40S |                          | 680         | 12.5×25               | 0.034                        | 0.085 | 1,700                                                               | ELXV350E□□681MK25S |
|                          | 8,200       | 18×35                 | 0.021                        | 0.053 | 3,050                                                               | ELXV100E□□822MM35S |                          | 1,000       | 12.5×30               | 0.030                        | 0.075 | 1,980                                                               | ELXV350E□□102MK30S |
|                          | 10,000      | 18×40                 | 0.017                        | 0.043 | 3,300                                                               | ELXV100E□□103MM40S |                          | 1,000       | 16×20                 | 0.038                        | 0.095 | 1,770                                                               | ELXV350E□□102ML20S |
|                          | 56          | 5×11.5                | 0.72                         | 1.8   | 165                                                                 | ELXV160E□□560MEB5D |                          | 1,200       | 12.5×35               | 0.027                        | 0.068 | 2,230                                                               | ELXV350E□□122MK35S |
|                          | 120         | 6.3×11.5              | 0.38                         | 0.95  | 255                                                                 | ELXV160E□□121MFB5D |                          | 1,200       | 16×25                 | 0.028                        | 0.070 | 2,190                                                               | ELXV350E□□122ML25S |
|                          | 180         | 6.3×15                | 0.27                         | 0.68  | 330                                                                 | ELXV160E□□181MF15D |                          | 1,500       | 12.5×40               | 0.024                        | 0.060 | 2,460                                                               | ELXV350E□□152MK40S |
|                          | 270         | 8×12                  | 0.20                         | 0.50  | 415                                                                 | ELXV160E□□271MH12D |                          | 1,500       | 18×20                 | 0.036                        | 0.090 | 1,940                                                               | ELXV350E□□152MM20S |
| 16                       | 270         | 10×12.5               | 0.12                         | 0.30  | 635                                                                 | ELXV160E□□271MJ35S |                          | 1,800       | 16×30                 | 0.025                        | 0.063 | 2,510                                                               | ELXV350E□□182ML30S |
|                          | 330         | 8×15                  | 0.16                         | 0.40  | 495                                                                 | ELXV160E□□331MH15D |                          | 1,800       | 18×25                 | 0.027                        | 0.068 | 2,350                                                               | ELXV350E□□182MM25S |
|                          | 470         | 8×20                  | 0.11                         | 0.28  | 640                                                                 | ELXV160E□□471MH20D |                          | 2,200       | 16×35                 | 0.022                        | 0.055 | 2,770                                                               | ELXV350E□□222ML35S |
|                          | 470         | 10×16                 | 0.084                        | 0.21  | 825                                                                 | ELXV160E□□471MJ16S |                          | 2,200       | 18×30                 | 0.024                        | 0.060 | 2,720                                                               | ELXV350E□□222MM30S |
|                          | 680         | 10×20                 | 0.062                        | 0.16  | 1,060                                                               | ELXV160E□□681MJ20S |                          | 2,700       | 16×40                 | 0.018                        | 0.045 | 3,110                                                               | ELXV350E□□272ML40S |
|                          | 820         | 10×25                 | 0.052                        | 0.13  | 1,260                                                               | ELXV160E□□821MJ25S |                          | 2,700       | 18×35                 | 0.021                        | 0.053 | 3,050                                                               | ELXV350E□□272MM35S |
|                          | 1,200       | 10×30                 | 0.044                        | 0.11  | 1,450                                                               | ELXV160E□□122MJ30S |                          | 3,300       | 18×40                 | 0.017                        | 0.043 | 3,300                                                               | ELXV350E□□332MM40S |
|                          | 1,200       | 12.5×20               | 0.046                        | 0.12  | 1,360                                                               | ELXV160E□□122MK20S | 50                       | 18          | 5×11.5                | 1.1                          | 3.3   | 165                                                                 | ELXV500E□□180MEB5D |
|                          | 1,500       | 12.5×25               | 0.034                        | 0.085 | 1,700                                                               | ELXV160E□□152MK25S |                          | 39          | 6.3×11.5              | 0.56                         | 1.6   | 255                                                                 | ELXV500E□□390MFB5D |
|                          | 2,200       | 12.5×30               | 0.030                        | 0.075 | 1,980                                                               | ELXV160E□□222MK30S |                          | 56          | 6.3×15                | 0.41                         | 1.2   | 310                                                                 | ELXV500E□□560MF15D |
|                          | 2,200       | 16×20                 | 0.038                        | 0.095 | 1,770                                                               | ELXV160E□□222ML20S |                          | 68          | 8×12                  | 0.29                         | 0.84  | 415                                                                 | ELXV500E□□680MH12D |

□□ : Enter the appropriate lead forming or taping code.

Production of the products shown in   is scheduled to be discontinued.



## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | Impedance<br>(Ω max./100kHz) |       | Rated<br>ripple<br>current<br>(mA rms/<br>105°C,<br>100kHz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | Impedance<br>(Ω max./100kHz) |       | Rated<br>ripple<br>current<br>(mA rms/<br>105°C,<br>100kHz) | Part No.           |
|--------------------------|-------------|-----------------------|------------------------------|-------|-------------------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|------------------------------|-------|-------------------------------------------------------------|--------------------|
|                          |             |                       | 20°C                         | -10°C |                                                             |                    |                          |             |                       | 20°C                         | -10°C |                                                             |                    |
| 50                       | 82          | 8×15                  | 0.24                         | 0.72  | 505                                                         | ELXV500E□□820MH15D | 80                       | 27          | 6.3×15                | 0.62                         | 1.7   | 220                                                         | ELXV800E□□270MF15D |
|                          | 82          | 10×12.5               | 0.16                         | 0.40  | 530                                                         | ELXV500E□□820MJC5S |                          | 33          | 8×12                  | 0.53                         | 1.5   | 275                                                         | ELXV800E□□330MH12D |
|                          | 120         | 8×20                  | 0.18                         | 0.52  | 610                                                         | ELXV500E□□121MH20D |                          | 39          | 10×12.5               | 0.47                         | 1.3   | 380                                                         | ELXV800E□□390MJC5S |
|                          | 120         | 10×16                 | 0.12                         | 0.30  | 755                                                         | ELXV500E□□121MJ16S |                          | 47          | 8×15                  | 0.35                         | 0.97  | 360                                                         | ELXV800E□□470MH15D |
|                          | 180         | 10×20                 | 0.088                        | 0.22  | 945                                                         | ELXV500E□□181MJ20S |                          | 56          | 8×20                  | 0.27                         | 0.74  | 490                                                         | ELXV800E□□560MH20D |
|                          | 220         | 10×25                 | 0.068                        | 0.17  | 1,150                                                       | ELXV500E□□221MJ25S |                          | 56          | 10×16                 | 0.33                         | 0.90  | 500                                                         | ELXV800E□□560MJ16S |
|                          | 330         | 10×30                 | 0.059                        | 0.15  | 1,260                                                       | ELXV500E□□331MJ30S |                          | 82          | 10×20                 | 0.26                         | 0.70  | 620                                                         | ELXV800E□□820MJ20S |
|                          | 330         | 12.5×20               | 0.059                        | 0.15  | 1,190                                                       | ELXV500E□□331MK20S |                          | 100         | 10×25                 | 0.19                         | 0.52  | 795                                                         | ELXV800E□□101MJ25S |
|                          | 470         | 12.5×25               | 0.045                        | 0.11  | 1,500                                                       | ELXV500E□□471MK25S |                          | 150         | 10×30                 | 0.15                         | 0.41  | 955                                                         | ELXV800E□□151MJ30S |
|                          | 560         | 12.5×30               | 0.039                        | 0.098 | 1,720                                                       | ELXV500E□□561MK30S |                          | 150         | 12.5×20               | 0.15                         | 0.41  | 890                                                         | ELXV800E□□151MK20S |
|                          | 680         | 12.5×35               | 0.033                        | 0.083 | 1,900                                                       | ELXV500E□□681MK35S |                          | 180         | 12.5×25               | 0.11                         | 0.30  | 1,040                                                       | ELXV800E□□181MK25S |
|                          | 680         | 16×20                 | 0.043                        | 0.11  | 1,500                                                       | ELXV500E□□681ML20S |                          | 270         | 12.5×30               | 0.094                        | 0.26  | 1,270                                                       | ELXV800E□□271MK30S |
|                          | 820         | 12.5×40               | 0.029                        | 0.073 | 2,120                                                       | ELXV500E□□821MK40S |                          | 270         | 16×20                 | 0.11                         | 0.30  | 1,240                                                       | ELXV800E□□271ML20S |
|                          | 820         | 16×25                 | 0.033                        | 0.083 | 1,880                                                       | ELXV500E□□821ML25S |                          | 330         | 12.5×35               | 0.087                        | 0.24  | 1,450                                                       | ELXV800E□□331MK35S |
|                          | 820         | 18×20                 | 0.039                        | 0.098 | 1,660                                                       | ELXV500E□□821MM20S |                          | 330         | 16×25                 | 0.081                        | 0.22  | 1,440                                                       | ELXV800E□□331ML25S |
|                          | 1,000       | 16×30                 | 0.029                        | 0.073 | 2,150                                                       | ELXV500E□□102ML30S |                          | 390         | 12.5×40               | 0.060                        | 0.17  | 1,610                                                       | ELXV800E□□391MK40S |
|                          | 1,000       | 18×25                 | 0.030                        | 0.075 | 2,020                                                       | ELXV500E□□102MM25S |                          | 390         | 18×20                 | 0.085                        | 0.23  | 1,450                                                       | ELXV800E□□391MM20S |
|                          | 1,200       | 16×35                 | 0.025                        | 0.063 | 2,320                                                       | ELXV500E□□122ML35S |                          | 470         | 16×30                 | 0.058                        | 0.16  | 1,790                                                       | ELXV800E□□471ML30S |
|                          | 1,500       | 16×40                 | 0.021                        | 0.053 | 2,650                                                       | ELXV500E□□152ML40S |                          | 470         | 18×25                 | 0.070                        | 0.19  | 1,650                                                       | ELXV800E□□471MM25S |
|                          | 1,500       | 18×30                 | 0.026                        | 0.065 | 2,340                                                       | ELXV500E□□152MM30S |                          | 560         | 16×35                 | 0.052                        | 0.14  | 2,000                                                       | ELXV800E□□561ML35S |
| 63                       | 1,800       | 18×35                 | 0.023                        | 0.058 | 2,620                                                       | ELXV500E□□182MM35S | 100                      | 680         | 16×40                 | 0.041                        | 0.11  | 2,200                                                       | ELXV800E□□681ML40S |
|                          | 2,200       | 18×40                 | 0.020                        | 0.050 | 2,790                                                       | ELXV500E□□222MM40S |                          | 680         | 18×30                 | 0.058                        | 0.16  | 1,850                                                       | ELXV800E□□681MM30S |
|                          | 12          | 5×11.5                | 1.9                          | 4.8   | 100                                                         | ELXV630E□□120MEB5D |                          | 820         | 18×35                 | 0.052                        | 0.14  | 1,990                                                       | ELXV800E□□821MM35S |
|                          | 27          | 6.3×11.5              | 1.1                          | 2.8   | 160                                                         | ELXV630E□□270MF5D  |                          | 1,000       | 18×40                 | 0.041                        | 0.11  | 2,370                                                       | ELXV800E□□102MM40S |
|                          | 39          | 6.3×15                | 0.62                         | 1.6   | 230                                                         | ELXV630E□□390MF15D |                          | 5.6         | 5×11.5                | 1.9                          | 5.1   | 100                                                         | ELXV101E□□5R6MEB5D |
|                          | 47          | 8×12                  | 0.49                         | 1.3   | 275                                                         | ELXV630E□□470MH12D |                          | 12          | 6.3×11.5              | 1.1                          | 3.0   | 150                                                         | ELXV101E□□120MFB5D |
|                          | 56          | 10×12.5               | 0.27                         | 0.68  | 420                                                         | ELXV630E□□560MJC5S |                          | 18          | 6.3×15                | 0.62                         | 1.7   | 220                                                         | ELXV101E□□180MF15D |
|                          | 68          | 8×15                  | 0.34                         | 0.85  | 360                                                         | ELXV630E□□680MH15D |                          | 22          | 8×12                  | 0.53                         | 1.5   | 275                                                         | ELXV101E□□220MH12D |
|                          | 68          | 10×16                 | 0.21                         | 0.53  | 523                                                         | ELXV630E□□680MJ16S |                          | 27          | 10×12.5               | 0.47                         | 1.3   | 380                                                         | ELXV101E□□270MJC5S |
|                          | 82          | 8×20                  | 0.21                         | 0.53  | 500                                                         | ELXV630E□□820MH20D |                          | 33          | 8×15                  | 0.35                         | 0.97  | 360                                                         | ELXV101E□□330MH15D |
|                          | 120         | 10×20                 | 0.16                         | 0.40  | 650                                                         | ELXV630E□□121MJ20S |                          | 33          | 10×16                 | 0.33                         | 0.90  | 500                                                         | ELXV101E□□330MJ16S |
|                          | 150         | 10×25                 | 0.13                         | 0.33  | 780                                                         | ELXV630E□□151MJ25S |                          | 39          | 8×20                  | 0.27                         | 0.74  | 490                                                         | ELXV101E□□390MH20D |
|                          | 180         | 10×30                 | 0.10                         | 0.25  | 960                                                         | ELXV630E□□181MJ30S |                          | 56          | 10×20                 | 0.26                         | 0.70  | 620                                                         | ELXV101E□□560MJ20S |
|                          | 220         | 12.5×20               | 0.11                         | 0.28  | 870                                                         | ELXV630E□□221MK20S |                          | 68          | 10×25                 | 0.19                         | 0.52  | 795                                                         | ELXV101E□□680MJ25S |
|                          | 270         | 12.5×25               | 0.074                        | 0.19  | 1,150                                                       | ELXV630E□□271MK25S |                          | 100         | 10×30                 | 0.15                         | 0.41  | 955                                                         | ELXV101E□□101MJ30S |
|                          | 390         | 12.5×30               | 0.068                        | 0.17  | 1,280                                                       | ELXV630E□□391MK30S |                          | 100         | 12.5×20               | 0.15                         | 0.41  | 890                                                         | ELXV101E□□101MK20S |
|                          | 390         | 16×20                 | 0.085                        | 0.22  | 1,100                                                       | ELXV630E□□391ML20S |                          | 120         | 12.5×25               | 0.11                         | 0.30  | 1,040                                                       | ELXV101E□□121MK25S |
|                          | 470         | 12.5×35               | 0.063                        | 0.16  | 1,390                                                       | ELXV630E□□471MK35S |                          | 180         | 12.5×30               | 0.094                        | 0.26  | 1,270                                                       | ELXV101E□□181MK30S |
|                          | 470         | 16×25                 | 0.055                        | 0.14  | 1,480                                                       | ELXV630E□□471ML25S |                          | 180         | 16×20                 | 0.11                         | 0.30  | 1,240                                                       | ELXV101E□□181ML20S |
|                          | 560         | 12.5×40               | 0.051                        | 0.13  | 1,530                                                       | ELXV630E□□561MK40S |                          | 220         | 12.5×35               | 0.087                        | 0.24  | 1,450                                                       | ELXV101E□□221MK35S |
| 80                       | 560         | 18×20                 | 0.085                        | 0.22  | 1,170                                                       | ELXV630E□□561MM20S |                          | 220         | 16×25                 | 0.081                        | 0.22  | 1,440                                                       | ELXV101E□□221ML25S |
|                          | 680         | 16×30                 | 0.046                        | 0.12  | 1,720                                                       | ELXV630E□□681ML30S |                          | 270         | 12.5×40               | 0.060                        | 0.17  | 1,610                                                       | ELXV101E□□271MK40S |
|                          | 680         | 18×25                 | 0.055                        | 0.14  | 1,520                                                       | ELXV630E□□681MM25S |                          | 270         | 18×20                 | 0.085                        | 0.23  | 1,450                                                       | ELXV101E□□271MM20S |
|                          | 820         | 16×35                 | 0.040                        | 0.10  | 1,910                                                       | ELXV630E□□821ML35S |                          | 330         | 16×30                 | 0.058                        | 0.16  | 1,790                                                       | ELXV101E□□331ML30S |
|                          | 820         | 18×30                 | 0.046                        | 0.12  | 1,770                                                       | ELXV630E□□821MM30S |                          | 330         | 18×25                 | 0.070                        | 0.19  | 1,650                                                       | ELXV101E□□331MM25S |
|                          | 1,000       | 16×40                 | 0.036                        | 0.09  | 2,070                                                       | ELXV630E□□102ML40S |                          | 390         | 16×35                 | 0.052                        | 0.14  | 2,000                                                       | ELXV101E□□391ML35S |
|                          | 1,000       | 18×35                 | 0.040                        | 0.10  | 1,970                                                       | ELXV630E□□102MM35S |                          | 390         | 18×30                 | 0.058                        | 0.16  | 1,850                                                       | ELXV101E□□391MM30S |
|                          | 1,200       | 18×40                 | 0.036                        | 0.09  | 2,130                                                       | ELXV630E□□122MM40S |                          | 470         | 16×40                 | 0.041                        | 0.11  | 2,200                                                       | ELXV101E□□471ML40S |
|                          | 8.2         | 5×11.5                | 1.9                          | 5.1   | 100                                                         | ELXV800E□□8R2MEB5D |                          | 560         | 18×35                 | 0.052                        | 0.14  | 1,990                                                       | ELXV101E□□561MM35S |
|                          | 18          | 6.3×11.5              | 1.1                          | 3.0   | 150                                                         | ELXV800E□□180MFB5D |                          | 680         | 18×40                 | 0.041                        | 0.11  | 2,370                                                       | ELXV101E□□681MM40S |

□ □ : Enter the appropriate lead forming or taping code.

Production of the products shown in   is scheduled to be discontinued.

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ● Frequency Multipliers

| Rated voltage<br>(V <sub>dc</sub> ) | Case size<br>φD (mm) | Frequency (Hz) |      |      |      | Rated voltage<br>(V <sub>dc</sub> ) | Case size<br>φD (mm) | Frequency (Hz) |      |      |      |
|-------------------------------------|----------------------|----------------|------|------|------|-------------------------------------|----------------------|----------------|------|------|------|
|                                     |                      | 120            | 1k   | 10k  | 100k |                                     |                      | 120            | 1k   | 10k  | 100k |
| 6.3 & 10                            | 5 to 8               | 0.65           | 0.83 | 0.95 | 1.00 | 35 & 50                             | 5 to 8               | 0.40           | 0.66 | 0.85 | 1.00 |
|                                     | 10 & 12.5            | 0.70           | 0.85 | 0.96 | 1.00 |                                     | 10 & 12.5            | 0.50           | 0.73 | 0.89 | 1.00 |
|                                     | 16 & 18              | 0.85           | 0.92 | 0.97 | 1.00 |                                     | 16 & 18              | 0.60           | 0.81 | 0.94 | 1.00 |
| 16 & 25                             | 5 to 8               | 0.55           | 0.76 | 0.91 | 1.00 | 63 to 100                           | 5 to 8               | 0.20           | 0.55 | 0.80 | 1.00 |
|                                     | 10 & 12.5            | 0.65           | 0.83 | 0.93 | 1.00 |                                     | 10 & 12.5            | 0.35           | 0.65 | 0.85 | 1.00 |
|                                     | 16 & 18              | 0.70           | 0.87 | 0.96 | 1.00 |                                     | 16 & 18              | 0.50           | 0.75 | 0.90 | 1.00 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current.

For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

# KXQ Series

KXJ

Downsized

KXQ



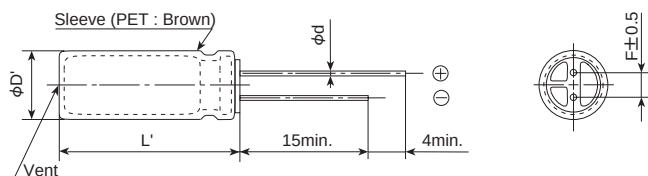
- Ideal for on-board charger
- Downsized from KXJ series
- Rated voltage range : 400 to 450V<sub>dc</sub>, Capacitance range : 47 to 180µF
- Endurance with ripple current : 10,000 to 12,000 hours at 105°C
- Non solvent resistant type
- RoHS2 Compliant
- AEC-Q200 compliant : Please contact Chemi-Con for more details, test data, information.

## SPECIFICATIONS

| Items                                                        | Characteristics                                                                                                                                                                                                                                                                       |                                      |                 |
|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-----------------|
| Category                                                     | -40 to +105℃                                                                                                                                                                                                                                                                          |                                      |                 |
| Temperature Range                                            |                                                                                                                                                                                                                                                                                       |                                      |                 |
| Rated Voltage Range                                          | 400 to 450V <sub>dc</sub>                                                                                                                                                                                                                                                             |                                      |                 |
| Capacitance Tolerance                                        | ± 20% (M)                                                                                                                                                                                                                                                                             |                                      | (at 20℃, 120Hz) |
| Leakage Current                                              | I=0.04CV+100 (after 1 minute)<br>I=0.02CV+25 (after 5 minutes)<br>Where, I : Max. leakage current(μA), C : Nominal capacitance (μF), V : Rated voltage (V)<br>(at 20℃)                                                                                                                |                                      |                 |
| Dissipation Factor<br>(tan δ)                                | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 400 to 450V                          | (at 20℃, 120Hz) |
|                                                              | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.30                                 |                 |
| Low Temperature<br>Characteristics<br>(Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 400 to 450V                          | (at 120Hz)      |
|                                                              | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 6                                    |                 |
| Endurance                                                    | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 12,000 hours (10,000 hours for 25L and less) at 105℃.        |                                      |                 |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ± 20% of the initial value         |                 |
|                                                              | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤200% of the initial specified value |                 |
|                                                              | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value         |                 |
| Shelf Life                                                   | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                      |                 |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ± 20% of the initial value         |                 |
|                                                              | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤200% of the initial specified value |                 |
|                                                              | Leakage current                                                                                                                                                                                                                                                                       | ≤500% of the initial specified value |                 |

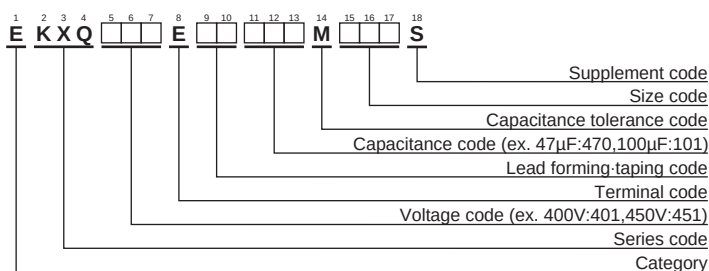
## DIMENSIONS [mm]

### Terminal Code : E



|     |             |     |
|-----|-------------|-----|
| φD  | 16          | 18  |
| φd  | 0.8         | 0.8 |
| F   | 7.5         | 7.5 |
| φD' | φD+0.5 max. |     |
| L'  | L+2.0 max.  |     |

## PART NUMBERING SYSTEM



Please refer to "Product code guide (radial lead type)"



**KXQ**Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(mA <sub>rms</sub> /105°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(mA <sub>rms</sub> /105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|--------------------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|--------------------------------------------------------------|--------------------|
| 400                      | 56          | 16×20                 | 0.30  | 450                                                          | EKXQ401E□□560ML20S | 450                      | 47          | 16×20                 | 0.30  | 400                                                          | EKXQ451E□□470ML20S |
|                          | 68          | 18×20                 | 0.30  | 530                                                          | EKXQ401E□□680MM20S |                          | 62          | 16×25                 | 0.30  | 510                                                          | EKXQ451E□□620ML25S |
|                          | 75          | 16×25                 | 0.30  | 580                                                          | EKXQ401E□□750ML25S |                          | 62          | 18×20                 | 0.30  | 510                                                          | EKXQ451E□□620MM20S |
|                          | 100         | 16×31.5               | 0.30  | 730                                                          | EKXQ401E□□101MLN3S |                          | 82          | 16×31.5               | 0.30  | 650                                                          | EKXQ451E□□820MLN3S |
|                          | 100         | 18×25                 | 0.30  | 660                                                          | EKXQ401E□□101MM25S |                          | 82          | 18×25                 | 0.30  | 640                                                          | EKXQ451E□□820MM25S |
|                          | 120         | 16×35.5               | 0.30  | 830                                                          | EKXQ401E□□121MLP1S |                          | 100         | 16×35.5               | 0.30  | 750                                                          | EKXQ451E□□101MLP1S |
|                          | 130         | 16×40                 | 0.30  | 910                                                          | EKXQ401E□□131ML40S |                          | 110         | 18×31.5               | 0.30  | 800                                                          | EKXQ451E□□111MMN3S |
|                          | 130         | 18×31.5               | 0.30  | 860                                                          | EKXQ401E□□131MMN3S |                          | 120         | 16×40                 | 0.30  | 860                                                          | EKXQ451E□□121ML40S |
|                          | 160         | 18×35.5               | 0.30  | 980                                                          | EKXQ401E□□161MMP1S |                          | 130         | 18×35.5               | 0.30  | 920                                                          | EKXQ451E□□131MMP1S |
|                          | 180         | 18×40                 | 0.30  | 1,020                                                        | EKXQ401E□□181MM40S |                          | 160         | 18×40                 | 0.30  | 980                                                          | EKXQ451E□□161MM40S |
| 420                      | 180         | 18×45                 | 0.30  | 1,080                                                        | EKXQ401E□□181MM45S | 450                      | 180         | 18×45                 | 0.30  | 1,000                                                        | EKXQ451E□□181MM45S |
|                          | 51          | 16×20                 | 0.30  | 400                                                          | EKXQ421E□□510ML20S |                          |             |                       |       |                                                              |                    |
|                          | 68          | 16×25                 | 0.30  | 510                                                          | EKXQ421E□□680ML25S |                          |             |                       |       |                                                              |                    |
|                          | 68          | 18×20                 | 0.30  | 510                                                          | EKXQ421E□□680MM20S |                          |             |                       |       |                                                              |                    |
|                          | 91          | 16×31.5               | 0.30  | 650                                                          | EKXQ421E□□910MLN3S |                          |             |                       |       |                                                              |                    |
|                          | 91          | 18×25                 | 0.30  | 640                                                          | EKXQ421E□□910MM25S |                          |             |                       |       |                                                              |                    |
|                          | 110         | 16×35.5               | 0.30  | 750                                                          | EKXQ421E□□111MLP1S |                          |             |                       |       |                                                              |                    |
|                          | 120         | 18×31.5               | 0.30  | 800                                                          | EKXQ421E□□121MMN3S |                          |             |                       |       |                                                              |                    |
|                          | 130         | 16×40                 | 0.30  | 860                                                          | EKXQ421E□□131ML40S |                          |             |                       |       |                                                              |                    |
|                          | 150         | 18×35.5               | 0.30  | 920                                                          | EKXQ421E□□151MMP1S |                          |             |                       |       |                                                              |                    |
|                          | 160         | 18×40                 | 0.30  | 980                                                          | EKXQ421E□□161MM40S |                          |             |                       |       |                                                              |                    |
|                          | 180         | 18×45                 | 0.30  | 1,000                                                        | EKXQ421E□□181MM45S |                          |             |                       |       |                                                              |                    |

□□ : Enter the appropriate lead forming or taping code.

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

| Capacitance(μF) | Frequency(Hz) | 120  | 1k   | 10k  | 100k |
|-----------------|---------------|------|------|------|------|
| 47 to 91        |               | 1.00 | 1.50 | 1.90 | 2.00 |
| 100 to 180      |               | 1.00 | 1.40 | 1.65 | 1.70 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

# KXN Series

KXL

Downsized →

KXN



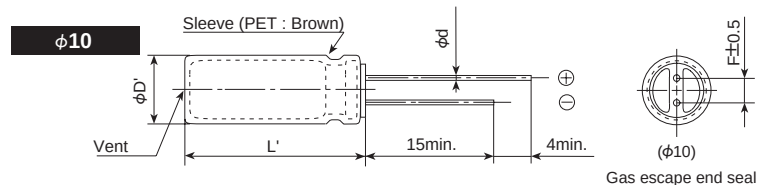
- Ideal for low profile power supply applications
- Downsized from KXL series
- Rated voltage range : 350 to 450V<sub>dc</sub>, Capacitance range : 15 to 330μF
- Endurance with ripple current : 10,000 to 12,000 hours at 105°C
- Non solvent resistant type
- RoHS2 Compliant

## SPECIFICATIONS

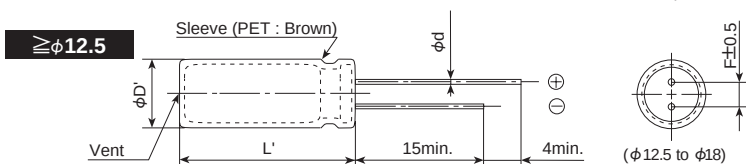
| Items                                                  | Characteristics                                                                                                                                                                                                                                                                       |                                      |                 |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-----------------|
| Category                                               | -40 to +105℃                                                                                                                                                                                                                                                                          |                                      |                 |
| Temperature Range                                      |                                                                                                                                                                                                                                                                                       |                                      |                 |
| Rated Voltage Range                                    | 350 to 450V <sub>dc</sub>                                                                                                                                                                                                                                                             |                                      |                 |
| Capacitance Tolerance                                  | ± 20% (M)                                                                                                                                                                                                                                                                             |                                      | (at 20℃, 120Hz) |
| Leakage Current                                        | I=0.04CV+100 (after 1 minute)<br>I=0.02CV+25 (after 5 minutes)<br>Where, I : Max. leakage current(μA), C : Nominal capacitance (μF), V : Rated voltage (V)<br>(at 20℃)                                                                                                                |                                      |                 |
| Dissipation Factor (tan δ )                            | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 350 to 450V                          | (at 20℃, 120Hz) |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.24                                 |                 |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 350 to 450V                          | (at 120Hz)      |
|                                                        | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 6                                    |                 |
|                                                        | Z(-40℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 10                                   |                 |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 12,000 hours (10,000 hours for 20L and less) at 105℃.        |                                      |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±20% of the initial value          |                 |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤200% of the initial specified value |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value         |                 |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                      |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±20% of the initial value          |                 |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤200% of the initial specified value |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤500% of the initial specified value |                 |

## DIMENSIONS [mm]

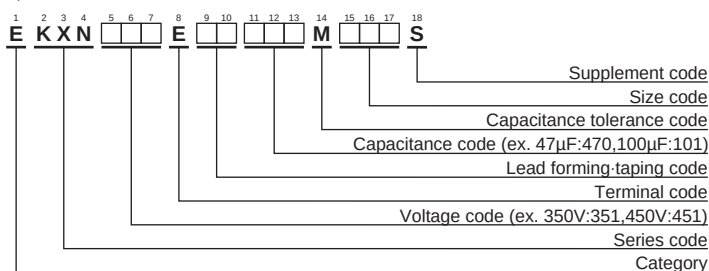
● Terminal Code : E



| φD  | 10          | 12.5 | 16  | 18  |
|-----|-------------|------|-----|-----|
| φd  | 0.6         | 0.6  | 0.8 | 0.8 |
| F   | 5.0         | 5.0  | 7.5 | 7.5 |
| φD' | φD+0.5 max. |      |     |     |
| L'  | L+2.0 max.  |      |     |     |



## PART NUMBERING SYSTEM



Please refer to "Product code guide (radial lead type)"



## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(mAmps/<br>105°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(mAmps/<br>105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|-----------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|-----------------------------------------------------|--------------------|
| 350                      | 18          | 10×16                 | 0.24  | 205                                                 | EKXN351E□□180MJ16S | 420                      | 15          | 10×16                 | 0.24  | 185                                                 | EKXN421E□□150MJ16S |
|                          | 27          | 10×20                 | 0.24  | 270                                                 | EKXN351E□□270MJ20S |                          | 22          | 10×20                 | 0.24  | 245                                                 | EKXN421E□□220MJ20S |
|                          | 33          | 10×25                 | 0.24  | 325                                                 | EKXN351E□□330MJ25S |                          | 27          | 10×25                 | 0.24  | 295                                                 | EKXN421E□□270MJ25S |
|                          | 33          | 12.5×16               | 0.24  | 315                                                 | EKXN351E□□330MK16S |                          | 27          | 12.5×16               | 0.24  | 285                                                 | EKXN421E□□270MK16S |
|                          | 47          | 10×30                 | 0.24  | 420                                                 | EKXN351E□□470MJ30S |                          | 33          | 10×30                 | 0.24  | 350                                                 | EKXN421E□□330MJ30S |
|                          | 47          | 12.5×20               | 0.24  | 420                                                 | EKXN351E□□470MK20S |                          | 39          | 10×35                 | 0.24  | 405                                                 | EKXN421E□□390MJ35S |
|                          | 56          | 10×35                 | 0.24  | 485                                                 | EKXN351E□□560MJ35S |                          | 39          | 12.5×20               | 0.24  | 380                                                 | EKXN421E□□390MK20S |
|                          | 56          | 16×16                 | 0.24  | 475                                                 | EKXN351E□□560ML16S |                          | 39          | 16×16                 | 0.24  | 400                                                 | EKXN421E□□390ML16S |
|                          | 68          | 10×40                 | 0.24  | 560                                                 | EKXN351E□□680MJ40S |                          | 47          | 10×40                 | 0.24  | 465                                                 | EKXN421E□□470MJ40S |
|                          | 68          | 10×45                 | 0.24  | 580                                                 | EKXN351E□□680MJ45S |                          | 56          | 10×45                 | 0.24  | 530                                                 | EKXN421E□□560MJ45S |
|                          | 68          | 12.5×25               | 0.24  | 550                                                 | EKXN351E□□680MK25S |                          | 56          | 10×50                 | 0.24  | 545                                                 | EKXN421E□□560MJ50S |
|                          | 68          | 18×16                 | 0.24  | 550                                                 | EKXN351E□□680MM16S |                          | 56          | 12.5×25               | 0.24  | 500                                                 | EKXN421E□□560MK25S |
|                          | 82          | 10×50                 | 0.24  | 660                                                 | EKXN351E□□820MJ50S |                          | 56          | 18×16                 | 0.24  | 500                                                 | EKXN421E□□560MM16S |
|                          | 82          | 12.5×30               | 0.24  | 640                                                 | EKXN351E□□820MK30S |                          | 68          | 12.5×30               | 0.24  | 585                                                 | EKXN421E□□680MK30S |
|                          | 82          | 16×20                 | 0.24  | 615                                                 | EKXN351E□□820ML20S |                          | 68          | 16×20                 | 0.24  | 560                                                 | EKXN421E□□680ML20S |
|                          | 100         | 12.5×35               | 0.24  | 745                                                 | EKXN351E□□101MK35S |                          | 82          | 12.5×35               | 0.24  | 675                                                 | EKXN421E□□820MK35S |
|                          | 100         | 12.5×40               | 0.24  | 775                                                 | EKXN351E□□101MK40S |                          | 82          | 12.5×40               | 0.24  | 705                                                 | EKXN421E□□820MK40S |
|                          | 100         | 18×20                 | 0.24  | 715                                                 | EKXN351E□□101MM20S |                          | 82          | 16×25                 | 0.24  | 670                                                 | EKXN421E□□820ML25S |
|                          | 120         | 12.5×45               | 0.24  | 880                                                 | EKXN351E□□121MK45S |                          | 82          | 18×20                 | 0.24  | 645                                                 | EKXN421E□□820MM20S |
|                          | 120         | 16×25                 | 0.24  | 810                                                 | EKXN351E□□121ML25S |                          | 100         | 12.5×45               | 0.24  | 805                                                 | EKXN421E□□101MK45S |
|                          | 120         | 16×30                 | 0.24  | 870                                                 | EKXN351E□□121ML30S |                          | 100         | 16×30                 | 0.24  | 795                                                 | EKXN421E□□101ML30S |
|                          | 150         | 12.5×50               | 0.24  | 1,010                                               | EKXN351E□□151MK50S |                          | 120         | 12.5×50               | 0.24  | 905                                                 | EKXN421E□□121MK50S |
|                          | 150         | 18×25                 | 0.24  | 930                                                 | EKXN351E□□151MM25S |                          | 120         | 16×35                 | 0.24  | 890                                                 | EKXN421E□□121ML35S |
|                          | 180         | 16×35                 | 0.24  | 1,090                                               | EKXN351E□□181ML35S |                          | 120         | 18×25                 | 0.24  | 830                                                 | EKXN421E□□121MM25S |
|                          | 180         | 16×40                 | 0.24  | 1,120                                               | EKXN351E□□181ML40S |                          | 150         | 16×40                 | 0.24  | 1,030                                               | EKXN421E□□151ML40S |
|                          | 180         | 18×30                 | 0.24  | 1,090                                               | EKXN351E□□181MM30S |                          | 150         | 18×30                 | 0.24  | 995                                                 | EKXN421E□□151MM30S |
|                          | 220         | 16×45                 | 0.24  | 1,270                                               | EKXN351E□□221ML45S |                          | 180         | 16×45                 | 0.24  | 1,140                                               | EKXN421E□□181ML45S |
|                          | 220         | 18×35                 | 0.24  | 1,250                                               | EKXN351E□□221MM35S |                          | 180         | 16×50                 | 0.24  | 1,160                                               | EKXN421E□□181ML50S |
|                          | 220         | 18×40                 | 0.24  | 1,280                                               | EKXN351E□□221MM40S |                          | 180         | 18×35                 | 0.24  | 1,130                                               | EKXN421E□□181MM35S |
|                          | 270         | 16×50                 | 0.24  | 1,430                                               | EKXN351E□□271ML50S |                          | 180         | 18×40                 | 0.24  | 1,160                                               | EKXN421E□□181MM40S |
|                          | 270         | 18×45                 | 0.24  | 1,450                                               | EKXN351E□□271MM45S |                          | 220         | 18×45                 | 0.24  | 1,310                                               | EKXN421E□□221MM45S |
|                          | 330         | 18×50                 | 0.24  | 1,600                                               | EKXN351E□□331MM50S |                          | 270         | 18×50                 | 0.24  | 1,450                                               | EKXN421E□□271MM50S |
| 400                      | 15          | 10×16                 | 0.24  | 185                                                 | EKXN401E□□150MJ16S | 450                      | 15          | 10×16                 | 0.24  | 185                                                 | EKXN451E□□150MJ16S |
|                          | 22          | 10×20                 | 0.24  | 245                                                 | EKXN401E□□220MJ20S |                          | 18          | 10×20                 | 0.24  | 220                                                 | EKXN451E□□180MJ20S |
|                          | 27          | 10×25                 | 0.24  | 295                                                 | EKXN401E□□270MJ25S |                          | 22          | 12.5×16               | 0.24  | 255                                                 | EKXN451E□□220MK16S |
|                          | 27          | 12.5×16               | 0.24  | 285                                                 | EKXN401E□□270MK16S |                          | 27          | 10×25                 | 0.24  | 295                                                 | EKXN451E□□270MJ25S |
|                          | 39          | 10×30                 | 0.24  | 385                                                 | EKXN401E□□390MJ30S |                          | 33          | 10×30                 | 0.24  | 360                                                 | EKXN451E□□330MJ30S |
|                          | 39          | 12.5×20               | 0.24  | 380                                                 | EKXN401E□□390MK20S |                          | 33          | 12.5×20               | 0.24  | 350                                                 | EKXN451E□□330MK20S |
|                          | 47          | 10×35                 | 0.24  | 445                                                 | EKXN401E□□470MJ35S |                          | 39          | 10×35                 | 0.24  | 410                                                 | EKXN451E□□390MJ35S |
|                          | 47          | 16×16                 | 0.24  | 435                                                 | EKXN401E□□470ML16S |                          | 39          | 16×16                 | 0.24  | 400                                                 | EKXN451E□□390ML16S |
|                          | 56          | 10×40                 | 0.24  | 505                                                 | EKXN401E□□560MJ40S |                          | 47          | 10×40                 | 0.24  | 465                                                 | EKXN451E□□470MJ40S |
|                          | 56          | 10×45                 | 0.24  | 530                                                 | EKXN401E□□560MJ45S |                          | 47          | 10×45                 | 0.24  | 485                                                 | EKXN451E□□470MJ45S |
|                          | 56          | 12.5×25               | 0.24  | 500                                                 | EKXN401E□□560MK25S |                          | 47          | 12.5×25               | 0.24  | 455                                                 | EKXN451E□□470MK25S |
|                          | 56          | 18×16                 | 0.24  | 500                                                 | EKXN401E□□560MM16S |                          | 47          | 18×16                 | 0.24  | 455                                                 | EKXN451E□□470MM16S |
|                          | 68          | 10×50                 | 0.24  | 600                                                 | EKXN401E□□680MJ50S |                          | 56          | 10×50                 | 0.24  | 545                                                 | EKXN451E□□560MJ50S |
|                          | 68          | 12.5×30               | 0.24  | 585                                                 | EKXN401E□□680MK30S |                          | 56          | 12.5×30               | 0.24  | 530                                                 | EKXN451E□□560MK30S |
|                          | 68          | 16×20                 | 0.24  | 560                                                 | EKXN401E□□680ML20S |                          | 56          | 16×20                 | 0.24  | 510                                                 | EKXN451E□□560ML20S |
|                          | 82          | 12.5×35               | 0.24  | 675                                                 | EKXN401E□□820MK35S |                          | 68          | 12.5×35               | 0.24  | 615                                                 | EKXN451E□□680MK35S |
|                          | 82          | 18×20                 | 0.24  | 645                                                 | EKXN401E□□820MM20S |                          | 82          | 12.5×40               | 0.24  | 705                                                 | EKXN451E□□820MK40S |
|                          | 100         | 12.5×40               | 0.24  | 775                                                 | EKXN401E□□101MK40S |                          | 82          | 12.5×45               | 0.24  | 725                                                 | EKXN451E□□820MK45S |
|                          | 100         | 12.5×45               | 0.24  | 805                                                 | EKXN401E□□101MK45S |                          | 82          | 16×25                 | 0.24  | 670                                                 | EKXN451E□□820ML25S |
|                          | 100         | 16×25                 | 0.24  | 740                                                 | EKXN401E□□101ML25S |                          | 82          | 18×20                 | 0.24  | 645                                                 | EKXN451E□□820MM20S |
|                          | 120         | 12.5×50               | 0.24  | 905                                                 | EKXN401E□□121MK50S |                          | 100         | 12.5×50               | 0.24  | 825                                                 | EKXN451E□□101MK50S |
|                          | 120         | 16×30                 | 0.24  | 870                                                 | EKXN401E□□121ML30S |                          | 100         | 16×30                 | 0.24  | 795                                                 | EKXN451E□□101ML30S |
|                          | 120         | 18×25                 | 0.24  | 830                                                 | EKXN401E□□121MM25S |                          | 100         | 18×25                 | 0.24  | 760                                                 | EKXN451E□□101MM25S |
|                          | 150         | 16×35                 | 0.24  | 995                                                 | EKXN401E□□151ML35S |                          | 120         | 16×35                 | 0.24  | 890                                                 | EKXN451E□□121ML35S |
|                          | 150         | 16×40                 | 0.24  | 1,030                                               | EKXN401E□□151ML40S |                          | 120         | 16×40                 | 0.24  | 920                                                 | EKXN451E□□121ML40S |
|                          | 150         | 18×30                 | 0.24  | 995                                                 | EKXN401E□□151MM30S |                          | 120         | 18×30                 | 0.24  | 890                                                 | EKXN451E□□121MM30S |
|                          | 180         | 16×45                 | 0.24  | 1,140                                               | EKXN401E□□181ML45S |                          | 150         | 16×45                 | 0.24  | 1,040                                               | EKXN451E□□151ML45S |
|                          | 180         | 18×35                 | 0.24  | 1,130                                               | EKXN401E□□181MM35S |                          | 150         | 18×35                 | 0.24  | 1,030                                               | EKXN451E□□151MM35S |
|                          | 220         | 16×50                 | 0.24  | 1,290                                               | EKXN401E□□221ML50S |                          | 180         | 16×50                 | 0.24  | 1,160                                               | EKXN451E□□181ML50S |
|                          | 220         | 18×40                 | 0.24  | 1,280                                               | EKXN401E□□221MM40S |                          | 180         | 18×40                 | 0.24  | 1,160                                               | EKXN451E□□181MM40S |
|                          | 220         | 18×45                 | 0.24  | 1,310                                               | EKXN401E□□221MM45S |                          | 180         | 18×45                 | 0.24  | 1,180                                               | EKXN451E□□181MM45S |
|                          | 270         | 18×50                 | 0.24  | 1,450                                               | EKXN401E□□271MM50S |                          | 220         | 18×50                 | 0.24  | 1,310                                               | EKXN451E□□221MM50S |

□□ : Enter the appropriate lead forming or taping code.

## ◆RATED RIPPLE CURRENT MULTIPLIERS

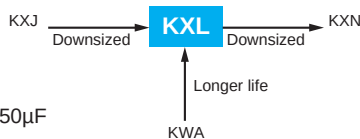
## ●Frequency Multipliers

| Capacitance(μF) | Frequency(Hz) | 120  | 1k   | 10k  | 100k |
|-----------------|---------------|------|------|------|------|
| 15 to 82        |               | 1.00 | 1.75 | 2.25 | 2.50 |
| 100 to 330      |               | 1.00 | 1.67 | 2.05 | 2.25 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

# KXL Series

- Ideal for low profile power supply applications
- Downsized from KXJ series
- Rated voltage range : 400 to 450V<sub>dc</sub>, Capacitance range : 15 to 150μF
- Endurance with ripple current : 10,000 to 12,000 hours at 105°C
- Non solvent resistant type
- RoHS2 Compliant

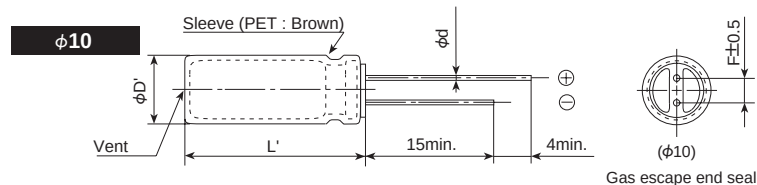


## SPECIFICATIONS

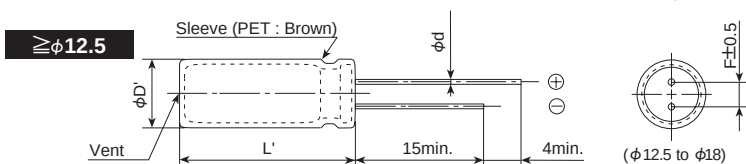
| Items                                                  | Characteristics                                                                                                                                                                                                                                                                         |                                      |
|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
| Category                                               | -40 to +105°C                                                                                                                                                                                                                                                                           |                                      |
| Temperature Range                                      |                                                                                                                                                                                                                                                                                         |                                      |
| Rated Voltage Range                                    | 400 to 450V <sub>dc</sub>                                                                                                                                                                                                                                                               |                                      |
| Capacitance Tolerance                                  | ±20% (M) (at 20°C, 120Hz)                                                                                                                                                                                                                                                               |                                      |
| Leakage Current                                        | I=0.04CV+100 (after 1 minute)<br>I=0.02CV+25 (after 5 minutes)<br>Where, I : Max. leakage current(μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C)                                                                                                                    |                                      |
| Dissipation Factor (tan δ)                             | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                        | 400 to 450V                          |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                            | 0.24 (at 20°C, 120Hz)                |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                        | 400 to 450V                          |
|                                                        | Z(-25°C)/Z(+20°C)                                                                                                                                                                                                                                                                       | 6                                    |
|                                                        | Z(-40°C)/Z(+20°C)                                                                                                                                                                                                                                                                       | 10 (at 120Hz)                        |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 12,000 hours (10,000 hours for 20L) at 105°C.                 |                                      |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                      | ≤ ±20% of the initial value          |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                            | ≤200% of the initial specified value |
|                                                        | Leakage current                                                                                                                                                                                                                                                                         | ≤ The initial specified value        |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                      |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                      | ≤ ±20% of the initial value          |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                            | ≤200% of the initial specified value |
|                                                        | Leakage current                                                                                                                                                                                                                                                                         | ≤500% of the initial specified value |

## DIMENSIONS [mm]

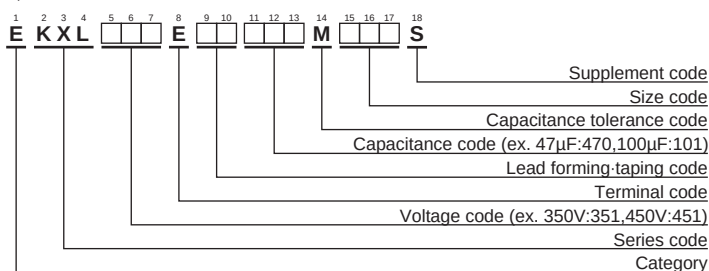
● Terminal Code : E



| φD  | 10          | 12.5 | 14.5 | 16  | 18  |
|-----|-------------|------|------|-----|-----|
| φd  | 0.6         | 0.6  | 0.8  | 0.8 | 0.8 |
| F   | 5.0         | 5.0  | 7.5  | 7.5 | 7.5 |
| φD' | φD+0.5 max. |      |      |     |     |
| L'  | L+2.0 max.  |      |      |     |     |



## PART NUMBERING SYSTEM



Please refer to "Product code guide (radial lead type)"

**KXL**Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(mA <sub>rms</sub> /105°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(mA <sub>rms</sub> /105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|--------------------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|--------------------------------------------------------------|--------------------|
| 400                      | 18          | 10×20                 | 0.24  | 220                                                          | EKXL401E□□180MJ20S | 450                      | 15          | 10×20                 | 0.24  | 190                                                          | EKXL451E□□150MJ20S |
|                          | 22          | 10×25                 | 0.24  | 250                                                          | EKXL401E□□220MJ25S |                          | 18          | 10×25                 | 0.24  | 230                                                          | EKXL451E□□180MJ25S |
|                          | 27          | 12.5×20               | 0.24  | 300                                                          | EKXL401E□□270MK20S |                          | 27          | 10×30                 | 0.24  | 300                                                          | EKXL451E□□270MJ30S |
|                          | 33          | 10×30                 | 0.24  | 340                                                          | EKXL401E□□330MJ30S |                          | 27          | 12.5×20               | 0.24  | 290                                                          | EKXL451E□□270MK20S |
|                          | 39          | 10×35                 | 0.24  | 390                                                          | EKXL401E□□390MJ35S |                          | 33          | 10×35                 | 0.24  | 350                                                          | EKXL451E□□330MJ35S |
|                          | 39          | 12.5×25               | 0.24  | 390                                                          | EKXL401E□□390MK25S |                          | 33          | 12.5×25               | 0.24  | 360                                                          | EKXL451E□□330MK25S |
|                          | 39          | 14.5×20               | 0.24  | 370                                                          | EKXL401E□□390MU20S |                          | 33          | 14.5×20               | 0.24  | 335                                                          | EKXL451E□□330MU20S |
|                          | 47          | 10×40                 | 0.24  | 440                                                          | EKXL401E□□470MJ40S |                          | 39          | 10×40                 | 0.24  | 400                                                          | EKXL451E□□390MJ40S |
|                          | 56          | 10×45                 | 0.24  | 500                                                          | EKXL401E□□560MJ45S |                          | 39          | 16×20                 | 0.24  | 400                                                          | EKXL451E□□390ML20S |
|                          | 56          | 12.5×30               | 0.24  | 495                                                          | EKXL401E□□560MK30S |                          | 47          | 10×50                 | 0.24  | 480                                                          | EKXL451E□□470MJ50S |
|                          | 56          | 14.5×25               | 0.24  | 495                                                          | EKXL401E□□560MU25S |                          | 47          | 12.5×30               | 0.24  | 440                                                          | EKXL451E□□470MK30S |
|                          | 56          | 16×20                 | 0.24  | 480                                                          | EKXL401E□□560ML20S |                          | 47          | 14.5×25               | 0.24  | 450                                                          | EKXL451E□□470MU25S |
|                          | 68          | 12.5×35               | 0.24  | 570                                                          | EKXL401E□□680MK35S |                          | 56          | 12.5×35               | 0.24  | 500                                                          | EKXL451E□□560MK35S |
|                          | 68          | 14.5×30               | 0.24  | 585                                                          | EKXL401E□□680MU30S |                          | 56          | 14.5×30               | 0.24  | 540                                                          | EKXL451E□□560MU30S |
|                          | 68          | 16×25                 | 0.24  | 570                                                          | EKXL401E□□680ML25S |                          | 56          | 16×25                 | 0.24  | 500                                                          | EKXL451E□□560ML25S |
|                          | 68          | 18×20                 | 0.24  | 530                                                          | EKXL401E□□680MM20S |                          | 56          | 18×20                 | 0.24  | 500                                                          | EKXL451E□□560MM20S |
|                          | 82          | 12.5×40               | 0.24  | 650                                                          | EKXL401E□□820MK40S |                          | 68          | 12.5×40               | 0.24  | 580                                                          | EKXL451E□□680MK40S |
|                          | 82          | 14.5×35               | 0.24  | 670                                                          | EKXL401E□□820MU35S |                          | 68          | 14.5×35               | 0.24  | 620                                                          | EKXL451E□□680MU35S |
|                          | 100         | 12.5×50               | 0.24  | 760                                                          | EKXL401E□□101MK50S |                          | 82          | 12.5×50               | 0.24  | 680                                                          | EKXL451E□□820MK50S |
|                          | 100         | 14.5×40               | 0.24  | 760                                                          | EKXL401E□□101MU40S |                          | 82          | 14.5×40               | 0.24  | 670                                                          | EKXL451E□□820MU40S |
|                          | 100         | 16×30                 | 0.24  | 720                                                          | EKXL401E□□101ML30S |                          | 82          | 16×30                 | 0.24  | 650                                                          | EKXL451E□□820ML30S |
|                          | 100         | 18×25                 | 0.24  | 710                                                          | EKXL401E□□101MM25S |                          | 82          | 18×25                 | 0.24  | 650                                                          | EKXL451E□□820MM25S |
|                          | 120         | 14.5×45               | 0.24  | 840                                                          | EKXL401E□□121MU45S |                          | 100         | 14.5×45               | 0.24  | 760                                                          | EKXL451E□□101MU45S |
|                          | 120         | 16×35                 | 0.24  | 810                                                          | EKXL401E□□121ML35S |                          | 100         | 16×35                 | 0.24  | 730                                                          | EKXL451E□□101ML35S |
|                          | 120         | 18×30                 | 0.24  | 840                                                          | EKXL401E□□121MM30S |                          | 100         | 18×30                 | 0.24  | 750                                                          | EKXL451E□□101MM30S |
|                          | 150         | 18×35                 | 0.24  | 930                                                          | EKXL401E□□151MM35S |                          | 120         | 18×35                 | 0.24  | 860                                                          | EKXL451E□□121MM35S |
| 420                      | 15          | 10×20                 | 0.24  | 195                                                          | EKXL421E□□150MJ20S |                          |             |                       |       |                                                              |                    |
|                          | 22          | 10×25                 | 0.24  | 250                                                          | EKXL421E□□220MJ25S |                          |             |                       |       |                                                              |                    |
|                          | 27          | 10×30                 | 0.24  | 300                                                          | EKXL421E□□270MJ30S |                          |             |                       |       |                                                              |                    |
|                          | 27          | 12.5×20               | 0.24  | 300                                                          | EKXL421E□□270MK20S |                          |             |                       |       |                                                              |                    |
|                          | 33          | 10×35                 | 0.24  | 350                                                          | EKXL421E□□330MJ35S |                          |             |                       |       |                                                              |                    |
|                          | 33          | 12.5×25               | 0.24  | 350                                                          | EKXL421E□□330MK25S |                          |             |                       |       |                                                              |                    |
|                          | 33          | 14.5×20               | 0.24  | 350                                                          | EKXL421E□□330MU20S |                          |             |                       |       |                                                              |                    |
|                          | 39          | 10×40                 | 0.24  | 400                                                          | EKXL421E□□390MJ40S |                          |             |                       |       |                                                              |                    |
|                          | 47          | 10×45                 | 0.24  | 460                                                          | EKXL421E□□470MJ45S |                          |             |                       |       |                                                              |                    |
|                          | 47          | 12.5×30               | 0.24  | 440                                                          | EKXL421E□□470MK30S |                          |             |                       |       |                                                              |                    |
|                          | 47          | 16×20                 | 0.24  | 430                                                          | EKXL421E□□470ML20S |                          |             |                       |       |                                                              |                    |
|                          | 56          | 10×50                 | 0.24  | 520                                                          | EKXL421E□□560MJ50S |                          |             |                       |       |                                                              |                    |
|                          | 56          | 12.5×35               | 0.24  | 510                                                          | EKXL421E□□560MK35S |                          |             |                       |       |                                                              |                    |
|                          | 56          | 14.5×25               | 0.24  | 490                                                          | EKXL421E□□560MU25S |                          |             |                       |       |                                                              |                    |
|                          | 68          | 12.5×40               | 0.24  | 580                                                          | EKXL421E□□680MK40S |                          |             |                       |       |                                                              |                    |
|                          | 68          | 14.5×30               | 0.24  | 560                                                          | EKXL421E□□680MU30S |                          |             |                       |       |                                                              |                    |
|                          | 68          | 16×25                 | 0.24  | 560                                                          | EKXL421E□□680ML25S |                          |             |                       |       |                                                              |                    |
|                          | 68          | 18×20                 | 0.24  | 540                                                          | EKXL421E□□680MM20S |                          |             |                       |       |                                                              |                    |
|                          | 82          | 12.5×45               | 0.24  | 660                                                          | EKXL421E□□820MK45S |                          |             |                       |       |                                                              |                    |
|                          | 82          | 14.5×35               | 0.24  | 660                                                          | EKXL421E□□820MU35S |                          |             |                       |       |                                                              |                    |
|                          | 82          | 16×30                 | 0.24  | 650                                                          | EKXL421E□□820ML30S |                          |             |                       |       |                                                              |                    |
|                          | 82          | 18×25                 | 0.24  | 640                                                          | EKXL421E□□820MM25S |                          |             |                       |       |                                                              |                    |
|                          | 100         | 12.5×50               | 0.24  | 750                                                          | EKXL421E□□101MK50S |                          |             |                       |       |                                                              |                    |
|                          | 100         | 14.5×40               | 0.24  | 720                                                          | EKXL421E□□101MU40S |                          |             |                       |       |                                                              |                    |
|                          | 100         | 16×35                 | 0.24  | 730                                                          | EKXL421E□□101ML35S |                          |             |                       |       |                                                              |                    |
|                          | 120         | 16×40                 | 0.24  | 840                                                          | EKXL421E□□121ML40S |                          |             |                       |       |                                                              |                    |
|                          | 120         | 18×30                 | 0.24  | 800                                                          | EKXL421E□□121MM30S |                          |             |                       |       |                                                              |                    |

□□ : Enter the appropriate lead forming or taping code.

## ◆RATED RIPPLE CURRENT MULTIPLIERS

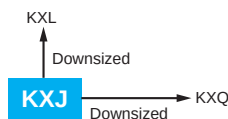
## ●Frequency Multipliers

| Capacitance(μF) | Frequency(Hz) | 120  | 1k   | 10k  | 100k |
|-----------------|---------------|------|------|------|------|
| 15 to 82        |               | 1.00 | 1.75 | 2.25 | 2.50 |
| 100 to 150      |               | 1.00 | 1.67 | 2.05 | 2.25 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

# KXJ Series

- Downsized and Longer life from current KXG series
- Endurance with ripple current : 8,000 to 12,000 hours at 105°C
- Rated voltage range : 160 to 500V, Capacitance range : 6.8 to 680μF
- For electronic ballast circuits and other long life applications
- Non solvent resistant type
- RoHS2 Compliant
- AEC-Q200 compliant : Please contact Chemi-Con for more details, test data, information.

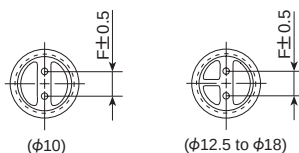
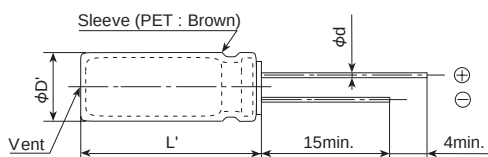


## SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                       |                                                    |                 |                                              |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|-----------------|----------------------------------------------|
| Category                                               | -40 to +105℃ (160 to 450V <sub>dc</sub> )    -25 to +105℃ (500V <sub>dc</sub> )                                                                                                                                                                                                       |                                                    |                 |                                              |
| Temperature Range                                      |                                                                                                                                                                                                                                                                                       |                                                    |                 |                                              |
| Rated Voltage Range                                    | 160 to 500V <sub>dc</sub>                                                                                                                                                                                                                                                             |                                                    |                 |                                              |
| Capacitance Tolerance                                  | ±20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                              |                                                    |                 |                                              |
| Leakage Current                                        |                                                                                                                                                                                                                                                                                       | After 1 minute                                     | After 5 minutes |                                              |
|                                                        | CV≤1000                                                                                                                                                                                                                                                                               | I=0.1CV+40                                         | I=0.03CV+15     |                                              |
|                                                        | CV>1000                                                                                                                                                                                                                                                                               | I=0.04CV+100                                       | I=0.02CV+25     |                                              |
|                                                        | Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃)                                                                                                                                                                                    |                                                    |                 |                                              |
| Dissipation Factor (tan δ)                             | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 160 to 250V                                        | 350 to 500V     | (at 20℃, 120Hz)                              |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.20                                               | 0.24            |                                              |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 160 to 250V                                        | 350, 400V       | 420 to 500V                                  |
|                                                        | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 3                                                  | 5               | 6                                            |
|                                                        | Z(-40℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 6                                                  | 6               | — (at 120Hz)                                 |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied(the peak voltage shall not exceed the rated voltage) for the specified time at 105℃.                                   |                                                    |                 |                                              |
|                                                        | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 160 to 450V                                        |                 | 500V                                         |
|                                                        | Time                                                                                                                                                                                                                                                                                  | 16L to 20L : 10,000hours, 25L to 50L : 12,000hours |                 | φ10 : 8,000hours, φ12.5 to φ18 : 10,000hours |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±20% of the initial value                        |                 |                                              |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤200% of the initial specified value               |                 |                                              |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value                       |                 |                                              |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                                    |                 |                                              |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±20% of the initial value                        |                 |                                              |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤200% of the initial specified value               |                 |                                              |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤500% of the initial specified value               |                 |                                              |

## DIMENSIONS [mm]

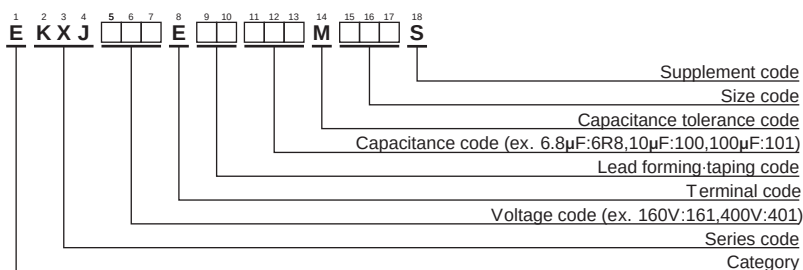
### Terminal Code : E



Gas escaped end seal

| φD  | 10         | 12.5 | 14.5 | 16  | 18  |
|-----|------------|------|------|-----|-----|
| φd  | 0.6        | 0.6  | 0.8  | 0.8 | 0.8 |
| F   | 5.0        | 5.0  | 7.5  | 7.5 | 7.5 |
| φD' | φD+0.5max. |      |      |     |     |
| L'  | L+1.5max.  |      |      |     |     |

## PART NUMBERING SYSTEM



Please refer to "Product code guide (radial lead type)"





## ◆ STANDARD RATINGS

| WV (V <sub>dc</sub> ) | Cap (μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(mA rms/105°C, 120Hz) | Part No.           | WV (V <sub>dc</sub> ) | Cap (μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(mA rms/105°C, 120Hz) | Part No.           |
|-----------------------|----------|-----------------------|-------|--------------------------------------------------|--------------------|-----------------------|----------|-----------------------|-------|--------------------------------------------------|--------------------|
| 160                   | 39       | 10×16                 | 0.20  | 245                                              | EKXJ161E□□390MJ16S | 220                   | 27       | 10×16                 | 0.20  | 200                                              | EKXJ221E□□270MJ16S |
|                       | 56       | 10×20                 | 0.20  | 315                                              | EKXJ161E□□560MJ20S |                       | 39       | 10×20                 | 0.20  | 265                                              | EKXJ221E□□390MJ20S |
|                       | 82       | 10×25                 | 0.20  | 415                                              | EKXJ161E□□820MJ25S |                       | 56       | 10×25                 | 0.20  | 345                                              | EKXJ221E□□560MJ25S |
|                       | 82       | 10×30                 | 0.20  | 445                                              | EKXJ161E□□820MJ30S |                       | 56       | 10×30                 | 0.20  | 370                                              | EKXJ221E□□560MJ30S |
|                       | 100      | 12.5×20               | 0.20  | 575                                              | EKXJ161E□□101MK20S |                       | 68       | 12.5×20               | 0.20  | 475                                              | EKXJ221E□□680MK20S |
|                       | 120      | 10×35                 | 0.20  | 570                                              | EKXJ161E□□121MJ35S |                       | 82       | 10×35                 | 0.20  | 470                                              | EKXJ221E□□820MJ35S |
|                       | 120      | 14.5×20               | 0.20  | 675                                              | EKXJ161E□□121MU20S |                       | 82       | 14.5×20               | 0.20  | 555                                              | EKXJ221E□□820MU20S |
|                       | 150      | 10×40                 | 0.20  | 665                                              | EKXJ161E□□151MJ40S |                       | 100      | 10×40                 | 0.20  | 545                                              | EKXJ221E□□101MJ40S |
|                       | 150      | 10×45                 | 0.20  | 695                                              | EKXJ161E□□151MJ45S |                       | 100      | 10×45                 | 0.20  | 565                                              | EKXJ221E□□101MJ45S |
|                       | 150      | 12.5×25               | 0.20  | 765                                              | EKXJ161E□□151MK25S |                       | 100      | 12.5×25               | 0.20  | 625                                              | EKXJ221E□□101MK25S |
|                       | 180      | 10×50                 | 0.20  | 785                                              | EKXJ161E□□181MJ50S |                       | 120      | 10×50                 | 0.20  | 645                                              | EKXJ221E□□121MJ50S |
|                       | 180      | 12.5×30               | 0.20  | 885                                              | EKXJ161E□□181MK30S |                       | 120      | 12.5×30               | 0.20  | 725                                              | EKXJ221E□□121MK30S |
|                       | 180      | 14.5×25               | 0.20  | 890                                              | EKXJ161E□□181MU25S |                       | 120      | 14.5×25               | 0.20  | 725                                              | EKXJ221E□□121MU25S |
|                       | 180      | 16×20                 | 0.20  | 855                                              | EKXJ161E□□181ML20S |                       | 120      | 16×20                 | 0.20  | 695                                              | EKXJ221E□□121ML20S |
|                       | 220      | 12.5×35               | 0.20  | 1,040                                            | EKXJ161E□□221MK35S |                       | 150      | 12.5×35               | 0.20  | 860                                              | EKXJ221E□□151MK35S |
|                       | 220      | 16×25                 | 0.20  | 1,020                                            | EKXJ161E□□221ML25S |                       | 150      | 16×25                 | 0.20  | 845                                              | EKXJ221E□□151ML25S |
|                       | 220      | 18×20                 | 0.20  | 990                                              | EKXJ161E□□221MM20S |                       | 150      | 18×20                 | 0.20  | 815                                              | EKXJ221E□□151MM20S |
|                       | 270      | 12.5×40               | 0.20  | 1,190                                            | EKXJ161E□□271MK40S |                       | 180      | 12.5×40               | 0.20  | 975                                              | EKXJ221E□□181MK40S |
|                       | 270      | 12.5×45               | 0.20  | 1,230                                            | EKXJ161E□□271MK45S |                       | 180      | 12.5×45               | 0.20  | 1,005                                            | EKXJ221E□□181MK45S |
|                       | 270      | 14.5×31.5             | 0.20  | 1,170                                            | EKXJ161E□□271MUN3S |                       | 180      | 14.5×31.5             | 0.20  | 955                                              | EKXJ221E□□181MUN3S |
|                       | 270      | 14.5×35.5             | 0.20  | 1,210                                            | EKXJ161E□□271MUP1S |                       | 220      | 12.5×50               | 0.20  | 1,145                                            | EKXJ221E□□221MK50S |
|                       | 330      | 12.5×50               | 0.20  | 1,400                                            | EKXJ161E□□331MK50S |                       | 220      | 14.5×35.5             | 0.20  | 1,095                                            | EKXJ221E□□221MUP1S |
|                       | 330      | 14.5×40               | 0.20  | 1,385                                            | EKXJ161E□□331MU40S |                       | 220      | 14.5×40               | 0.20  | 1,130                                            | EKXJ221E□□221MU40S |
|                       | 330      | 16×31.5               | 0.20  | 1,350                                            | EKXJ161E□□331MLN3S |                       | 220      | 16×31.5               | 0.20  | 1,100                                            | EKXJ221E□□221MLN3S |
|                       | 330      | 18×25                 | 0.20  | 1,290                                            | EKXJ161E□□331MM25S |                       | 220      | 18×25                 | 0.20  | 1,050                                            | EKXJ221E□□221MM25S |
|                       | 390      | 14.5×45               | 0.20  | 1,545                                            | EKXJ161E□□391MU45S |                       | 270      | 14.5×45               | 0.20  | 1,285                                            | EKXJ221E□□271MU45S |
|                       | 390      | 16×35.5               | 0.20  | 1,500                                            | EKXJ161E□□391MLP1S |                       | 270      | 14.5×50               | 0.20  | 1,315                                            | EKXJ221E□□271MU50S |
|                       | 470      | 14.5×50               | 0.20  | 1,735                                            | EKXJ161E□□471MU50S |                       | 270      | 16×35.5               | 0.20  | 1,245                                            | EKXJ221E□□271MLP1S |
|                       | 470      | 16×40                 | 0.20  | 1,700                                            | EKXJ161E□□471ML40S |                       | 270      | 18×31.5               | 0.20  | 1,260                                            | EKXJ221E□□271MMN3S |
|                       | 470      | 16×45                 | 0.20  | 1,730                                            | EKXJ161E□□471ML45S |                       | 330      | 16×40                 | 0.20  | 1,425                                            | EKXJ221E□□331ML40S |
|                       | 470      | 18×31.5               | 0.20  | 1,660                                            | EKXJ161E□□471MMN3S |                       | 330      | 16×45                 | 0.20  | 1,450                                            | EKXJ221E□□331ML45S |
|                       | 470      | 18×35.5               | 0.20  | 1,715                                            | EKXJ161E□□471MMP1S |                       | 330      | 18×35.5               | 0.20  | 1,440                                            | EKXJ221E□□331MMP1S |
|                       | 560      | 16×50                 | 0.20  | 1,920                                            | EKXJ161E□□561ML50S |                       | 390      | 16×50                 | 0.20  | 1,600                                            | EKXJ221E□□391ML50S |
|                       | 560      | 18×40                 | 0.20  | 1,905                                            | EKXJ161E□□561MM40S |                       | 390      | 18×40                 | 0.20  | 1,590                                            | EKXJ221E□□391MM40S |
|                       | 680      | 18×45                 | 0.20  | 2,130                                            | EKXJ161E□□681MM45S |                       | 390      | 18×45                 | 0.20  | 1,620                                            | EKXJ221E□□391MM45S |
|                       | 680      | 18×50                 | 0.20  | 2,145                                            | EKXJ161E□□681MM50S |                       | 470      | 18×50                 | 0.20  | 1,785                                            | EKXJ221E□□471MM50S |
| 200                   | 27       | 10×16                 | 0.20  | 200                                              | EKXJ201E□□270MJ16S | 250                   | 22       | 10×16                 | 0.20  | 185                                              | EKXJ251E□□220MJ16S |
|                       | 47       | 10×20                 | 0.20  | 290                                              | EKXJ201E□□470MJ20S |                       | 33       | 10×20                 | 0.20  | 240                                              | EKXJ251E□□330MJ20S |
|                       | 56       | 10×25                 | 0.20  | 345                                              | EKXJ201E□□560MJ25S |                       | 47       | 10×25                 | 0.20  | 315                                              | EKXJ251E□□470MJ25S |
|                       | 68       | 10×30                 | 0.20  | 405                                              | EKXJ201E□□680MJ30S |                       | 47       | 10×30                 | 0.20  | 340                                              | EKXJ251E□□470MJ30S |
|                       | 82       | 12.5×20               | 0.20  | 520                                              | EKXJ201E□□820MK20S |                       | 56       | 12.5×20               | 0.20  | 430                                              | EKXJ251E□□560MK20S |
|                       | 100      | 10×35                 | 0.20  | 520                                              | EKXJ201E□□101MJ35S |                       | 68       | 10×35                 | 0.20  | 430                                              | EKXJ251E□□680MJ35S |
|                       | 100      | 12.5×25               | 0.20  | 625                                              | EKXJ201E□□101MK25S |                       | 68       | 14.5×20               | 0.20  | 505                                              | EKXJ251E□□680MU20S |
|                       | 100      | 14.5×20               | 0.20  | 615                                              | EKXJ201E□□101MU20S |                       | 82       | 10×40                 | 0.20  | 495                                              | EKXJ251E□□820MJ40S |
|                       | 120      | 10×40                 | 0.20  | 595                                              | EKXJ201E□□121MJ40S |                       | 82       | 10×45                 | 0.20  | 515                                              | EKXJ251E□□820MJ45S |
|                       | 120      | 10×45                 | 0.20  | 620                                              | EKXJ201E□□121MJ45S |                       | 82       | 12.5×25               | 0.20  | 565                                              | EKXJ251E□□820MK25S |
|                       | 120      | 12.5×30               | 0.20  | 725                                              | EKXJ201E□□121MK30S |                       | 100      | 10×50                 | 0.20  | 585                                              | EKXJ251E□□101MJ50S |
|                       | 120      | 16×20                 | 0.20  | 695                                              | EKXJ201E□□121ML20S |                       | 100      | 12.5×30               | 0.20  | 660                                              | EKXJ251E□□101MK30S |
|                       | 150      | 10×50                 | 0.20  | 720                                              | EKXJ201E□□151MJ50S |                       | 100      | 14.5×25               | 0.20  | 665                                              | EKXJ251E□□101MU25S |
|                       | 150      | 12.5×35               | 0.20  | 860                                              | EKXJ201E□□151MK35S |                       | 100      | 16×20                 | 0.20  | 635                                              | EKXJ251E□□101ML20S |
|                       | 150      | 14.5×25               | 0.20  | 810                                              | EKXJ201E□□151MU25S |                       | 120      | 12.5×35               | 0.20  | 770                                              | EKXJ251E□□121MK35S |
|                       | 180      | 14.5×31.5             | 0.20  | 955                                              | EKXJ201E□□181MUN3S |                       | 120      | 16×25                 | 0.20  | 755                                              | EKXJ251E□□121ML25S |
|                       | 180      | 16×25                 | 0.20  | 925                                              | EKXJ201E□□181ML25S |                       | 120      | 18×20                 | 0.20  | 730                                              | EKXJ251E□□121MM20S |
|                       | 180      | 18×20                 | 0.20  | 895                                              | EKXJ201E□□181MM20S |                       | 150      | 12.5×40               | 0.20  | 890                                              | EKXJ251E□□151MK40S |
|                       | 220      | 12.5×40               | 0.20  | 1,075                                            | EKXJ201E□□221MK40S |                       | 150      | 12.5×45               | 0.20  | 920                                              | EKXJ251E□□151MK45S |
|                       | 220      | 12.5×45               | 0.20  | 1,110                                            | EKXJ201E□□221MK45S |                       | 150      | 14.5×31.5             | 0.20  | 870                                              | EKXJ251E□□151MUN3S |
|                       | 220      | 14.5×35.5             | 0.20  | 1,095                                            | EKXJ201E□□221MUP1S |                       | 180      | 12.5×50               | 0.20  | 1,035                                            | EKXJ251E□□181MK50S |
|                       | 220      | 18×25                 | 0.20  | 1,050                                            | EKXJ201E□□221MM25S |                       | 180      | 14.5×35.5             | 0.20  | 990                                              | EKXJ251E□□181MUP1S |
|                       | 270      | 12.5×50               | 0.20  | 1,265                                            | EKXJ201E□□271MK50S |                       | 180      | 14.5×40               | 0.20  | 1,020                                            | EKXJ251E□□181MU40S |
|                       | 270      | 14.5×40               | 0.20  | 1,250                                            | EKXJ201E□□271MU40S |                       | 180      | 16×31.5               | 0.20  | 995                                              | EKXJ251E□□181MLN3S |
|                       | 270      | 14.5×45               | 0.20  | 1,290                                            | EKXJ201E□□271MU45S |                       | 180      | 18×25                 | 0.20  | 950                                              | EKXJ251E□□181MM25S |
|                       | 270      | 16×31.5               | 0.20  | 1,220                                            | EKXJ201E□□271MLN3S |                       | 220      | 14.5×45               | 0.20  | 1,160                                            | EKXJ251E□□221MU45S |
|                       | 270      | 16×35.5               | 0.20  | 1,250                                            | EKXJ201E□□271MLP1S |                       | 220      | 14.5×50               | 0.20  | 1,185                                            | EKXJ251E□□221MU50S |
|                       | 330      | 14.5×50               | 0.20  | 1,450                                            | EKXJ201E□□331MU50S |                       | 220      | 16×35.5               | 0.20  | 1,125                                            | EKXJ251E□□221MLP1S |
|                       | 330      | 16×40                 | 0.20  | 1,425                                            | EKXJ201E□□331ML40S |                       | 220      | 18×31.5               | 0.20  | 1,135                                            | EKXJ251E□□221MMN3S |
|                       | 330      | 18×31.5               | 0.20  | 1,395                                            | EKXJ201E□□331MMN3S |                       | 270      | 16×40                 | 0.20  | 1,285                                            | EKXJ251E□□271ML40S |
|                       | 390      | 16×45                 | 0.20  | 1,575                                            | EKXJ201E□□391ML45S |                       | 270      | 16×45                 | 0.20  | 1,310                                            | EKXJ251E□□271ML45S |
|                       | 390      | 18×35.5               | 0.20  | 1,565                                            | EKXJ201E□□391MMP1S |                       | 270      | 18×35.5               | 0.20  | 1,300                                            | EKXJ251E□□271MMP1S |
|                       | 470      | 16×50                 | 0.20  | 1,755                                            | EKXJ201E□□471ML50S |                       | 330      | 16×50                 | 0.20  | 1,475                                            | EKXJ251E□□331ML50S |
|                       | 470      | 18×40                 | 0.20  | 1,745                                            | EKXJ201E□□471MM40S |                       | 330      | 18×40                 | 0.20  | 1,460                                            | EKXJ251E□□331MM40S |
|                       | 470      | 18×45                 | 0.20  | 1,770                                            | EKXJ201E□□471MM45S |                       | 330      | 18×45                 | 0.20  | 1,485                                            | EKXJ251E□□331MM45S |
|                       | 560      | 18×50                 | 0.20  | 1,945                                            | EKXJ201E□□561MM50S |                       | 390      | 18×50                 | 0.20  | 1,625                                            | EKXJ251E□□391MM50S |

□ □ : Enter the appropriate lead forming or taping code.



## ◆ STANDARD RATINGS

| WV (V <sub>dc</sub> ) | Cap (μF) | Case size<br>ΦD×L(mm) | tan δ | Rated ripple<br>current<br>(mA <sub>rms</sub> /105°C, 120Hz) | Part No.           | WV (V <sub>dc</sub> ) | Cap (μF) | Case size<br>ΦD×L(mm) | tan δ | Rated ripple<br>current<br>(mA <sub>rms</sub> /105°C, 120Hz) | Part No.           |
|-----------------------|----------|-----------------------|-------|--------------------------------------------------------------|--------------------|-----------------------|----------|-----------------------|-------|--------------------------------------------------------------|--------------------|
| 350                   | 12       | 10×16                 | 0.24  | 135                                                          | EKXJ351E□□120MJ16S | 420                   | 6.8      | 10×16                 | 0.24  | 105                                                          | EKXJ421E□□6R8MJ16S |
|                       | 22       | 10×20                 | 0.24  | 200                                                          | EKXJ351E□□220MJ20S |                       | 12       | 10×20                 | 0.24  | 150                                                          | EKXJ421E□□120MJ20S |
|                       | 27       | 10×25                 | 0.24  | 240                                                          | EKXJ351E□□270MJ25S |                       | 15       | 10×25                 | 0.24  | 185                                                          | EKXJ421E□□150MJ25S |
|                       | 27       | 10×30                 | 0.24  | 255                                                          | EKXJ351E□□270MJ30S |                       | 18       | 10×30                 | 0.24  | 215                                                          | EKXJ421E□□180MJ30S |
|                       | 33       | 12.5×20               | 0.24  | 330                                                          | EKXJ351E□□330MK20S |                       | 22       | 12.5×20               | 0.24  | 285                                                          | EKXJ421E□□220MK20S |
|                       | 39       | 10×35                 | 0.24  | 325                                                          | EKXJ351E□□390MJ35S |                       | 27       | 10×35                 | 0.24  | 275                                                          | EKXJ421E□□270MJ35S |
|                       | 47       | 10×40                 | 0.24  | 375                                                          | EKXJ351E□□470MJ40S |                       | 27       | 10×40                 | 0.24  | 290                                                          | EKXJ421E□□270MJ40S |
|                       | 47       | 12.5×25               | 0.24  | 425                                                          | EKXJ351E□□470MK25S |                       | 27       | 12.5×25               | 0.24  | 340                                                          | EKXJ421E□□270MK25S |
|                       | 47       | 14.5×20               | 0.24  | 420                                                          | EKXJ351E□□470MU20S |                       | 27       | 14.5×20               | 0.24  | 335                                                          | EKXJ421E□□270MU20S |
|                       | 56       | 10×45                 | 0.24  | 425                                                          | EKXJ351E□□560MJ45S |                       | 33       | 10×45                 | 0.24  | 335                                                          | EKXJ421E□□330MJ45S |
|                       | 56       | 12.5×30               | 0.24  | 495                                                          | EKXJ351E□□560MK30S |                       | 33       | 12.5×30               | 0.24  | 400                                                          | EKXJ421E□□330MK30S |
|                       | 56       | 16×20                 | 0.24  | 475                                                          | EKXJ351E□□560ML20S |                       | 33       | 16×20                 | 0.24  | 385                                                          | EKXJ421E□□330ML20S |
|                       | 68       | 10×50                 | 0.24  | 485                                                          | EKXJ351E□□680MJ50S |                       | 39       | 10×50                 | 0.24  | 375                                                          | EKXJ421E□□390MJ50S |
|                       | 68       | 12.5×35               | 0.24  | 580                                                          | EKXJ351E□□680MK35S |                       | 39       | 14.5×25               | 0.24  | 435                                                          | EKXJ421E□□390MU25S |
|                       | 68       | 14.5×25               | 0.24  | 545                                                          | EKXJ351E□□680MU25S |                       | 47       | 12.5×35               | 0.24  | 505                                                          | EKXJ421E□□470MK35S |
|                       | 68       | 18×20                 | 0.24  | 550                                                          | EKXJ351E□□680MM20S |                       | 47       | 16×25                 | 0.24  | 500                                                          | EKXJ421E□□470ML25S |
|                       | 82       | 12.5×40               | 0.24  | 655                                                          | EKXJ351E□□820MK40S |                       | 47       | 18×20                 | 0.24  | 480                                                          | EKXJ421E□□470MM20S |
|                       | 82       | 14.5×31.5             | 0.24  | 645                                                          | EKXJ351E□□820MUN3S |                       | 56       | 12.5×40               | 0.24  | 570                                                          | EKXJ421E□□560MK40S |
|                       | 82       | 16×25                 | 0.24  | 625                                                          | EKXJ351E□□820ML25S |                       | 56       | 12.5×45               | 0.24  | 590                                                          | EKXJ421E□□560MK45S |
|                       | 100      | 12.5×45               | 0.24  | 750                                                          | EKXJ351E□□101MK45S |                       | 56       | 14.5×31.5             | 0.24  | 560                                                          | EKXJ421E□□560MUN3S |
|                       | 100      | 12.5×50               | 0.24  | 770                                                          | EKXJ351E□□101MK50S |                       | 68       | 12.5×50               | 0.24  | 670                                                          | EKXJ421E□□680MK50S |
|                       | 100      | 14.5×35.5             | 0.24  | 740                                                          | EKXJ351E□□101MUP1S |                       | 68       | 14.5×35.5             | 0.24  | 640                                                          | EKXJ421E□□680MUP1S |
|                       | 100      | 16×31.5               | 0.24  | 740                                                          | EKXJ351E□□101MLN3S |                       | 68       | 14.5×40               | 0.24  | 660                                                          | EKXJ421E□□680MU40S |
|                       | 100      | 18×25                 | 0.24  | 710                                                          | EKXJ351E□□101MM25S |                       | 68       | 16×31.5               | 0.24  | 645                                                          | EKXJ421E□□680MLN3S |
|                       | 120      | 14.5×40               | 0.24  | 835                                                          | EKXJ351E□□121MU40S |                       | 68       | 18×25                 | 0.24  | 615                                                          | EKXJ421E□□680MM25S |
|                       | 120      | 14.5×45               | 0.24  | 860                                                          | EKXJ351E□□121MU45S |                       | 82       | 14.5×45               | 0.24  | 750                                                          | EKXJ421E□□820MU45S |
|                       | 120      | 16×35.5               | 0.24  | 830                                                          | EKXJ351E□□121MLP1S |                       | 82       | 16×35.5               | 0.24  | 725                                                          | EKXJ421E□□820MLP1S |
|                       | 150      | 14.5×50               | 0.24  | 980                                                          | EKXJ351E□□151MU50S |                       | 82       | 18×31.5               | 0.24  | 730                                                          | EKXJ421E□□820MMN3S |
|                       | 150      | 16×40                 | 0.24  | 960                                                          | EKXJ351E□□151ML40S | 450                   | 100      | 14.5×50               | 0.24  | 845                                                          | EKXJ421E□□101MU50S |
|                       | 150      | 16×45                 | 0.24  | 975                                                          | EKXJ351E□□151ML45S |                       | 100      | 16×40                 | 0.24  | 825                                                          | EKXJ421E□□101ML40S |
|                       | 150      | 18×31.5               | 0.24  | 940                                                          | EKXJ351E□□151MMN3S |                       | 100      | 16×45                 | 0.24  | 840                                                          | EKXJ421E□□101ML45S |
|                       | 180      | 16×50                 | 0.24  | 1,090                                                        | EKXJ351E□□181ML50S |                       | 100      | 18×35.5               | 0.24  | 835                                                          | EKXJ421E□□101MMP1S |
|                       | 180      | 18×35.5               | 0.24  | 1,065                                                        | EKXJ351E□□181MMP1S |                       | 120      | 16×50                 | 0.24  | 935                                                          | EKXJ421E□□121ML50S |
|                       | 180      | 18×40                 | 0.24  | 1,080                                                        | EKXJ351E□□181MM40S |                       | 120      | 18×40                 | 0.24  | 930                                                          | EKXJ421E□□121MM40S |
|                       | 220      | 18×45                 | 0.24  | 1,210                                                        | EKXJ351E□□221MM45S |                       | 120      | 18×45                 | 0.24  | 945                                                          | EKXJ421E□□121MM45S |
|                       | 220      | 18×50                 | 0.24  | 1,220                                                        | EKXJ351E□□221MM50S |                       | 150      | 18×50                 | 0.24  | 1,060                                                        | EKXJ421E□□151MM50S |
| 400                   | 10       | 10×16                 | 0.24  | 125                                                          | EKXJ401E□□100MJ16S |                       | 6.8      | 10×16                 | 0.24  | 105                                                          | EKXJ451E□□6R8MJ16S |
|                       | 18       | 10×20                 | 0.24  | 180                                                          | EKXJ401E□□180MJ20S |                       | 12       | 10×20                 | 0.24  | 150                                                          | EKXJ451E□□120MJ20S |
|                       | 22       | 10×25                 | 0.24  | 215                                                          | EKXJ401E□□220MJ25S |                       | 15       | 10×25                 | 0.24  | 185                                                          | EKXJ451E□□150MJ25S |
|                       | 27       | 10×30                 | 0.24  | 255                                                          | EKXJ401E□□270MJ30S |                       | 18       | 10×30                 | 0.24  | 215                                                          | EKXJ451E□□180MJ30S |
|                       | 27       | 12.5×20               | 0.24  | 300                                                          | EKXJ401E□□270MK20S |                       | 18       | 12.5×20               | 0.24  | 255                                                          | EKXJ451E□□180MK20S |
|                       | 33       | 10×35                 | 0.24  | 300                                                          | EKXJ401E□□330MJ35S |                       | 22       | 10×35                 | 0.24  | 250                                                          | EKXJ451E□□220MJ35S |
|                       | 39       | 10×40                 | 0.24  | 340                                                          | EKXJ401E□□390MJ40S |                       | 27       | 10×40                 | 0.24  | 290                                                          | EKXJ451E□□270MJ40S |
|                       | 39       | 10×45                 | 0.24  | 355                                                          | EKXJ401E□□390MJ45S |                       | 27       | 10×45                 | 0.24  | 305                                                          | EKXJ451E□□270MJ45S |
|                       | 39       | 12.5×25               | 0.24  | 390                                                          | EKXJ401E□□390MK25S |                       | 27       | 12.5×25               | 0.24  | 340                                                          | EKXJ451E□□270MK25S |
|                       | 39       | 14.5×20               | 0.24  | 385                                                          | EKXJ401E□□390MU20S |                       | 27       | 14.5×20               | 0.24  | 335                                                          | EKXJ451E□□270MU20S |
|                       | 47       | 12.5×30               | 0.24  | 455                                                          | EKXJ401E□□470MK30S |                       | 33       | 12.5×30               | 0.24  | 400                                                          | EKXJ451E□□330MK30S |
|                       | 47       | 16×20                 | 0.24  | 435                                                          | EKXJ401E□□470ML20S |                       | 33       | 14.5×25               | 0.24  | 400                                                          | EKXJ451E□□330MU25S |
|                       | 56       | 10×50                 | 0.24  | 440                                                          | EKXJ401E□□560MJ50S |                       | 33       | 16×20                 | 0.24  | 385                                                          | EKXJ451E□□330ML20S |
|                       | 56       | 12.5×35               | 0.24  | 525                                                          | EKXJ401E□□560MK35S |                       | 39       | 10×50                 | 0.24  | 375                                                          | EKXJ451E□□390MJ50S |
|                       | 56       | 14.5×25               | 0.24  | 495                                                          | EKXJ401E□□560MU25S |                       | 39       | 12.5×35               | 0.24  | 460                                                          | EKXJ451E□□390MK35S |
|                       | 56       | 18×20                 | 0.24  | 500                                                          | EKXJ401E□□560MM20S |                       | 39       | 18×20                 | 0.24  | 440                                                          | EKXJ451E□□390MM20S |
|                       | 68       | 12.5×40               | 0.24  | 600                                                          | EKXJ401E□□680MK40S |                       | 47       | 12.5×40               | 0.24  | 525                                                          | EKXJ451E□□470MK40S |
|                       | 68       | 14.5×31.5             | 0.24  | 585                                                          | EKXJ401E□□680MUN3S |                       | 47       | 14.5×31.5             | 0.24  | 515                                                          | EKXJ451E□□470MUN3S |
|                       | 68       | 16×25                 | 0.24  | 570                                                          | EKXJ401E□□680ML25S |                       | 47       | 16×25                 | 0.24  | 500                                                          | EKXJ451E□□470ML25S |
|                       | 82       | 12.5×45               | 0.24  | 680                                                          | EKXJ401E□□820MK45S |                       | 56       | 12.5×45               | 0.24  | 590                                                          | EKXJ451E□□560MK45S |
|                       | 82       | 12.5×50               | 0.24  | 700                                                          | EKXJ401E□□820MK50S |                       | 56       | 14.5×35.5             | 0.24  | 580                                                          | EKXJ451E□□560MUP1S |
|                       | 82       | 14.5×35.5             | 0.24  | 670                                                          | EKXJ401E□□820MUP1S |                       | 56       | 16×31.5               | 0.24  | 585                                                          | EKXJ451E□□560MLN3S |
|                       | 82       | 16×31.5               | 0.24  | 670                                                          | EKXJ401E□□820MLN3S |                       | 56       | 18×25                 | 0.24  | 560                                                          | EKXJ451E□□560MM25S |
|                       | 82       | 18×25                 | 0.24  | 640                                                          | EKXJ401E□□820MM25S |                       | 68       | 12.5×50               | 0.24  | 670                                                          | EKXJ451E□□680MK50S |
|                       | 100      | 14.5×40               | 0.24  | 760                                                          | EKXJ401E□□101MU40S |                       | 68       | 14.5×40               | 0.24  | 660                                                          | EKXJ451E□□680MU40S |
|                       | 100      | 14.5×45               | 0.24  | 785                                                          | EKXJ401E□□101MU45S |                       | 68       | 14.5×45               | 0.24  | 680                                                          | EKXJ451E□□680MU45S |
|                       | 100      | 16×35.5               | 0.24  | 760                                                          | EKXJ401E□□101MLP1S |                       | 68       | 16×35.5               | 0.24  | 660                                                          | EKXJ451E□□680MLP1S |
|                       | 120      | 14.5×50               | 0.24  | 875                                                          | EKXJ401E□□121MU50S |                       | 82       | 14.5×50               | 0.24  | 765                                                          | EKXJ451E□□820MU50S |
|                       | 120      | 16×40                 | 0.24  | 860                                                          | EKXJ401E□□121ML40S |                       | 82       | 16×40                 | 0.24  | 750                                                          | EKXJ451E□□820ML40S |
|                       | 120      | 16×45                 | 0.24  | 875                                                          | EKXJ401E□□121ML45S |                       | 82       | 16×45                 | 0.24  | 760                                                          | EKXJ451E□□820ML45S |
|                       | 120      | 18×31.5               | 0.24  | 840                                                          | EKXJ401E□□121MMN3S |                       | 82       | 18×31.5               | 0.24  | 730                                                          | EKXJ451E□□820MMN3S |
|                       | 120      | 18×35.5               | 0.24  | 870                                                          | EKXJ401E□□121MMP1S |                       | 100      | 16×50                 | 0.24  | 855                                                          | EKXJ451E□□101ML50S |
|                       | 150      | 16×50                 | 0.24  | 995                                                          | EKXJ401E□□151ML50S |                       | 100      | 18×35.5               | 0.24  | 835                                                          | EKXJ451E□□101MMP1S |
|                       | 150      | 18×40                 | 0.24  | 985                                                          | EKXJ401E□□151MM40S |                       | 120      | 18×40                 | 0.24  | 930                                                          | EKXJ451E□□121MM40S |
|                       | 180      | 18×45                 | 0.24  | 1,095                                                        | EKXJ401E□□181MM45S |                       | 120      | 18×45                 | 0.24  | 945                                                          | EKXJ451E□□121MM45S |
|                       | 220      | 18×50                 | 0.24  | 1,220                                                        | EKXJ401E□□221MM50S |                       | 150      | 18×50                 | 0.24  | 1,060                                                        | EKXJ451E□□151MM50S |

□ □ : Enter the appropriate lead forming or taping code.



### ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(mA <sub>rms</sub> /105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|--------------------------------------------------------------|--------------------|
| 500                      | 6.8         | 10 × 20               | 0.24  | 90                                                           | EKXJ501E□□6R8MJ20S |
|                          | 8.2         | 10 × 25               | 0.24  | 110                                                          | EKXJ501E□□8R2MJ25S |
|                          | 10          | 10 × 30               | 0.24  | 130                                                          | EKXJ501E□□100MJ30S |
|                          | 12          | 12.5 × 20             | 0.24  | 135                                                          | EKXJ501E□□120MK20S |
|                          | 15          | 10 × 35               | 0.24  | 170                                                          | EKXJ501E□□150MJ35S |
|                          | 15          | 10 × 40               | 0.24  | 175                                                          | EKXJ501E□□150MJ40S |
|                          | 15          | 12.5 × 25             | 0.24  | 165                                                          | EKXJ501E□□150MK25S |
|                          | 18          | 10 × 45               | 0.24  | 190                                                          | EKXJ501E□□180MJ45S |
|                          | 18          | 12.5 × 30             | 0.24  | 190                                                          | EKXJ501E□□180MK30S |
|                          | 22          | 10 × 50               | 0.24  | 230                                                          | EKXJ501E□□220MJ50S |
|                          | 22          | 12.5 × 35             | 0.24  | 220                                                          | EKXJ501E□□220MK35S |
|                          | 27          | 12.5 × 40             | 0.24  | 260                                                          | EKXJ501E□□270MK40S |
|                          | 33          | 12.5 × 45             | 0.24  | 285                                                          | EKXJ501E□□330MK45S |
|                          | 39          | 12.5 × 50             | 0.24  | 330                                                          | EKXJ501E□□390MK50S |

□□ : Enter the appropriate lead forming or taping code.

### ◆RATED RIPPLE CURRENT MULTIPLIERS

#### ●Frequency Multipliers

(160 to 450V<sub>dc</sub>)

| Capacitance(μF) | Frequency(Hz) | 120  | 1k   | 10k  | 100k |
|-----------------|---------------|------|------|------|------|
| 6.8 to 82       |               | 1.00 | 1.75 | 2.25 | 2.50 |
| 100 to 680      |               | 1.00 | 1.67 | 2.05 | 2.25 |

(500V<sub>dc</sub>)

| Capacitance(μF) | Frequency(Hz) | 120  | 1k   | 10k  | 100k |
|-----------------|---------------|------|------|------|------|
| 6.8 to 22       |               | 1.00 | 1.78 | 2.30 | 2.59 |
| 27 to 39        |               | 1.00 | 1.75 | 2.25 | 2.50 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

# KWB Series

- Ideal for low profile power supply applications
- Downsized form KWA series
- Rated voltage range : 400 to 450V<sub>dc</sub>, Capacitance range : 18 to 270μF
- Endurance with ripple current : 5,000 hours at 105°C
- Non solvent resistant type
- RoHS2 Compliant

KWB

Downsized

KWA

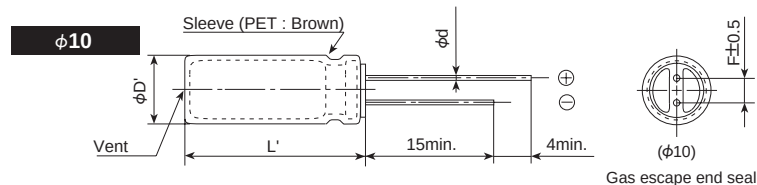


## SPECIFICATIONS

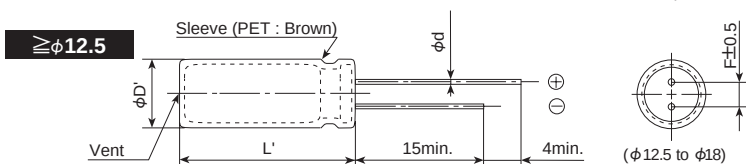
| Items                                                  | Characteristics                                                                                                                                                                                                                                                                         |                                      |
|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
| Category                                               | -40 to +105°C                                                                                                                                                                                                                                                                           |                                      |
| Temperature Range                                      |                                                                                                                                                                                                                                                                                         |                                      |
| Rated Voltage Range                                    | 400 to 450V <sub>dc</sub>                                                                                                                                                                                                                                                               |                                      |
| Capacitance Tolerance                                  | ±20% (M) (at 20°C, 120Hz)                                                                                                                                                                                                                                                               |                                      |
| Leakage Current                                        | I=0.04CV+100 (after 1 minute)<br>I=0.02CV+25 (after 5 minutes)<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C)                                                                                                                   |                                      |
| Dissipation Factor (tan δ)                             | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                        | 400 to 450V                          |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                            | 0.20 (at 20°C, 120Hz)                |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                        | 400 to 450V                          |
|                                                        | Z(-25°C)/Z(+20°C)                                                                                                                                                                                                                                                                       | 6                                    |
|                                                        | Z(-40°C)/Z(+20°C)                                                                                                                                                                                                                                                                       | 10 (at 120Hz)                        |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 5,000 hours at 105°C.                                         |                                      |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                      | ≤ ±20% of the initial value          |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                            | ≤200% of the initial specified value |
|                                                        | Leakage current                                                                                                                                                                                                                                                                         | ≤ The initial specified value        |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                      |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                      | ≤ ±20% of the initial value          |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                            | ≤200% of the initial specified value |
|                                                        | Leakage current                                                                                                                                                                                                                                                                         | ≤500% of the initial specified value |

## DIMENSIONS [mm]

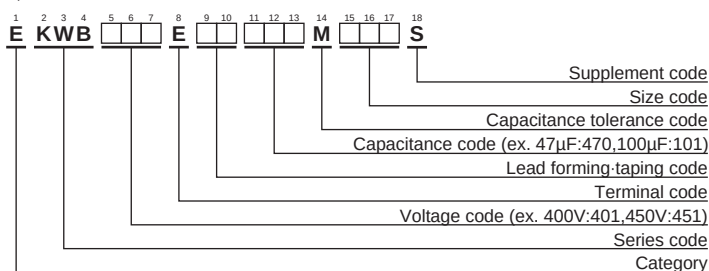
● Terminal Code : E



| φD  | 10          | 12.5 | 14.5 | 16  | 18  |
|-----|-------------|------|------|-----|-----|
| φd  | 0.6         | 0.6  | 0.8  | 0.8 | 0.8 |
| F   | 5.0         | 5.0  | 7.5  | 7.5 | 7.5 |
| φD' | φD+0.5 max. |      |      |     |     |
| L'  | L+2.0 max.  |      |      |     |     |



## PART NUMBERING SYSTEM



Please refer to "Product code guide (radial lead type)"

**KWB**Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(mA rms/105°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(mA rms/105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|--------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|--------------------------------------------------|--------------------|
| 400                      | 22          | 10×20                 | 0.20  | 235                                              | EKWB401E□□220MJ20S | 450                      | 18          | 10×20                 | 0.20  | 210                                              | EKWB451E□□180MJ20S |
|                          | 27          | 10×25                 | 0.20  | 285                                              | EKWB401E□□270MJ25S |                          | 27          | 10×25                 | 0.20  | 285                                              | EKWB451E□□270MJ25S |
|                          | 39          | 10×30                 | 0.20  | 365                                              | EKWB401E□□390MJ30S |                          | 33          | 10×30                 | 0.20  | 335                                              | EKWB451E□□330MJ30S |
|                          | 39          | 12.5×20               | 0.20  | 345                                              | EKWB401E□□390MK20S |                          | 33          | 12.5×20               | 0.20  | 320                                              | EKWB451E□□330MK20S |
|                          | 47          | 10×35                 | 0.20  | 425                                              | EKWB401E□□470MJ35S |                          | 39          | 10×35                 | 0.20  | 385                                              | EKWB451E□□390MJ35S |
|                          | 56          | 10×40                 | 0.20  | 485                                              | EKWB401E□□560MJ40S |                          | 47          | 10×40                 | 0.20  | 445                                              | EKWB451E□□470MJ40S |
|                          | 56          | 12.5×25               | 0.20  | 450                                              | EKWB401E□□560MK25S |                          | 47          | 12.5×25               | 0.20  | 415                                              | EKWB451E□□470MK25S |
|                          | 68          | 10×45                 | 0.20  | 555                                              | EKWB401E□□680MJ45S |                          | 56          | 10×45                 | 0.20  | 505                                              | EKWB451E□□560MJ45S |
|                          | 68          | 10×50                 | 0.20  | 575                                              | EKWB401E□□680MJ50S |                          | 56          | 10×50                 | 0.20  | 520                                              | EKWB451E□□560MJ50S |
|                          | 68          | 12.5×30               | 0.20  | 530                                              | EKWB401E□□680MK30S |                          | 56          | 12.5×30               | 0.20  | 480                                              | EKWB451E□□560MK30S |
|                          | 68          | 16×20                 | 0.20  | 510                                              | EKWB401E□□680ML20S |                          | 56          | 16×20                 | 0.20  | 460                                              | EKWB451E□□560ML20S |
|                          | 82          | 12.5×35               | 0.20  | 610                                              | EKWB401E□□820MK35S |                          | 68          | 12.5×35               | 0.20  | 560                                              | EKWB451E□□680MK35S |
|                          | 82          | 18×20                 | 0.20  | 585                                              | EKWB401E□□820MM20S |                          | 82          | 12.5×40               | 0.20  | 640                                              | EKWB451E□□820MK40S |
|                          | 100         | 12.5×40               | 0.20  | 705                                              | EKWB401E□□101MK40S |                          | 82          | 12.5×45               | 0.20  | 660                                              | EKWB451E□□820MK45S |
|                          | 100         | 14.5×31.5             | 0.20  | 680                                              | EKWB401E□□101MUN3S |                          | 82          | 14.5×31.5             | 0.20  | 615                                              | EKWB451E□□820MUN3S |
|                          | 100         | 16×25                 | 0.20  | 670                                              | EKWB401E□□101ML25S |                          | 82          | 16×25                 | 0.20  | 605                                              | EKWB451E□□820ML25S |
|                          | 120         | 12.5×45               | 0.20  | 800                                              | EKWB401E□□121MK45S |                          | 82          | 18×20                 | 0.20  | 585                                              | EKWB451E□□820MM20S |
|                          | 120         | 12.5×50               | 0.20  | 820                                              | EKWB401E□□121MK50S |                          | 100         | 12.5×50               | 0.20  | 750                                              | EKWB451E□□101MK50S |
|                          | 120         | 14.5×35               | 0.20  | 765                                              | EKWB401E□□121MU35S |                          | 100         | 14.5×35               | 0.20  | 700                                              | EKWB451E□□101MU35S |
|                          | 120         | 16×31.5               | 0.20  | 790                                              | EKWB401E□□121MLN3S |                          | 100         | 16×31.5               | 0.20  | 720                                              | EKWB451E□□101MLN3S |
|                          | 120         | 18×25                 | 0.20  | 755                                              | EKWB401E□□121MM25S |                          | 100         | 18×25                 | 0.20  | 690                                              | EKWB451E□□101MM25S |
|                          | 150         | 16×35                 | 0.20  | 905                                              | EKWB401E□□151ML35S |                          | 120         | 16×35                 | 0.20  | 810                                              | EKWB451E□□121ML35S |
|                          | 150         | 18×31.5               | 0.20  | 915                                              | EKWB401E□□151MMN3S |                          | 120         | 18×31.5               | 0.20  | 815                                              | EKWB451E□□121MMN3S |
|                          | 180         | 16×40                 | 0.20  | 1,020                                            | EKWB401E□□181ML40S |                          | 150         | 16×40                 | 0.20  | 935                                              | EKWB451E□□151ML40S |
|                          | 180         | 16×45                 | 0.20  | 1,040                                            | EKWB401E□□181ML45S |                          | 150         | 16×45                 | 0.20  | 950                                              | EKWB451E□□151ML45S |
|                          | 180         | 18×31.5               | 0.20  | 1,000                                            | EKWB401E□□181MMN3S |                          | 150         | 18×31.5               | 0.20  | 915                                              | EKWB451E□□151MMN3S |
|                          | 180         | 18×35                 | 0.20  | 1,020                                            | EKWB401E□□181MM35S |                          | 150         | 18×35                 | 0.20  | 935                                              | EKWB451E□□151MM35S |
|                          | 220         | 16×50                 | 0.20  | 1,170                                            | EKWB401E□□221ML50S |                          | 180         | 16×50                 | 0.20  | 1,060                                            | EKWB451E□□181ML50S |
|                          | 220         | 18×40                 | 0.20  | 1,160                                            | EKWB401E□□221MM40S |                          | 180         | 18×40                 | 0.20  | 1,050                                            | EKWB451E□□181MM40S |
|                          | 270         | 18×45                 | 0.20  | 1,310                                            | EKWB401E□□271MM45S |                          | 220         | 18×45                 | 0.20  | 1,190                                            | EKWB451E□□221MM45S |
|                          | 270         | 18×50                 | 0.20  | 1,310                                            | EKWB401E□□271MM50S |                          | 220         | 18×50                 | 0.20  | 1,190                                            | EKWB451E□□221MM50S |
| 420                      | 22          | 10×20                 | 0.20  | 235                                              | EKWB421E□□220MJ20S | 450                      | 18          | 10×20                 | 0.20  | 210                                              | EKWB451E□□180MJ20S |
|                          | 27          | 10×25                 | 0.20  | 285                                              | EKWB421E□□270MJ25S |                          | 27          | 10×25                 | 0.20  | 285                                              | EKWB451E□□270MJ25S |
|                          | 33          | 12.5×20               | 0.20  | 320                                              | EKWB421E□□330MK20S |                          | 33          | 10×30                 | 0.20  | 335                                              | EKWB451E□□330MJ30S |
|                          | 39          | 10×30                 | 0.20  | 365                                              | EKWB421E□□390MJ30S |                          | 33          | 12.5×20               | 0.20  | 320                                              | EKWB451E□□330MK20S |
|                          | 47          | 10×35                 | 0.20  | 425                                              | EKWB421E□□470MJ35S |                          | 39          | 10×35                 | 0.20  | 385                                              | EKWB451E□□390MJ35S |
|                          | 47          | 12.5×25               | 0.20  | 415                                              | EKWB421E□□470MK25S |                          | 47          | 10×40                 | 0.20  | 445                                              | EKWB451E□□470MJ40S |
|                          | 56          | 10×40                 | 0.20  | 485                                              | EKWB421E□□560MJ40S |                          | 47          | 12.5×25               | 0.20  | 415                                              | EKWB451E□□470MK25S |
|                          | 56          | 10×45                 | 0.20  | 505                                              | EKWB421E□□560MJ45S |                          | 56          | 10×45                 | 0.20  | 505                                              | EKWB451E□□560MJ45S |
|                          | 56          | 10×50                 | 0.20  | 520                                              | EKWB421E□□560MJ50S |                          | 56          | 10×50                 | 0.20  | 520                                              | EKWB451E□□560MJ50S |
|                          | 68          | 12.5×30               | 0.20  | 530                                              | EKWB421E□□680MK30S |                          | 56          | 12.5×30               | 0.20  | 480                                              | EKWB451E□□560MK30S |
|                          | 68          | 16×20                 | 0.20  | 510                                              | EKWB421E□□680ML20S |                          | 56          | 16×20                 | 0.20  | 460                                              | EKWB451E□□560ML20S |
|                          | 82          | 12.5×35               | 0.20  | 610                                              | EKWB421E□□820MK35S |                          | 68          | 12.5×35               | 0.20  | 560                                              | EKWB451E□□680MK35S |
|                          | 82          | 12.5×40               | 0.20  | 640                                              | EKWB421E□□820MK40S |                          | 82          | 12.5×40               | 0.20  | 640                                              | EKWB451E□□820MK40S |
|                          | 82          | 14.5×31.5             | 0.20  | 615                                              | EKWB421E□□820MUN3S |                          | 82          | 12.5×45               | 0.20  | 660                                              | EKWB451E□□820MK45S |
|                          | 82          | 16×25                 | 0.20  | 605                                              | EKWB421E□□820ML25S |                          | 82          | 14.5×31.5             | 0.20  | 615                                              | EKWB451E□□820MUN3S |
|                          | 82          | 18×20                 | 0.20  | 585                                              | EKWB421E□□820MM20S |                          | 82          | 16×25                 | 0.20  | 605                                              | EKWB451E□□820ML25S |
|                          | 100         | 12.5×45               | 0.20  | 730                                              | EKWB421E□□101MK45S |                          | 82          | 18×20                 | 0.20  | 585                                              | EKWB451E□□820MM20S |
|                          | 100         | 14.5×35               | 0.20  | 700                                              | EKWB421E□□101MU35S |                          | 100         | 12.5×50               | 0.20  | 750                                              | EKWB451E□□101MK50S |
|                          | 120         | 12.5×50               | 0.20  | 820                                              | EKWB421E□□121MK50S |                          | 100         | 14.5×35               | 0.20  | 700                                              | EKWB451E□□101MU35S |
|                          | 120         | 16×31.5               | 0.20  | 790                                              | EKWB421E□□121MLN3S |                          | 100         | 16×31.5               | 0.20  | 720                                              | EKWB451E□□101MLN3S |
|                          | 120         | 18×25                 | 0.20  | 755                                              | EKWB421E□□121MM25S |                          | 100         | 18×25                 | 0.20  | 690                                              | EKWB451E□□101MM25S |
|                          | 150         | 16×35                 | 0.20  | 905                                              | EKWB421E□□151ML35S |                          | 120         | 16×35                 | 0.20  | 810                                              | EKWB451E□□121ML35S |
|                          | 150         | 16×40                 | 0.20  | 935                                              | EKWB421E□□151ML40S |                          | 120         | 18×31.5               | 0.20  | 815                                              | EKWB451E□□121MMN3S |
|                          | 150         | 18×31.5               | 0.20  | 915                                              | EKWB421E□□151MMN3S |                          | 150         | 16×40                 | 0.20  | 935                                              | EKWB451E□□151ML40S |
|                          | 180         | 16×45                 | 0.20  | 1,040                                            | EKWB421E□□181ML45S |                          | 150         | 16×45                 | 0.20  | 950                                              | EKWB451E□□151ML45S |
|                          | 180         | 16×50                 | 0.20  | 1,060                                            | EKWB421E□□181ML50S |                          | 150         | 18×31.5               | 0.20  | 915                                              | EKWB451E□□151MMN3S |
|                          | 180         | 18×35                 | 0.20  | 1,020                                            | EKWB421E□□181MM35S |                          | 150         | 18×35                 | 0.20  | 935                                              | EKWB451E□□151MM35S |
|                          | 180         | 18×40                 | 0.20  | 1,050                                            | EKWB421E□□181MM40S |                          | 180         | 16×50                 | 0.20  | 1,060                                            | EKWB451E□□181ML50S |
|                          | 220         | 18×45                 | 0.20  | 1,190                                            | EKWB421E□□221MM45S |                          | 180         | 18×40                 | 0.20  | 1,050                                            | EKWB451E□□181MM40S |
|                          | 270         | 18×50                 | 0.20  | 1,310                                            | EKWB421E□□271MM50S |                          | 220         | 18×45                 | 0.20  | 1,190                                            | EKWB451E□□221MM45S |

□□ : Enter the appropriate lead forming or taping code.

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ● Frequency Multipliers

| Capacitance(μF) | Frequency(Hz) | 120  | 1k   | 10k  | 100k |
|-----------------|---------------|------|------|------|------|
| 18 to 82        |               | 1.00 | 1.50 | 1.75 | 1.80 |
| 100 to 270      |               | 1.00 | 1.30 | 1.40 | 1.50 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

# KWA Series

- Ideal for low profile power supply applications
- Longer life form KHE series
- Rated voltage range : 400 to 450V<sub>dc</sub>, Capacitance range : 27 to 120μF
- Endurance with ripple current : 5,000 hours at 105°C
- Non solvent resistant type
- RoHS2 Compliant

KWA

Longer life

KHE

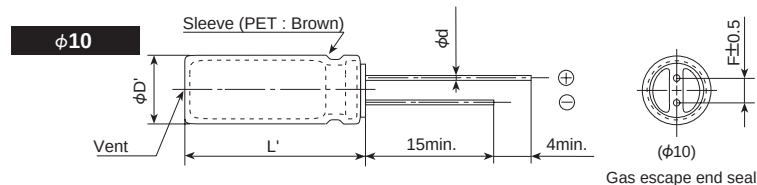


## SPECIFICATIONS

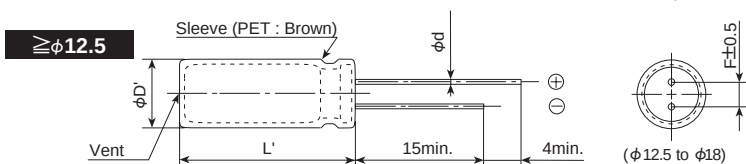
| Items                                                  | Characteristics                                                                                                                                                                                                                                                                       |                                      |      |      |                 |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------|------|-----------------|
| Category                                               | -40 to +105℃                                                                                                                                                                                                                                                                          |                                      |      |      |                 |
| Temperature Range                                      |                                                                                                                                                                                                                                                                                       |                                      |      |      |                 |
| Rated Voltage Range                                    | 400 to 450V <sub>dc</sub>                                                                                                                                                                                                                                                             |                                      |      |      |                 |
| Capacitance Tolerance                                  | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                             |                                      |      |      |                 |
| Leakage Current                                        | I=0.04CV+100 (after 1 minute)<br>I=0.02CV+25 (after 5 minutes)<br>Where, I : Max. leakage current(μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃)                                                                                                                   |                                      |      |      |                 |
| Dissipation Factor (tan δ )                            | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 400 to 450V                          |      |      | (at 20℃, 120Hz) |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.20                                 |      |      |                 |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 400V                                 | 420V | 450V | (at 120Hz)      |
|                                                        | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 5                                    | 6    | 6    |                 |
|                                                        | Z(-40℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 6                                    | —    | —    |                 |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 5,000 hours at 105℃.                                         |                                      |      |      |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±20% of the initial value          |      |      |                 |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤200% of the initial specified value |      |      |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value         |      |      |                 |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                      |      |      |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±20% of the initial value          |      |      |                 |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤200% of the initial specified value |      |      |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤500% of the initial specified value |      |      |                 |

## DIMENSIONS [mm]

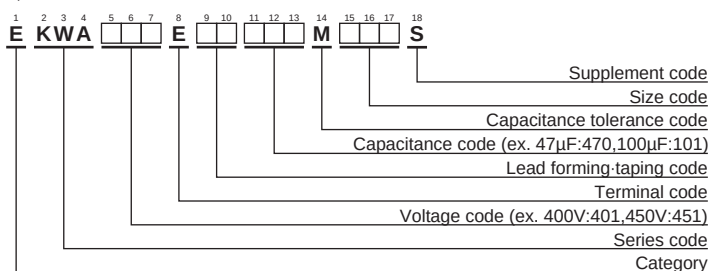
● Terminal Code : E



| φD  | 10          | 12.5 | 14.5 | 16  | 18  |
|-----|-------------|------|------|-----|-----|
| φd  | 0.6         | 0.6  | 0.8  | 0.8 | 0.8 |
| F   | 5.0         | 5.0  | 7.5  | 7.5 | 7.5 |
| φD' | φD+0.5 max. |      |      |     |     |
| L'  | L+2.0 max.  |      |      |     |     |



## PART NUMBERING SYSTEM



Please refer to "Product code guide (radial lead type)"



**KWA**Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(mA <sub>rms</sub> /105°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(mA <sub>rms</sub> /105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|--------------------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|--------------------------------------------------------------|--------------------|
| 400                      | 33          | 10×30                 | 0.20  | 320                                                          | EKWA401E□□330MJ30S | 450                      | 27          | 10×30                 | 0.20  | 290                                                          | EKWA451E□□270MJ30S |
|                          | 39          | 10×35                 | 0.20  | 370                                                          | EKWA401E□□390MJ35S |                          | 33          | 10×35                 | 0.20  | 340                                                          | EKWA451E□□330MJ35S |
|                          | 47          | 10×40                 | 0.20  | 420                                                          | EKWA401E□□470MJ40S |                          | 39          | 10×40                 | 0.20  | 380                                                          | EKWA451E□□390MJ40S |
|                          | 56          | 10×45                 | 0.20  | 480                                                          | EKWA401E□□560MJ45S |                          | 47          | 10×45                 | 0.20  | 440                                                          | EKWA451E□□470MJ45S |
|                          | 56          | 12.5×30               | 0.20  | 460                                                          | EKWA401E□□560MK30S |                          | 47          | 12.5×30               | 0.20  | 420                                                          | EKWA451E□□470MK30S |
|                          | 68          | 12.5×35               | 0.20  | 530                                                          | EKWA401E□□680MK35S |                          | 56          | 12.5×35               | 0.20  | 480                                                          | EKWA451E□□560MK35S |
|                          | 82          | 12.5×40               | 0.20  | 610                                                          | EKWA401E□□820MK40S |                          | 68          | 12.5×40               | 0.20  | 550                                                          | EKWA451E□□680MK40S |
|                          | 82          | 14.5×31.5             | 0.20  | 590                                                          | EKWA401E□□820MUN3S |                          | 68          | 14.5×31.5             | 0.20  | 530                                                          | EKWA451E□□680MUN3S |
|                          | 100         | 12.5×45               | 0.20  | 690                                                          | EKWA401E□□101MK45S |                          | 82          | 12.5×45               | 0.20  | 630                                                          | EKWA451E□□820MK45S |
|                          | 100         | 14.5×40               | 0.20  | 700                                                          | EKWA401E□□101MU40S |                          | 82          | 14.5×35               | 0.20  | 620                                                          | EKWA451E□□820MU35S |
|                          | 100         | 16×31.5               | 0.20  | 710                                                          | EKWA401E□□101MLN3S |                          | 82          | 16×31.5               | 0.20  | 640                                                          | EKWA451E□□820MLN3S |
|                          | 120         | 14.5×45               | 0.20  | 790                                                          | EKWA401E□□121MU45S |                          | 100         | 14.5×45               | 0.20  | 720                                                          | EKWA451E□□101MU45S |
|                          | 120         | 16×35                 | 0.20  | 800                                                          | EKWA401E□□121ML35S |                          | 100         | 16×35                 | 0.20  | 730                                                          | EKWA451E□□101ML35S |
| 420                      | 120         | 18×31.5               | 0.20  | 800                                                          | EKWA401E□□121MMN3S |                          | 120         | 18×31.5               | 0.20  | 800                                                          | EKWA451E□□121MMN3S |
|                          | 33          | 10×30                 | 0.20  | 320                                                          | EKWA421E□□330MJ30S |                          |             |                       |       |                                                              |                    |
|                          | 39          | 10×35                 | 0.20  | 370                                                          | EKWA421E□□390MJ35S |                          |             |                       |       |                                                              |                    |
|                          | 47          | 10×40                 | 0.20  | 420                                                          | EKWA421E□□470MJ40S |                          |             |                       |       |                                                              |                    |
|                          | 56          | 10×50                 | 0.20  | 500                                                          | EKWA421E□□560MJ50S |                          |             |                       |       |                                                              |                    |
|                          | 56          | 12.5×30               | 0.20  | 460                                                          | EKWA421E□□560MK30S |                          |             |                       |       |                                                              |                    |
|                          | 68          | 12.5×35               | 0.20  | 530                                                          | EKWA421E□□680MK35S |                          |             |                       |       |                                                              |                    |
|                          | 68          | 14.5×31.5             | 0.20  | 530                                                          | EKWA421E□□680MUN3S |                          |             |                       |       |                                                              |                    |
|                          | 82          | 12.5×40               | 0.20  | 610                                                          | EKWA421E□□820MK40S |                          |             |                       |       |                                                              |                    |
|                          | 82          | 14.5×35               | 0.20  | 620                                                          | EKWA421E□□820MU35S |                          |             |                       |       |                                                              |                    |
|                          | 100         | 12.5×50               | 0.20  | 680                                                          | EKWA421E□□101MK50S |                          |             |                       |       |                                                              |                    |
|                          | 100         | 14.5×40               | 0.20  | 700                                                          | EKWA421E□□101MU40S |                          |             |                       |       |                                                              |                    |
|                          | 100         | 16×31.5               | 0.20  | 710                                                          | EKWA421E□□101MLN3S |                          |             |                       |       |                                                              |                    |
|                          | 120         | 14.5×45               | 0.20  | 790                                                          | EKWA421E□□121MU45S |                          |             |                       |       |                                                              |                    |
|                          | 120         | 16×35                 | 0.20  | 800                                                          | EKWA421E□□121ML35S |                          |             |                       |       |                                                              |                    |
|                          | 120         | 18×31.5               | 0.20  | 800                                                          | EKWA421E□□121MMN3S |                          |             |                       |       |                                                              |                    |

□□ : Enter the appropriate lead forming or taping code.

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

| Capacitance(μF) | Frequency(Hz) | 120  | 1k   | 10k  | 100k |
|-----------------|---------------|------|------|------|------|
| 27 to 82        | 120           | 1.00 | 1.50 | 1.75 | 1.80 |
|                 | 100           | 1.00 | 1.30 | 1.40 | 1.50 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

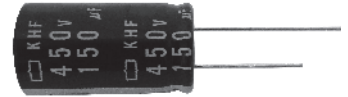
# KHF Series

- Ideal for low profile power supply applications
- Downsize, high ripple design
- Rated voltage range : 400 to 450V<sub>dc</sub>, Capacitance range : 18 to 270μF
- Endurance with ripple current : 3,000 hours at 105°C
- Non solvent resistant type
- RoHS2 Compliant

KHF

Downsized

KHE

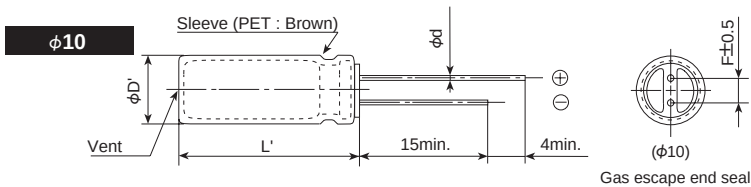


## SPECIFICATIONS

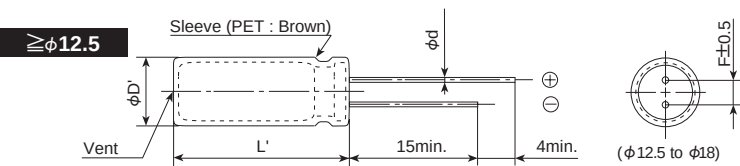
| Items                                                  | Characteristics                                                                                                                                                                                                                                                                       |                                      |                 |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-----------------|
| Category                                               | -40 to +105℃                                                                                                                                                                                                                                                                          |                                      |                 |
| Temperature Range                                      |                                                                                                                                                                                                                                                                                       |                                      |                 |
| Rated Voltage Range                                    | 400 to 450V <sub>dc</sub>                                                                                                                                                                                                                                                             |                                      |                 |
| Capacitance Tolerance                                  | ±20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                              |                                      |                 |
| Leakage Current                                        |                                                                                                                                                                                                                                                                                       | After 1 minute                       | After 5 minutes |
|                                                        | CV≤1,000                                                                                                                                                                                                                                                                              | I=0.1CV+40                           | I=0.03CV+15     |
|                                                        | CV>1,000                                                                                                                                                                                                                                                                              | I=0.04CV+100                         | I=0.02CV+25     |
|                                                        | Where, I : Max. leakage current(μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃)                                                                                                                                                                                     |                                      |                 |
| Dissipation Factor (tan δ)                             | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 400 to 450V                          | (at 20℃, 120Hz) |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.20                                 |                 |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 400 to 450V                          | (at 120Hz)      |
|                                                        | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 6                                    |                 |
|                                                        | Z(-40℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 10                                   |                 |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 3,000 hours at 105℃.                                         |                                      |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±20% of the initial value          |                 |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤200% of the initial specified value |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value         |                 |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                      |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±20% of the initial value          |                 |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤200% of the initial specified value |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤500% of the initial specified value |                 |

## DIMENSIONS [mm]

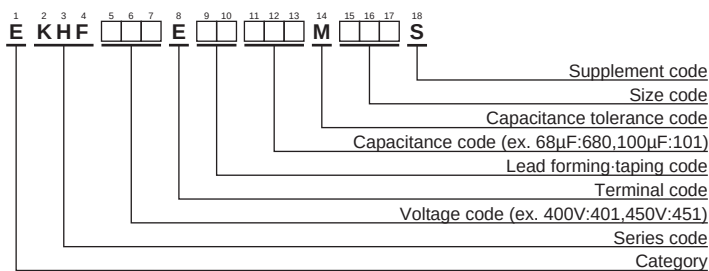
### Terminal Code : E



| φD  | 10          | 12.5 | 14.5 | 16  | 18  |
|-----|-------------|------|------|-----|-----|
| φd  | 0.6         | 0.6  | 0.8  | 0.8 | 0.8 |
| F   | 5.0         | 5.0  | 7.5  | 7.5 | 7.5 |
| φD' | φD+0.5 max. |      |      |     |     |
| L'  | L+2.0 max.  |      |      |     |     |



## PART NUMBERING SYSTEM



Please refer to "Product code guide (radial lead type)"

**KHF** Series

## ◆ STANDARD RATINGS

| WV (V <sub>dc</sub> ) | Cap (μF) | Case size ϕD×L(mm) | tan δ | Rated ripple current (mA <sub>rms</sub> /105°C, 120Hz) | Part No.           | WV (V <sub>dc</sub> ) | Cap (μF) | Case size ϕD×L(mm) | tan δ | Rated ripple current (mA <sub>rms</sub> /105°C, 120Hz) | Part No.           |
|-----------------------|----------|--------------------|-------|--------------------------------------------------------|--------------------|-----------------------|----------|--------------------|-------|--------------------------------------------------------|--------------------|
| 400                   | 22       | 10×20              | 0.20  | 235                                                    | EKHF401E□□220MJ20S | 450                   | 18       | 10×20              | 0.20  | 210                                                    | EKHF451E□□180MJ20S |
|                       | 27       | 10×25              | 0.20  | 285                                                    | EKHF401E□□270MJ25S |                       | 27       | 10×25              | 0.20  | 285                                                    | EKHF451E□□270MJ25S |
|                       | 39       | 10×30              | 0.20  | 365                                                    | EKHF401E□□390MJ30S |                       | 33       | 10×30              | 0.20  | 335                                                    | EKHF451E□□330MJ30S |
|                       | 39       | 12.5×20            | 0.20  | 345                                                    | EKHF401E□□390MK20S |                       | 33       | 12.5×20            | 0.20  | 320                                                    | EKHF451E□□330MK20S |
|                       | 47       | 10×35              | 0.20  | 425                                                    | EKHF401E□□470MJ35S |                       | 39       | 10×35              | 0.20  | 385                                                    | EKHF451E□□390MJ35S |
|                       | 56       | 10×40              | 0.20  | 485                                                    | EKHF401E□□560MJ40S |                       | 47       | 10×40              | 0.20  | 445                                                    | EKHF451E□□470MJ40S |
|                       | 56       | 12.5×25            | 0.20  | 450                                                    | EKHF401E□□560MK25S |                       | 47       | 12.5×25            | 0.20  | 415                                                    | EKHF451E□□470MK25S |
|                       | 68       | 10×45              | 0.20  | 555                                                    | EKHF401E□□680MJ45S |                       | 56       | 10×45              | 0.20  | 505                                                    | EKHF451E□□560MJ45S |
|                       | 68       | 10×50              | 0.20  | 575                                                    | EKHF401E□□680MJ50S |                       | 56       | 10×50              | 0.20  | 520                                                    | EKHF451E□□560MJ50S |
|                       | 68       | 12.5×30            | 0.20  | 530                                                    | EKHF401E□□680MK30S |                       | 56       | 12.5×30            | 0.20  | 480                                                    | EKHF451E□□560MK30S |
|                       | 68       | 16×20              | 0.20  | 510                                                    | EKHF401E□□680ML20S |                       | 56       | 16×20              | 0.20  | 460                                                    | EKHF451E□□560ML20S |
|                       | 82       | 12.5×35            | 0.20  | 610                                                    | EKHF401E□□820MK35S |                       | 68       | 12.5×35            | 0.20  | 560                                                    | EKHF451E□□680MK35S |
|                       | 100      | 12.5×40            | 0.20  | 705                                                    | EKHF401E□□101MK40S |                       | 82       | 12.5×40            | 0.20  | 640                                                    | EKHF451E□□820MK40S |
|                       | 100      | 14.5×31.5          | 0.20  | 680                                                    | EKHF401E□□101MUN3S |                       | 82       | 14.5×31.5          | 0.20  | 615                                                    | EKHF451E□□820MUN3S |
|                       | 100      | 16×25              | 0.20  | 670                                                    | EKHF401E□□101ML25S |                       | 82       | 16×25              | 0.20  | 605                                                    | EKHF451E□□820ML25S |
|                       | 100      | 18×20              | 0.20  | 650                                                    | EKHF401E□□101MM20S |                       | 82       | 18×20              | 0.20  | 585                                                    | EKHF451E□□820MM20S |
|                       | 120      | 12.5×45            | 0.20  | 800                                                    | EKHF401E□□121MK45S |                       | 100      | 12.5×45            | 0.20  | 730                                                    | EKHF451E□□101MK45S |
|                       | 120      | 12.5×50            | 0.20  | 820                                                    | EKHF401E□□121MK50S |                       | 100      | 12.5×50            | 0.20  | 750                                                    | EKHF451E□□101MK50S |
|                       | 120      | 14.5×35            | 0.20  | 765                                                    | EKHF401E□□121MU35S |                       | 100      | 14.5×35            | 0.20  | 700                                                    | EKHF451E□□101MU35S |
|                       | 120      | 14.5×40            | 0.20  | 810                                                    | EKHF401E□□121MU40S |                       | 100      | 16×31.5            | 0.20  | 720                                                    | EKHF451E□□101MLN3S |
|                       | 120      | 16×31.5            | 0.20  | 790                                                    | EKHF401E□□121MLN3S |                       | 100      | 18×25              | 0.20  | 690                                                    | EKHF451E□□101MM25S |
|                       | 120      | 18×25              | 0.20  | 755                                                    | EKHF401E□□121MM25S |                       | 120      | 14.5×40            | 0.20  | 810                                                    | EKHF451E□□121MU40S |
|                       | 150      | 14.5×45            | 0.20  | 905                                                    | EKHF401E□□151MU45S |                       | 120      | 14.5×45            | 0.20  | 835                                                    | EKHF451E□□121MU45S |
|                       | 150      | 16×35              | 0.20  | 905                                                    | EKHF401E□□151ML35S |                       | 120      | 16×35              | 0.20  | 810                                                    | EKHF451E□□121ML35S |
|                       | 150      | 18×31.5            | 0.20  | 915                                                    | EKHF401E□□151MMN3S |                       | 150      | 16×40              | 0.20  | 935                                                    | EKHF451E□□151ML40S |
|                       | 180      | 16×40              | 0.20  | 1020                                                   | EKHF401E□□181ML40S |                       | 150      | 16×45              | 0.20  | 950                                                    | EKHF451E□□151ML45S |
|                       | 180      | 16×45              | 0.20  | 1040                                                   | EKHF401E□□181ML45S |                       | 150      | 18×31.5            | 0.20  | 915                                                    | EKHF451E□□151MMN3S |
|                       | 180      | 18×31.5            | 0.20  | 1000                                                   | EKHF401E□□181MMN3S |                       | 150      | 18×35              | 0.20  | 935                                                    | EKHF451E□□151MM35S |
|                       | 180      | 18×35              | 0.20  | 1020                                                   | EKHF401E□□181MM35S |                       | 180      | 16×50              | 0.20  | 1060                                                   | EKHF451E□□181ML50S |
|                       | 220      | 16×50              | 0.20  | 1170                                                   | EKHF401E□□221ML50S |                       | 180      | 18×40              | 0.20  | 1050                                                   | EKHF451E□□181MM40S |
|                       | 220      | 18×40              | 0.20  | 1160                                                   | EKHF401E□□221MM40S |                       | 220      | 18×45              | 0.20  | 1190                                                   | EKHF451E□□221MM45S |
|                       | 270      | 18×45              | 0.20  | 1310                                                   | EKHF401E□□271MM45S |                       | 220      | 18×50              | 0.20  | 1190                                                   | EKHF451E□□221MM50S |
|                       | 270      | 18×50              | 0.20  | 1310                                                   | EKHF401E□□271MM50S |                       |          |                    |       |                                                        |                    |
| 420                   | 22       | 10×20              | 0.20  | 235                                                    | EKHF421E□□220MJ20S |                       |          |                    |       |                                                        |                    |
|                       | 27       | 10×25              | 0.20  | 285                                                    | EKHF421E□□270MJ25S |                       |          |                    |       |                                                        |                    |
|                       | 39       | 10×30              | 0.20  | 365                                                    | EKHF421E□□390MJ30S |                       |          |                    |       |                                                        |                    |
|                       | 39       | 12.5×20            | 0.20  | 345                                                    | EKHF421E□□390MK20S |                       |          |                    |       |                                                        |                    |
|                       | 47       | 10×35              | 0.20  | 425                                                    | EKHF421E□□470MJ35S |                       |          |                    |       |                                                        |                    |
|                       | 56       | 10×40              | 0.20  | 485                                                    | EKHF421E□□560MJ40S |                       |          |                    |       |                                                        |                    |
|                       | 56       | 10×45              | 0.20  | 505                                                    | EKHF421E□□560MJ45S |                       |          |                    |       |                                                        |                    |
|                       | 56       | 12.5×25            | 0.20  | 450                                                    | EKHF421E□□560MK25S |                       |          |                    |       |                                                        |                    |
|                       | 68       | 10×50              | 0.20  | 575                                                    | EKHF421E□□680MJ50S |                       |          |                    |       |                                                        |                    |
|                       | 68       | 12.5×30            | 0.20  | 530                                                    | EKHF421E□□680MK30S |                       |          |                    |       |                                                        |                    |
|                       | 68       | 16×20              | 0.20  | 510                                                    | EKHF421E□□680ML20S |                       |          |                    |       |                                                        |                    |
|                       | 82       | 12.5×35            | 0.20  | 610                                                    | EKHF421E□□820MK35S |                       |          |                    |       |                                                        |                    |
|                       | 82       | 14.5×31.5          | 0.20  | 615                                                    | EKHF421E□□820MUN3S |                       |          |                    |       |                                                        |                    |
|                       | 82       | 16×25              | 0.20  | 605                                                    | EKHF421E□□820ML25S |                       |          |                    |       |                                                        |                    |
|                       | 82       | 18×20              | 0.20  | 585                                                    | EKHF421E□□820MM20S |                       |          |                    |       |                                                        |                    |
|                       | 100      | 12.5×40            | 0.20  | 705                                                    | EKHF421E□□101MK40S |                       |          |                    |       |                                                        |                    |
|                       | 100      | 12.5×45            | 0.20  | 730                                                    | EKHF421E□□101MK45S |                       |          |                    |       |                                                        |                    |
|                       | 100      | 14.5×35            | 0.20  | 700                                                    | EKHF421E□□101MU35S |                       |          |                    |       |                                                        |                    |
|                       | 120      | 12.5×50            | 0.20  | 820                                                    | EKHF421E□□121MK50S |                       |          |                    |       |                                                        |                    |
|                       | 120      | 14.5×40            | 0.20  | 810                                                    | EKHF421E□□121MU40S |                       |          |                    |       |                                                        |                    |
|                       | 120      | 16×31.5            | 0.20  | 790                                                    | EKHF421E□□121MLN3S |                       |          |                    |       |                                                        |                    |
|                       | 120      | 18×25              | 0.20  | 755                                                    | EKHF421E□□121MM25S |                       |          |                    |       |                                                        |                    |
|                       | 150      | 14.5×45            | 0.20  | 905                                                    | EKHF421E□□151MU45S |                       |          |                    |       |                                                        |                    |
|                       | 150      | 16×35              | 0.20  | 905                                                    | EKHF421E□□151ML35S |                       |          |                    |       |                                                        |                    |
|                       | 150      | 16×40              | 0.20  | 935                                                    | EKHF421E□□151ML40S |                       |          |                    |       |                                                        |                    |
|                       | 150      | 18×31.5            | 0.20  | 915                                                    | EKHF421E□□151MMN3S |                       |          |                    |       |                                                        |                    |
|                       | 180      | 16×45              | 0.20  | 1040                                                   | EKHF421E□□181ML45S |                       |          |                    |       |                                                        |                    |
|                       | 180      | 18×35              | 0.20  | 1020                                                   | EKHF421E□□181MM35S |                       |          |                    |       |                                                        |                    |
|                       | 220      | 16×50              | 0.20  | 1170                                                   | EKHF421E□□221ML50S |                       |          |                    |       |                                                        |                    |
|                       | 220      | 18×40              | 0.20  | 1160                                                   | EKHF421E□□221MM40S |                       |          |                    |       |                                                        |                    |
|                       | 220      | 18×45              | 0.20  | 1190                                                   | EKHF421E□□221MM45S |                       |          |                    |       |                                                        |                    |
|                       | 270      | 18×50              | 0.20  | 1310                                                   | EKHF421E□□271MM50S |                       |          |                    |       |                                                        |                    |

□□ : Enter the appropriate lead forming or taping code.

## ◆ RATED RIPPLE CURRENT MULTIPLIERS

## ● Frequency Multipliers

| Capacitance(μF) | Frequency(Hz) | 120  | 1k   | 10k  | 100k |
|-----------------|---------------|------|------|------|------|
| 18 to 82        |               | 1.00 | 1.50 | 1.75 | 1.80 |
| 100 to 270      |               | 1.00 | 1.30 | 1.40 | 1.50 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

Product specifications in this catalog are subject to change without notice. Request our product specifications before purchase and/or use. Please use our products based on the information contained in this catalog and product specifications.

# KHE Series

- Ideal for low profile power supply applications
- Downsize, high ripple design
- Rated voltage range : 400 to 450V<sub>dc</sub>, Capacitance range : 27 to 120μF
- Endurance with ripple current : 2,000 hours at 105°C
- Non solvent resistant type
- RoHS2 Compliant

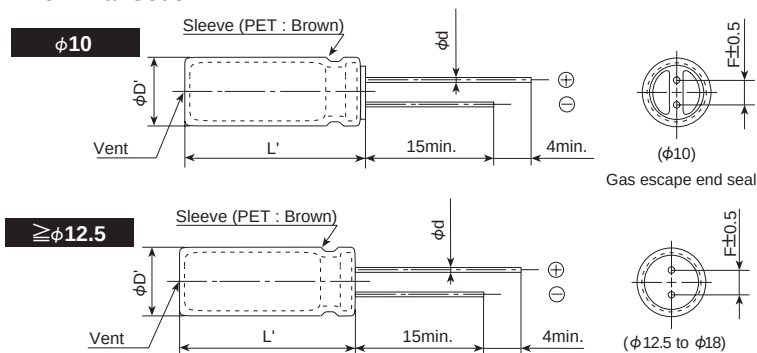


## SPECIFICATIONS

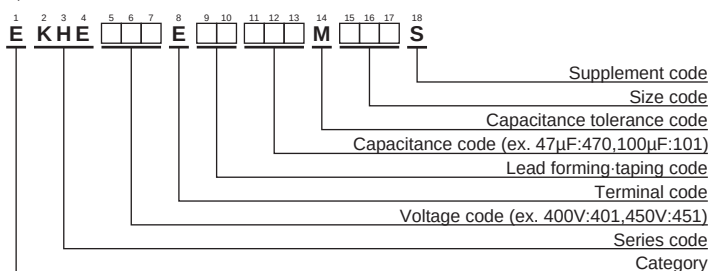
| Items                                                        | Characteristics                                                                                                                                                                                                                                                                       |                                      |                 |      |                 |
|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-----------------|------|-----------------|
| Category                                                     | -40 to +105℃                                                                                                                                                                                                                                                                          |                                      |                 |      |                 |
| Temperature Range                                            |                                                                                                                                                                                                                                                                                       |                                      |                 |      |                 |
| Rated Voltage Range                                          | 400 to 450V <sub>dc</sub>                                                                                                                                                                                                                                                             |                                      |                 |      |                 |
| Capacitance Tolerance                                        | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                             |                                      |                 |      |                 |
| Leakage Current                                              |                                                                                                                                                                                                                                                                                       | After 1 minute                       | After 5 minutes |      |                 |
|                                                              | CV≤1,000                                                                                                                                                                                                                                                                              | I=0.1CV+40                           | I=0.03CV+15     |      |                 |
|                                                              | CV>1,000                                                                                                                                                                                                                                                                              | I=0.04CV+100                         | I=0.02CV+25     |      |                 |
|                                                              | Where, I : Max. leakage current(μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃)                                                                                                                                                                                     |                                      |                 |      |                 |
| Dissipation Factor<br>(tan δ )                               | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 400V                                 | 420V            | 450V | (at 20℃, 120Hz) |
|                                                              | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.15                                 | 0.20            | 0.20 |                 |
| Low Temperature<br>Characteristics<br>(Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 400V                                 | 420V            | 450V | (at 120Hz)      |
|                                                              | Z (-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                      | 5                                    | 6               | 6    |                 |
|                                                              | Z (-40℃)/Z(+20℃)                                                                                                                                                                                                                                                                      | 6                                    | —               | —    |                 |
| Endurance                                                    | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 2,000 hours at 105℃.                                         |                                      |                 |      |                 |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±20% of the initial value          |                 |      |                 |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤200% of the initial specified value |                 |      |                 |
|                                                              | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value         |                 |      |                 |
| Shelf Life                                                   | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                      |                 |      |                 |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±20% of the initial value          |                 |      |                 |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤200% of the initial specified value |                 |      |                 |
|                                                              | Leakage current                                                                                                                                                                                                                                                                       | ≤500% of the initial specified value |                 |      |                 |

## DIMENSIONS [mm]

### Terminal Code : E



## PART NUMBERING SYSTEM



Please refer to "Product code guide (radial lead type)"

## ◆ STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(mA <sub>rms</sub> /105°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(mA <sub>rms</sub> /105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|--------------------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|--------------------------------------------------------------|--------------------|
| 400                      | 33          | 10×30                 | 0.15  | 335                                                          | EKHE401E□□330MJ30S | 450                      | 27          | 10×30                 | 0.20  | 305                                                          | EKHE451E□□270MJ30S |
|                          | 39          | 10×35                 | 0.15  | 385                                                          | EKHE401E□□390MJ35S |                          | 33          | 10×35                 | 0.20  | 355                                                          | EKHE451E□□330MJ35S |
|                          | 47          | 10×40                 | 0.15  | 445                                                          | EKHE401E□□470MJ40S |                          | 39          | 10×40                 | 0.20  | 405                                                          | EKHE451E□□390MJ40S |
|                          | 56          | 10×45                 | 0.15  | 505                                                          | EKHE401E□□560MJ45S |                          | 47          | 10×45                 | 0.20  | 460                                                          | EKHE451E□□470MJ45S |
|                          | 56          | 12.5×30               | 0.15  | 480                                                          | EKHE401E□□560MK30S |                          | 47          | 12.5×30               | 0.20  | 440                                                          | EKHE451E□□470MK30S |
|                          | 68          | 12.5×35               | 0.15  | 560                                                          | EKHE401E□□680MK35S |                          | 56          | 12.5×35               | 0.20  | 505                                                          | EKHE451E□□560MK35S |
|                          | 82          | 12.5×40               | 0.15  | 640                                                          | EKHE401E□□820MK40S |                          | 68          | 12.5×40               | 0.20  | 580                                                          | EKHE451E□□680MK40S |
|                          | 82          | 14.5×31.5             | 0.15  | 625                                                          | EKHE401E□□820MUN3S |                          | 68          | 14.5×31.5             | 0.20  | 570                                                          | EKHE451E□□680MUN3S |
|                          | 100         | 12.5×45               | 0.15  | 730                                                          | EKHE401E□□101MK45S |                          | 82          | 12.5×45               | 0.20  | 660                                                          | EKHE451E□□820MK45S |
|                          | 100         | 14.5×35               | 0.15  | 715                                                          | EKHE401E□□101MU35S |                          | 82          | 14.5×35               | 0.20  | 650                                                          | EKHE451E□□820MU35S |
|                          | 100         | 16×31.5               | 0.15  | 720                                                          | EKHE401E□□101MLN3S |                          | 82          | 16×31.5               | 0.20  | 655                                                          | EKHE451E□□820MLN3S |
|                          | 120         | 14.5×40               | 0.15  | 810                                                          | EKHE401E□□121MU40S |                          | 100         | 14.5×40               | 0.20  | 740                                                          | EKHE451E□□101MU40S |
| 420                      | 120         | 16×35                 | 0.15  | 810                                                          | EKHE401E□□121ML35S | 450                      | 100         | 16×35                 | 0.20  | 740                                                          | EKHE451E□□101ML35S |
|                          | 120         | 18×31.5               | 0.15  | 815                                                          | EKHE401E□□121MMN3S |                          | 120         | 18×31.5               | 0.20  | 815                                                          | EKHE451E□□121MMN3S |
|                          | 33          | 10×30                 | 0.20  | 335                                                          | EKHE421E□□330MJ30S |                          |             |                       |       |                                                              |                    |
|                          | 39          | 10×35                 | 0.20  | 385                                                          | EKHE421E□□390MJ35S |                          |             |                       |       |                                                              |                    |
|                          | 47          | 10×40                 | 0.20  | 445                                                          | EKHE421E□□470MJ40S |                          |             |                       |       |                                                              |                    |
|                          | 56          | 10×50                 | 0.20  | 520                                                          | EKHE421E□□560MJ50S |                          |             |                       |       |                                                              |                    |
|                          | 56          | 12.5×30               | 0.20  | 480                                                          | EKHE421E□□560MK30S |                          |             |                       |       |                                                              |                    |
|                          | 68          | 12.5×35               | 0.20  | 560                                                          | EKHE421E□□680MK35S |                          |             |                       |       |                                                              |                    |
|                          | 82          | 12.5×40               | 0.20  | 640                                                          | EKHE421E□□820MK40S |                          |             |                       |       |                                                              |                    |
|                          | 82          | 14.5×31.5             | 0.20  | 625                                                          | EKHE421E□□820MUN3S |                          |             |                       |       |                                                              |                    |
|                          | 100         | 12.5×50               | 0.20  | 750                                                          | EKHE421E□□101MK50S |                          |             |                       |       |                                                              |                    |
|                          | 100         | 14.5×40               | 0.20  | 740                                                          | EKHE421E□□101MU40S |                          |             |                       |       |                                                              |                    |
|                          | 100         | 16×31.5               | 0.20  | 720                                                          | EKHE421E□□101MLN3S |                          |             |                       |       |                                                              |                    |
|                          | 120         | 14.5×45               | 0.20  | 835                                                          | EKHE421E□□121MU45S |                          |             |                       |       |                                                              |                    |
|                          | 120         | 16×35                 | 0.20  | 810                                                          | EKHE421E□□121ML35S |                          |             |                       |       |                                                              |                    |
|                          | 120         | 18×31.5               | 0.20  | 815                                                          | EKHE421E□□121MMN3S |                          |             |                       |       |                                                              |                    |

□□ : Enter the appropriate lead forming or taping code.

## ◆ RATED RIPPLE CURRENT MULTIPLIERS

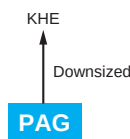
## ● Frequency Multipliers

| Capacitance(μF) \ Frequency(Hz) | 120  | 1k   | 10k  | 100k |
|---------------------------------|------|------|------|------|
| 27 to 82                        | 1.00 | 1.50 | 1.75 | 1.80 |
| 100 to 120                      | 1.00 | 1.30 | 1.40 | 1.50 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

# PAG Series

- Downsize, high ripple design (φ 10 to 18)
- Rated voltage range : 200 to 450V<sub>dc</sub>, Capacitance range : 18 to 560μF
- Endurance with ripple current : 2,000 hours at 105°C
- Ideal for low profile power supply applications
- Non solvent resistant type
- RoHS2 Compliant

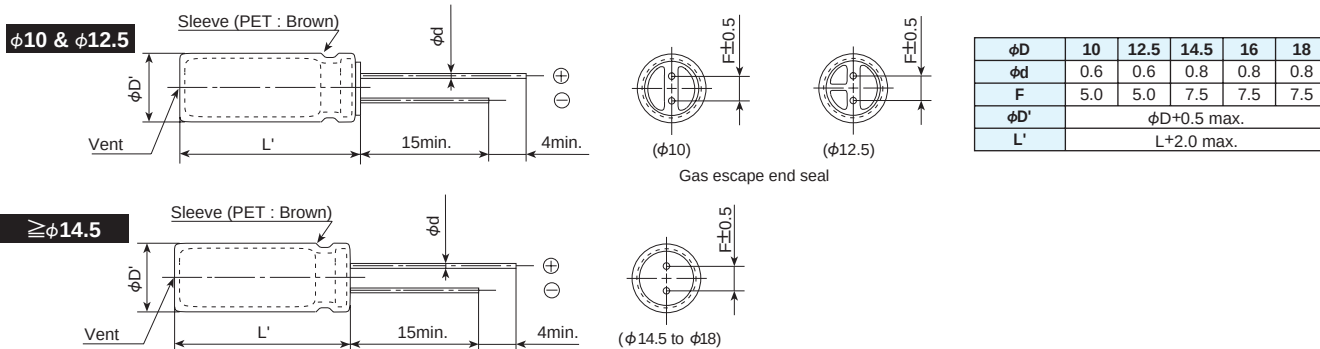


## SPECIFICATIONS

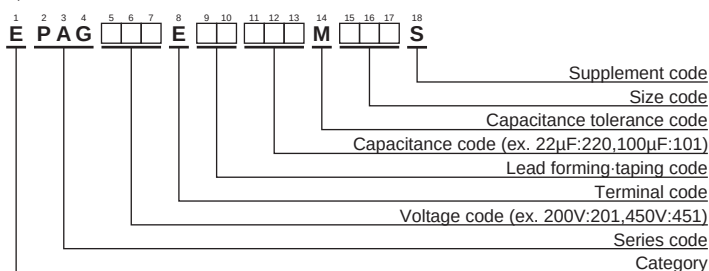
| Items                                                  | Characteristics                                                                                                                                                                                                                                                                       |                                      |                 |      |      |                  |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-----------------|------|------|------------------|
| Category                                               |                                                                                                                                                                                                                                                                                       |                                      |                 |      |      |                  |
| Temperature Range                                      | -40 to +105℃ (200, 400V <sub>dc</sub> ) -25 to +105℃ (420, 450V <sub>dc</sub> )                                                                                                                                                                                                       |                                      |                 |      |      |                  |
| Rated Voltage Range                                    | 200 to 450V <sub>dc</sub>                                                                                                                                                                                                                                                             |                                      |                 |      |      |                  |
| Capacitance Tolerance                                  | ±20% (M) (at 20℃, 120Hz)℃                                                                                                                                                                                                                                                             |                                      |                 |      |      |                  |
| Leakage Current                                        |                                                                                                                                                                                                                                                                                       | After 1 minute                       | After 5 minutes |      |      |                  |
|                                                        | CV≤1,000                                                                                                                                                                                                                                                                              | I=0.1CV+40                           | I=0.03CV+15     |      |      |                  |
|                                                        | CV>1,000                                                                                                                                                                                                                                                                              | I=0.04CV+100                         | I=0.02CV+25     |      |      |                  |
|                                                        | Where, I : Max. leakage current(μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃)℃                                                                                                                                                                                    |                                      |                 |      |      |                  |
| Dissipation Factor (tan δ )                            | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 200V                                 | 400V            | 420V | 450V | (at 20℃, 120Hz)℃ |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.12                                 | 0.15            | 0.20 | 0.20 |                  |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 200V                                 | 400V            | 420V | 450V | (at 120Hz)       |
|                                                        | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 3                                    | 5               | 6    | 6    |                  |
|                                                        | Z(-40℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 6                                    | 6               | —    | —    |                  |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 2,000 hours at 105℃.                                         |                                      |                 |      |      |                  |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±20% of the initial value          |                 |      |      |                  |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤200% of the initial specified value |                 |      |      |                  |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value         |                 |      |      |                  |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                      |                 |      |      |                  |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±20% of the initial value          |                 |      |      |                  |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤200% of the initial specified value |                 |      |      |                  |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤500% of the initial specified value |                 |      |      |                  |

## DIMENSIONS [mm]

### Terminal Code : E



## PART NUMBERING SYSTEM



Please refer to "Product code guide (radial lead type)"



**PAG**Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(mA <sub>rms</sub> /105°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(mA <sub>rms</sub> /105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|--------------------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|--------------------------------------------------------------|--------------------|
| 200                      | 82          | 10×30                 | 0.12  | 440                                                          | EPAG201E□□820MJ30S | 420                      | 22          | 10×30                 | 0.20  | 230                                                          | EPAG421E□□220MJ30S |
|                          | 100         | 10×35                 | 0.12  | 510                                                          | EPAG201E□□101MJ35S |                          | 27          | 10×35                 | 0.20  | 270                                                          | EPAG421E□□270MJ35S |
|                          | 120         | 10×40                 | 0.12  | 590                                                          | EPAG201E□□121MJ40S |                          | 33          | 10×40                 | 0.20  | 310                                                          | EPAG421E□□330MJ40S |
|                          | 150         | 12.5×30               | 0.12  | 650                                                          | EPAG201E□□151MK30S |                          | 39          | 12.5×30               | 0.20  | 330                                                          | EPAG421E□□390MK30S |
|                          | 180         | 12.5×35               | 0.12  | 750                                                          | EPAG201E□□181MK35S |                          | 47          | 12.5×35               | 0.20  | 390                                                          | EPAG421E□□470MK35S |
|                          | 220         | 12.5×40               | 0.12  | 830                                                          | EPAG201E□□221MK40S |                          | 56          | 12.5×40               | 0.20  | 430                                                          | EPAG421E□□560MK40S |
|                          | 220         | 14.5×30               | 0.12  | 830                                                          | EPAG201E□□221MU30S |                          | 56          | 14.5×30               | 0.20  | 430                                                          | EPAG421E□□560MU30S |
|                          | 270         | 14.5×35               | 0.12  | 960                                                          | EPAG201E□□271MU35S |                          | 68          | 14.5×35               | 0.20  | 510                                                          | EPAG421E□□680MU35S |
|                          | 270         | 16×30                 | 0.12  | 960                                                          | EPAG201E□□271ML30S |                          | 68          | 16×30                 | 0.20  | 510                                                          | EPAG421E□□680ML30S |
|                          | 330         | 16×35                 | 0.12  | 1,100                                                        | EPAG201E□□331ML35S |                          | 82          | 14.5×40               | 0.20  | 570                                                          | EPAG421E□□820MU40S |
|                          | 330         | 18×30                 | 0.12  | 1,100                                                        | EPAG201E□□331MM30S |                          | 82          | 16×35                 | 0.20  | 570                                                          | EPAG421E□□820ML35S |
|                          | 390         | 16×40                 | 0.12  | 1,240                                                        | EPAG201E□□391ML40S |                          | 100         | 16×40                 | 0.20  | 610                                                          | EPAG421E□□101ML40S |
|                          | 390         | 18×35                 | 0.12  | 1,240                                                        | EPAG201E□□391MM35S |                          | 100         | 18×30                 | 0.20  | 610                                                          | EPAG421E□□101MM30S |
|                          | 470         | 18×40                 | 0.12  | 1,390                                                        | EPAG201E□□471MM40S |                          | 120         | 18×35                 | 0.20  | 690                                                          | EPAG421E□□121MM35S |
|                          | 560         | 18×45                 | 0.12  | 1,560                                                        | EPAG201E□□561MM45S |                          | 150         | 18×40                 | 0.20  | 790                                                          | EPAG421E□□151MM40S |
| 400                      | 27          | 10×30                 | 0.15  | 260                                                          | EPAG401E□□270MJ30S | 450                      | 18          | 10×30                 | 0.20  | 210                                                          | EPAG451E□□180MJ30S |
|                          | 33          | 10×35                 | 0.15  | 300                                                          | EPAG401E□□330MJ35S |                          | 22          | 10×35                 | 0.20  | 240                                                          | EPAG451E□□220MJ35S |
|                          | 39          | 10×40                 | 0.15  | 340                                                          | EPAG401E□□390MJ40S |                          | 27          | 10×40                 | 0.20  | 280                                                          | EPAG451E□□270MJ40S |
|                          | 47          | 12.5×30               | 0.15  | 370                                                          | EPAG401E□□470MK30S |                          | 33          | 12.5×30               | 0.20  | 310                                                          | EPAG451E□□330MK30S |
|                          | 56          | 12.5×35               | 0.15  | 420                                                          | EPAG401E□□560MK35S |                          | 39          | 12.5×35               | 0.20  | 350                                                          | EPAG451E□□390MK35S |
|                          | 68          | 12.5×40               | 0.15  | 480                                                          | EPAG401E□□680MK40S |                          | 47          | 12.5×40               | 0.20  | 390                                                          | EPAG451E□□470MK40S |
|                          | 68          | 14.5×30               | 0.15  | 480                                                          | EPAG401E□□680MU30S |                          | 47          | 14.5×30               | 0.20  | 390                                                          | EPAG451E□□470MU30S |
|                          | 82          | 14.5×35               | 0.15  | 530                                                          | EPAG401E□□820MU35S |                          | 56          | 14.5×35               | 0.20  | 440                                                          | EPAG451E□□560MU35S |
|                          | 100         | 14.5×40               | 0.15  | 580                                                          | EPAG401E□□101MU40S |                          | 56          | 16×30                 | 0.20  | 440                                                          | EPAG451E□□560ML30S |
|                          | 100         | 16×30                 | 0.15  | 580                                                          | EPAG401E□□101ML30S |                          | 68          | 14.5×40               | 0.20  | 500                                                          | EPAG451E□□680MU40S |
|                          | 120         | 16×35                 | 0.15  | 670                                                          | EPAG401E□□121ML35S |                          | 68          | 16×35                 | 0.20  | 500                                                          | EPAG451E□□680ML35S |
|                          | 120         | 18×30                 | 0.15  | 670                                                          | EPAG401E□□121MM30S |                          | 82          | 16×40                 | 0.20  | 550                                                          | EPAG451E□□820ML40S |
|                          | 150         | 16×40                 | 0.15  | 770                                                          | EPAG401E□□151ML40S |                          | 82          | 18×30                 | 0.20  | 550                                                          | EPAG451E□□820MM30S |
|                          | 150         | 18×35                 | 0.15  | 770                                                          | EPAG401E□□151MM35S |                          | 100         | 18×35                 | 0.20  | 650                                                          | EPAG451E□□101MM35S |
|                          | 180         | 18×40                 | 0.15  | 880                                                          | EPAG401E□□181MM40S |                          | 120         | 18×40                 | 0.20  | 740                                                          | EPAG451E□□121MM40S |
|                          | 220         | 18×45                 | 0.15  | 1,000                                                        | EPAG401E□□221MM45S |                          | 150         | 18×45                 | 0.20  | 810                                                          | EPAG451E□□151MM45S |

□□ : Enter the appropriate lead forming or taping code.

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

| Capacitance(μF) \ Frequency(Hz) | 120  | 1k   | 10k  | 100k |
|---------------------------------|------|------|------|------|
| 18 to 82                        | 1.00 | 1.50 | 1.75 | 1.80 |
| 100 to 560                      | 1.00 | 1.30 | 1.40 | 1.50 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.



## KLJ Series

- Doesn't spark with DC over voltage
- Endurance with ripple current : 2,000 hours at 105°C
- Non solvent resistant type
- ESR value prescribed
- RoHS2 Compliant

Doesn't spark with DC over voltage!

KLJ

Downsized  
KLG

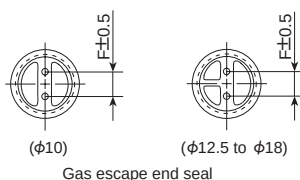
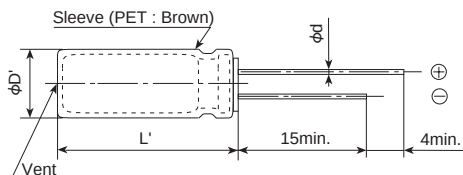


### SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                       |                                       |      |      |                 |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|------|------|-----------------|
| Category                                               |                                                                                                                                                                                                                                                                                       |                                       |      |      |                 |
| Temperature Range                                      | -25 to +105℃                                                                                                                                                                                                                                                                          |                                       |      |      |                 |
| Rated Voltage Range                                    | 200 to 450V <sub>dc</sub>                                                                                                                                                                                                                                                             |                                       |      |      |                 |
| Capacitance Tolerance                                  | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                             |                                       |      |      |                 |
| Leakage Current                                        | I=0.04CV+100<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 1 minute)                                                                                                                                                     |                                       |      |      |                 |
| Dissipation Factor (tan δ )                            | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 200V                                  | 400V | 450V | (at 20℃, 120Hz) |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.20                                  | 0.24 | 0.24 |                 |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 200V                                  | 400V | 450V | (at 120Hz)      |
|                                                        | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 4                                     | 6    | 6    |                 |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 2,000 hours at 105℃.                                         |                                       |      |      |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ± 20% of the initial value          |      |      |                 |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤ 200% of the initial specified value |      |      |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value         |      |      |                 |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                       |      |      |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ± 20% of the initial value          |      |      |                 |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤ 200% of the initial specified value |      |      |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤ 500% of the initial specified value |      |      |                 |

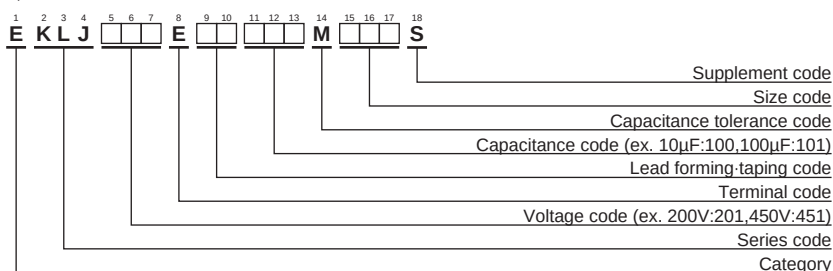
### DIMENSIONS [mm]

#### Terminal Code : E



| φD  | 10         | 12.5 | 16  | 18  |
|-----|------------|------|-----|-----|
| φd  | 0.6        | 0.6  | 0.8 | 0.8 |
| F   | 5.0        | 5.0  | 7.5 | 7.5 |
| φD' | φD+0.5max. |      |     |     |
| L'  | L+1.5max.  |      |     |     |

### PART NUMBERING SYSTEM



Please refer to "Product code guide (radial lead type)"

### RATED RIPPLE CURRENT MULTIPLIERS

#### Frequency Multipliers

| Capacitance(μF) | Frequency(Hz) | 120  | 300  | 1k   | 10k  | 50k  | 100k |
|-----------------|---------------|------|------|------|------|------|------|
| 10μF            |               | 1.00 | 1.35 | 1.75 | 2.30 | 2.50 | 2.70 |
| 15 to 47μF      |               | 1.00 | 1.25 | 1.50 | 1.75 | 1.80 | 1.85 |
| 56 to 330μF     |               | 1.00 | 1.15 | 1.30 | 1.40 | 1.50 | 1.60 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φ D×L(mm) | tan δ | ESR<br>(Ω max/20°C, 100kHz) | Rated ripple current<br>(mA rms/105°C, 120Hz) | Part No.           |
|--------------------------|-------------|------------------------|-------|-----------------------------|-----------------------------------------------|--------------------|
| 200                      | 33          | 10×20                  | 0.20  | 1.8                         | 165                                           | EKLJ201E□□330MJ20S |
|                          | 39          | 10×25                  | 0.20  | 1.4                         | 200                                           | EKLJ201E□□390MJ25S |
|                          | 56          | 12.5×20                | 0.20  | 1.0                         | 265                                           | EKLJ201E□□560MK20S |
|                          | 82          | 12.5×25                | 0.20  | 0.72                        | 350                                           | EKLJ201E□□820MK25S |
|                          | 100         | 16×20                  | 0.20  | 0.63                        | 390                                           | EKLJ201E□□101ML20S |
|                          | 120         | 16×25                  | 0.20  | 0.44                        | 465                                           | EKLJ201E□□121ML25S |
|                          | 150         | 18×20                  | 0.20  | 0.31                        | 505                                           | EKLJ201E□□151MM20S |
|                          | 180         | 16×31.5                | 0.20  | 0.36                        | 615                                           | EKLJ201E□□181MLN3S |
|                          | 180         | 18×25                  | 0.20  | 0.30                        | 585                                           | EKLJ201E□□181MM25S |
|                          | 220         | 16×35.5                | 0.20  | 0.30                        | 695                                           | EKLJ201E□□221MLP1S |
|                          | 220         | 18×31.5                | 0.20  | 0.28                        | 700                                           | EKLJ201E□□221MMN3S |
| 400                      | 270         | 18×35.5                | 0.20  | 0.24                        | 805                                           | EKLJ201E□□271MMP1S |
|                          | 330         | 18×40                  | 0.20  | 0.21                        | 900                                           | EKLJ201E□□331MM40S |
|                          | 10          | 10×16                  | 0.24  | 5.7                         | 64                                            | EKLJ401E□□100MJ16S |
|                          | 15          | 10×20                  | 0.24  | 4.0                         | 105                                           | EKLJ401E□□150MJ20S |
|                          | 18          | 10×25                  | 0.24  | 3.2                         | 110                                           | EKLJ401E□□180MJ25S |
|                          | 22          | 12.5×20                | 0.24  | 2.7                         | 165                                           | EKLJ401E□□220MK20S |
|                          | 27          | 12.5×25                | 0.24  | 1.9                         | 200                                           | EKLJ401E□□270MK25S |
|                          | 33          | 16×20                  | 0.24  | 1.5                         | 225                                           | EKLJ401E□□330ML20S |
|                          | 39          | 18×20                  | 0.24  | 1.2                         | 255                                           | EKLJ401E□□390MM20S |
|                          | 47          | 16×25                  | 0.24  | 1.1                         | 290                                           | EKLJ401E□□470ML25S |
|                          | 47          | 18×20                  | 0.24  | 1.2                         | 280                                           | EKLJ401E□□470MM20S |
|                          | 56          | 16×31.5                | 0.24  | 0.84                        | 340                                           | EKLJ401E□□560MLN3S |
|                          | 68          | 16×35.5                | 0.24  | 0.72                        | 385                                           | EKLJ401E□□680MLP1S |
|                          | 68          | 18×25                  | 0.24  | 0.88                        | 360                                           | EKLJ401E□□680MM25S |
| 450                      | 82          | 16×40                  | 0.24  | 0.65                        | 435                                           | EKLJ401E□□820ML40S |
|                          | 82          | 18×31.5                | 0.24  | 0.64                        | 425                                           | EKLJ401E□□820MMN3S |
|                          | 100         | 18×35.5                | 0.24  | 0.54                        | 490                                           | EKLJ401E□□101MMP1S |
|                          | 120         | 18×40                  | 0.24  | 0.49                        | 540                                           | EKLJ401E□□121MM40S |
|                          | 39          | 16×25                  | 0.24  | 1.4                         | 265                                           | EKLJ451E□□390ML25S |
|                          | 39          | 18×20                  | 0.24  | 1.4                         | 255                                           | EKLJ451E□□390MM20S |
|                          | 47          | 16×25                  | 0.24  | 1.3                         | 290                                           | EKLJ451E□□470ML25S |
|                          | 47          | 18×25                  | 0.24  | 1.2                         | 320                                           | EKLJ451E□□470MM25S |
|                          | 56          | 16×31.5                | 0.24  | 1.1                         | 340                                           | EKLJ451E□□560MLN3S |
|                          | 68          | 16×35.5                | 0.24  | 0.86                        | 420                                           | EKLJ451E□□680MLP1S |
|                          | 68          | 18×31.5                | 0.24  | 0.91                        | 390                                           | EKLJ451E□□680MMN3S |
|                          | 82          | 16×40                  | 0.24  | 0.79                        | 435                                           | EKLJ451E□□820ML40S |
|                          | 82          | 18×31.5                | 0.24  | 0.78                        | 425                                           | EKLJ451E□□820MMN3S |
|                          | 100         | 18×40                  | 0.24  | 0.67                        | 490                                           | EKLJ451E□□101MM40S |
|                          | 110         | 18×40                  | 0.24  | 0.59                        | 540                                           | EKLJ451E□□111MM40S |
|                          | 120         | 18×45                  | 0.24  | 0.58                        | 570                                           | EKLJ451E□□121MM45S |

□□ : Enter the appropriate lead forming or taping code.

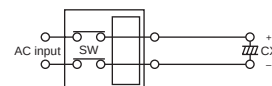
## ◆DC OVERVOLTAGE TEST CONDITIONS

The vent will operate and the capacitor shall become an open circuit without burning materials when the following excess DC voltage is applied.

## ●Test DC voltage

| Rated voltage      | Nominal capacitance | Current limit | Test DC voltage        |
|--------------------|---------------------|---------------|------------------------|
| 200V <sub>dc</sub> | <330μF              | 4A            | 300/375V <sub>dc</sub> |
|                    | 330μF               | 5A            |                        |
| 400V <sub>dc</sub> | <100μF              | 2A            | 500/600V <sub>dc</sub> |
|                    | 100μF ≤ C ≤ 120μF   | 4A            |                        |
| 450V <sub>dc</sub> | <100μF              | 2A            | 550/675V <sub>dc</sub> |
|                    | 100μF ≤ C ≤ 120μF   | 4A            |                        |

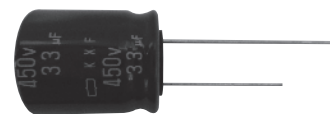
## ●Test circuit



Constant DC voltage/current power supply

# KXF Series

- For LED light circuits and other long life applications
- Rated voltage range : 160 to 450 V<sub>dc</sub> , Capacitance range : 5.6 to 68μF
- Endurance with ripple current : 15,000 to 20,000 hours at 105°C
- Non solvent resistant type
- RoHS2 Compliant

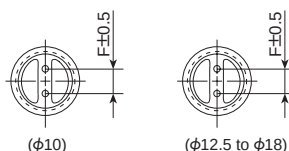
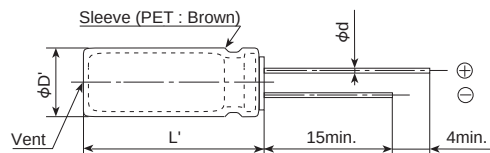


## SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                       |                                       |                 |            |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-----------------|------------|
| Category                                               | -40 to +105℃                                                                                                                                                                                                                                                                          |                                       |                 |            |
| Temperature Range                                      |                                                                                                                                                                                                                                                                                       |                                       |                 |            |
| Rated Voltage Range                                    | 160 to 450V <sub>dc</sub>                                                                                                                                                                                                                                                             |                                       |                 |            |
| Capacitance Tolerance                                  | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                             |                                       |                 |            |
| Leakage Current                                        | After 1 minute                                                                                                                                                                                                                                                                        | After 5 minutes                       | (at 20℃)        |            |
|                                                        | I=0.04CV+100                                                                                                                                                                                                                                                                          | I=0.02CV+25                           |                 |            |
|                                                        | Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)                                                                                                                                                                                             |                                       |                 |            |
| Dissipation Factor (tan δ)                             | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 160 to 450V                           | (at 20℃, 120Hz) |            |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.24                                  |                 |            |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 160 to 250V                           | 400, 450V       | (at 120Hz) |
|                                                        | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 3                                     | 6               |            |
|                                                        | Z(-40℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 8                                     | 10              |            |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 20,000 hours (15,000 hours for ϕ 10×12.5L) at 105℃.          |                                       |                 |            |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ± 30% of the initial value          |                 |            |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤ 300% of the initial specified value |                 |            |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value         |                 |            |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                       |                 |            |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ± 30% of the initial value          |                 |            |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤ 300% of the initial specified value |                 |            |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤ 500% of the initial specified value |                 |            |

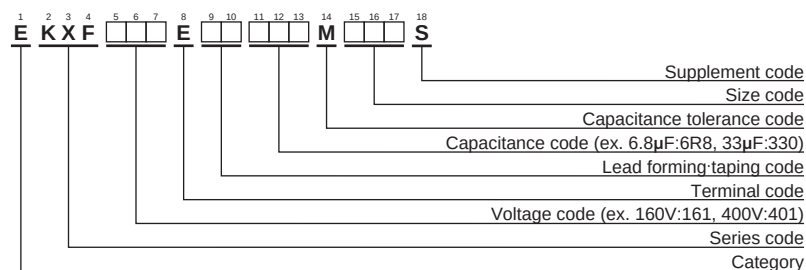
## DIMENSIONS [mm]

- Terminal Code : E



| φD  | 10         | 12.5 | 16  | 18  |
|-----|------------|------|-----|-----|
| φd  | 0.6        | 0.6  | 0.8 | 0.8 |
| F   | 5.0        | 5.0  | 7.5 | 7.5 |
| φD' | φD+0.5max. |      |     |     |
| L'  | L+1.5max.  |      |     |     |

## PART NUMBERING SYSTEM



Please refer to "Product code guide (radial lead type)"

## RATED RIPPLE CURRENT MULTIPLIERS

- Frequency Multipliers

| Capacitance(μF) | Frequency(Hz) | 120  | 1k   | 10k  | 100k |
|-----------------|---------------|------|------|------|------|
| 5.6 ~ 68        |               | 1.00 | 1.75 | 2.25 | 2.50 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

**KXF** Series

## ◆ STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple current<br>(mA <sub>rms</sub> /105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|-----------------------------------------------------------|--------------------|
| 160                      | 22          | 10×12.5               | 0.24  | 121                                                       | EKXF161E□□220MJC5S |
|                          | 33          | 10×16                 | 0.24  | 158                                                       | EKXF161E□□330MJ16S |
| 200                      | 18          | 10×12.5               | 0.24  | 113                                                       | EKXF201E□□180MJC5S |
|                          | 27          | 10×16                 | 0.24  | 149                                                       | EKXF201E□□270MJ16S |
| 250                      | 10          | 10×12.5               | 0.24  | 90                                                        | EKXF251E□□100MJC5S |
|                          | 12          | 10×12.5               | 0.24  | 97                                                        | EKXF251E□□120MJC5S |
|                          | 18          | 10×16                 | 0.24  | 129                                                       | EKXF251E□□180MJ16S |
| 400                      | 5.6         | 10×12.5               | 0.24  | 64                                                        | EKXF401E□□5R6MJC5S |
|                          | 8.2         | 10×16                 | 0.24  | 88                                                        | EKXF401E□□8R2MJ16S |
| 450                      | 6.8         | 10×16                 | 0.24  | 62                                                        | EKXF451E□□6R8MJ16S |
|                          | 8.2         | 10×16                 | 0.24  | 88                                                        | EKXF451E□□8R2MJ16S |
|                          | 10          | 10×20                 | 0.24  | 92                                                        | EKXF451E□□100MJ20S |
|                          | 15          | 12.5×20               | 0.24  | 140                                                       | EKXF451E□□150MK20S |
|                          | 22          | 12.5×25               | 0.24  | 240                                                       | EKXF451E□□220MK25S |
|                          | 27          | 16×20                 | 0.24  | 305                                                       | EKXF451E□□270ML20S |
|                          | 33          | 16×25                 | 0.24  | 392                                                       | EKXF451E□□330ML25S |
|                          | 33          | 18×20                 | 0.24  | 312                                                       | EKXF451E□□330MM20S |
|                          | 47          | 18×25                 | 0.24  | 480                                                       | EKXF451E□□470MM25S |
|                          | 68          | 18×31.5               | 0.24  | 520                                                       | EKXF451E□□680MMN3S |

□□ : Enter the appropriate lead forming or taping code.



# LE Series

- Suitable for long life products
- Downsize and long life
- Endurance with ripple current : 10,000 hours at 105°C
- Case size range :  $\phi 5 \times 11L$  to  $\phi 8 \times 11.5L$
- Solvent resistant type (see PRECAUTIONS AND GUIDELINES)
- RoHS2 Compliant

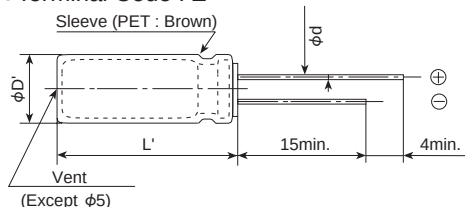


## SPECIFICATION

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |      |      |      |      |      |      |
|--------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|
| Category                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |      |      |      |      |      |      |
| Temperature Range                                      | -40 to +105°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |      |      |      |      |      |      |
| Rated Voltage Range                                    | 10 to 100V <sub>dc</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |      |      |      |      |      |      |
| Capacitance Tolerance                                  | $\pm 20\%$ (M) (at 20°C, 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |      |      |      |      |      |      |
| Leakage Current                                        | I=0.01CV or 3 $\mu$ A, whichever is greater.<br>Where, I : Max. leakage current ( $\mu$ A), C : Nominal capacitance ( $\mu$ F), V : Rated voltage (V) (at 20°C after 2 minutes)                                                                                                                                                                                                                                                                                              |      |      |      |      |      |      |      |
| Dissipation Factor (tan $\delta$ )                     | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                                                                                                                                                                                                             | 10V  | 16V  | 25V  | 35V  | 50V  | 63V  | 100V |
|                                                        | tan $\delta$ (Max.)                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 0.45 | 0.35 | 0.30 | 0.22 | 0.19 | 0.17 | 0.15 |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                                                                                                                                                                                                             | 10V  | 16V  | 25V  | 35V  | 50V  | 63V  | 100V |
|                                                        | Z(-25°C)/Z(20°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 8    | 6    | 4    | 4    | 3    | 3    | 3    |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 10,000 hours at 105°C.<br>Capacitance change $\leq \pm 25\%$ of the initial value<br>D.F. (tan $\delta$ ) $\leq 300\%$ of the initial specified value<br>Leakage current $\leq$ The initial specified value (at 120Hz)                             |      |      |      |      |      |      |      |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4.<br>Capacitance change $\leq \pm 25\%$ of the initial value<br>D.F. (tan $\delta$ ) $\leq 300\%$ of the initial specified value<br>Leakage current $\leq$ The initial specified value |      |      |      |      |      |      |      |

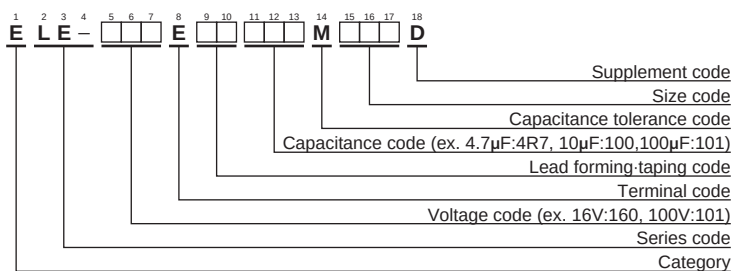
## DIMENSIONS [mm]

### Terminal Code : E



| $\phi D$  | 5                           | 6.3 | 8   |
|-----------|-----------------------------|-----|-----|
| $\phi d$  | 0.5                         | 0.5 | 0.6 |
| F         | 2.0                         | 2.5 | 3.5 |
| $\phi D'$ | $\phi D + 0.5 \text{ max.}$ |     |     |
| L'        | $L + 1.5 \text{ max.}$      |     |     |

## PART NUMBERING SYSTEM



Please refer to "Product code guide (radial lead type)"





## LE Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>( $\mu$ F) | Case size<br>$\phi$ D $\times$ L (mm) | $\tan \delta$ | Rated ripple current<br>(mA <sub>rms</sub> /105°C, 100kHz) | Part No.           |
|--------------------------|-------------------|---------------------------------------|---------------|------------------------------------------------------------|--------------------|
| 10                       | 100               | 5 $\times$ 11                         | 0.45          | 130                                                        | ELE-100E□□101ME11D |
|                          | 220               | 6.3 $\times$ 11                       | 0.45          | 210                                                        | ELE-100E□□221MF11D |
|                          | 330               | 8 $\times$ 11.5                       | 0.45          | 330                                                        | ELE-100E□□331MHB5D |
| 16                       | 47                | 5 $\times$ 11                         | 0.35          | 130                                                        | ELE-160E□□470ME11D |
|                          | 100               | 6.3 $\times$ 11                       | 0.35          | 210                                                        | ELE-160E□□101MF11D |
|                          | 220               | 8 $\times$ 11.5                       | 0.35          | 330                                                        | ELE-160E□□221MHB5D |
| 25                       | 33                | 5 $\times$ 11                         | 0.30          | 130                                                        | ELE-250E□□330ME11D |
|                          | 47                | 5 $\times$ 11                         | 0.30          | 130                                                        | ELE-250E□□470ME11D |
|                          | 100               | 6.3 $\times$ 11                       | 0.30          | 210                                                        | ELE-250E□□101MF11D |
| 35                       | 33                | 5 $\times$ 11                         | 0.22          | 130                                                        | ELE-350E□□330ME11D |
|                          | 47                | 6.3 $\times$ 11                       | 0.22          | 210                                                        | ELE-350E□□470MF11D |
|                          | 100               | 8 $\times$ 11.5                       | 0.22          | 330                                                        | ELE-350E□□101MHB5D |
| 50                       | 1.0               | 5 $\times$ 11                         | 0.19          | 25                                                         | ELE-500E□□1R0ME11D |
|                          | 2.2               | 5 $\times$ 11                         | 0.19          | 35                                                         | ELE-500E□□2R2ME11D |
|                          | 3.3               | 5 $\times$ 11                         | 0.19          | 70                                                         | ELE-500E□□3R3ME11D |
|                          | 4.7               | 5 $\times$ 11                         | 0.19          | 80                                                         | ELE-500E□□4R7ME11D |
|                          | 10                | 5 $\times$ 11                         | 0.19          | 90                                                         | ELE-500E□□100ME11D |
|                          | 22                | 5 $\times$ 11                         | 0.19          | 110                                                        | ELE-500E□□220ME11D |
|                          | 33                | 6.3 $\times$ 11                       | 0.19          | 190                                                        | ELE-500E□□330MF11D |
|                          | 47                | 6.3 $\times$ 11                       | 0.19          | 190                                                        | ELE-500E□□470MF11D |
| 63                       | 100               | 8 $\times$ 11.5                       | 0.19          | 270                                                        | ELE-500E□□101MHB5D |
|                          | 10                | 5 $\times$ 11                         | 0.17          | 80                                                         | ELE-630E□□100ME11D |
|                          | 22                | 6.3 $\times$ 11                       | 0.17          | 170                                                        | ELE-630E□□220MF11D |
|                          | 33                | 6.3 $\times$ 11                       | 0.17          | 170                                                        | ELE-630E□□330MF11D |
| 100                      | 47                | 8 $\times$ 11.5                       | 0.17          | 240                                                        | ELE-630E□□470MHB5D |
|                          | 1.0               | 5 $\times$ 11                         | 0.15          | 40                                                         | ELE-101E□□1R0ME11D |
|                          | 2.2               | 5 $\times$ 11                         | 0.15          | 50                                                         | ELE-101E□□2R2ME11D |
|                          | 3.3               | 5 $\times$ 11                         | 0.15          | 60                                                         | ELE-101E□□3R3ME11D |
|                          | 4.7               | 5 $\times$ 11                         | 0.15          | 70                                                         | ELE-101E□□4R7ME11D |
|                          | 10                | 6.3 $\times$ 11                       | 0.15          | 150                                                        | ELE-101E□□100MF11D |
|                          | 22                | 8 $\times$ 11.5                       | 0.15          | 230                                                        | ELE-101E□□220MHB5D |

□□ : Enter the appropriate lead forming or taping code.

Production of the products shown in □□□□□ is scheduled to be discontinued.

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

| Capacitance( $\mu$ F) | Frequency(Hz) |      |      |      |
|-----------------------|---------------|------|------|------|
|                       | 120           | 1k   | 10k  | 100k |
| 1.0 to 10             | 0.42          | 0.60 | 0.80 | 1.00 |
| 22 to 33              | 0.55          | 0.75 | 0.90 | 1.00 |
| 47 to 330             | 0.70          | 0.85 | 0.95 | 1.00 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

# GPA Series

- Guaranteed short time at 150°C
- Downsized, low impedance and high-ripple current version of GXE series
- Specified ESR after endurance test
- For high ripple current automotive applications.  
(Direct fuel injection and electric power steering etc.)
- Endurance with ripple current : 3,000 to 5,000 hours at 125°C
- Solvent resistant type (see PRECAUTIONS AND GUIDELINES)
- RoHS2 Compliant
- AEC-Q200 compliant : Please contact Chemi-Con for more details, test data, information.

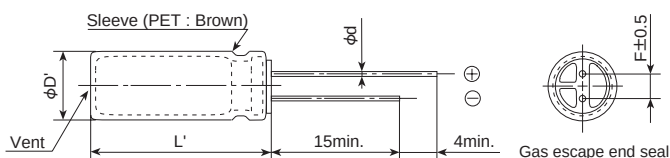


## SPECIFICATIONS

| Items                                                        | Characteristics                                                                                                                                                                                                                                                                                                                                   |                                      |      |      |      |      |      |
|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------|------|------|------|------|
| Category                                                     | -40 to +125°C                                                                                                                                                                                                                                                                                                                                     |                                      |      |      |      |      |      |
| Temperature Range                                            |                                                                                                                                                                                                                                                                                                                                                   |                                      |      |      |      |      |      |
| Rated Voltage Range                                          | 25 to 100V <sub>dc</sub>                                                                                                                                                                                                                                                                                                                          |                                      |      |      |      |      |      |
| Capacitance Tolerance                                        | ± 20% (M) (at 20°C, 120Hz)                                                                                                                                                                                                                                                                                                                        |                                      |      |      |      |      |      |
| Leakage Current                                              | I=0.03CV or 4μA, whichever is greater.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C, 1 minute)                                                                                                                                                                                           |                                      |      |      |      |      |      |
| Dissipation Factor<br>(tan δ )                               | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                                                                                  | 25V                                  | 35V  | 50V  | 63V  | 80V  | 100V |
|                                                              | tan δ (Max.)                                                                                                                                                                                                                                                                                                                                      | 0.14                                 | 0.12 | 0.10 | 0.10 | 0.08 | 0.08 |
|                                                              | When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase. (at 20°C, 120Hz)                                                                                                                                                                                                                                 |                                      |      |      |      |      |      |
| Low Temperature<br>Characteristics<br>(Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                                                                                  | 25V                                  | 35V  | 50V  | 63V  | 80V  | 100V |
|                                                              | Z(-25°C)/Z(+20°C)                                                                                                                                                                                                                                                                                                                                 | 2                                    | 2    | 2    | 2    | 2    | 2    |
|                                                              | Z(-40°C)/Z(+20°C)                                                                                                                                                                                                                                                                                                                                 | 4                                    | 4    | 4    | 4    | 4    | 4    |
| (at 120Hz)                                                   |                                                                                                                                                                                                                                                                                                                                                   |                                      |      |      |      |      |      |
| Endurance 1                                                  | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 5,000 hours (3,000 hours for 25L and less) at 125 °C.                                                                   |                                      |      |      |      |      |      |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                                                                                | ≤ ± 30% of the initial value         |      |      |      |      |      |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                                                                                     | ≤300% of the initial specified value |      |      |      |      |      |
|                                                              | Leakage current                                                                                                                                                                                                                                                                                                                                   | ≤The initial specified value         |      |      |      |      |      |
| Endurance 2                                                  | The following specifications shall be satisfied when the capacitors are restored to 20°C after the test condition that the rated voltage is applied for 100 hours at 150°C and DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 4,500 hours (2,500 hours for 25L and less) at 125°C. |                                      |      |      |      |      |      |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                                                                                | ≤ ± 30% of the initial value         |      |      |      |      |      |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                                                                                     | ≤300% of the initial specified value |      |      |      |      |      |
|                                                              | Leakage current                                                                                                                                                                                                                                                                                                                                   | ≤The initial specified value         |      |      |      |      |      |
| Shelf Life                                                   | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 125°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4.                                                           |                                      |      |      |      |      |      |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                                                                                | ≤ ± 30% of the initial value         |      |      |      |      |      |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                                                                                     | ≤300% of the initial specified value |      |      |      |      |      |
|                                                              | Leakage current                                                                                                                                                                                                                                                                                                                                   | ≤The initial specified value         |      |      |      |      |      |

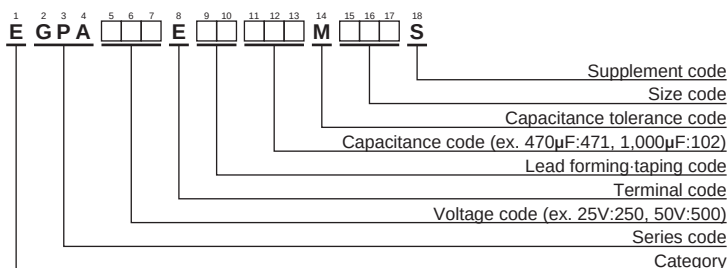
## DIMENSIONS [mm]

- Terminal Code : E



| φD  | 12.5       | 14.5 | 16  | 18  |
|-----|------------|------|-----|-----|
| φd  | 0.6        | 0.8  | 0.8 | 0.8 |
| F   | 5.0        | 7.5  | 7.5 | 7.5 |
| φD' | φD+0.5max. |      |     |     |
| L'  | L+1.5max.  |      |     |     |

## PART NUMBERING SYSTEM



Please refer to "Product code guide (radial lead type)"



## ◆ STANDARD RATINGS

| WV<br>(V <sub>ac</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | ESR (Initial)<br>(Ω max./100kHz) |       | ESR (End of Life)<br>(Ω max./100kHz) |       | Rated ripple current<br>(mA rms/125°C,<br>100kHz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|----------------------------------|-------|--------------------------------------|-------|---------------------------------------------------|--------------------|
|                          |             |                       |       | 20°C                             | -40°C | 20°C                                 | -40°C |                                                   |                    |
| 25                       | 1,200       | 12.5×20               | 0.14  | 0.044                            | 0.22  | 0.18                                 | 2.2   | 1,820                                             | EGPA250E□□122MK20S |
|                          | 1,500       | 14.5×20               | 0.14  | 0.037                            | 0.19  | 0.11                                 | 1.3   | 2,100                                             | EGPA250E□□152MU20S |
|                          | 1,800       | 12.5×25               | 0.14  | 0.033                            | 0.17  | 0.13                                 | 1.6   | 2,400                                             | EGPA250E□□182MK25S |
|                          | 1,800       | 16×20                 | 0.14  | 0.034                            | 0.17  | 0.10                                 | 1.3   | 2,280                                             | EGPA250E□□182ML20S |
|                          | 2,200       | 12.5×30               | 0.16  | 0.029                            | 0.13  | 0.11                                 | 1.3   | 2,560                                             | EGPA250E□□222MK30S |
|                          | 2,200       | 14.5×25               | 0.16  | 0.028                            | 0.14  | 0.080                                | 0.90  | 2,800                                             | EGPA250E□□222MU25S |
|                          | 2,700       | 12.5×35               | 0.16  | 0.024                            | 0.11  | 0.090                                | 0.80  | 2,970                                             | EGPA250E□□272MK35S |
|                          | 2,700       | 14.5×30               | 0.16  | 0.023                            | 0.10  | 0.070                                | 0.70  | 3,060                                             | EGPA250E□□272MU30S |
|                          | 2,700       | 16×25                 | 0.16  | 0.026                            | 0.13  | 0.080                                | 1.1   | 3,100                                             | EGPA250E□□272ML25S |
|                          | 2,700       | 18×20                 | 0.16  | 0.032                            | 0.16  | 0.090                                | 0.60  | 2,490                                             | EGPA250E□□272MM20S |
|                          | 3,300       | 12.5×40               | 0.18  | 0.021                            | 0.095 | 0.080                                | 0.50  | 3,600                                             | EGPA250E□□332MK40S |
|                          | 3,300       | 14.5×35               | 0.18  | 0.021                            | 0.095 | 0.060                                | 0.70  | 3,380                                             | EGPA250E□□332MU35S |
|                          | 3,300       | 16×30                 | 0.18  | 0.023                            | 0.10  | 0.070                                | 0.90  | 3,160                                             | EGPA250E□□332ML30S |
|                          | 3,900       | 16×35                 | 0.18  | 0.020                            | 0.090 | 0.060                                | 0.70  | 3,590                                             | EGPA250E□□392ML35S |
|                          | 3,900       | 18×25                 | 0.18  | 0.024                            | 0.12  | 0.070                                | 0.50  | 3,200                                             | EGPA250E□□392MM25S |
|                          | 4,700       | 14.5×40               | 0.20  | 0.018                            | 0.081 | 0.050                                | 0.50  | 4,000                                             | EGPA250E□□472MU40S |
|                          | 4,700       | 18×30                 | 0.20  | 0.022                            | 0.099 | 0.080                                | 0.60  | 3,390                                             | EGPA250E□□472ML30S |
|                          | 5,600       | 16×40                 | 0.22  | 0.017                            | 0.077 | 0.040                                | 0.60  | 4,300                                             | EGPA250E□□562ML40S |
|                          | 5,600       | 18×35                 | 0.22  | 0.019                            | 0.086 | 0.070                                | 0.50  | 4,200                                             | EGPA250E□□562MM35S |
|                          | 6,800       | 18×40                 | 0.24  | 0.016                            | 0.072 | 0.030                                | 0.40  | 4,600                                             | EGPA250E□□682MM40S |
| 35                       | 680         | 12.5×20               | 0.12  | 0.044                            | 0.22  | 0.18                                 | 2.2   | 1,820                                             | EGPA350E□□681MK20S |
|                          | 1,000       | 12.5×25               | 0.12  | 0.033                            | 0.17  | 0.13                                 | 1.6   | 2,400                                             | EGPA350E□□102MK25S |
|                          | 1,000       | 14.5×20               | 0.12  | 0.037                            | 0.19  | 0.11                                 | 1.3   | 2,100                                             | EGPA350E□□102MU20S |
|                          | 1,200       | 12.5×30               | 0.12  | 0.029                            | 0.13  | 0.11                                 | 1.3   | 2,560                                             | EGPA350E□□122MK30S |
|                          | 1,200       | 14.5×25               | 0.12  | 0.028                            | 0.14  | 0.080                                | 0.90  | 2,800                                             | EGPA350E□□122MU25S |
|                          | 1,200       | 16×20                 | 0.12  | 0.034                            | 0.17  | 0.10                                 | 1.3   | 2,280                                             | EGPA350E□□122ML20S |
|                          | 1,500       | 12.5×35               | 0.12  | 0.024                            | 0.11  | 0.090                                | 0.80  | 2,970                                             | EGPA350E□□152MK35S |
|                          | 1,500       | 14.5×30               | 0.12  | 0.023                            | 0.10  | 0.070                                | 0.70  | 3,060                                             | EGPA350E□□152MU30S |
|                          | 1,500       | 18×20                 | 0.12  | 0.032                            | 0.16  | 0.090                                | 0.60  | 2,490                                             | EGPA350E□□152MM20S |
|                          | 1,800       | 12.5×40               | 0.12  | 0.021                            | 0.095 | 0.080                                | 0.50  | 3,600                                             | EGPA350E□□182MK40S |
|                          | 1,800       | 16×25                 | 0.12  | 0.026                            | 0.13  | 0.080                                | 1.1   | 3,100                                             | EGPA350E□□182ML25S |
|                          | 2,200       | 14.5×35               | 0.14  | 0.021                            | 0.095 | 0.060                                | 0.70  | 3,380                                             | EGPA350E□□222MU35S |
|                          | 2,200       | 16×30                 | 0.14  | 0.023                            | 0.10  | 0.070                                | 0.90  | 3,160                                             | EGPA350E□□222ML30S |
|                          | 2,200       | 18×25                 | 0.14  | 0.024                            | 0.12  | 0.070                                | 0.50  | 3,200                                             | EGPA350E□□222MM25S |
|                          | 2,700       | 14.5×40               | 0.14  | 0.018                            | 0.081 | 0.050                                | 0.50  | 4,000                                             | EGPA350E□□272MU40S |
|                          | 2,700       | 16×35                 | 0.14  | 0.020                            | 0.090 | 0.060                                | 0.70  | 3,590                                             | EGPA350E□□272ML35S |
|                          | 2,700       | 18×30                 | 0.14  | 0.022                            | 0.099 | 0.080                                | 0.60  | 3,390                                             | EGPA350E□□272MM30S |
|                          | 3,300       | 16×40                 | 0.16  | 0.017                            | 0.077 | 0.040                                | 0.60  | 4,300                                             | EGPA350E□□332ML40S |
|                          | 3,300       | 18×35                 | 0.16  | 0.019                            | 0.086 | 0.070                                | 0.50  | 4,200                                             | EGPA350E□□332MM35S |
|                          | 4,700       | 18×40                 | 0.18  | 0.016                            | 0.072 | 0.030                                | 0.40  | 4,600                                             | EGPA350E□□472MM40S |
| 50                       | 470         | 12.5×20               | 0.10  | 0.065                            | 0.33  | 0.18                                 | 2.2   | 1,500                                             | EGPA500E□□471MK20S |
|                          | 560         | 14.5×20               | 0.10  | 0.055                            | 0.28  | 0.11                                 | 1.3   | 1,740                                             | EGPA500E□□561MU20S |
|                          | 680         | 12.5×25               | 0.10  | 0.048                            | 0.24  | 0.13                                 | 1.6   | 1,900                                             | EGPA500E□□681MK25S |
|                          | 680         | 16×20                 | 0.10  | 0.043                            | 0.22  | 0.10                                 | 1.3   | 2,040                                             | EGPA500E□□681ML20S |
|                          | 820         | 12.5×30               | 0.10  | 0.041                            | 0.18  | 0.11                                 | 1.3   | 2,150                                             | EGPA500E□□821MK30S |
|                          | 820         | 14.5×25               | 0.10  | 0.040                            | 0.20  | 0.080                                | 0.90  | 2,190                                             | EGPA500E□□821MU25S |
|                          | 1,000       | 12.5×35               | 0.10  | 0.034                            | 0.15  | 0.090                                | 0.80  | 2,510                                             | EGPA500E□□102MK35S |
|                          | 1,000       | 14.5×30               | 0.10  | 0.036                            | 0.16  | 0.070                                | 0.70  | 2,470                                             | EGPA500E□□102MU30S |
|                          | 1,000       | 16×25                 | 0.10  | 0.031                            | 0.16  | 0.080                                | 1.1   | 2,620                                             | EGPA500E□□102ML25S |
|                          | 1,000       | 18×20                 | 0.10  | 0.039                            | 0.20  | 0.090                                | 0.60  | 2,240                                             | EGPA500E□□102MM20S |
|                          | 1,200       | 12.5×40               | 0.10  | 0.028                            | 0.13  | 0.080                                | 0.50  | 2,870                                             | EGPA500E□□122MK40S |
|                          | 1,200       | 14.5×35               | 0.10  | 0.029                            | 0.13  | 0.060                                | 0.70  | 2,840                                             | EGPA500E□□122MU35S |
|                          | 1,200       | 16×30                 | 0.10  | 0.027                            | 0.13  | 0.070                                | 0.90  | 2,940                                             | EGPA500E□□122ML30S |
|                          | 1,200       | 18×25                 | 0.10  | 0.029                            | 0.15  | 0.070                                | 0.50  | 2,750                                             | EGPA500E□□122MM25S |
|                          | 1,500       | 16×35                 | 0.10  | 0.023                            | 0.10  | 0.060                                | 0.70  | 3,300                                             | EGPA500E□□152ML35S |
|                          | 1,800       | 14.5×40               | 0.10  | 0.024                            | 0.11  | 0.050                                | 0.50  | 3,230                                             | EGPA500E□□182MU40S |
|                          | 1,800       | 18×30                 | 0.10  | 0.026                            | 0.12  | 0.080                                | 0.60  | 3,140                                             | EGPA500E□□182MM30S |
|                          | 2,200       | 16×40                 | 0.12  | 0.020                            | 0.090 | 0.040                                | 0.60  | 3,720                                             | EGPA500E□□222ML40S |
|                          | 2,200       | 18×35                 | 0.12  | 0.022                            | 0.10  | 0.070                                | 0.50  | 3,510                                             | EGPA500E□□222MM35S |
|                          | 2,700       | 18×40                 | 0.12  | 0.018                            | 0.080 | 0.030                                | 0.40  | 3,940                                             | EGPA500E□□272MM40S |

□□ : Enter the appropriate lead forming or taping code.



## GPA Series

### ◆STANDARD RATINGS

| WV<br>(V <sub>ac</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | ESR (Initial)<br>(Ω max./100kHz) |       | ESR (End of Life)<br>(Ω max./100kHz) |       | Rated ripple current<br>(mA rms/125°C, 100kHz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|----------------------------------|-------|--------------------------------------|-------|------------------------------------------------|--------------------|
|                          |             |                       |       | 20°C                             | -40°C | 20°C                                 | -40°C |                                                |                    |
| 63                       | 470         | 16×20                 | 0.10  | 0.085                            | 0.58  | 0.19                                 | 3.0   | 1,790                                          | EGPA630E□□471ML20S |
|                          | 680         | 16×25                 | 0.10  | 0.061                            | 0.48  | 0.14                                 | 2.0   | 2,030                                          | EGPA630E□□681ML25S |
|                          | 680         | 18×20                 | 0.10  | 0.070                            | 0.49  | 0.19                                 | 3.0   | 1,910                                          | EGPA630E□□681MM20S |
|                          | 820         | 16×30                 | 0.10  | 0.053                            | 0.41  | 0.090                                | 1.3   | 2,330                                          | EGPA630E□□821ML30S |
|                          | 1,000       | 16×35                 | 0.10  | 0.044                            | 0.33  | 0.070                                | 0.90  | 2,580                                          | EGPA630E□□102ML35S |
|                          | 1,000       | 18×25                 | 0.10  | 0.049                            | 0.34  | 0.14                                 | 2.0   | 2,280                                          | EGPA630E□□102MM25S |
|                          | 1,200       | 16×40                 | 0.10  | 0.036                            | 0.26  | 0.060                                | 0.80  | 2,900                                          | EGPA630E□□122ML40S |
|                          | 1,200       | 18×30                 | 0.10  | 0.041                            | 0.26  | 0.090                                | 1.3   | 2,580                                          | EGPA630E□□122MM30S |
|                          | 1,500       | 18×35                 | 0.10  | 0.035                            | 0.21  | 0.070                                | 0.90  | 2,890                                          | EGPA630E□□152MM35S |
| 80                       | 1,800       | 18×40                 | 0.10  | 0.030                            | 0.18  | 0.060                                | 0.80  | 3,210                                          | EGPA630E□□182MM40S |
|                          | 330         | 16×20                 | 0.08  | 0.085                            | 0.58  | 0.19                                 | 3.0   | 1,790                                          | EGPA800E□□331ML20S |
|                          | 470         | 16×25                 | 0.08  | 0.061                            | 0.48  | 0.14                                 | 2.0   | 2,030                                          | EGPA800E□□471ML25S |
|                          | 470         | 18×20                 | 0.08  | 0.070                            | 0.49  | 0.19                                 | 3.0   | 1,910                                          | EGPA800E□□471MM20S |
|                          | 560         | 16×30                 | 0.08  | 0.053                            | 0.41  | 0.090                                | 1.3   | 2,330                                          | EGPA800E□□561ML30S |
|                          | 560         | 18×25                 | 0.08  | 0.049                            | 0.34  | 0.14                                 | 2.0   | 2,280                                          | EGPA800E□□561MM25S |
|                          | 680         | 16×35                 | 0.08  | 0.044                            | 0.33  | 0.070                                | 0.90  | 2,580                                          | EGPA800E□□681ML35S |
|                          | 680         | 18×30                 | 0.08  | 0.041                            | 0.26  | 0.090                                | 1.3   | 2,580                                          | EGPA800E□□681MM30S |
|                          | 820         | 16×40                 | 0.08  | 0.036                            | 0.26  | 0.060                                | 0.80  | 2,900                                          | EGPA800E□□821ML40S |
| 100                      | 820         | 18×35                 | 0.08  | 0.035                            | 0.21  | 0.070                                | 0.90  | 2,890                                          | EGPA800E□□821MM35S |
|                          | 1,200       | 18×40                 | 0.08  | 0.030                            | 0.18  | 0.060                                | 0.80  | 3,210                                          | EGPA800E□□122MM40S |
|                          | 200         | 16×20                 | 0.08  | 0.11                             | 0.88  | 0.25                                 | 3.9   | 1,580                                          | EGPA101E□□201ML20S |
|                          | 270         | 18×20                 | 0.08  | 0.091                            | 0.73  | 0.22                                 | 3.9   | 1,690                                          | EGPA101E□□271MM20S |
|                          | 300         | 16×25                 | 0.08  | 0.079                            | 0.72  | 0.18                                 | 2.7   | 1,990                                          | EGPA101E□□301ML25S |
|                          | 360         | 16×30                 | 0.08  | 0.068                            | 0.62  | 0.13                                 | 1.9   | 2,250                                          | EGPA101E□□361ML30S |
|                          | 390         | 18×25                 | 0.08  | 0.064                            | 0.50  | 0.15                                 | 2.7   | 2,110                                          | EGPA101E□□391MM25S |
|                          | 470         | 16×35                 | 0.08  | 0.056                            | 0.50  | 0.090                                | 1.3   | 2,500                                          | EGPA101E□□471ML35S |
|                          | 510         | 18×30                 | 0.08  | 0.054                            | 0.39  | 0.13                                 | 1.9   | 2,410                                          | EGPA101E□□511MM30S |
|                          | 560         | 16×40                 | 0.08  | 0.046                            | 0.39  | 0.080                                | 1.1   | 2,700                                          | EGPA101E□□561ML40S |
|                          | 620         | 18×35                 | 0.08  | 0.044                            | 0.32  | 0.090                                | 1.3   | 2,690                                          | EGPA101E□□621MM35S |
|                          | 750         | 18×40                 | 0.08  | 0.039                            | 0.27  | 0.080                                | 1.1   | 2,880                                          | EGPA101E□□751MM40S |

□□ : Enter the appropriate lead forming or taping code.

### ◆RATED RIPPLE CURRENT MULTIPLIERS

#### ●Frequency Multipliers

| Capacitance(μF) | Frequency(Hz) | 120  | 1k   | 10k  | 100k |
|-----------------|---------------|------|------|------|------|
| 200             |               | 0.40 | 0.82 | 0.93 | 1.00 |
| 270 to 560      |               | 0.50 | 0.85 | 0.94 | 1.00 |
| 620 to 1,800    |               | 0.60 | 0.87 | 0.95 | 1.00 |
| 2,200 to 3,900  |               | 0.75 | 0.90 | 0.95 | 1.00 |
| 4,700 to 6,800  |               | 0.85 | 0.95 | 0.98 | 1.00 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

Please contact us for lifetime estimation.



## GVA Series

- Structure of higher vibration by GPA series (acceleration 392m/s<sup>2</sup>, 40G)
- Guaranteed short time at 150°C
- Designed for electric power steering and ECU(include engine control, direct fuel injection) etc.
- Rated voltage range : 25 to 100V, Capacitance range : 430 to 5,100μF
- Solvent resistant type
- RoHS2 Compliant
- AEC-Q200 compliant : Please contact Chemi-Con for more details, test data, information.

GPA → Vibration resistance → **GVA**

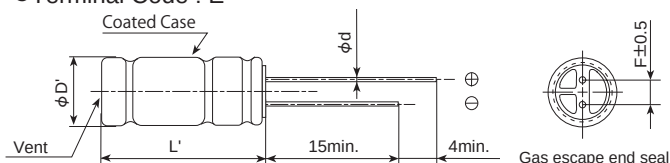


### SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                                                 |                                                                                    |      |      |      |      |      |
|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|------|------|------|------|------|
| Category                                               | -40 to +125℃                                                                                                                                                                                                                                                                                                    |                                                                                    |      |      |      |      |      |
| Temperature Range                                      |                                                                                                                                                                                                                                                                                                                 |                                                                                    |      |      |      |      |      |
| Rated Voltage Range                                    | 25 to 100V <sub>dc</sub>                                                                                                                                                                                                                                                                                        |                                                                                    |      |      |      |      |      |
| Capacitance Tolerance                                  | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                                                       |                                                                                    |      |      |      |      |      |
| Leakage Current                                        | I=0.03CV or 4μA, whichever is greater.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃, 1 minute)                                                                                                                                                          |                                                                                    |      |      |      |      |      |
| Dissipation Factor (tan δ )                            | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                                                | 25V                                                                                | 35V  | 50V  | 63V  | 80V  | 100V |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                                                    | 0.14                                                                               | 0.12 | 0.10 | 0.10 | 0.08 | 0.08 |
|                                                        | When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase. (at 20℃, 120Hz)                                                                                                                                                                                                |                                                                                    |      |      |      |      |      |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                                                | 25V                                                                                | 35V  | 50V  | 63V  | 80V  | 100V |
|                                                        | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                                                 | 2                                                                                  | 2    | 2    | 2    | 2    | 2    |
|                                                        | Z(-40℃)/Z(+20℃)                                                                                                                                                                                                                                                                                                 | 4                                                                                  | 4    | 4    | 4    | 4    | 4    |
| Endurance 1                                            | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 5,000 hours at 125 ℃.                                                                  |                                                                                    |      |      |      |      |      |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                                              | ≤ ±30% of the initial value                                                        |      |      |      |      |      |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                                                   | ≤300% of the initial specified value                                               |      |      |      |      |      |
|                                                        | Leakage current                                                                                                                                                                                                                                                                                                 | ≤The initial specified value                                                       |      |      |      |      |      |
| Endurance 2                                            | The following specifications shall be satisfied when the capacitors are restored to 20℃ after the test condition that the rated voltage is applied for 100 hours at 150℃ and DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 4,500 hours at 125℃. |                                                                                    |      |      |      |      |      |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                                              | ≤ ±30% of the initial value                                                        |      |      |      |      |      |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                                                   | ≤300% of the initial specified value                                               |      |      |      |      |      |
|                                                        | Leakage current                                                                                                                                                                                                                                                                                                 | ≤The initial specified value                                                       |      |      |      |      |      |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 125℃without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4.                            |                                                                                    |      |      |      |      |      |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                                              | ≤ ±30% of the initial value                                                        |      |      |      |      |      |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                                                   | ≤300% of the initial specified value                                               |      |      |      |      |      |
|                                                        | Leakage current                                                                                                                                                                                                                                                                                                 | ≤The initial specified value                                                       |      |      |      |      |      |
| Vibration                                              | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to vibration test (vibration profile shown below) at room temperature (15 to 35℃).                                                                                                                      |                                                                                    |      |      |      |      |      |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                                              | ≤ ±5% of the initial value                                                         |      |      |      |      |      |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                                                   | ≤The initial specified value                                                       |      |      |      |      |      |
|                                                        | Leakage current                                                                                                                                                                                                                                                                                                 | ≤The initial specified value                                                       |      |      |      |      |      |
|                                                        | Vibration profile                                                                                                                                                                                                                                                                                               |                                                                                    |      |      |      |      |      |
|                                                        | Vibration frequency range                                                                                                                                                                                                                                                                                       | 10 to 2,000Hz                                                                      |      |      |      |      |      |
|                                                        | Amplitude or Acceleration                                                                                                                                                                                                                                                                                       | 1.5mm peak to peak or 392m/s <sup>2</sup> (40G), whichever is the less severe      |      |      |      |      |      |
|                                                        | Sweep rate                                                                                                                                                                                                                                                                                                      | 10 to 2,000 to 10Hz 0.5 octave/minute                                              |      |      |      |      |      |
|                                                        | Direction and period of motion                                                                                                                                                                                                                                                                                  | 2 hours in each of 3 mutually perpendicular directions (total of 6hours)           |      |      |      |      |      |
|                                                        | Fixation                                                                                                                                                                                                                                                                                                        | Fix main body and Lead teminal using a fixture tool, please contact us for detail. |      |      |      |      |      |

### DIMENSIONS [mm]

- Terminal Code : E



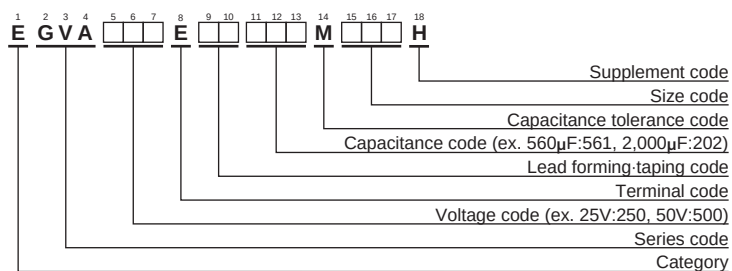
\* Please contact us about lead formings and mounting methods.

|           |                  |
|-----------|------------------|
| $\phi D$  | 18               |
| $\phi d$  | 0.8              |
| F         | 7.5              |
| $\phi D'$ | $\phi D \pm 0.5$ |
| $L'$      | $+1.5$<br>$-1.0$ |



## GVA Series

### ◆PART NUMBERING SYSTEM



Please refer to "Product code guide (radial lead type)"

### ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | ESR<br>(Ω max./100kHz) |       | Rated ripple current<br>(mA rms/125°C, 100kHz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|------------------------|-------|------------------------------------------------|--------------------|
|                          |             |                       |       | 20°C                   | -40°C |                                                |                    |
| 25                       | 3,900       | 18×30                 | 0.18  | 0.023                  | 0.11  | 3,330                                          | EGVA250E□□392MM30H |
|                          | 5,100       | 18×35.5               | 0.22  | 0.019                  | 0.086 | 3,750                                          | EGVA250E□□512MMP1H |
| 35                       | 2,700       | 18×30                 | 0.14  | 0.023                  | 0.11  | 3,330                                          | EGVA350E□□272MM30H |
|                          | 3,600       | 18×35.5               | 0.16  | 0.019                  | 0.086 | 3,750                                          | EGVA350E□□362MMP1H |
| 50                       | 1,600       | 18×30                 | 0.10  | 0.027                  | 0.14  | 3,000                                          | EGVA500E□□162MM30H |
|                          | 2,000       | 18×35.5               | 0.12  | 0.022                  | 0.10  | 3,450                                          | EGVA500E□□202MMP1H |
| 63                       | 1,200       | 18×30                 | 0.10  | 0.045                  | 0.34  | 2,530                                          | EGVA630E□□122MM30H |
|                          | 1,500       | 18×35.5               | 0.10  | 0.036                  | 0.26  | 2,870                                          | EGVA630E□□152MMP1H |
| 80                       | 750         | 18×30                 | 0.08  | 0.045                  | 0.34  | 2,530                                          | EGVA800E□□751MM30H |
|                          | 910         | 18×35.5               | 0.08  | 0.036                  | 0.26  | 2,870                                          | EGVA800E□□911MMP1H |
| 100                      | 430         | 18×30                 | 0.08  | 0.055                  | 0.41  | 2,290                                          | EGVA101E□□431MM30H |
|                          | 560         | 18×35.5               | 0.08  | 0.044                  | 0.32  | 2,620                                          | EGVA101E□□561MMP1H |

□□ : Enter the appropriate lead forming or taping code.

### ◆RATED RIPPLE CURRENT MULTIPLIERS

#### ●Frequency Multipliers

| Capacitance(μF) | Frequency(Hz) | 120  | 1k   | 10k  | 100k |
|-----------------|---------------|------|------|------|------|
| 430 to 560      |               | 0.50 | 0.85 | 0.94 | 1.00 |
| 750 to 2,000    |               | 0.60 | 0.87 | 0.95 | 1.00 |
| 2,700 to 3,900  |               | 0.75 | 0.90 | 0.95 | 1.00 |
| 5,100           |               | 0.85 | 0.95 | 0.98 | 1.00 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

Please contact us for lifetime estimation.



## GXM Series New!

- Suitable for high-temperature applications such as power supplies at communication base stations.
- Rated voltage range : 400 to 450V<sub>dc</sub>, Capacitance range : 39 to 180μF
- Endurance with ripple current : 5,000 hours at 125°C
- Non solvent resistant type
- RoHS2 Compliant

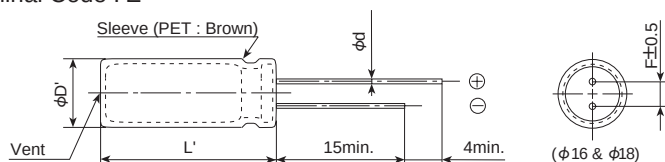


### SPECIFICATIONS

| Items                                                        | Characteristics                                                                                                                                                                                                                                                                     |                                       |                 |
|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-----------------|
| Category                                                     |                                                                                                                                                                                                                                                                                     |                                       |                 |
| Temperature Range                                            | -40 to +125℃                                                                                                                                                                                                                                                                        |                                       |                 |
| Rated Voltage Range                                          | 400 to 450V <sub>dc</sub>                                                                                                                                                                                                                                                           |                                       |                 |
| Capacitance Tolerance                                        | ± 20% (M)                                                                                                                                                                                                                                                                           |                                       | (at 20℃, 120Hz) |
| Leakage Current                                              | I=0.04CV+100 (after 1 minute)<br>I=0.02CV+25 (after 5 minutes)<br>Where, I : Max. leakage current(μA), C : Nominal capacitance (μF), V : Rated voltage (V)<br>(at 20℃)                                                                                                              |                                       |                 |
| Dissipation Factor<br>(tan δ )                               | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                    | 400 to 450V                           | (at 20℃, 120Hz) |
|                                                              | tan δ (Max.)                                                                                                                                                                                                                                                                        | 0.24                                  |                 |
| Low Temperature<br>Characteristics<br>(Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                    | 400 to 450V                           | (at 120Hz)      |
|                                                              | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                     | 6                                     |                 |
|                                                              | Z(-40℃)/Z(+20℃)                                                                                                                                                                                                                                                                     | 10                                    |                 |
| Endurance                                                    | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 5,000 hours at 125℃.                                       |                                       |                 |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                  | ≤ ± 30% of the initial value          |                 |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                       | ≤ 300% of the initial specified value |                 |
|                                                              | Leakage current                                                                                                                                                                                                                                                                     | ≤ The initial specified value         |                 |
| Shelf Life                                                   | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 500 hours at 125℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                       |                 |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                  | ≤ ± 30% of the initial value          |                 |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                       | ≤ 300% of the initial specified value |                 |
|                                                              | Leakage current                                                                                                                                                                                                                                                                     | ≤ 500% of the initial specified value |                 |

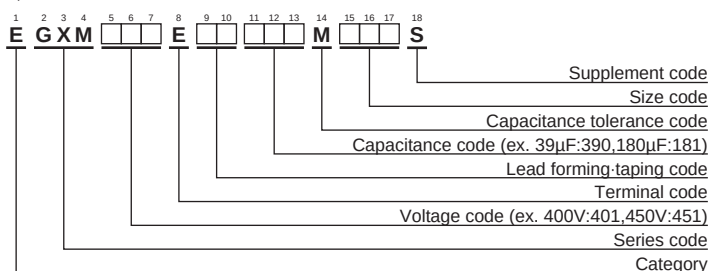
### DIMENSIONS [mm]

- Terminal Code : E



| φD  | 16          | 18  |
|-----|-------------|-----|
| φd  | 0.8         | 0.8 |
| F   | 7.5         | 7.5 |
| φD' | φD+0.5 max. |     |
| L'  | L+2.0 max.  |     |

### PART NUMBERING SYSTEM



Please refer to "Product code guide (radial lead type)"





## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(mA <sub>rms</sub> /125°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|--------------------------------------------------------------|--------------------|
| 400                      | 47          | 16×20                 | 0.24  | 380                                                          | EGXM401E□□470ML20S |
|                          | 68          | 16×25                 | 0.24  | 550                                                          | EGXM401E□□680ML25S |
|                          | 68          | 18×20                 | 0.24  | 480                                                          | EGXM401E□□680MM20S |
|                          | 100         | 16×30                 | 0.24  | 720                                                          | EGXM401E□□101ML30S |
|                          | 100         | 18×25                 | 0.24  | 680                                                          | EGXM401E□□101MM25S |
|                          | 120         | 16×35                 | 0.24  | 810                                                          | EGXM401E□□121ML35S |
|                          | 120         | 16×40                 | 0.24  | 830                                                          | EGXM401E□□121ML40S |
|                          | 120         | 18×30                 | 0.24  | 810                                                          | EGXM401E□□121MM30S |
|                          | 150         | 18×35                 | 0.24  | 930                                                          | EGXM401E□□151MM35S |
|                          | 180         | 18×40                 | 0.24  | 1,040                                                        | EGXM401E□□181MM40S |
| 420                      | 47          | 16×20                 | 0.24  | 380                                                          | EGXM421E□□470ML20S |
|                          | 56          | 18×20                 | 0.24  | 430                                                          | EGXM421E□□560MM20S |
|                          | 68          | 16×25                 | 0.24  | 550                                                          | EGXM421E□□680ML25S |
|                          | 82          | 16×30                 | 0.24  | 650                                                          | EGXM421E□□820ML30S |
|                          | 82          | 18×25                 | 0.24  | 620                                                          | EGXM421E□□820MM25S |
|                          | 100         | 16×35                 | 0.24  | 730                                                          | EGXM421E□□101ML35S |
|                          | 120         | 16×40                 | 0.24  | 830                                                          | EGXM421E□□121ML40S |
|                          | 120         | 18×30                 | 0.24  | 810                                                          | EGXM421E□□121MM30S |
|                          | 120         | 18×35                 | 0.24  | 830                                                          | EGXM421E□□121MM35S |
|                          | 150         | 18×40                 | 0.24  | 950                                                          | EGXM421E□□151MM40S |
| 450                      | 39          | 16×20                 | 0.24  | 340                                                          | EGXM451E□□390ML20S |
|                          | 56          | 16×25                 | 0.24  | 500                                                          | EGXM451E□□560ML25S |
|                          | 56          | 18×20                 | 0.24  | 430                                                          | EGXM451E□□560MM20S |
|                          | 82          | 16×30                 | 0.24  | 650                                                          | EGXM451E□□820ML30S |
|                          | 82          | 18×25                 | 0.24  | 620                                                          | EGXM451E□□820MM25S |
|                          | 100         | 16×35                 | 0.24  | 730                                                          | EGXM451E□□101ML35S |
|                          | 100         | 16×40                 | 0.24  | 760                                                          | EGXM451E□□101ML40S |
|                          | 100         | 18×30                 | 0.24  | 740                                                          | EGXM451E□□101MM30S |
|                          | 120         | 18×35                 | 0.24  | 830                                                          | EGXM451E□□121MM35S |
|                          | 150         | 18×40                 | 0.24  | 950                                                          | EGXM451E□□151MM40S |

□□ : Enter the appropriate lead forming or taping code.

## ◆RATED RIPPLE CURRENT MULTIPLIERS

### ●Frequency Multipliers

| Capacitance(μF) \ Frequency(Hz) | 120  | 1k   | 10k  | 100k |
|---------------------------------|------|------|------|------|
| 39 to 82                        | 1.00 | 1.60 | 2.20 | 2.50 |
| 100 to 180                      | 1.00 | 1.50 | 2.00 | 2.25 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

# GXF Series

- Downsizing and high-ripple current version of GXE series
- For automobile modules and networking equipment and other high temperature applications
- Endurance with ripple current : 3,000 hours at 125°C
- Solvent resistant type except 160 to 400V<sub>dc</sub>
- RoHS2 Compliant
- AEC-Q200 compliant : Please contact Chemi-Con for more details, test data, information.

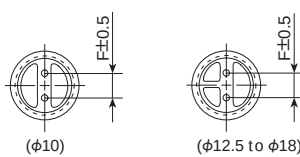
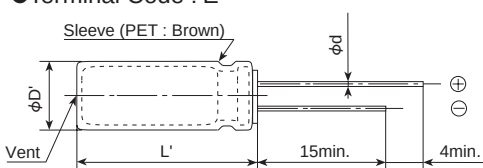


## SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                                                                 |                                      |      |      |      |                           |                                      |             |             |            |  |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------|------|------|---------------------------|--------------------------------------|-------------|-------------|------------|--|
| Category                                               | -40 to +125℃                                                                                                                                                                                                                                                                                                                    |                                      |      |      |      |                           |                                      |             |             |            |  |
| Temperature Range                                      |                                                                                                                                                                                                                                                                                                                                 |                                      |      |      |      |                           |                                      |             |             |            |  |
| Rated Voltage Range                                    | 25 to 400V <sub>dc</sub>                                                                                                                                                                                                                                                                                                        |                                      |      |      |      |                           |                                      |             |             |            |  |
| Capacitance Tolerance                                  | ± 20% (M) (20℃, 120Hz)                                                                                                                                                                                                                                                                                                          |                                      |      |      |      |                           |                                      |             |             |            |  |
| Leakage Current                                        | 25 to 100V <sub>dc</sub>                                                                                                                                                                                                                                                                                                        |                                      |      |      |      | 160 to 400V <sub>dc</sub> |                                      |             |             |            |  |
|                                                        | I=0.03CV or 4 μA, whichever is greater.                                                                                                                                                                                                                                                                                         |                                      |      |      |      | CV≤1,000                  | I=0.1CV+40                           |             |             |            |  |
|                                                        |                                                                                                                                                                                                                                                                                                                                 |                                      |      |      |      | CV>1,000                  | I=0.04CV+100                         |             |             |            |  |
|                                                        | Where, I : Max. leakage current ( μA), C : Nominal capacitance ( μF), V : Rated voltage (V) (at 20℃ after 1 minute)                                                                                                                                                                                                             |                                      |      |      |      |                           |                                      |             |             |            |  |
| Dissipation Factor (tan δ )                            | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                                                                | 25V                                  | 35V  | 50V  | 63V  | 80V                       | 100V                                 | 160 to 250V | 350 to 400V |            |  |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                                                                    | 0.14                                 | 0.12 | 0.10 | 0.10 | 0.08                      | 0.08                                 | 0.15        | 0.20        |            |  |
|                                                        | When nominal capacitance exceeds 1,000 μF, add 0.02 to the value above for each 1,000 μ F increase. (at 20℃, 120Hz)                                                                                                                                                                                                             |                                      |      |      |      |                           |                                      |             |             |            |  |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                                                                | 25V                                  | 35V  | 50V  | 63V  | 80V                       | 100V                                 | 160 to 250V | 350 to 400V |            |  |
|                                                        | Z (-25℃)/Z (+20℃)                                                                                                                                                                                                                                                                                                               | 2                                    | 2    | 2    | 2    | 2                         | 2                                    | 3           | 6           |            |  |
|                                                        | Z (-40℃)/Z (+20℃)                                                                                                                                                                                                                                                                                                               | 4                                    | 4    | 4    | 4    | 4                         | 4                                    | 6           | 12          | (at 120Hz) |  |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for the 3,000 hours at 125℃.                                                                               |                                      |      |      |      |                           |                                      |             |             |            |  |
|                                                        | Rated Voltage                                                                                                                                                                                                                                                                                                                   | 25 to 100V <sub>dc</sub>             |      |      |      |                           | 160 to 400V <sub>dc</sub>            |             |             |            |  |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                                                              | ≤ ±30% of the initial value          |      |      |      |                           | ≤ ±20% of the initial value          |             |             |            |  |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                                                                   | ≤300% of the initial specified value |      |      |      |                           | ≤200% of the initial specified value |             |             |            |  |
|                                                        | Leakage current                                                                                                                                                                                                                                                                                                                 | ≤The initial specified value         |      |      |      |                           | ≤The initial specified value         |             |             |            |  |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours (500hours for 160 to 400V <sub>dc</sub> ) at 125℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                      |      |      |      |                           |                                      |             |             |            |  |
|                                                        | Rated Voltage                                                                                                                                                                                                                                                                                                                   | 25 to 100V <sub>dc</sub>             |      |      |      |                           | 160 to 400V <sub>dc</sub>            |             |             |            |  |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                                                              | ≤ ±30% of the initial value          |      |      |      |                           | ≤ ±20% of the initial value          |             |             |            |  |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                                                                   | ≤300% of the initial specified value |      |      |      |                           | ≤200% of the initial specified value |             |             |            |  |
|                                                        | Leakage current                                                                                                                                                                                                                                                                                                                 | ≤The initial specified value         |      |      |      |                           | ≤500% of the initial specified value |             |             |            |  |

## DIMENSIONS [mm]

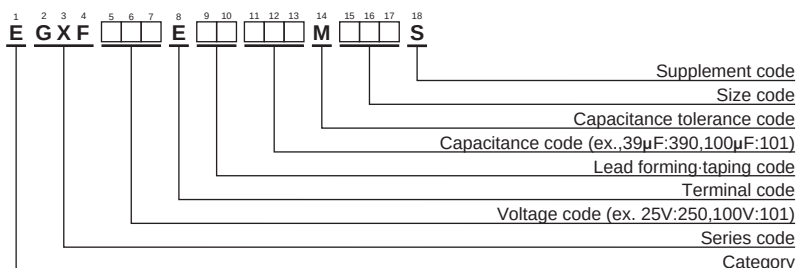
### Terminal Code : E



Gas escape end seal

| ΦD  | 10         | 12.5 | 14.5 | 16  | 18  |
|-----|------------|------|------|-----|-----|
| Φd  | 0.6        | 0.6  | 0.8  | 0.8 | 0.8 |
| F   | 5.0        | 5.0  | 7.5  | 7.5 | 7.5 |
| ΦD' | ΦD+0.5max. |      |      |     |     |
| L'  | L+1.5max.  |      |      |     |     |

## PART NUMBERING SYSTEM



Please refer to "Product code guide (radial lead type)"



## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φDxL(mm) | ESR<br>(Ωmax./100kHz) |       | Rated<br>ripple<br>current<br>(mA <sub>rms</sub> /125°C,<br>100kHz) | Part No.           |
|--------------------------|-------------|-----------------------|-----------------------|-------|---------------------------------------------------------------------|--------------------|
|                          |             |                       | 20°C                  | -40°C |                                                                     |                    |
| 25                       | 510         | 10×12.5               | 0.14                  | 2.1   | 900                                                                 | EGXF250E□□511MJCS5 |
|                          | 750         | 10×16                 | 0.094                 | 1.5   | 1,300                                                               | EGXF250E□□751MJ16S |
|                          | 910         | 12.5×15               | 0.082                 | 1.1   | 1,220                                                               | EGXF250E□□911MK15S |
|                          | 1,200       | 10×20                 | 0.073                 | 1.1   | 1,540                                                               | EGXF250E□□122MJ20S |
|                          | 1,200       | 14.5×15               | 0.067                 | 0.80  | 1,320                                                               | EGXF250E□□122MU15S |
|                          | 1,500       | 10×25                 | 0.042                 | 0.24  | 1,880                                                               | EGXF250E□□152MJ25S |
|                          | 1,600       | 16×15                 | 0.063                 | 0.76  | 1,430                                                               | EGXF250E□□162ML15S |
|                          | 1,800       | 12.5×20               | 0.038                 | 0.19  | 1,590                                                               | EGXF250E□□182MK20S |
|                          | 2,000       | 10×30                 | 0.033                 | 0.19  | 2,150                                                               | EGXF250E□□202MJ30S |
|                          | 2,200       | 14.5×20               | 0.030                 | 0.17  | 1,780                                                               | EGXF250E□□222MU20S |
|                          | 2,400       | 18×15                 | 0.053                 | 0.51  | 1,630                                                               | EGXF250E□□242MM15S |
|                          | 2,700       | 12.5×25               | 0.030                 | 0.14  | 2,280                                                               | EGXF250E□□272MK25S |
|                          | 3,000       | 16×20                 | 0.029                 | 0.13  | 1,890                                                               | EGXF250E□□302ML20S |
|                          | 3,300       | 12.5×30               | 0.025                 | 0.10  | 2,760                                                               | EGXF250E□□332MK30S |
|                          | 3,600       | 14.5×25               | 0.025                 | 0.11  | 2,760                                                               | EGXF250E□□362MU25S |
|                          | 4,300       | 12.5×35               | 0.022                 | 0.080 | 3,120                                                               | EGXF250E□□432MK35S |
|                          | 4,300       | 16×25                 | 0.022                 | 0.092 | 3,030                                                               | EGXF250E□□432ML25S |
|                          | 4,300       | 18×20                 | 0.028                 | 0.10  | 1,930                                                               | EGXF250E□□432MM20S |
|                          | 4,700       | 14.5×30               | 0.020                 | 0.081 | 3,090                                                               | EGXF250E□□472MU30S |
|                          | 5,100       | 12.5×40               | 0.019                 | 0.068 | 3,610                                                               | EGXF250E□□512MK40S |
|                          | 5,100       | 14.5×35               | 0.018                 | 0.065 | 3,430                                                               | EGXF250E□□512MU35S |
|                          | 5,100       | 16×30                 | 0.018                 | 0.071 | 3,330                                                               | EGXF250E□□512ML30S |
|                          | 5,600       | 18×25                 | 0.020                 | 0.078 | 3,200                                                               | EGXF250E□□562MM25S |
|                          | 6,800       | 14.5×40               | 0.016                 | 0.054 | 3,820                                                               | EGXF250E□□682MU40S |
|                          | 6,800       | 16×35                 | 0.016                 | 0.056 | 3,630                                                               | EGXF250E□□682ML35S |
| 35                       | 7,500       | 18×30                 | 0.016                 | 0.060 | 3,480                                                               | EGXF250E□□752MM30S |
|                          | 8,200       | 16×40                 | 0.015                 | 0.048 | 3,930                                                               | EGXF250E□□822ML40S |
|                          | 9,100       | 18×35                 | 0.015                 | 0.049 | 3,750                                                               | EGXF250E□□912MM35S |
|                          | 11,000      | 18×40                 | 0.014                 | 0.043 | 4,040                                                               | EGXF250E□□113MM40S |
|                          | 300         | 10×12.5               | 0.14                  | 2.1   | 900                                                                 | EGXF350E□□301MJCS5 |
|                          | 510         | 10×16                 | 0.094                 | 1.5   | 1,300                                                               | EGXF350E□□511MJ16S |
|                          | 560         | 12.5×15               | 0.082                 | 1.1   | 1,220                                                               | EGXF350E□□561MK15S |
|                          | 680         | 10×20                 | 0.073                 | 1.1   | 1,540                                                               | EGXF350E□□681MJ20S |
|                          | 750         | 14.5×15               | 0.067                 | 0.80  | 1,320                                                               | EGXF350E□□751MU15S |
|                          | 820         | 10×25                 | 0.042                 | 0.24  | 1,880                                                               | EGXF350E□□821MJ25S |
|                          | 1,100       | 12.5×20               | 0.038                 | 0.19  | 1,590                                                               | EGXF350E□□112MK20S |
|                          | 1,100       | 16×15                 | 0.063                 | 0.76  | 1,430                                                               | EGXF350E□□112ML15S |
|                          | 1,200       | 10×30                 | 0.033                 | 0.19  | 2,150                                                               | EGXF350E□□122MJ30S |
|                          | 1,500       | 12.5×25               | 0.030                 | 0.14  | 2,280                                                               | EGXF350E□□152MK25S |
|                          | 1,500       | 14.5×20               | 0.030                 | 0.17  | 1,780                                                               | EGXF350E□□152MU20S |
|                          | 1,500       | 18×15                 | 0.053                 | 0.51  | 1,630                                                               | EGXF350E□□152MM15S |
|                          | 2,000       | 12.5×30               | 0.025                 | 0.10  | 2,760                                                               | EGXF350E□□202MK30S |
|                          | 2,000       | 16×20                 | 0.029                 | 0.13  | 1,890                                                               | EGXF350E□□202ML20S |
|                          | 2,200       | 14.5×25               | 0.025                 | 0.11  | 2,760                                                               | EGXF350E□□222MU25S |
|                          | 2,400       | 12.5×35               | 0.022                 | 0.080 | 3,120                                                               | EGXF350E□□242MK35S |
|                          | 2,400       | 16×25                 | 0.022                 | 0.092 | 3,030                                                               | EGXF350E□□242ML25S |
|                          | 2,400       | 18×20                 | 0.028                 | 0.10  | 1,930                                                               | EGXF350E□□242MM20S |
|                          | 2,700       | 12.5×40               | 0.019                 | 0.068 | 3,610                                                               | EGXF350E□□272MK40S |
|                          | 2,700       | 14.5×30               | 0.020                 | 0.081 | 3,090                                                               | EGXF350E□□272MU30S |
|                          | 3,000       | 14.5×35               | 0.018                 | 0.065 | 3,430                                                               | EGXF350E□□302MU35S |
|                          | 3,300       | 16×30                 | 0.018                 | 0.071 | 3,330                                                               | EGXF350E□□332ML30S |
|                          | 3,300       | 18×25                 | 0.020                 | 0.078 | 3,200                                                               | EGXF350E□□332MM25S |
| 50                       | 3,900       | 14.5×40               | 0.016                 | 0.054 | 3,820                                                               | EGXF350E□□392MU40S |
|                          | 4,300       | 16×35                 | 0.016                 | 0.056 | 3,630                                                               | EGXF350E□□432ML35S |
|                          | 4,300       | 18×30                 | 0.016                 | 0.060 | 3,480                                                               | EGXF350E□□432MM30S |
|                          | 4,700       | 16×40                 | 0.015                 | 0.048 | 3,930                                                               | EGXF350E□□472ML40S |
|                          | 5,100       | 18×35                 | 0.015                 | 0.049 | 3,750                                                               | EGXF350E□□512MM35S |
|                          | 6,200       | 18×40                 | 0.014                 | 0.043 | 4,040                                                               | EGXF350E□□622MM40S |
|                          | 160         | 10×12.5               | 0.24                  | 3.6   | 730                                                                 | EGXF500E□□161MJCS5 |
|                          | 240         | 10×16                 | 0.16                  | 2.5   | 1,080                                                               | EGXF500E□□241MJ16S |
|                          | 270         | 12.5×15               | 0.14                  | 1.8   | 1,020                                                               | EGXF500E□□271MK15S |
|                          | 330         | 10×20                 | 0.12                  | 1.8   | 1,290                                                               | EGXF500E□□331MJ20S |
|                          | 390         | 14.5×15               | 0.12                  | 1.4   | 1,090                                                               | EGXF500E□□391MU15S |
|                          | 430         | 10×25                 | 0.055                 | 0.31  | 1,740                                                               | EGXF500E□□431MJ25S |
|                          | 510         | 12.5×20               | 0.049                 | 0.24  | 1,410                                                               | EGXF500E□□511MK20S |
|                          | 560         | 10×30                 | 0.041                 | 0.25  | 2,020                                                               | EGXF500E□□561MJ30S |
|                          | 560         | 16×15                 | 0.11                  | 1.3   | 1,190                                                               | EGXF500E□□561ML15S |
|                          | 680         | 14.5×20               | 0.038                 | 0.22  | 1,610                                                               | EGXF500E□□681MU20S |
|                          | 750         | 12.5×25               | 0.038                 | 0.18  | 2,030                                                               | EGXF500E□□751MK25S |
|                          | 750         | 18×15                 | 0.085                 | 0.87  | 1,370                                                               | EGXF500E□□751MM15S |
|                          | 910         | 16×20                 | 0.037                 | 0.17  | 1,740                                                               | EGXF500E□□911ML20S |
|                          | 1,000       | 12.5×30               | 0.031                 | 0.14  | 2,510                                                               | EGXF500E□□102MK30S |
|                          | 1,000       | 14.5×25               | 0.031                 | 0.14  | 2,480                                                               | EGXF500E□□102MU25S |
|                          | 1,200       | 12.5×35               | 0.027                 | 0.11  | 2,900                                                               | EGXF500E□□122MK35S |
|                          | 1,200       | 18×20                 | 0.036                 | 0.14  | 1,830                                                               | EGXF500E□□122MM20S |
|                          | 1,300       | 14.5×30               | 0.026                 | 0.11  | 2,870                                                               | EGXF500E□□132MU30S |
|                          | 1,300       | 16×25                 | 0.027                 | 0.13  | 2,690                                                               | EGXF500E□□132ML25S |
|                          | 1,500       | 12.5×40               | 0.023                 | 0.090 | 3,260                                                               | EGXF500E□□152MK40S |
|                          | 1,500       | 14.5×35               | 0.023                 | 0.085 | 3,160                                                               | EGXF500E□□152MM35S |
| 63                       | 1,600       | 16×30                 | 0.023                 | 0.094 | 3,150                                                               | EGXF500E□□162ML30S |
|                          | 1,800       | 18×25                 | 0.025                 | 0.11  | 2,900                                                               | EGXF500E□□182MM25S |
|                          | 2,000       | 14.5×40               | 0.020                 | 0.072 | 3,560                                                               | EGXF500E□□202MU40S |
|                          | 2,000       | 16×35                 | 0.020                 | 0.074 | 3,470                                                               | EGXF500E□□202MM35S |
|                          | 2,200       | 18×30                 | 0.021                 | 0.079 | 3,330                                                               | EGXF500E□□222MM30S |
|                          | 2,400       | 16×40                 | 0.018                 | 0.063 | 3,800                                                               | EGXF500E□□242ML40S |
|                          | 2,700       | 18×35                 | 0.019                 | 0.065 | 3,590                                                               | EGXF500E□□272MM35S |
|                          | 3,300       | 18×40                 | 0.017                 | 0.058 | 3,850                                                               | EGXF500E□□332MM40S |
|                          | 390         | 12.5×20               | 0.097                 | 0.75  | 1,310                                                               | EGXF630E□□391MK20S |
|                          | 510         | 12.5×25               | 0.072                 | 0.55  | 1,880                                                               | EGXF630E□□511MK25S |
|                          | 510         | 14.5×20               | 0.072                 | 0.59  | 1,510                                                               | EGXF630E□□511MU20S |
|                          | 620         | 16×20                 | 0.062                 | 0.39  | 1,630                                                               | EGXF630E□□621ML20S |
|                          | 680         | 12.5×30               | 0.052                 | 0.37  | 2,410                                                               | EGXF630E□□681MK30S |
|                          | 680         | 14.5×25               | 0.054                 | 0.40  | 2,130                                                               | EGXF630E□□681MU25S |
|                          | 820         | 12.5×35               | 0.044                 | 0.29  | 2,760                                                               | EGXF630E□□821MK35S |
|                          | 820         | 18×20                 | 0.055                 | 0.29  | 1,750                                                               | EGXF630E□□821MM20S |
|                          | 910         | 14.5×30               | 0.042                 | 0.30  | 2,700                                                               | EGXF630E□□911MU30S |
|                          | 910         | 16×25                 | 0.047                 | 0.27  | 2,300                                                               | EGXF630E□□911ML25S |
|                          | 1,000       | 12.5×40               | 0.038                 | 0.26  | 3,080                                                               | EGXF630E□□102MK40S |
|                          | 1,100       | 14.5×35               | 0.037                 | 0.24  | 2,940                                                               | EGXF630E□□112MU35S |
|                          | 1,100       | 16×30                 | 0.037                 | 0.23  | 2,940                                                               | EGXF630E□□112ML30S |
|                          | 1,200       | 18×25                 | 0.044                 | 0.22  | 2,440                                                               | EGXF630E□□122MM25S |
|                          | 1,300       | 14.5×40               | 0.032                 | 0.20  | 3,350                                                               | EGXF630E□□132MU40S |
|                          | 1,300       | 16×35                 | 0.031                 | 0.17  | 3,220                                                               | EGXF630E□□132ML35S |
|                          | 1,500       | 18×30                 | 0.037                 | 0.18  | 3,100                                                               | EGXF630E□□152MM30S |
|                          | 1,800       | 16×40                 | 0.028                 | 0.15  | 3,590                                                               | EGXF630E□□182ML40S |
|                          | 2,000       | 18×35                 | 0.028                 | 0.13  | 3,450                                                               | EGXF630E□□202MM35S |
|                          | 2,400       | 18×40                 | 0.023                 | 0.10  | 3,690                                                               | EGXF630E□□242MM40S |
| 80                       | 240         | 12.5×20               | 0.097                 | 0.75  | 1,310                                                               | EGXF800E□□241MK20S |
|                          | 330         | 12.5×25               | 0.072                 | 0.55  | 1,880                                                               | EGXF800E□□331MK25S |
|                          | 330         | 14.5×20               | 0.072                 | 0.59  | 1,510                                                               | EGXF800E□□331MU20S |
|                          | 390         | 16×20                 | 0.062                 | 0.39  | 1,630                                                               | EGXF800E□□391ML20S |
|                          | 430         | 12.5×30               | 0.052                 | 0.37  | 2,410                                                               | EGXF800E□□431MK30S |
|                          | 470         | 14.5×25               | 0.054                 | 0.40  | 2,130                                                               | EGXF800E□□471MU25S |
|                          | 560         | 12.5×35               | 0.044                 | 0.29  | 2,760                                                               | EGXF800E□□561MK35S |
|                          | 560         | 16×25                 | 0.047                 | 0.27  | 2,300                                                               | EGXF800E□□561ML25S |
|                          | 560         | 18×20                 | 0.055                 | 0.29  | 1,750                                                               | EGXF800E□□561MM20S |
|                          | 620         | 12.5×40               | 0.038                 | 0.26  | 3,080                                                               | EGXF800E□□621MK40S |
|                          | 620         | 14.5×30               | 0.042                 | 0.30  | 2,700                                                               | EGXF800E□□621MU30S |
|                          | 680         | 14.5×35               | 0.037                 | 0.24  | 2,940                                                               | EGXF800E□□681MU35S |
|                          | 680         | 16×30                 | 0.037                 | 0.23  | 2,940                                                               | EGXF800E□□681ML30S |
|                          | 750         | 18×25                 | 0.044                 | 0.22  | 2,440                                                               | EGXF800E□□751MM25S |
|                          | 820         | 14.5×40               | 0.032                 | 0.20  | 3,350                                                               | EGXF800E□□821MU40S |
|                          | 910         | 16×35                 | 0.031                 | 0.17  | 3,220                                                               | EGXF800E□□911ML35S |
|                          | 910         | 18×30                 | 0.037                 | 0.18  | 3,100                                                               | EGXF800E□□911MM30S |
|                          | 1,100       | 16×40                 | 0.028                 | 0.15  | 3,590                                                               | EGXF800E□□112ML40S |
|                          | 1,300       | 18×35                 | 0.028                 | 0.13  | 3,450                                                               | EGXF800E□□132MM35S |
|                          | 1,500       | 18×40                 | 0.023                 | 0.10  | 3,690                                                               | EGXF800E□□152MM40S |
|                          | 130         | 12.5×20               | 0.12                  | 0.94  | 1,210                                                               | EGXF101E□□131MK20S |
|                          | 180         | 14.5×20               | 0.082                 | 0.69  | 1,450                                                               | EGXF101E□□181MU20S |
|                          | 200         | 12.5×25               | 0.082                 | 0.70  | 1,800                                                               | EGXF101E□□201MK25S |
|                          | 240         | 12.5×30               | 0.062                 | 0.52  | 2,290                                                               | EGXF101E□□241MK30S |
|                          | 240         | 16×20                 | 0.071                 | 0.53  | 1,580                                                               | EGXF101E□□241ML20S |
|                          | 270         | 14.5×25               | 0.064                 | 0.52  | 2,050                                                               | EGXF101E□□271MU25S |
|                          | 330         | 12.5×35               | 0.051                 | 0.38  | 2,680                                                               | EGXF101E□□331MK35S |



## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φDxL(mm) | ESR<br>(Ωmax./100kHz) |       | Rated<br>ripple<br>current<br>(mA <sub>rms</sub> /125°C,<br>100kHz) | Part No.           |
|--------------------------|-------------|-----------------------|-----------------------|-------|---------------------------------------------------------------------|--------------------|
|                          |             |                       | 20°C                  | -40°C |                                                                     |                    |
| 100                      | 330         | 16×25                 | 0.057                 | 0.39  | 2,190                                                               | EGXF101E□□331ML25S |
|                          | 330         | 18×20                 | 0.069                 | 0.39  | 1,690                                                               | EGXF101E□□331MM20S |
|                          | 360         | 14.5×30               | 0.050                 | 0.40  | 2,620                                                               | EGXF101E□□361MU30S |
|                          | 390         | 12.5×40               | 0.044                 | 0.33  | 2,970                                                               | EGXF101E□□391MK40S |
|                          | 390         | 14.5×35               | 0.044                 | 0.33  | 2,850                                                               | EGXF101E□□391MU35S |
|                          | 390         | 16×30                 | 0.044                 | 0.33  | 2,770                                                               | EGXF101E□□391ML30S |
|                          | 430         | 18×25                 | 0.054                 | 0.32  | 2,310                                                               | EGXF101E□□431MM25S |
|                          | 510         | 14.5×40               | 0.038                 | 0.26  | 3,230                                                               | EGXF101E□□511MU40S |
|                          | 510         | 16×35                 | 0.037                 | 0.26  | 3,010                                                               | EGXF101E□□511ML35S |
|                          | 560         | 18×30                 | 0.043                 | 0.26  | 2,830                                                               | EGXF101E□□561MM30S |
|                          | 620         | 16×40                 | 0.032                 | 0.21  | 3,320                                                               | EGXF101E□□621ML40S |
|                          | 680         | 18×35                 | 0.034                 | 0.19  | 3,210                                                               | EGXF101E□□681MM35S |
| 160                      | 820         | 18×40                 | 0.029                 | 0.16  | 3,410                                                               | EGXF101E□□821MM40S |
|                          | 51          | 10×20                 | —                     | —     | 900                                                                 | EGXF161E□□510MJ20S |
|                          | 62          | 10×25                 | —                     | —     | 1,200                                                               | EGXF161E□□620MJ25S |
|                          | 75          | 12.5×20               | —                     | —     | 1,220                                                               | EGXF161E□□750MK20S |
|                          | 82          | 10×30                 | —                     | —     | 1,410                                                               | EGXF161E□□820MJ30S |
|                          | 100         | 10×35                 | —                     | —     | 1,600                                                               | EGXF161E□□101MJ35S |
|                          | 100         | 14.5×20               | —                     | —     | 1,340                                                               | EGXF161E□□101MU20S |
|                          | 110         | 12.5×25               | —                     | —     | 1,510                                                               | EGXF161E□□111MK25S |
|                          | 120         | 10×40                 | —                     | —     | 1,790                                                               | EGXF161E□□121MJ40S |
|                          | 130         | 16×20                 | —                     | —     | 1,500                                                               | EGXF161E□□131ML20S |
|                          | 150         | 12.5×30               | —                     | —     | 1,770                                                               | EGXF161E□□151MK30S |
|                          | 150         | 14.5×25               | —                     | —     | 1,610                                                               | EGXF161E□□151MU25S |
| 200                      | 180         | 12.5×35               | —                     | —     | 1,970                                                               | EGXF161E□□181MK35S |
|                          | 180         | 14.5×30               | —                     | —     | 1,880                                                               | EGXF161E□□181MU30S |
|                          | 180         | 18×20                 | —                     | —     | 1,730                                                               | EGXF161E□□181MM20S |
|                          | 200         | 12.5×40               | —                     | —     | 2,150                                                               | EGXF161E□□201MK40S |
|                          | 200         | 16×25                 | —                     | —     | 1,850                                                               | EGXF161E□□201ML25S |
|                          | 220         | 14.5×35               | —                     | —     | 2,030                                                               | EGXF161E□□221MU35S |
|                          | 240         | 18×25                 | —                     | —     | 2,050                                                               | EGXF161E□□241MM25S |
|                          | 270         | 14.5×40               | —                     | —     | 2,250                                                               | EGXF161E□□271MU40S |
|                          | 36          | 10×20                 | —                     | —     | 900                                                                 | EGXF201E□□360MJ20S |
|                          | 43          | 10×25                 | —                     | —     | 1,200                                                               | EGXF201E□□430MJ25S |
|                          | 56          | 12.5×20               | —                     | —     | 1,220                                                               | EGXF201E□□560MK20S |
|                          | 62          | 10×30                 | —                     | —     | 1,410                                                               | EGXF201E□□620MJ30S |
| 250                      | 75          | 10×35                 | —                     | —     | 1,600                                                               | EGXF201E□□750MJ35S |
|                          | 75          | 14.5×20               | —                     | —     | 1,340                                                               | EGXF201E□□750MU20S |
|                          | 82          | 10×40                 | —                     | —     | 1,790                                                               | EGXF201E□□820MJ40S |
|                          | 82          | 12.5×25               | —                     | —     | 1,510                                                               | EGXF201E□□820MK25S |
|                          | 100         | 12.5×30               | —                     | —     | 1,770                                                               | EGXF201E□□101MK30S |
|                          | 100         | 16×20                 | —                     | —     | 1,500                                                               | EGXF201E□□101ML20S |
|                          | 110         | 14.5×25               | —                     | —     | 1,610                                                               | EGXF201E□□111MU25S |
|                          | 130         | 12.5×35               | —                     | —     | 1,970                                                               | EGXF201E□□131MK35S |
|                          | 130         | 14.5×30               | —                     | —     | 1,880                                                               | EGXF201E□□131MU30S |
|                          | 130         | 18×20                 | —                     | —     | 1,730                                                               | EGXF201E□□131MM20S |
|                          | 150         | 12.5×40               | —                     | —     | 2,150                                                               | EGXF201E□□151MK40S |
|                          | 150         | 16×25                 | —                     | —     | 1,850                                                               | EGXF201E□□151ML25S |
| 350                      | 160         | 14.5×35               | —                     | —     | 2,030                                                               | EGXF201E□□161MU35S |
|                          | 180         | 18×25                 | —                     | —     | 2,050                                                               | EGXF201E□□181MM25S |
|                          | 200         | 14.5×40               | —                     | —     | 2,250                                                               | EGXF201E□□201MU40S |
|                          | 24          | 10×20                 | —                     | —     | 460                                                                 | EGXF351E□□240MJ20S |
|                          | 27          | 12.5×25               | —                     | —     | 980                                                                 | EGXF351E□□270MK25S |
|                          | 30          | 10×40                 | —                     | —     | 940                                                                 | EGXF351E□□300MJ40S |
|                          | 33          | 16×20                 | —                     | —     | 970                                                                 | EGXF351E□□330ML20S |
|                          | 36          | 12.5×30               | —                     | —     | 1,210                                                               | EGXF351E□□360MK30S |
|                          | 36          | 14.5×25               | —                     | —     | 1,210                                                               | EGXF351E□□360MU25S |
|                          | 43          | 12.5×35               | —                     | —     | 1,330                                                               | EGXF351E□□430MK35S |
|                          | 43          | 18×20                 | —                     | —     | 1,060                                                               | EGXF351E□□430MM20S |
|                          | 47          | 14.5×30               | —                     | —     | 1,410                                                               | EGXF351E□□470MU30S |
| 400                      | 47          | 16×25                 | —                     | —     | 1,130                                                               | EGXF351E□□470ML25S |
|                          | 51          | 12.5×40               | —                     | —     | 1,450                                                               | EGXF351E□□510MK40S |
|                          | 56          | 14.5×35               | —                     | —     | 1,590                                                               | EGXF351E□□560MU35S |
|                          | 62          | 18×25                 | —                     | —     | 1,200                                                               | EGXF351E□□620MM25S |
|                          | 68          | 14.5×40               | —                     | —     | 1,820                                                               | EGXF351E□□680MU40S |
|                          | 12          | 10×20                 | —                     | —     | 460                                                                 | EGXF401E□□120MJ20S |
|                          | 16          | 10×25                 | —                     | —     | 610                                                                 | EGXF401E□□160MJ25S |
|                          | 20          | 10×30                 | —                     | —     | 720                                                                 | EGXF401E□□200MJ30S |
|                          | 20          | 12.5×20               | —                     | —     | 680                                                                 | EGXF401E□□200MK20S |
|                          | 24          | 10×35                 | —                     | —     | 820                                                                 | EGXF401E□□240MJ35S |
|                          | 24          | 14.5×20               | —                     | —     | 870                                                                 | EGXF401E□□240MU20S |
|                          | 27          | 12.5×25               | —                     | —     | 980                                                                 | EGXF401E□□270MK25S |
| 450                      | 30          | 10×40                 | —                     | —     | 940                                                                 | EGXF401E□□300MJ40S |
|                          | 33          | 16×20                 | —                     | —     | 970                                                                 | EGXF401E□□330ML20S |
|                          | 36          | 12.5×30               | —                     | —     | 1,210                                                               | EGXF401E□□360MK30S |
|                          | 36          | 14.5×25               | —                     | —     | 1,210                                                               | EGXF401E□□360MU25S |
|                          | 43          | 12.5×35               | —                     | —     | 1,330                                                               | EGXF401E□□430MK35S |
|                          | 43          | 18×20                 | —                     | —     | 1,060                                                               | EGXF401E□□430MM20S |
|                          | 47          | 14.5×30               | —                     | —     | 1,410                                                               | EGXF401E□□470MU30S |
|                          | 47          | 16×25                 | —                     | —     | 1,130                                                               | EGXF401E□□470ML25S |
|                          | 51          | 12.5×40               | —                     | —     | 1,450                                                               | EGXF401E□□510MK40S |
|                          | 56          | 14.5×35               | —                     | —     | 1,590                                                               | EGXF401E□□560MU35S |
|                          | 62          | 18×25                 | —                     | —     | 1,200                                                               | EGXF401E□□620MM25S |
|                          | 68          | 14.5×40               | —                     | —     | 1,820                                                               | EGXF401E□□680MU40S |

□□ : Enter the appropriate lead forming or taping code.

\*1: Assembly boards with the designated products attached cannot be cleaned.

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

(25 to 100V<sub>dc</sub>)

| Capacitance(μF) | Frequency(Hz) | 120  | 1k   | 10k  | 100k |
|-----------------|---------------|------|------|------|------|
| 130 to 240      |               | 0.40 | 0.82 | 0.93 | 1.00 |
| 270 to 560      |               | 0.50 | 0.85 | 0.94 | 1.00 |
| 620 to 2,000    |               | 0.60 | 0.87 | 0.95 | 1.00 |
| 2,200 to 4,300  |               | 0.75 | 0.90 | 0.95 | 1.00 |
| 4,700 to 11,000 |               | 0.85 | 0.95 | 0.98 | 1.00 |

Please contact us for lifetime estimation.

(160 to 400V<sub>dc</sub>)

| Capacitance(μF) | Frequency(Hz) | 50   | 120  | 300  | 1k   | 10k  | 100k |
|-----------------|---------------|------|------|------|------|------|------|
| 12 to 33        |               | 0.15 | 0.30 | 0.45 | 0.65 | 0.95 | 1.00 |
| 36 to 270       |               | 0.25 | 0.35 | 0.50 | 0.70 | 0.96 | 1.00 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.



# GXL Series



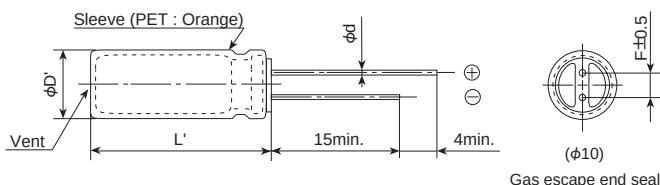
- Long-Life version of GXE series
- For automobile modules and other high temperature applications
- Endurance with ripple current : 5,000 hours at 125°C
- Solvent resistant type (see PRECAUTIONS AND GUIDELINES)
- RoHS2 Compliant
- AEC-Q200 compliant : Please contact Chemi-Con for more details, test data, information.

## SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                         |                                      |      |      |      |      |                  |
|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------|------|------|------|------------------|
| Category                                               |                                                                                                                                                                                                                                                                                         |                                      |      |      |      |      |                  |
| Temperature Range                                      | -40 to +125°C                                                                                                                                                                                                                                                                           |                                      |      |      |      |      |                  |
| Rated Voltage Range                                    | 10 to 50V <sub>dc</sub>                                                                                                                                                                                                                                                                 |                                      |      |      |      |      |                  |
| Capacitance Tolerance                                  | ± 20% (M) (at 20°C, 120Hz)                                                                                                                                                                                                                                                              |                                      |      |      |      |      |                  |
| Leakage Current                                        | I=0.03CV or 4μA, whichever is greater.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C, 1 minute)                                                                                                                                 |                                      |      |      |      |      |                  |
| Dissipation Factor (tan δ)                             | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                        | 10V                                  | 16V  | 25V  | 35V  | 50V  | (at 20°C, 120Hz) |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                            | 0.20                                 | 0.16 | 0.14 | 0.12 | 0.10 |                  |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                        | 10V                                  | 16V  | 25V  | 35V  | 50V  | (at 120Hz)       |
|                                                        | Z(-25°C)/Z(+20°C)                                                                                                                                                                                                                                                                       | 3                                    | 2    | 2    | 2    | 2    |                  |
|                                                        | Z(-40°C)/Z(+20°C)                                                                                                                                                                                                                                                                       | 6                                    | 4    | 4    | 4    | 4    |                  |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 5,000 hours at 125°C.                                         |                                      |      |      |      |      |                  |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                      | ≤ ± 30% of the initial value         |      |      |      |      |                  |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                            | ≤300% of the initial specified value |      |      |      |      |                  |
|                                                        | Leakage current                                                                                                                                                                                                                                                                         | ≤The initial specified value         |      |      |      |      |                  |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 125°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                      |      |      |      |      |                  |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                      | ≤ ± 30% of the initial value         |      |      |      |      |                  |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                            | ≤300% of the initial specified value |      |      |      |      |                  |
|                                                        | Leakage current                                                                                                                                                                                                                                                                         | ≤The initial specified value         |      |      |      |      |                  |

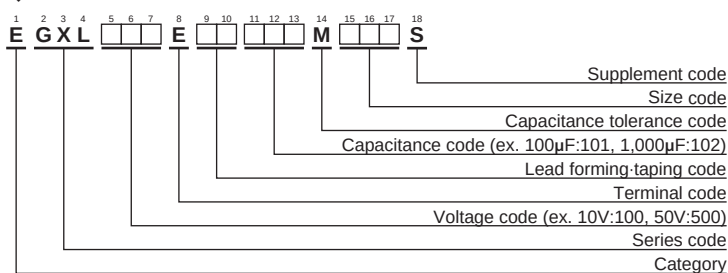
## DIMENSIONS [mm]

- Terminal Code : E



|     |            |
|-----|------------|
| φD  | 10         |
| φd  | 0.6        |
| F   | 5.0        |
| φD' | φD+0.5max. |
| L'  | L+1.5max.  |

## PART NUMBERING SYSTEM



Please refer to "Product code guide (radial lead type)"

**GXL**Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>ac</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Impedance<br>(Ω max./20°C, 100kHz) | Rated ripple current<br>(mA <sub>rms</sub> /125°C, 100kHz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|------------------------------------|------------------------------------------------------------|--------------------|
| 10                       | 330         | 10 × 12.5             | 0.20  | 0.17                               | 800                                                        | EGXL100E□□331MJC5S |
|                          | 470         | 10 × 12.5             | 0.20  | 0.17                               | 800                                                        | EGXL100E□□471MJC5S |
|                          | 1,000       | 10 × 20               | 0.20  | 0.094                              | 1,300                                                      | EGXL100E□□102MJ20S |
| 16                       | 220         | 10 × 12.5             | 0.16  | 0.17                               | 800                                                        | EGXL160E□□221MJC5S |
|                          | 330         | 10 × 12.5             | 0.16  | 0.17                               | 800                                                        | EGXL160E□□331MJC5S |
|                          | 470         | 10 × 16               | 0.16  | 0.12                               | 1,050                                                      | EGXL160E□□471MJ16S |
| 25                       | 220         | 10 × 12.5             | 0.14  | 0.17                               | 800                                                        | EGXL250E□□221MJC5S |
|                          | 330         | 10 × 16               | 0.14  | 0.12                               | 1,050                                                      | EGXL250E□□331MJ16S |
|                          | 470         | 10 × 20               | 0.14  | 0.094                              | 1,300                                                      | EGXL250E□□471MJ20S |
| 35                       | 100         | 10 × 12.5             | 0.12  | 0.17                               | 800                                                        | EGXL350E□□101MJC5S |
|                          | 220         | 10 × 16               | 0.12  | 0.12                               | 1,050                                                      | EGXL350E□□221MJ16S |
|                          | 330         | 10 × 20               | 0.12  | 0.094                              | 1,300                                                      | EGXL350E□□331MJ20S |
| 50                       | 100         | 10 × 12.5             | 0.10  | 0.30                               | 590                                                        | EGXL500E□□101MJC5S |
|                          | 220         | 10 × 20               | 0.10  | 0.19                               | 970                                                        | EGXL500E□□221MJ20S |

□□ : Enter the appropriate lead forming or taping code.

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

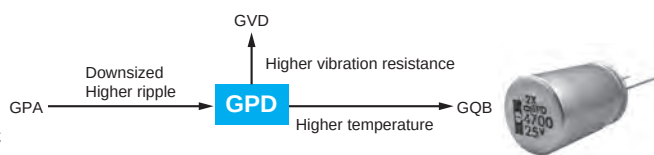
| Capacitance(μF) | Frequency(Hz) |      |      |      |
|-----------------|---------------|------|------|------|
|                 | 120           | 1k   | 10k  | 100k |
| 100             | 0.40          | 0.75 | 0.90 | 1.00 |
| 220 to 470      | 0.50          | 0.85 | 0.94 | 1.00 |
| 1,000           | 0.60          | 0.87 | 0.95 | 1.00 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.



# GPD Series

- Guaranteed short time at 150°C
- Downsized and high-ripple current version of GPA series
- For automobile modules and other high temperature applications
- Endurance with ripple current : 2,000 to 3,000 hours at 125°C to 135°C
- Solvent resistant type (see PRECAUTIONS AND GUIDELINES)
- RoHS2 Compliant
- AEC-Q200 compliant : Please contact Chemi-Con for more details, test data, information.

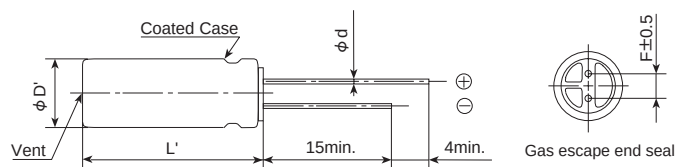


## SPECIFICATIONS

| Items                                                        | Characteristics                                                                                                                                                                                                                                                                                                                          |                                                                                                       |      |      |      |      |      |                 |
|--------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|------|------|------|------|------|-----------------|
| Category                                                     |                                                                                                                                                                                                                                                                                                                                          |                                                                                                       |      |      |      |      |      |                 |
| Temperature Range                                            | -40 to +135℃                                                                                                                                                                                                                                                                                                                             |                                                                                                       |      |      |      |      |      |                 |
| Rated Voltage Range                                          | 25 to 100V <sub>dc</sub>                                                                                                                                                                                                                                                                                                                 |                                                                                                       |      |      |      |      |      |                 |
| Capacitance Tolerance                                        | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                                                                                |                                                                                                       |      |      |      |      |      |                 |
| Leakage Current                                              | I=0.03CV or 4μA, whichever is greater.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃, 1 minute)                                                                                                                                                                                   |                                                                                                       |      |      |      |      |      |                 |
| Dissipation Factor<br>(tan δ)                                | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                                                                         | 25V                                                                                                   | 35V  | 50V  | 63V  | 80V  | 100V | (at 20℃, 120Hz) |
|                                                              | tan δ (Max.)                                                                                                                                                                                                                                                                                                                             | 0.14                                                                                                  | 0.12 | 0.10 | 0.10 | 0.08 | 0.08 |                 |
|                                                              | When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase.                                                                                                                                                                                                                                         |                                                                                                       |      |      |      |      |      |                 |
| Low Temperature<br>Characteristics<br>(Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                                                                         | 25V                                                                                                   | 35V  | 50V  | 63V  | 80V  | 100V | (at 120Hz)      |
|                                                              | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                                                                          | 2                                                                                                     | 2    | 2    | 2    | 2    | 2    |                 |
|                                                              | Z(-40℃)/Z(+20℃)                                                                                                                                                                                                                                                                                                                          | 4                                                                                                     | 4    | 4    | 4    | 4    | 4    |                 |
| Endurance 1                                                  | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for the specified period of time at 125℃ or 135℃.                                                                   |                                                                                                       |      |      |      |      |      |                 |
|                                                              | Time                                                                                                                                                                                                                                                                                                                                     | 125℃ 3,000hours<br>135℃ 25 to 50V <sub>dc</sub> : 3,000hours<br>63 to 100V <sub>dc</sub> : 2,000hours |      |      |      |      |      |                 |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                                                                       | ≤ ±30% of the initial value                                                                           |      |      |      |      |      |                 |
|                                                              | D.F. (tan δ)                                                                                                                                                                                                                                                                                                                             | ≤300% of the initial specified value                                                                  |      |      |      |      |      |                 |
|                                                              | Leakage current                                                                                                                                                                                                                                                                                                                          | ≤The initial specified value                                                                          |      |      |      |      |      |                 |
| Endurance 2                                                  | The following specifications shall be satisfied when the capacitors are restored to 20℃ after the test condition that the rated voltage is applied for 100 hours at 150℃ and DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for the specified period of time at 125℃ or 135℃. |                                                                                                       |      |      |      |      |      |                 |
|                                                              | Time                                                                                                                                                                                                                                                                                                                                     | 125℃ 2,500hours<br>135℃ 25 to 50V <sub>dc</sub> : 2,500hours<br>63 to 100V <sub>dc</sub> : 1,500hours |      |      |      |      |      |                 |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                                                                       | ≤ ±30% of the initial value                                                                           |      |      |      |      |      |                 |
|                                                              | D.F. (tan δ)                                                                                                                                                                                                                                                                                                                             | ≤300% of the initial specified value                                                                  |      |      |      |      |      |                 |
|                                                              | Leakage current                                                                                                                                                                                                                                                                                                                          | ≤The initial specified value                                                                          |      |      |      |      |      |                 |
| Shelf Life                                                   | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 125℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4.                                                    |                                                                                                       |      |      |      |      |      |                 |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                                                                       | ≤ ±30% of the initial value                                                                           |      |      |      |      |      |                 |
|                                                              | D.F. (tan δ)                                                                                                                                                                                                                                                                                                                             | ≤300% of the initial specified value                                                                  |      |      |      |      |      |                 |
|                                                              | Leakage current                                                                                                                                                                                                                                                                                                                          | ≤The initial specified value                                                                          |      |      |      |      |      |                 |

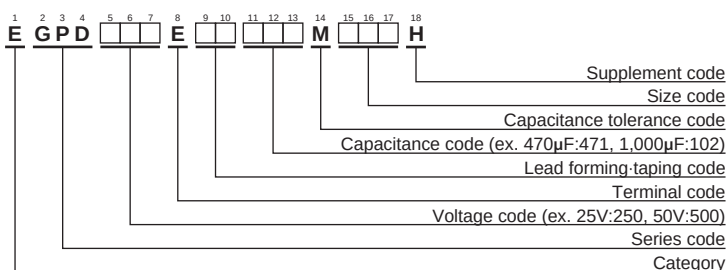
## DIMENSIONS [mm]

- Terminal Code : E



| φD  | 12.5                                     | 16  | 18  |
|-----|------------------------------------------|-----|-----|
| φd  | 0.6                                      | 0.8 | 0.8 |
| F   | 5.0                                      | 7.5 | 7.5 |
| φD' | φD±0.5                                   |     |     |
| L'  | L <sup>+</sup> 1.5<br>L <sup>-</sup> 1.0 |     |     |

## PART NUMBERING SYSTEM



Please refer to "Product code guide (radial lead type)"





## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | ESR<br>(Ω max./100kHz) |       | Rated ripple current<br>(mA rms/100kHz) |       | Part No.           |
|--------------------------|-------------|-----------------------|-------|------------------------|-------|-----------------------------------------|-------|--------------------|
|                          |             |                       |       | 20°C                   | -40°C | 125°C                                   | 135°C |                    |
| 25                       | 2,000       | 12.5 × 20             | 0.16  | 0.042                  | 0.48  | 2,760                                   | 1,690 | EGPD250E□□202MK20H |
|                          | 3,000       | 12.5 × 25             | 0.18  | 0.033                  | 0.30  | 3,480                                   | 2,010 | EGPD250E□□302MK25H |
|                          | 3,300       | 16 × 20               | 0.18  | 0.035                  | 0.27  | 3,040                                   | 1,860 | EGPD250E□□332ML20H |
|                          | 3,600       | 12.5 × 30             | 0.18  | 0.028                  | 0.24  | 4,490                                   | 2,900 | EGPD250E□□362MK30H |
|                          | 4,300       | 18 × 20               | 0.20  | 0.034                  | 0.22  | 3,250                                   | 1,870 | EGPD250E□□432MM20H |
|                          | 4,700       | 12.5 × 35             | 0.20  | 0.025                  | 0.21  | 5,140                                   | 3,190 | EGPD250E□□472MK35H |
|                          | 4,700       | 16 × 25               | 0.20  | 0.028                  | 0.22  | 4,260                                   | 2,870 | EGPD250E□□472ML25H |
|                          | 5,100       | 12.5 × 40             | 0.22  | 0.024                  | 0.19  | 5,810                                   | 3,470 | EGPD250E□□512MK40H |
|                          | 5,600       | 16 × 30               | 0.22  | 0.023                  | 0.18  | 5,480                                   | 3,400 | EGPD250E□□562ML30H |
|                          | 6,200       | 18 × 25               | 0.24  | 0.027                  | 0.19  | 4,500                                   | 2,900 | EGPD250E□□622MM25H |
|                          | 7,500       | 16 × 35               | 0.26  | 0.020                  | 0.14  | 6,070                                   | 3,630 | EGPD250E□□752ML35H |
|                          | 7,500       | 18 × 30               | 0.26  | 0.022                  | 0.16  | 5,600                                   | 3,470 | EGPD250E□□752MM30H |
|                          | 9,100       | 16 × 40               | 0.30  | 0.019                  | 0.12  | 6,810                                   | 3,930 | EGPD250E□□912ML40H |
| 35                       | 10,000      | 18 × 35               | 0.32  | 0.019                  | 0.12  | 6,280                                   | 3,750 | EGPD250E□□103MM35H |
|                          | 12,000      | 18 × 40               | 0.36  | 0.018                  | 0.10  | 7,070                                   | 4,080 | EGPD250E□□123MM40H |
|                          | 1,300       | 12.5 × 20             | 0.12  | 0.042                  | 0.48  | 2,760                                   | 1,690 | EGPD350E□□132MK20H |
|                          | 1,800       | 12.5 × 25             | 0.12  | 0.033                  | 0.30  | 3,480                                   | 2,010 | EGPD350E□□182MK25H |
|                          | 2,000       | 16 × 20               | 0.14  | 0.035                  | 0.27  | 3,040                                   | 1,860 | EGPD350E□□202ML20H |
|                          | 2,200       | 12.5 × 30             | 0.14  | 0.028                  | 0.24  | 4,490                                   | 2,900 | EGPD350E□□222MK30H |
|                          | 2,400       | 18 × 20               | 0.14  | 0.034                  | 0.22  | 3,250                                   | 1,870 | EGPD350E□□242MM20H |
|                          | 2,700       | 12.5 × 35             | 0.14  | 0.025                  | 0.21  | 5,140                                   | 3,190 | EGPD350E□□272MK35H |
|                          | 3,000       | 16 × 25               | 0.16  | 0.028                  | 0.22  | 4,260                                   | 2,870 | EGPD350E□□302ML25H |
|                          | 3,300       | 12.5 × 40             | 0.16  | 0.024                  | 0.19  | 5,810                                   | 3,470 | EGPD350E□□332MK40H |
|                          | 3,600       | 16 × 30               | 0.16  | 0.023                  | 0.18  | 5,480                                   | 3,400 | EGPD350E□□362ML30H |
|                          | 3,900       | 18 × 25               | 0.16  | 0.027                  | 0.19  | 4,500                                   | 2,900 | EGPD350E□□392MM25H |
|                          | 4,300       | 16 × 35               | 0.18  | 0.020                  | 0.14  | 6,070                                   | 3,630 | EGPD350E□□432ML35H |
| 50                       | 4,700       | 18 × 30               | 0.18  | 0.022                  | 0.16  | 5,600                                   | 3,470 | EGPD350E□□472MM30H |
|                          | 5,600       | 16 × 40               | 0.20  | 0.019                  | 0.12  | 6,810                                   | 3,930 | EGPD350E□□562ML40H |
|                          | 6,200       | 18 × 35               | 0.22  | 0.019                  | 0.12  | 6,280                                   | 3,750 | EGPD350E□□622MM35H |
|                          | 7,500       | 18 × 40               | 0.24  | 0.018                  | 0.10  | 7,070                                   | 4,080 | EGPD350E□□752MM40H |
|                          | 620         | 12.5 × 20             | 0.10  | 0.073                  | 0.88  | 2,400                                   | 1,470 | EGPD500E□□621MK20H |
|                          | 820         | 12.5 × 25             | 0.10  | 0.058                  | 0.67  | 3,350                                   | 2,260 | EGPD500E□□821MK25H |
|                          | 1,000       | 16 × 20               | 0.10  | 0.050                  | 0.55  | 2,960                                   | 1,870 | EGPD500E□□102ML20H |
|                          | 1,100       | 12.5 × 30             | 0.10  | 0.048                  | 0.52  | 4,220                                   | 2,520 | EGPD500E□□112MK30H |
|                          | 1,300       | 12.5 × 35             | 0.10  | 0.042                  | 0.44  | 4,810                                   | 2,780 | EGPD500E□□132MK35H |
|                          | 1,300       | 16 × 25               | 0.10  | 0.042                  | 0.44  | 4,040                                   | 2,500 | EGPD500E□□132ML25H |
|                          | 1,300       | 18 × 20               | 0.10  | 0.042                  | 0.44  | 3,130                                   | 2,110 | EGPD500E□□132MM20H |
|                          | 1,600       | 12.5 × 40             | 0.10  | 0.037                  | 0.36  | 5,240                                   | 3,020 | EGPD500E□□162MK40H |
|                          | 1,600       | 16 × 30               | 0.10  | 0.035                  | 0.36  | 5,130                                   | 2,960 | EGPD500E□□162ML30H |
| 63                       | 1,800       | 18 × 25               | 0.10  | 0.033                  | 0.32  | 4,230                                   | 2,530 | EGPD500E□□182MM25H |
|                          | 2,200       | 16 × 35               | 0.12  | 0.029                  | 0.27  | 5,480                                   | 3,160 | EGPD500E□□222ML35H |
|                          | 2,400       | 18 × 30               | 0.12  | 0.028                  | 0.25  | 5,240                                   | 3,020 | EGPD500E□□242MM30H |
|                          | 2,700       | 16 × 40               | 0.12  | 0.025                  | 0.22  | 5,930                                   | 3,420 | EGPD500E□□272ML40H |
|                          | 3,000       | 18 × 35               | 0.14  | 0.024                  | 0.20  | 5,870                                   | 3,390 | EGPD500E□□302MM35H |
|                          | 3,600       | 18 × 40               | 0.14  | 0.023                  | 0.16  | 6,420                                   | 3,700 | EGPD500E□□362MM40H |
|                          | 390         | 12.5 × 20             | 0.10  | 0.072                  | 0.56  | 1,640                                   | 1,420 | EGPD630E□□391MK20H |
|                          | 560         | 12.5 × 25             | 0.10  | 0.052                  | 0.39  | 2,520                                   | 2,050 | EGPD630E□□561MK25H |
|                          | 680         | 16 × 20               | 0.10  | 0.053                  | 0.34  | 2,140                                   | 1,910 | EGPD630E□□681ML20H |
|                          | 750         | 12.5 × 30             | 0.10  | 0.042                  | 0.30  | 3,110                                   | 2,630 | EGPD630E□□751MK30H |
|                          | 910         | 12.5 × 35             | 0.10  | 0.035                  | 0.25  | 3,760                                   | 2,970 | EGPD630E□□911MK35H |
|                          | 910         | 18 × 20               | 0.10  | 0.044                  | 0.26  | 2,350                                   | 2,100 | EGPD630E□□911MM20H |
|                          | 1,000       | 16 × 25               | 0.10  | 0.038                  | 0.23  | 2,940                                   | 2,680 | EGPD630E□□102ML25H |
|                          | 1,100       | 12.5 × 40             | 0.10  | 0.031                  | 0.22  | 4,610                                   | 3,260 | EGPD630E□□112MK40H |
|                          | 1,200       | 16 × 30               | 0.10  | 0.034                  | 0.20  | 3,860                                   | 3,050 | EGPD630E□□122ML30H |
|                          | 1,300       | 18 × 25               | 0.10  | 0.033                  | 0.19  | 3,080                                   | 2,810 | EGPD630E□□132MM25H |
|                          | 1,600       | 16 × 35               | 0.10  | 0.027                  | 0.15  | 4,590                                   | 3,420 | EGPD630E□□162ML35H |
|                          | 1,600       | 18 × 30               | 0.10  | 0.028                  | 0.15  | 4,080                                   | 3,220 | EGPD630E□□162MM30H |
|                          | 1,800       | 16 × 40               | 0.10  | 0.025                  | 0.14  | 5,190                                   | 3,670 | EGPD630E□□182ML40H |
|                          | 2,200       | 18 × 35               | 0.12  | 0.022                  | 0.12  | 5,220                                   | 3,690 | EGPD630E□□222MM35H |
|                          | 2,400       | 18 × 40               | 0.12  | 0.021                  | 0.11  | 5,660                                   | 3,820 | EGPD630E□□242MM40H |

□□ : Enter the appropriate lead forming or taping code.



## GPD Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | ESR<br>(Ω max./100kHz) |       | Rated ripple current<br>(mA rms/100kHz) |       | Part No.           |
|--------------------------|-------------|-----------------------|-------|------------------------|-------|-----------------------------------------|-------|--------------------|
|                          |             |                       |       | 20°C                   | -40°C | 125°C                                   | 135°C |                    |
| 80                       | 270         | 12.5 × 20             | 0.08  | 0.072                  | 0.56  | 1,640                                   | 1,420 | EGPD800E□□271MK20H |
|                          | 390         | 12.5 × 25             | 0.08  | 0.052                  | 0.39  | 2,520                                   | 2,050 | EGPD800E□□391MK25H |
|                          | 470         | 16 × 20               | 0.08  | 0.053                  | 0.34  | 2,140                                   | 1,910 | EGPD800E□□471ML20H |
|                          | 510         | 12.5 × 30             | 0.08  | 0.042                  | 0.30  | 3,110                                   | 2,630 | EGPD800E□□511MK30H |
|                          | 620         | 12.5 × 35             | 0.08  | 0.035                  | 0.25  | 3,760                                   | 2,970 | EGPD800E□□621MK35H |
|                          | 620         | 18 × 20               | 0.08  | 0.044                  | 0.26  | 2,350                                   | 2,100 | EGPD800E□□621MM20H |
|                          | 680         | 16 × 25               | 0.08  | 0.038                  | 0.23  | 2,940                                   | 2,680 | EGPD800E□□681ML25H |
|                          | 750         | 12.5 × 40             | 0.08  | 0.031                  | 0.22  | 4,610                                   | 3,260 | EGPD800E□□751MK40H |
|                          | 750         | 16 × 30               | 0.08  | 0.034                  | 0.20  | 3,860                                   | 3,050 | EGPD800E□□751ML30H |
|                          | 820         | 18 × 25               | 0.08  | 0.033                  | 0.19  | 3,080                                   | 2,810 | EGPD800E□□821MM25H |
|                          | 1,000       | 16 × 35               | 0.08  | 0.027                  | 0.15  | 4,590                                   | 3,420 | EGPD800E□□102ML35H |
|                          | 1,100       | 18 × 30               | 0.08  | 0.028                  | 0.15  | 4,080                                   | 3,220 | EGPD800E□□112MM30H |
|                          | 1,300       | 16 × 40               | 0.08  | 0.025                  | 0.14  | 5,190                                   | 3,670 | EGPD800E□□132ML40H |
|                          | 1,300       | 18 × 35               | 0.08  | 0.022                  | 0.12  | 5,220                                   | 3,690 | EGPD800E□□132MM35H |
|                          | 1,600       | 18 × 40               | 0.08  | 0.021                  | 0.11  | 5,660                                   | 3,820 | EGPD800E□□162MM40H |
| 100                      | 160         | 12.5 × 20             | 0.08  | 0.090                  | 0.75  | 1,580                                   | 1,410 | EGPD101E□□161MK20H |
|                          | 220         | 12.5 × 25             | 0.08  | 0.068                  | 0.55  | 2,140                                   | 1,960 | EGPD101E□□221MK25H |
|                          | 270         | 16 × 20               | 0.08  | 0.067                  | 0.47  | 2,050                                   | 1,670 | EGPD101E□□271ML20H |
|                          | 300         | 12.5 × 30             | 0.08  | 0.052                  | 0.41  | 2,950                                   | 2,330 | EGPD101E□□301MK30H |
|                          | 360         | 12.5 × 35             | 0.08  | 0.045                  | 0.35  | 3,530                                   | 2,630 | EGPD101E□□361MK35H |
|                          | 360         | 18 × 20               | 0.08  | 0.061                  | 0.35  | 2,270                                   | 1,860 | EGPD101E□□361MM20H |
|                          | 390         | 16 × 25               | 0.08  | 0.048                  | 0.33  | 2,790                                   | 2,360 | EGPD101E□□391ML25H |
|                          | 430         | 12.5 × 40             | 0.08  | 0.038                  | 0.29  | 4,140                                   | 2,920 | EGPD101E□□431MK40H |
|                          | 470         | 16 × 30               | 0.08  | 0.041                  | 0.27  | 3,440                                   | 2,720 | EGPD101E□□471ML30H |
|                          | 510         | 18 × 25               | 0.08  | 0.045                  | 0.25  | 2,920                                   | 2,470 | EGPD101E□□511MM25H |
|                          | 560         | 16 × 35               | 0.08  | 0.036                  | 0.23  | 4,190                                   | 2,960 | EGPD101E□□561ML35H |
|                          | 620         | 18 × 30               | 0.08  | 0.037                  | 0.20  | 3,920                                   | 2,920 | EGPD101E□□621MM30H |
|                          | 750         | 16 × 40               | 0.08  | 0.028                  | 0.18  | 5,020                                   | 3,380 | EGPD101E□□751ML40H |
|                          | 820         | 18 × 35               | 0.08  | 0.030                  | 0.16  | 4,710                                   | 3,330 | EGPD101E□□821MM35H |
|                          | 910         | 18 × 40               | 0.08  | 0.026                  | 0.14  | 5,280                                   | 3,560 | EGPD101E□□911MM40H |

□□ : Enter the appropriate lead forming or taping code.

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

| Capacitance(μF) \ Frequency(Hz) | 120  | 1k   | 10k  | 100k |
|---------------------------------|------|------|------|------|
| 160                             | 0.40 | 0.75 | 0.90 | 1.00 |
| 220 to 620                      | 0.50 | 0.85 | 0.94 | 1.00 |
| 680 to 2,000                    | 0.60 | 0.87 | 0.95 | 1.00 |
| 2,200 to 4,300                  | 0.75 | 0.90 | 0.95 | 1.00 |
| 4,700 to 12,000                 | 0.85 | 0.95 | 0.98 | 1.00 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

Please contact us for lifetime estimation.

# GVD Series

- Structure of higher vibration resistance by GPD series (acceleration 392m/s<sup>2</sup>, 40G)
- Guaranteed short time at 150°C
- Designed for electric power steering and ECU (include engine control, direct fuel injection) etc.
- Rated voltage range : 25 to 100V, Capacitance range : 510 to 8,200μF
- Solvent resistant type
- RoHS2 Compliant
- AEC-Q200 compliant : Please contact Chemi-Con for more details, test data, information.

GPD → Vibration resistance → GVD

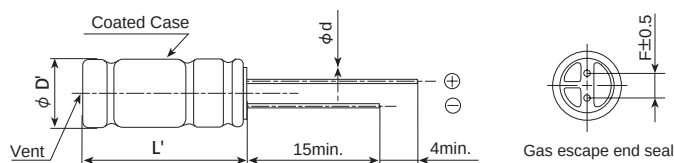


## SPECIFICATIONS

| Items                                                        | Characteristics                                                                                                                                                                                                                                                                                                                          |                                                                                                                                  |      |      |      |      |                 |
|--------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|------|------|------|------|-----------------|
| Category                                                     | -40 to +135℃                                                                                                                                                                                                                                                                                                                             |                                                                                                                                  |      |      |      |      |                 |
| Temperature Range                                            |                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                  |      |      |      |      |                 |
| Rated Voltage Range                                          | 25 to 100V <sub>dc</sub>                                                                                                                                                                                                                                                                                                                 |                                                                                                                                  |      |      |      |      |                 |
| Capacitance Tolerance                                        | ± 20% (M)                                                                                                                                                                                                                                                                                                                                |                                                                                                                                  |      |      |      |      | (at 20℃, 120Hz) |
| Leakage Current                                              | I=0.03CV or 4μA, whichever is greater.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)<br>(at 20℃, 1 minute)                                                                                                                                                                                |                                                                                                                                  |      |      |      |      |                 |
| Dissipation Factor<br>(tan δ )                               | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                                                                         | 25V                                                                                                                              | 35V  | 50V  | 63V  | 80V  | 100V            |
|                                                              | tan δ (Max.)                                                                                                                                                                                                                                                                                                                             | 0.14                                                                                                                             | 0.12 | 0.10 | 0.10 | 0.08 | 0.08            |
|                                                              | When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase.                                                                                                                                                                                                                                         |                                                                                                                                  |      |      |      |      | (at 20℃, 120Hz) |
| Low Temperature<br>Characteristics<br>(Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                                                                         | 25V                                                                                                                              | 35V  | 50V  | 63V  | 80V  | 100V            |
|                                                              | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                                                                          | 2                                                                                                                                | 2    | 2    | 2    | 2    | 2               |
|                                                              | Z(-40℃)/Z(+20℃)                                                                                                                                                                                                                                                                                                                          | 4                                                                                                                                | 4    | 4    | 4    | 4    | 4               |
|                                                              |                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                  |      |      |      |      | (at 120Hz)      |
| Endurance 1                                                  | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for the specified period of time at 125℃ or 135℃.                                                                   |                                                                                                                                  |      |      |      |      |                 |
|                                                              | Time                                                                                                                                                                                                                                                                                                                                     | 125℃ 25 to 100V <sub>dc</sub> : 3,000hours<br>135℃ 25 to 50V <sub>dc</sub> : 3,000hours<br>63 to 100V <sub>dc</sub> : 2,000hours |      |      |      |      |                 |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                                                                       | ≤ ±30% of the initial value                                                                                                      |      |      |      |      |                 |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                                                                            | ≤300% of the initial specified value                                                                                             |      |      |      |      |                 |
|                                                              | Leakage current                                                                                                                                                                                                                                                                                                                          | ≤The initial specified value                                                                                                     |      |      |      |      |                 |
| Endurance 2                                                  | The following specifications shall be satisfied when the capacitors are restored to 20℃ after the test condition that the rated voltage is applied for 100 hours at 150℃ and DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for the specified period of time at 125℃ or 135℃. |                                                                                                                                  |      |      |      |      |                 |
|                                                              | Time                                                                                                                                                                                                                                                                                                                                     | 125℃ 25 to 100V <sub>dc</sub> : 2,500hours<br>135℃ 25 to 50V <sub>dc</sub> : 2,500hours<br>63 to 100V <sub>dc</sub> : 1,500hours |      |      |      |      |                 |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                                                                       | ≤ ±30% of the initial value                                                                                                      |      |      |      |      |                 |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                                                                            | ≤300% of the initial specified value                                                                                             |      |      |      |      |                 |
|                                                              | Leakage current                                                                                                                                                                                                                                                                                                                          | ≤The initial specified value                                                                                                     |      |      |      |      |                 |
|                                                              |                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                  |      |      |      |      |                 |
| Shelf Life                                                   | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 125℃without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4.                                                     |                                                                                                                                  |      |      |      |      |                 |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                                                                       | ≤ ±30% of the initial value                                                                                                      |      |      |      |      |                 |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                                                                            | ≤300% of the initial specified value                                                                                             |      |      |      |      |                 |
|                                                              | Leakage current                                                                                                                                                                                                                                                                                                                          | ≤The initial specified value                                                                                                     |      |      |      |      |                 |
|                                                              |                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                  |      |      |      |      |                 |
| Vibration                                                    | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to vibration test (vibration profile shown below) at room temperature (15 to 35℃).                                                                                                                                               |                                                                                                                                  |      |      |      |      |                 |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                                                                       | ≤ ±5 % of the initial value                                                                                                      |      |      |      |      |                 |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                                                                            | ≤The initial specified value                                                                                                     |      |      |      |      |                 |
|                                                              | Leakage current                                                                                                                                                                                                                                                                                                                          | ≤The initial specified value                                                                                                     |      |      |      |      |                 |
|                                                              | Vibration profile                                                                                                                                                                                                                                                                                                                        |                                                                                                                                  |      |      |      |      |                 |
|                                                              | Vibration frequency range                                                                                                                                                                                                                                                                                                                | 10 to 2,000Hz                                                                                                                    |      |      |      |      |                 |
|                                                              | Amplitude or Acceleration                                                                                                                                                                                                                                                                                                                | 1.5mm peak to peak or 392m/s <sup>2</sup> (40G), whichever is the less severe                                                    |      |      |      |      |                 |
|                                                              | Sweep rate                                                                                                                                                                                                                                                                                                                               | 10 to 2,000 to 10Hz 0.5 octave/minute                                                                                            |      |      |      |      |                 |
|                                                              | Direction and period of motion                                                                                                                                                                                                                                                                                                           | 2 hours in each of 3 mutually perpendicular directions (total of 6hours)                                                         |      |      |      |      |                 |
|                                                              | Fixation                                                                                                                                                                                                                                                                                                                                 | Fix main body and Lead teminal using a fixture tool, please contact us for detail.                                               |      |      |      |      |                 |
|                                                              |                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                  |      |      |      |      |                 |

## DIMENSIONS [mm]

- Terminal Code : E



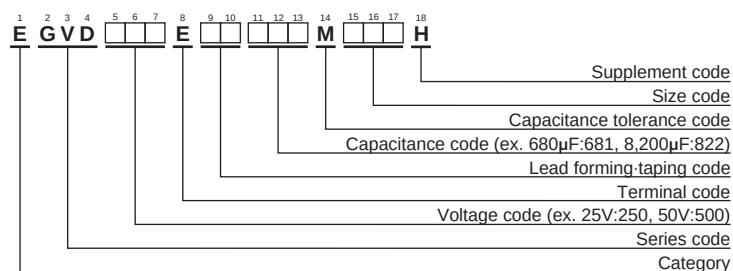
\* Please contact us about lead formings and mounting methods.

|     |                |
|-----|----------------|
| φD  | 18             |
| φd  | 0.8            |
| F   | 7.5            |
| φD' | φD±0.5         |
| L'  | L'+1.5<br>-1.0 |



## GVD Series

## ◆PART NUMBERING SYSTEM



Please refer to "Product code guide (radial lead type)"

## ◆STANDARD RATINGS

| WV<br>(V <sub>ac</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | ESR<br>(Ω max/100kHz) |       | Rated ripple current<br>(mA rms/100kHz) |       | Part No.           |
|--------------------------|-------------|-----------------------|-------|-----------------------|-------|-----------------------------------------|-------|--------------------|
|                          |             |                       |       | 20°C                  | -40°C | 125°C                                   | 135°C |                    |
| 25                       | 6,200       | 18×30                 | 0.24  | 0.023                 | 0.19  | 5,380                                   | 3,330 | EGVD250E□□622MM30H |
|                          | 8,200       | 18×35.5               | 0.28  | 0.019                 | 0.13  | 6,110                                   | 3,750 | EGVD250E□□822MMP1H |
| 35                       | 3,600       | 18×30                 | 0.16  | 0.023                 | 0.19  | 5,380                                   | 3,330 | EGVD350E□□362MM30H |
|                          | 4,700       | 18×35.5               | 0.18  | 0.019                 | 0.13  | 6,110                                   | 3,750 | EGVD350E□□472MMP1H |
| 50                       | 2,000       | 18×30                 | 0.12  | 0.029                 | 0.26  | 5,050                                   | 2,910 | EGVD500E□□202MM30H |
|                          | 2,400       | 18×35.5               | 0.12  | 0.024                 | 0.20  | 5,760                                   | 3,330 | EGVD500E□□242MMP1H |
| 63                       | 1,300       | 18×30                 | 0.10  | 0.029                 | 0.18  | 3,930                                   | 3,100 | EGVD630E□□132MM30H |
|                          | 1,800       | 18×35.5               | 0.10  | 0.024                 | 0.14  | 4,920                                   | 3,520 | EGVD630E□□182MMP1H |
| 80                       | 820         | 18×30                 | 0.08  | 0.029                 | 0.18  | 3,930                                   | 3,100 | EGVD800E□□821MM30H |
|                          | 1,200       | 18×35.5               | 0.08  | 0.024                 | 0.14  | 4,920                                   | 3,520 | EGVD800E□□122MMP1H |
| 100                      | 510         | 18×30                 | 0.08  | 0.038                 | 0.25  | 3,800                                   | 2,830 | EGVD101E□□511MM30H |
|                          | 680         | 18×35.5               | 0.08  | 0.030                 | 0.19  | 4,550                                   | 3,210 | EGVD101E□□681MMP1H |

□□ : Enter the appropriate lead forming or taping code.

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

| Capacitance(μF) | Frequency(Hz) |      |      |      |
|-----------------|---------------|------|------|------|
|                 | 120           | 1k   | 10k  | 100k |
| 510             | 0.50          | 0.85 | 0.94 | 1.00 |
| 680 to 2,000    | 0.60          | 0.87 | 0.95 | 1.00 |
| 2,400 to 3,600  | 0.75          | 0.90 | 0.95 | 1.00 |
| 4,700 to 8,200  | 0.85          | 0.95 | 0.98 | 1.00 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

Please contact us for lifetime estimation.



## GQB Series

- Endurance with ripple current : 1,000 hours at 150°C
- For automobile transmission, electric water pump and other high temperature applications.
- Rated voltage range : 25 & 35V, Nominal capacitance range : 560 to 3,600μF
- Solvent resistant type (see PRECAUTIONS AND GUIDELINES)
- RoHS2 Compliant
- AEC-Q200 compliant : Please contact Chemi-Con for more details, test data, information.

Higher temperature  
Higher ripple current  
GPD → **GQB**

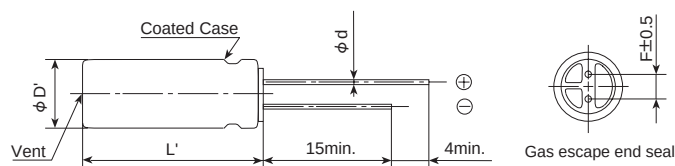


### SPECIFICATIONS

| Items                                                        | Characteristics                                                                                                                                                                                                                                                                     |                                       |      |            |
|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|------|------------|
| Category                                                     | -40 to +150℃                                                                                                                                                                                                                                                                        |                                       |      |            |
| Temperature Range                                            |                                                                                                                                                                                                                                                                                     |                                       |      |            |
| Rated Voltage Range                                          | 25, 35V <sub>dc</sub>                                                                                                                                                                                                                                                               |                                       |      |            |
| Capacitance Tolerance                                        | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                           |                                       |      |            |
| Leakage Current                                              | I=0.03CV or 4μA, whichever is greater.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃, 1 minute)                                                                                                                              |                                       |      |            |
| Dissipation Factor<br>(tan δ)                                | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                    | 25V                                   | 35V  |            |
|                                                              | tan δ (Max.)                                                                                                                                                                                                                                                                        | 0.14                                  | 0.12 |            |
|                                                              | When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase. (at 20℃, 120Hz)                                                                                                                                                                    |                                       |      |            |
| Low Temperature<br>Characteristics<br>(Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                    | 25V                                   | 35V  |            |
|                                                              | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                     | 2                                     | 2    |            |
|                                                              | Z(-40℃)/Z(+20℃)                                                                                                                                                                                                                                                                     | 4                                     | 4    | (at 120Hz) |
| Endurance 1                                                  | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 1,000 hours at 150℃.                                       |                                       |      |            |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                  | ≤ ± 30% of the initial value          |      |            |
|                                                              | D.F. (tan δ)                                                                                                                                                                                                                                                                        | ≤ 300% of the initial specified value |      |            |
|                                                              | Leakage current                                                                                                                                                                                                                                                                     | ≤ The initial specified value         |      |            |
| Endurance 2                                                  | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 2,000 hours at 125℃.                                       |                                       |      |            |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                  | ≤ ± 30% of the initial value          |      |            |
|                                                              | D.F. (tan δ)                                                                                                                                                                                                                                                                        | ≤ 300% of the initial specified value |      |            |
|                                                              | Leakage current                                                                                                                                                                                                                                                                     | ≤ The initial specified value         |      |            |
| Shelf Life                                                   | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 500 hours at 150℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                       |      |            |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                  | ≤ ± 30% of the initial value          |      |            |
|                                                              | D.F. (tan δ)                                                                                                                                                                                                                                                                        | ≤ 300% of the initial specified value |      |            |
|                                                              | Leakage current                                                                                                                                                                                                                                                                     | ≤ The initial specified value         |      |            |

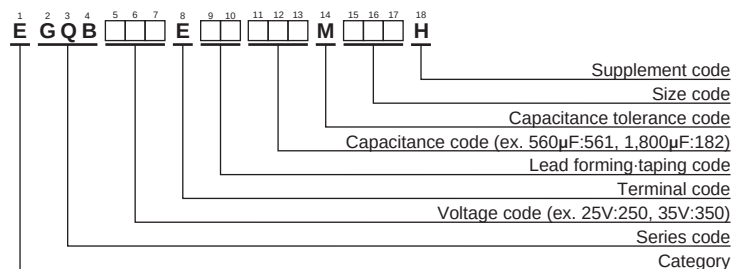
### DIMENSIONS [mm]

- Terminal Code : E



| φD  | 12.5         | 16  | 18  |
|-----|--------------|-----|-----|
| φd  | 0.6          | 0.8 | 0.8 |
| F   | 5.0          | 7.5 | 7.5 |
| φD' | φD±0.5       |     |     |
| L'  | +1.5<br>-1.0 |     |     |

### PART NUMBERING SYSTEM



Please refer to "Product code guide (radial lead type)"



## GQB Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | ESR<br>(Ω max./100kHz) |       | Rated ripple current<br>(mA <sub>rms</sub> /100kHz) |       | Part No.           |
|--------------------------|-------------|-----------------------|-------|------------------------|-------|-----------------------------------------------------|-------|--------------------|
|                          |             |                       |       | 20°C                   | -40°C | 150°C                                               | 125°C |                    |
| 25                       | 1,100       | 12.5 × 20             | 0.14  | 0.12                   | 1.4   | 1,100                                               | 2,620 | EGQB250E□□112MK20H |
|                          | 1,600       | 12.5 × 25             | 0.14  | 0.080                  | 1.0   | 1,300                                               | 2,910 | EGQB250E□□162MK25H |
|                          | 1,800       | 16 × 20               | 0.14  | 0.070                  | 1.0   | 1,460                                               | 3,590 | EGQB250E□□182ML20H |
|                          | 2,400       | 18 × 20               | 0.16  | 0.058                  | 0.90  | 1,560                                               | 3,830 | EGQB250E□□242MM20H |
|                          | 2,700       | 16 × 25               | 0.16  | 0.050                  | 0.80  | 1,720                                               | 4,560 | EGQB250E□□272ML25H |
|                          | 3,600       | 18 × 25               | 0.18  | 0.042                  | 0.70  | 1,800                                               | 4,800 | EGQB250E□□362MM25H |
| 35                       | 560         | 12.5 × 20             | 0.12  | 0.15                   | 4.5   | 1,000                                               | 2,230 | EGQB350E□□561MK20H |
|                          | 750         | 12.5 × 25             | 0.12  | 0.12                   | 3.4   | 1,200                                               | 2,680 | EGQB350E□□751MK25H |
|                          | 910         | 16 × 20               | 0.12  | 0.10                   | 3.0   | 1,260                                               | 3,110 | EGQB350E□□911ML20H |
|                          | 1,200       | 18 × 20               | 0.12  | 0.084                  | 2.0   | 1,320                                               | 3,250 | EGQB350E□□122MM20H |
|                          | 1,400       | 16 × 25               | 0.12  | 0.067                  | 2.0   | 1,600                                               | 4,060 | EGQB350E□□142ML25H |
|                          | 1,800       | 18 × 25               | 0.12  | 0.058                  | 1.4   | 1,680                                               | 4,500 | EGQB350E□□182MM25H |

□□ : Enter the appropriate lead forming or taping code.

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ● Frequency Multipliers

| Capacitance(μF) \ Frequency(Hz) | 120  | 1k   | 10k  | 100k |
|---------------------------------|------|------|------|------|
| 560                             | 0.50 | 0.85 | 0.94 | 1.00 |
| 750 to 1,800                    | 0.60 | 0.87 | 0.95 | 1.00 |
| 2,400 to 3,600                  | 0.75 | 0.90 | 0.95 | 1.00 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

Please contact us for lifetime estimation.

# LBV Series

- Downsizing of LBG series.
- For airbag application and power supply application
- High capacitance, low ESR and good low temperature behavior
- Endurance with ripple current : 5,000 hours at 105°C
- Solvent resistant type (see PRECAUTIONS AND GUIDELINES)
- RoHS2 Compliant
- AEC-Q200 compliant : Please contact Chemi-Con for more details, test data, information.

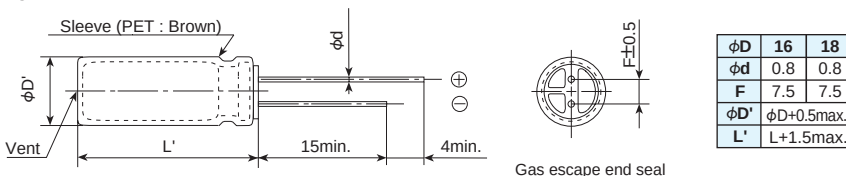


## SPECIFICATIONS

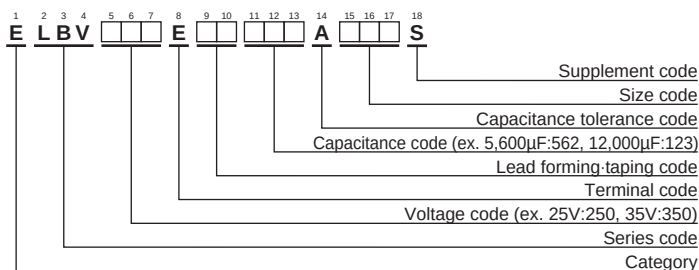
| Items                                                  | Characteristics                                                                                                                                                                                                                                                                       |                                       |      |                 |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|------|-----------------|
| Category                                               | -55 to +105℃                                                                                                                                                                                                                                                                          |                                       |      |                 |
| Temperature Range                                      | -55 to +105℃                                                                                                                                                                                                                                                                          |                                       |      |                 |
| Rated Voltage Range                                    | 25 & 35V <sub>dc</sub>                                                                                                                                                                                                                                                                |                                       |      |                 |
| Capacitance Range                                      | 3,000 to 15,000μF                                                                                                                                                                                                                                                                     |                                       |      | (at 20℃, 120Hz) |
| Capacitance Tolerance                                  | 0 to +30% (A)                                                                                                                                                                                                                                                                         |                                       |      | (at 20℃, 120Hz) |
| Leakage Current                                        | I=0.01CV<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)<br>(at 20℃ after 2 minutes)                                                                                                                                                     |                                       |      |                 |
| Dissipation Factor (tan δ)                             | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 25V                                   | 35V  |                 |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.20                                  | 0.16 |                 |
|                                                        | When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase.                                                                                                                                                                                      |                                       |      | (at 20℃, 120Hz) |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 25V                                   | 35V  |                 |
|                                                        | Z(-55℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 3                                     | 3    |                 |
|                                                        | (at 120Hz)                                                                                                                                                                                                                                                                            |                                       |      |                 |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 5,000 hours at 105℃.                                         |                                       |      |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ± 30% of the initial value          |      |                 |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤ 300% of the initial specified value |      |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value         |      |                 |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                       |      |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ± 30% of the initial value          |      |                 |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤ 300% of the initial specified value |      |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value         |      |                 |

## DIMENSIONS [mm]

- Terminal Code : E



## PART NUMBERING SYSTEM



Please refer to "Product code guide (radial lead type)"





## LBV Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L (mm) | tan δ | ESR (Ω max./100kHz) |       | Rated ripple current<br>(mA rms/105°C, 100kHz) | Part No.           |
|--------------------------|-------------|------------------------|-------|---------------------|-------|------------------------------------------------|--------------------|
|                          |             |                        |       | 20°C                | -40°C |                                                |                    |
| 25                       | 4,400       | 16 × 20                | 0.26  | 0.030               | 0.095 | 2,000                                          | ELBV250E□□442AL20S |
|                          | 5,700       | 18 × 20                | 0.28  | 0.028               | 0.080 | 2,100                                          | ELBV250E□□572AM20S |
|                          | 6,200       | 16 × 25                | 0.30  | 0.024               | 0.073 | 2,300                                          | ELBV250E□□622AL25S |
|                          | 8,100       | 18 × 25                | 0.34  | 0.022               | 0.060 | 2,400                                          | ELBV250E□□812AM25S |
|                          | 8,500       | 16 × 31.5              | 0.34  | 0.020               | 0.065 | 2,550                                          | ELBV250E□□852ALN3S |
|                          | 9,900       | 16 × 35.5              | 0.36  | 0.018               | 0.055 | 2,700                                          | ELBV250E□□992ALP1S |
|                          | 11,000      | 16 × 40                | 0.40  | 0.016               | 0.050 | 2,900                                          | ELBV250E□□113AL40S |
|                          | 11,000      | 18 × 31.5              | 0.40  | 0.018               | 0.045 | 2,700                                          | ELBV250E□□113AMN3S |
|                          | 12,000      | 18 × 35.5              | 0.42  | 0.016               | 0.040 | 2,900                                          | ELBV250E□□123AMP1S |
| 35                       | 15,000      | 18 × 40                | 0.48  | 0.015               | 0.035 | 3,100                                          | ELBV250E□□153AM40S |
|                          | 3,000       | 16 × 20                | 0.20  | 0.030               | 0.095 | 2,000                                          | ELBV350E□□302AL20S |
|                          | 4,000       | 18 × 20                | 0.22  | 0.028               | 0.080 | 2,100                                          | ELBV350E□□402AM20S |
|                          | 4,300       | 16 × 25                | 0.22  | 0.024               | 0.073 | 2,300                                          | ELBV350E□□432AL25S |
|                          | 5,600       | 18 × 25                | 0.24  | 0.022               | 0.060 | 2,400                                          | ELBV350E□□562AM25S |
|                          | 5,900       | 16 × 31.5              | 0.24  | 0.020               | 0.065 | 2,550                                          | ELBV350E□□592ALN3S |
|                          | 6,900       | 16 × 35.5              | 0.26  | 0.018               | 0.055 | 2,700                                          | ELBV350E□□692ALP1S |
|                          | 7,600       | 18 × 31.5              | 0.28  | 0.018               | 0.045 | 2,700                                          | ELBV350E□□762AMN3S |
|                          | 8,200       | 16 × 40                | 0.30  | 0.016               | 0.050 | 2,900                                          | ELBV350E□□822AL40S |
|                          | 9,000       | 18 × 35.5              | 0.32  | 0.016               | 0.040 | 2,900                                          | ELBV350E□□902AMP1S |
|                          | 10,000      | 18 × 40                | 0.34  | 0.015               | 0.035 | 3,100                                          | ELBV350E□□103AM40S |

□□ : Enter the appropriate lead forming or taping code.

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

| Capacitance(μF) | Frequency(Hz) |      |      |      |
|-----------------|---------------|------|------|------|
|                 | 120           | 1k   | 10k  | 100k |
| 3,000           | 0.75          | 0.90 | 0.95 | 1.00 |
| 4,000 to 15,000 | 0.85          | 0.95 | 0.98 | 1.00 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

# LBG Series

- For airbag application
- High capacitance, low impedance, and good low temperature behavior
- Endurance with ripple current : 5,000 hours at 105°C
- Solvent resistant type (see PRECAUTIONS AND GUIDELINES)
- RoHS2 Compliant
- AEC-Q200 compliant : Please contact Chemi-Con for more details, test data, information.

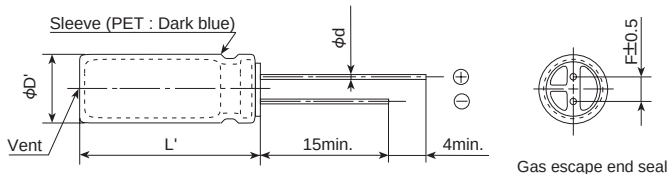


## SPECIFICATIONS

| Items                                                        | Characteristics                                                                                                                                                                                                                                                                       |                                      |                 |                 |
|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-----------------|-----------------|
| Category                                                     | -55 to +105℃                                                                                                                                                                                                                                                                          |                                      |                 |                 |
| Temperature Range                                            | -55 to +105℃                                                                                                                                                                                                                                                                          |                                      |                 |                 |
| Rated Voltage Range                                          | 25 & 35V <sub>dc</sub>                                                                                                                                                                                                                                                                |                                      |                 |                 |
| Capacitance Range                                            | 1,000 to 11,000μF                                                                                                                                                                                                                                                                     |                                      | (at 20℃, 120Hz) |                 |
| Capacitance Tolerance                                        | 0 to +30% (A)                                                                                                                                                                                                                                                                         |                                      | (at 20℃, 120Hz) |                 |
| Leakage Current                                              | I=0.01CV<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)<br>(at 20℃ after 2 minutes)                                                                                                                                                     |                                      |                 |                 |
| Dissipation Factor<br>(tan δ)                                | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 25V                                  | 35V             |                 |
|                                                              | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.20                                 | 0.16            |                 |
|                                                              | When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase.                                                                                                                                                                                      |                                      |                 | (at 20℃, 120Hz) |
| Low Temperature<br>Characteristics<br>(Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 25V                                  | 35V             |                 |
|                                                              | Z(-55℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 3                                    | 3               |                 |
|                                                              | (at 120Hz)                                                                                                                                                                                                                                                                            |                                      |                 |                 |
| Endurance                                                    | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 5,000 hours at 105℃.                                         |                                      |                 |                 |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±20% of the initial value          |                 |                 |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤200% of the initial specified value |                 |                 |
|                                                              | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value         |                 |                 |
| Shelf Life                                                   | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                      |                 |                 |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±20% of the initial value          |                 |                 |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤200% of the initial specified value |                 |                 |
|                                                              | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value         |                 |                 |

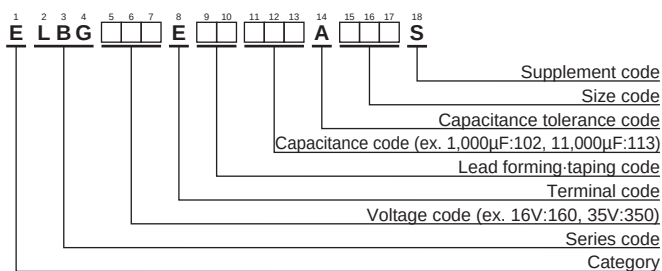
## DIMENSIONS [mm]

### Terminal Code : E



| φD  | 12.5       | 14.5 | 16  | 18  |
|-----|------------|------|-----|-----|
| φd  | 0.6        | 0.8  | 0.8 | 0.8 |
| F   | 5.0        | 7.5  | 7.5 | 7.5 |
| φD' | φD+0.5max. |      |     |     |
| L'  | L+1.5max.  |      |     |     |

## PART NUMBERING SYSTEM



Please refer to "Product code guide (radial lead type)"



## LBG Series

### ◆STANDARD RATINGS

| WV<br>(V <sub>ac</sub> ) | Cap<br>(μF) | Case size<br>φ D × L (mm) | tan δ | Impedance (Ω max./100kHz) |       | Rated ripple current<br>(mA <sub>rms</sub> /105°C, 100kHz) | Part No.             |
|--------------------------|-------------|---------------------------|-------|---------------------------|-------|------------------------------------------------------------|----------------------|
|                          |             |                           |       | 20°C                      | -40°C |                                                            |                      |
| 25                       | 1,700       | 12.5 × 20                 | 0.20  | 0.057                     | 0.29  | 1,700                                                      | ELBG250E □□ 172AK20S |
|                          | 2,400       | 12.5 × 25                 | 0.22  | 0.045                     | 0.23  | 2,000                                                      | ELBG250E □□ 242AK25S |
|                          | 2,400       | 14.5 × 20                 | 0.22  | 0.051                     | 0.26  | 2,000                                                      | ELBG250E □□ 242AU20S |
|                          | 2,800       | 12.5 × 30                 | 0.22  | 0.039                     | 0.20  | 2,300                                                      | ELBG250E □□ 282AK30S |
|                          | 3,000       | 16 × 20                   | 0.24  | 0.044                     | 0.22  | 2,250                                                      | ELBG250E □□ 302AL20S |
|                          | 3,400       | 14.5 × 25                 | 0.24  | 0.041                     | 0.21  | 2,400                                                      | ELBG250E □□ 342AU25S |
|                          | 3,500       | 12.5 × 35                 | 0.24  | 0.033                     | 0.17  | 2,700                                                      | ELBG250E □□ 352AK35S |
|                          | 4,200       | 16 × 25                   | 0.26  | 0.033                     | 0.17  | 2,600                                                      | ELBG250E □□ 422AL25S |
|                          | 4,200       | 18 × 20                   | 0.26  | 0.042                     | 0.21  | 2,500                                                      | ELBG250E □□ 422AM20S |
|                          | 4,500       | 12.5 × 40                 | 0.26  | 0.027                     | 0.14  | 3,100                                                      | ELBG250E □□ 452AK40S |
|                          | 4,600       | 14.5 × 31.5               | 0.26  | 0.032                     | 0.16  | 2,700                                                      | ELBG250E □□ 462AUN3S |
|                          | 5,400       | 14.5 × 35.5               | 0.28  | 0.028                     | 0.14  | 3,100                                                      | ELBG250E □□ 542AUP1S |
|                          | 5,600       | 16 × 31.5                 | 0.28  | 0.026                     | 0.13  | 3,200                                                      | ELBG250E □□ 562ALN3S |
|                          | 6,000       | 18 × 25                   | 0.30  | 0.030                     | 0.15  | 2,800                                                      | ELBG250E □□ 602AM25S |
|                          | 6,400       | 14.5 × 40                 | 0.30  | 0.025                     | 0.13  | 3,400                                                      | ELBG250E □□ 642AU40S |
|                          | 6,600       | 16 × 35.5                 | 0.30  | 0.023                     | 0.12  | 3,500                                                      | ELBG250E □□ 662ALP1S |
|                          | 7,800       | 16 × 40                   | 0.32  | 0.021                     | 0.11  | 3,800                                                      | ELBG250E □□ 782AL40S |
|                          | 7,900       | 18 × 31.5                 | 0.32  | 0.024                     | 0.12  | 3,500                                                      | ELBG250E □□ 792AMN3S |
|                          | 9,200       | 18 × 35.5                 | 0.36  | 0.022                     | 0.11  | 3,700                                                      | ELBG250E □□ 922AMP1S |
|                          | 11,000      | 18 × 40                   | 0.40  | 0.020                     | 0.10  | 4,000                                                      | ELBG250E □□ 113AM40S |
| 35                       | 1,000       | 12.5 × 20                 | 0.16  | 0.057                     | 0.29  | 1,700                                                      | ELBG350E □□ 102AK20S |
|                          | 1,400       | 12.5 × 25                 | 0.16  | 0.045                     | 0.23  | 2,000                                                      | ELBG350E □□ 142AK25S |
|                          | 1,400       | 14.5 × 20                 | 0.16  | 0.051                     | 0.26  | 2,000                                                      | ELBG350E □□ 142AU20S |
|                          | 1,600       | 12.5 × 30                 | 0.16  | 0.039                     | 0.20  | 2,300                                                      | ELBG350E □□ 162AK30S |
|                          | 1,800       | 16 × 20                   | 0.16  | 0.044                     | 0.22  | 2,250                                                      | ELBG350E □□ 182AL20S |
|                          | 2,000       | 14.5 × 25                 | 0.18  | 0.041                     | 0.21  | 2,400                                                      | ELBG350E □□ 202AU25S |
|                          | 2,100       | 12.5 × 35                 | 0.18  | 0.033                     | 0.17  | 2,700                                                      | ELBG350E □□ 212AK35S |
|                          | 2,500       | 16 × 25                   | 0.18  | 0.033                     | 0.17  | 2,600                                                      | ELBG350E □□ 252AL25S |
|                          | 2,500       | 18 × 20                   | 0.18  | 0.042                     | 0.21  | 2,500                                                      | ELBG350E □□ 252AM20S |
|                          | 2,700       | 12.5 × 40                 | 0.18  | 0.027                     | 0.14  | 3,100                                                      | ELBG350E □□ 272AK40S |
|                          | 2,800       | 14.5 × 31.5               | 0.18  | 0.032                     | 0.16  | 2,700                                                      | ELBG350E □□ 282AUN3S |
|                          | 3,200       | 14.5 × 35.5               | 0.20  | 0.028                     | 0.14  | 3,100                                                      | ELBG350E □□ 322AUP1S |
|                          | 3,400       | 16 × 31.5                 | 0.20  | 0.026                     | 0.13  | 3,200                                                      | ELBG350E □□ 342ALN3S |
|                          | 3,600       | 18 × 25                   | 0.20  | 0.030                     | 0.15  | 2,800                                                      | ELBG350E □□ 362AM25S |
|                          | 3,800       | 14.5 × 40                 | 0.20  | 0.025                     | 0.13  | 3,400                                                      | ELBG350E □□ 382AU40S |
|                          | 4,000       | 16 × 35.5                 | 0.22  | 0.023                     | 0.12  | 3,500                                                      | ELBG350E □□ 402ALP1S |
|                          | 4,700       | 16 × 40                   | 0.22  | 0.021                     | 0.11  | 3,800                                                      | ELBG350E □□ 472AL40S |
|                          | 4,800       | 18 × 31.5                 | 0.22  | 0.024                     | 0.12  | 3,500                                                      | ELBG350E □□ 482AMN3S |
|                          | 5,600       | 18 × 35.5                 | 0.24  | 0.022                     | 0.11  | 3,700                                                      | ELBG350E □□ 562AMP1S |
|                          | 6,700       | 18 × 40                   | 0.26  | 0.020                     | 0.10  | 4,000                                                      | ELBG350E □□ 672AM40S |

□□ : Enter the appropriate lead forming or taping code.

### ◆RATED RIPPLE CURRENT MULTIPLIERS

#### ● Frequency Multipliers

| Capacitance(μF) \ Frequency(Hz) | 120  | 1k   | 10k  | 100k |
|---------------------------------|------|------|------|------|
| 1,000 to 2,000                  | 0.60 | 0.87 | 0.95 | 1.00 |
| 2,100 to 3,800                  | 0.75 | 0.90 | 0.95 | 1.00 |
| 4,000 to 11,000                 | 0.85 | 0.95 | 0.98 | 1.00 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

## Product code guide (Snap-in type)

(Example : KMS series, 400V-330μF, φ30×30L)

Please refer to the following table



For more details, refer to Product Guide.

| Contents | Code | Series | Code | Type                  | Code | Tol.(%) | Code | Sleeve material | Terminal plating material | Code |
|----------|------|--------|------|-----------------------|------|---------|------|-----------------|---------------------------|------|
| Polar    | E    | KMS    | KMS  | Snap-in               | VS   | ±20     | M    | PET             | Sn                        | S    |
|          |      |        |      | Snap-in               | VN   |         |      | PVC             |                           | M    |
|          |      |        |      | Flat terminal for PCB | LI   |         |      |                 |                           |      |
|          |      |        |      | For Connector         | LR   |         |      |                 |                           |      |
|          |      |        |      | Horizontal            | LC   |         |      |                 |                           |      |
|          |      |        |      | Straight              | VR   |         |      |                 |                           |      |

|          |             |   |   |              |   |   |               |   |                     |                  |    |    |                       |           |    |                 |    |
|----------|-------------|---|---|--------------|---|---|---------------|---|---------------------|------------------|----|----|-----------------------|-----------|----|-----------------|----|
| 1        | 2           | 3 | 4 | 5            | 6 | 7 | 8             | 9 | 10                  | 11               | 12 | 13 | 14                    | 15        | 16 | 17              | 18 |
| E        | K           | M | S | 4            | 0 | 1 | V             | S | N                   | 3                | 3  | 1  | M                     | R         | 3  | 0               | S  |
| Category | Series code |   |   | Voltage code |   |   | Terminal code |   | Dummy terminal code | Capacitance code |    |    | Capacitance tolerance | Size code |    | Supplement code |    |

| Voltage(V) | Code |
|------------|------|
| 6.3        | 6R3  |
| 10         | 100  |
| 25         | 250  |
| 100        | 101  |
| 250        | 251  |
| 315        | 3B1  |
| ...        | ...  |

| Terminal # | Code |
|------------|------|
| 0          | N    |
| 1          | S    |
| 2          | D    |
| 3          | T    |

| Cap.(μF) | Code |
|----------|------|
| 39       | 390  |
| 47       | 470  |
| 100      | 101  |
| 470      | 471  |
| 1,000    | 102  |
| 4,700    | 472  |
| 10,000   | 103  |
| ...      | ...  |

| φD(mm) | Code |
|--------|------|
| 22     | P    |
| 25.4   | Q    |
| 30     | R    |
| 35     | A    |
| 40     | B    |

| L(mm) | Code |
|-------|------|
| 20    | 20   |
| 25    | 25   |
| 30    | 30   |
| 35    | 35   |
| 40    | 40   |
| 45    | 45   |
| 50    | 50   |
| 55    | 55   |
| 60    | 60   |

\*Refer to the appendix (Part number) for codes not listed here.

## Available terminals

[mm]

|                                                                     |                                       |                                       |
|---------------------------------------------------------------------|---------------------------------------|---------------------------------------|
| <b>Terminal, Dummy code : VNN</b><br>                               | <b>Terminal, Dummy code : LIN</b><br> | <b>Terminal, Dummy code : VEN</b><br> |
| <b>Terminal, Dummy code : VRD</b><br>                               | <b>Terminal, Dummy code : VND</b><br> | <b>Terminal, Dummy code : LIS</b><br> |
| <b>Horizontal mounting</b><br><b>Terminal, Dummy code : LCN</b><br> |                                       |                                       |

\*1 Negative terminal : Mesh marking

\*2 Use the dummy terminals for mechanical support only.

The dummy terminals must not be connected to any circuit trace on PC board, be sure to electrically isolate from the negative and the positive terminals.

# SMR Series

- Endurance with ripple current : 2,000 hours at 85°C
- Downsized and high ripple current from SMQ series
- Non solvent resistant type
- RoHS2 Compliant

SMR

↑  
Downsized  
Higher ripple  
SMQ

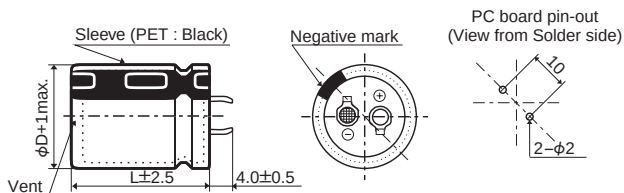


## SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                        |                                      |            |                  |
|--------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------------|------------------|
| Category                                               | -25 to +85°C                                                                                                                                                                                                                                                                           |                                      |            |                  |
| Temperature Range                                      |                                                                                                                                                                                                                                                                                        |                                      |            |                  |
| Rated Voltage Range                                    | 400 to 450V <sub>dc</sub>                                                                                                                                                                                                                                                              |                                      |            |                  |
| Capacitance Tolerance                                  | ± 20% (M) (at 20°C, 120Hz)                                                                                                                                                                                                                                                             |                                      |            |                  |
| Leakage Current                                        | $I \leq 3\sqrt{CV}$<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C after 5 minutes)                                                                                                                                             |                                      |            |                  |
| Dissipation Factor (tan δ)                             | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                       | 400V                                 | 420 & 450V | (at 20°C, 120Hz) |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                           | 0.15                                 | 0.20       |                  |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                       | 400 to 450V                          | (at 120Hz) |                  |
|                                                        | Z(-25°C)/Z(+20°C)                                                                                                                                                                                                                                                                      | 8                                    |            |                  |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 2,000 hours at 85°C.                                         |                                      |            |                  |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                     | ≤ ±20% of the initial value          |            |                  |
|                                                        | D. F. (tan δ)                                                                                                                                                                                                                                                                          | ≤200% of the initial specified value |            |                  |
|                                                        | Leakage current                                                                                                                                                                                                                                                                        | ≤ The initial specified value        |            |                  |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 85°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                      |            |                  |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                     | ≤ ±15% of the initial value          |            |                  |
|                                                        | D. F. (tan δ)                                                                                                                                                                                                                                                                          | ≤150% of the initial specified value |            |                  |
|                                                        | Leakage current                                                                                                                                                                                                                                                                        | ≤ The initial specified value        |            |                  |

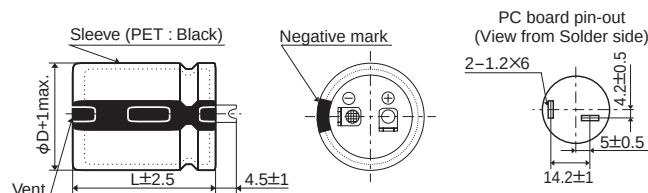
## DIMENSIONS [mm]

● Terminal Code : VS (φ22 to φ35) : Standard

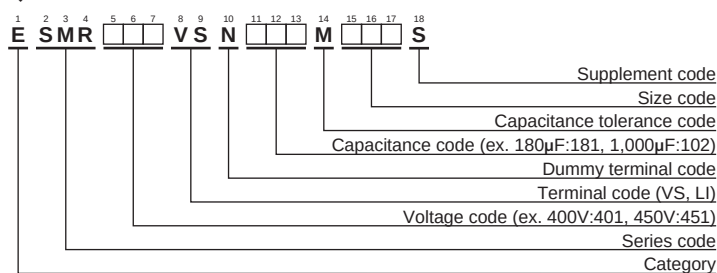


The standard design has no plastic disc.

● Terminal Code : LI (φ35)



## PART NUMBERING SYSTEM



Please refer to "Product code guide (snap-in type)"



## SMR Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>85°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>85°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|---------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|---------------------------------------------------|--------------------|
| 400                      | 150         | 22 × 25               | 0.15  | 1.30                                              | ESMR401VSN151MP25S | 420                      | 330         | 35 × 25               | 0.20  | 1.99                                              | ESMR421VSN331MA25S |
|                          | 180         | 22 × 30               | 0.15  | 1.49                                              | ESMR401VSN181MP30S |                          | 390         | 25.4 × 45             | 0.20  | 2.47                                              | ESMR421VSN391MQ45S |
|                          | 220         | 22 × 35               | 0.15  | 1.69                                              | ESMR401VSN221MP35S |                          | 390         | 30 × 35               | 0.20  | 2.32                                              | ESMR421VSN391MR35S |
|                          | 220         | 25.4 × 25             | 0.15  | 1.65                                              | ESMR401VSN221MQ25S |                          | 470         | 25.4 × 50             | 0.20  | 2.77                                              | ESMR421VSN471MQ50S |
|                          | 270         | 22 × 40               | 0.15  | 1.90                                              | ESMR401VSN271MP40S |                          | 470         | 30 × 40               | 0.20  | 2.61                                              | ESMR421VSN471MR40S |
|                          | 270         | 25.4 × 30             | 0.15  | 1.88                                              | ESMR401VSN271MQ30S |                          | 470         | 35 × 30               | 0.20  | 2.41                                              | ESMR421VSN471MA30S |
|                          | 330         | 22 × 45               | 0.15  | 2.15                                              | ESMR401VSN331MP45S |                          | 560         | 30 × 45               | 0.20  | 2.93                                              | ESMR421VSN561MR45S |
|                          | 330         | 25.4 × 35             | 0.15  | 2.16                                              | ESMR401VSN331MQ35S |                          | 560         | 35 × 35               | 0.20  | 2.67                                              | ESMR421VSN561MA35S |
|                          | 330         | 30 × 25               | 0.15  | 2.10                                              | ESMR401VSN331MR25S |                          | 680         | 30 × 50               | 0.20  | 3.28                                              | ESMR421VSN681MR50S |
|                          | 390         | 22 × 50               | 0.15  | 2.40                                              | ESMR401VSN391MP50S |                          | 680         | 35 × 40               | 0.20  | 3.11                                              | ESMR421VSN681MA40S |
|                          | 390         | 25.4 × 40             | 0.15  | 2.40                                              | ESMR401VSN391MQ40S |                          | 820         | 35 × 45               | 0.20  | 3.43                                              | ESMR421VSN821MA45S |
|                          | 390         | 30 × 30               | 0.15  | 2.32                                              | ESMR401VSN391MR30S | 450                      | 120         | 22 × 25               | 0.20  | 1.12                                              | ESMR451VSN121MP25S |
|                          | 390         | 35 × 25               | 0.15  | 2.05                                              | ESMR401VSN391MA25S |                          | 150         | 22 × 30               | 0.20  | 1.32                                              | ESMR451VSN151MP30S |
|                          | 470         | 25.4 × 45             | 0.15  | 2.69                                              | ESMR401VSN471MQ45S |                          | 180         | 22 × 35               | 0.20  | 1.49                                              | ESMR451VSN181MP35S |
|                          | 470         | 30 × 35               | 0.15  | 2.60                                              | ESMR401VSN471MR35S |                          | 180         | 25.4 × 25             | 0.20  | 1.42                                              | ESMR451VSN181MQ25S |
|                          | 470         | 35 × 30               | 0.15  | 2.28                                              | ESMR401VSN471MA30S |                          | 220         | 22 × 40               | 0.20  | 1.67                                              | ESMR451VSN221MP40S |
|                          | 560         | 30 × 40               | 0.15  | 2.92                                              | ESMR401VSN561MR40S |                          | 220         | 25.4 × 30             | 0.20  | 1.66                                              | ESMR451VSN221MQ30S |
|                          | 560         | 35 × 30               | 0.15  | 2.48                                              | ESMR401VSN561MA30S |                          | 220         | 30 × 25               | 0.20  | 1.68                                              | ESMR451VSN221MR25S |
|                          | 680         | 30 × 45               | 0.15  | 3.30                                              | ESMR401VSN681MR45S |                          | 270         | 22 × 45               | 0.20  | 1.88                                              | ESMR451VSN271MP45S |
|                          | 680         | 35 × 35               | 0.15  | 2.79                                              | ESMR401VSN681MA35S |                          | 270         | 25.4 × 35             | 0.20  | 1.87                                              | ESMR451VSN271MQ35S |
|                          | 820         | 35 × 45               | 0.15  | 3.25                                              | ESMR401VSN821MA45S |                          | 330         | 25.4 × 40             | 0.20  | 2.11                                              | ESMR451VSN331MQ40S |
|                          | 1,000       | 35 × 50               | 0.15  | 3.66                                              | ESMR401VSN102MA50S |                          | 330         | 30 × 30               | 0.20  | 2.10                                              | ESMR451VSN331MR30S |
| 420                      | 120         | 22 × 25               | 0.20  | 1.15                                              | ESMR421VSN121MP25S |                          | 330         | 35 × 25               | 0.20  | 2.10                                              | ESMR451VSN331MA25S |
|                          | 180         | 22 × 30               | 0.20  | 1.48                                              | ESMR421VSN181MP30S |                          | 390         | 25.4 × 50             | 0.20  | 2.37                                              | ESMR451VSN391MQ50S |
|                          | 180         | 25.4 × 25             | 0.20  | 1.51                                              | ESMR421VSN181MQ25S |                          | 390         | 30 × 35               | 0.20  | 2.32                                              | ESMR451VSN391MR35S |
|                          | 220         | 22 × 35               | 0.20  | 1.68                                              | ESMR421VSN221MP35S |                          | 390         | 35 × 30               | 0.20  | 2.32                                              | ESMR451VSN391MA30S |
|                          | 220         | 25.4 × 30             | 0.20  | 1.71                                              | ESMR421VSN221MQ30S |                          | 470         | 30 × 40               | 0.20  | 2.66                                              | ESMR451VSN471MR40S |
|                          | 270         | 22 × 45               | 0.20  | 1.94                                              | ESMR421VSN271MP45S |                          | 470         | 35 × 35               | 0.20  | 2.54                                              | ESMR451VSN471MA35S |
|                          | 270         | 25.4 × 35             | 0.20  | 1.99                                              | ESMR421VSN271MQ35S |                          | 560         | 30 × 45               | 0.20  | 2.93                                              | ESMR451VSN561MR45S |
|                          | 270         | 30 × 25               | 0.20  | 1.87                                              | ESMR421VSN271MR25S |                          | 560         | 35 × 40               | 0.20  | 2.87                                              | ESMR451VSN561MA40S |
|                          | 330         | 22 × 50               | 0.20  | 2.20                                              | ESMR421VSN331MP50S |                          | 680         | 35 × 45               | 0.20  | 3.21                                              | ESMR451VSN681MA45S |
|                          | 330         | 25.4 × 40             | 0.20  | 2.24                                              | ESMR421VSN331MQ40S |                          | 820         | 35 × 50               | 0.20  | 3.60                                              | ESMR451VSN821MA50S |
|                          | 330         | 30 × 30               | 0.20  | 2.08                                              | ESMR421VSN331MR30S |                          |             |                       |       |                                                   |                    |

## ◆RATED RIPPLE CURRENT MULTIPLIERS

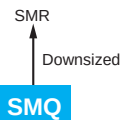
## ●Frequency Multipliers

| Frequency(Hz)             | 50   | 120  | 300  | 1k   | 10k  | 50k  |
|---------------------------|------|------|------|------|------|------|
| 400 to 450V <sub>dc</sub> | 0.77 | 1.00 | 1.16 | 1.30 | 1.41 | 1.43 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

# SMQ Series

- Endurance with ripple current : 2,000 hours at 85°C
- Non solvent resistant type
- RoHS2 Compliant

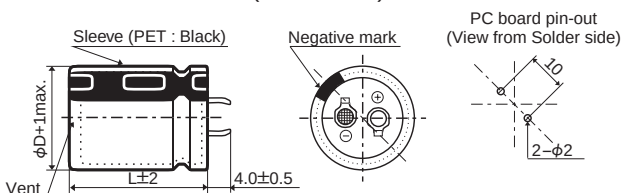


## SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                      |                                      |             |            |                 |
|--------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------|------------|-----------------|
| Category                                               | -25 to +85℃                                                                                                                                                                                                                                                                          |                                      |             |            |                 |
| Temperature Range                                      |                                                                                                                                                                                                                                                                                      |                                      |             |            |                 |
| Rated Voltage Range                                    | 160 to 450V <sub>dc</sub>                                                                                                                                                                                                                                                            |                                      |             |            |                 |
| Capacitance Tolerance                                  | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                            |                                      |             |            |                 |
| Leakage Current                                        | $I \leq 3\sqrt{CV}$<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 5 minutes)                                                                                                                                            |                                      |             |            |                 |
| Dissipation Factor (tan δ)                             | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                     | 160 to 250V                          | 315 to 400V | 420 & 450V | (at 20℃, 120Hz) |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                         | 0.15                                 | 0.15        | 0.20       |                 |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                     | 160 to 250V                          | 315 to 400V | 420 & 450V | (at 120Hz)      |
|                                                        | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                      | 4                                    | 8           | 8          |                 |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 2,000 hours at 85℃.                                         |                                      |             |            |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                   | ≤ ±20% of the initial value          |             |            |                 |
|                                                        | D. F. (tan δ)                                                                                                                                                                                                                                                                        | ≤200% of the initial specified value |             |            |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                      | ≤The initial specified value         |             |            |                 |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 85℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                      |             |            |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                   | ≤ ±15% of the initial value          |             |            |                 |
|                                                        | D. F. (tan δ)                                                                                                                                                                                                                                                                        | ≤150% of the initial specified value |             |            |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                      | ≤The initial specified value         |             |            |                 |

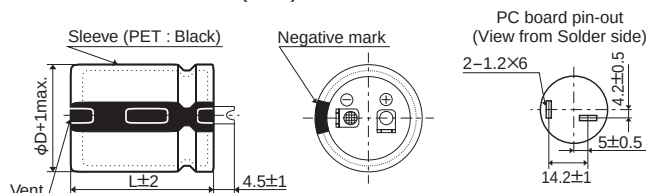
## DIMENSIONS [mm]

●Terminal Code : VS (φ22 to φ35) : Standard

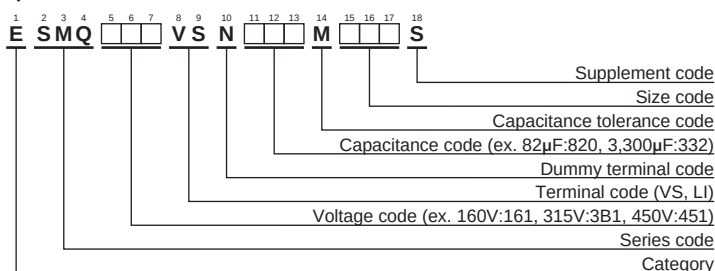


The standard design has no plastic disc.

●Terminal Code : LI (φ35)



## PART NUMBERING SYSTEM



Please refer to "Product code guide (snap-in type)"





## ◆ STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>85°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>85°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|---------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|---------------------------------------------------|--------------------|
| 160                      | 560         | 22 × 25               | 0.15  | 2.25                                              | ESMQ161VSN561MP25S | 250                      | 270         | 22 × 25               | 0.15  | 1.31                                              | ESMQ251VSN271MP25S |
|                          | 680         | 22 × 30               | 0.15  | 2.50                                              | ESMQ161VSN681MP30S |                          | 330         | 22 × 30               | 0.15  | 1.75                                              | ESMQ251VSN331MP30S |
|                          | 820         | 22 × 35               | 0.15  | 2.75                                              | ESMQ161VSN821MP35S |                          | 390         | 22 × 30               | 0.15  | 1.91                                              | ESMQ251VSN391MP30S |
|                          | 1,000       | 22 × 40               | 0.15  | 3.00                                              | ESMQ161VSN102MP40S |                          | 390         | 25.4 × 25             | 0.15  | 1.91                                              | ESMQ251VSN391MQ25S |
|                          | 1,000       | 25.4 × 30             | 0.15  | 3.00                                              | ESMQ161VSN102MQ30S |                          | 470         | 22 × 35               | 0.15  | 2.11                                              | ESMQ251VSN471MP35S |
|                          | 1,200       | 22 × 45               | 0.15  | 3.25                                              | ESMQ161VSN122MP45S |                          | 470         | 25.4 × 30             | 0.15  | 2.11                                              | ESMQ251VSN471MQ30S |
|                          | 1,200       | 25.4 × 35             | 0.15  | 3.25                                              | ESMQ161VSN122MQ35S |                          | 560         | 22 × 40               | 0.15  | 2.25                                              | ESMQ251VSN561MP40S |
|                          | 1,200       | 30 × 25               | 0.15  | 3.25                                              | ESMQ161VSN122MR25S |                          | 560         | 25.4 × 30             | 0.15  | 2.25                                              | ESMQ251VSN561MQ30S |
|                          | 1,500       | 22 × 50               | 0.15  | 3.73                                              | ESMQ161VSN152MP50S |                          | 560         | 30 × 25               | 0.15  | 2.25                                              | ESMQ251VSN561MR25S |
|                          | 1,500       | 25.4 × 40             | 0.15  | 3.73                                              | ESMQ161VSN152MQ40S |                          | 680         | 22 × 45               | 0.15  | 2.50                                              | ESMQ251VSN681MP45S |
|                          | 1,500       | 30 × 30               | 0.15  | 3.73                                              | ESMQ161VSN152MR30S |                          | 680         | 25.4 × 35             | 0.15  | 2.50                                              | ESMQ251VSN681MQ35S |
|                          | 1,500       | 35 × 25               | 0.15  | 3.73                                              | ESMQ161VSN152MA25S |                          | 680         | 30 × 30               | 0.15  | 2.50                                              | ESMQ251VSN681MR30S |
|                          | 1,800       | 25.4 × 45             | 0.15  | 4.20                                              | ESMQ161VSN182MQ45S |                          | 820         | 22 × 50               | 0.15  | 2.77                                              | ESMQ251VSN821MP50S |
|                          | 1,800       | 30 × 35               | 0.15  | 4.20                                              | ESMQ161VSN182MR35S |                          | 820         | 25.4 × 40             | 0.15  | 2.77                                              | ESMQ251VSN821MQ40S |
|                          | 1,800       | 35 × 30               | 0.15  | 4.20                                              | ESMQ161VSN182MA30S |                          | 820         | 30 × 30               | 0.15  | 2.77                                              | ESMQ251VSN821MR30S |
|                          | 2,200       | 30 × 40               | 0.15  | 4.78                                              | ESMQ161VSN222MR40S |                          | 820         | 35 × 25               | 0.15  | 2.77                                              | ESMQ251VSN821MA25S |
|                          | 2,200       | 35 × 35               | 0.15  | 4.78                                              | ESMQ161VSN222MA35S |                          | 1,000       | 25.4 × 45             | 0.15  | 3.32                                              | ESMQ251VSN102MQ45S |
|                          | 2,700       | 35 × 40               | 0.15  | 5.45                                              | ESMQ161VSN272MA40S |                          | 1,000       | 30 × 35               | 0.15  | 3.32                                              | ESMQ251VSN102MR35S |
|                          | 3,300       | 35 × 45               | 0.15  | 5.75                                              | ESMQ161VSN332MA45S |                          | 1,000       | 35 × 30               | 0.15  | 3.32                                              | ESMQ251VSN102MA30S |
|                          | 3,900       | 35 × 50               | 0.15  | 6.00                                              | ESMQ161VSN392MA50S |                          | 1,200       | 30 × 40               | 0.15  | 3.53                                              | ESMQ251VSN122MR40S |
| 180                      | 470         | 22 × 25               | 0.15  | 2.08                                              | ESMQ181VSN471MP25S | 315                      | 1,200       | 35 × 35               | 0.15  | 3.53                                              | ESMQ251VSN122MA35S |
|                          | 560         | 22 × 30               | 0.15  | 2.25                                              | ESMQ181VSN561MP30S |                          | 1,500       | 30 × 50               | 0.15  | 4.04                                              | ESMQ251VSN152MR50S |
|                          | 680         | 22 × 30               | 0.15  | 2.50                                              | ESMQ181VSN681MP30S |                          | 1,500       | 35 × 40               | 0.15  | 4.04                                              | ESMQ251VSN152MA40S |
|                          | 680         | 25.4 × 25             | 0.15  | 2.50                                              | ESMQ181VSN681MQ25S |                          | 1,800       | 35 × 45               | 0.15  | 4.55                                              | ESMQ251VSN182MA45S |
|                          | 820         | 22 × 35               | 0.15  | 2.75                                              | ESMQ181VSN821MP35S |                          | 180         | 22 × 25               | 0.15  | 1.21                                              | ESMQ3B1VSN181MP25S |
|                          | 820         | 25.4 × 30             | 0.15  | 2.75                                              | ESMQ181VSN821MQ30S |                          | 220         | 22 × 30               | 0.15  | 1.41                                              | ESMQ3B1VSN221MP30S |
|                          | 1,000       | 22 × 45               | 0.15  | 3.00                                              | ESMQ181VSN102MP45S |                          | 270         | 22 × 30               | 0.15  | 1.60                                              | ESMQ3B1VSN271MP30S |
|                          | 1,000       | 25.4 × 35             | 0.15  | 3.00                                              | ESMQ181VSN102MQ35S |                          | 330         | 22 × 40               | 0.15  | 1.82                                              | ESMQ3B1VSN331MP40S |
|                          | 1,000       | 30 × 25               | 0.15  | 3.00                                              | ESMQ181VSN102MR25S |                          | 330         | 25.4 × 30             | 0.15  | 1.82                                              | ESMQ3B1VSN331MQ30S |
|                          | 1,200       | 22 × 50               | 0.15  | 3.31                                              | ESMQ181VSN122MP50S |                          | 330         | 30 × 25               | 0.15  | 1.82                                              | ESMQ3B1VSN331MR25S |
|                          | 1,200       | 25.4 × 40             | 0.15  | 3.31                                              | ESMQ181VSN122MQ40S |                          | 390         | 22 × 45               | 0.15  | 2.01                                              | ESMQ3B1VSN391MP45S |
|                          | 1,200       | 30 × 30               | 0.15  | 3.31                                              | ESMQ181VSN122MR30S |                          | 390         | 25.4 × 35             | 0.15  | 2.01                                              | ESMQ3B1VSN391MQ35S |
|                          | 1,200       | 35 × 25               | 0.15  | 3.31                                              | ESMQ181VSN122MA25S |                          | 390         | 30 × 30               | 0.15  | 2.01                                              | ESMQ3B1VSN391MR30S |
|                          | 1,500       | 25.4 × 45             | 0.15  | 3.83                                              | ESMQ181VSN152MQ45S |                          | 470         | 22 × 50               | 0.15  | 2.27                                              | ESMQ3B1VSN471MP50S |
|                          | 1,500       | 30 × 35               | 0.15  | 3.83                                              | ESMQ181VSN152MR35S |                          | 470         | 25.4 × 40             | 0.15  | 2.27                                              | ESMQ3B1VSN471MQ40S |
|                          | 1,500       | 35 × 30               | 0.15  | 3.83                                              | ESMQ181VSN152MA30S |                          | 470         | 30 × 30               | 0.15  | 2.27                                              | ESMQ3B1VSN471MR30S |
|                          | 1,800       | 25.4 × 50             | 0.15  | 4.32                                              | ESMQ181VSN182MQ50S |                          | 470         | 35 × 25               | 0.15  | 2.27                                              | ESMQ3B1VSN471MA25S |
|                          | 1,800       | 30 × 40               | 0.15  | 4.32                                              | ESMQ181VSN182MR40S |                          | 560         | 25.4 × 45             | 0.15  | 2.56                                              | ESMQ3B1VSN561MQ45S |
|                          | 1,800       | 35 × 30               | 0.15  | 4.32                                              | ESMQ181VSN182MA30S |                          | 560         | 30 × 35               | 0.15  | 2.56                                              | ESMQ3B1VSN561MR35S |
| 200                      | 2,200       | 30 × 45               | 0.15  | 4.92                                              | ESMQ181VSN222MR45S | 350                      | 560         | 35 × 30               | 0.15  | 2.56                                              | ESMQ3B1VSN561MA30S |
|                          | 2,200       | 35 × 40               | 0.15  | 4.92                                              | ESMQ181VSN222MA40S |                          | 680         | 30 × 40               | 0.15  | 2.87                                              | ESMQ3B1VSN681MR40S |
|                          | 2,700       | 35 × 45               | 0.15  | 5.52                                              | ESMQ181VSN272MA45S |                          | 680         | 35 × 35               | 0.15  | 2.87                                              | ESMQ3B1VSN681MA35S |
|                          | 3,300       | 35 × 50               | 0.15  | 5.75                                              | ESMQ181VSN332MA50S |                          | 820         | 30 × 45               | 0.15  | 3.25                                              | ESMQ3B1VSN821MR45S |
|                          | 390         | 22 × 25               | 0.15  | 1.68                                              | ESMQ201VSN391MP25S |                          | 820         | 35 × 40               | 0.15  | 3.25                                              | ESMQ3B1VSN821MA40S |
|                          | 470         | 22 × 30               | 0.15  | 1.85                                              | ESMQ201VSN471MP30S |                          | 1,000       | 30 × 50               | 0.15  | 3.63                                              | ESMQ3B1VSN102MR50S |
|                          | 560         | 22 × 30               | 0.15  | 2.43                                              | ESMQ201VSN561MP30S |                          | 1,000       | 35 × 45               | 0.15  | 3.63                                              | ESMQ3B1VSN102MA45S |
|                          | 560         | 25.4 × 25             | 0.15  | 2.43                                              | ESMQ201VSN561MQ25S |                          | 150         | 22 × 25               | 0.15  | 1.12                                              | ESMQ351VSN151MP25S |
|                          | 680         | 22 × 35               | 0.15  | 2.68                                              | ESMQ201VSN681MP35S |                          | 180         | 22 × 30               | 0.15  | 1.22                                              | ESMQ351VSN181MP30S |
|                          | 680         | 25.4 × 30             | 0.15  | 2.68                                              | ESMQ201VSN681MQ30S |                          | 220         | 22 × 35               | 0.15  | 1.44                                              | ESMQ351VSN221MP35S |
|                          | 820         | 22 × 40               | 0.15  | 2.93                                              | ESMQ201VSN821MP40S |                          | 270         | 22 × 40               | 0.15  | 1.66                                              | ESMQ351VSN271MP40S |
|                          | 820         | 25.4 × 30             | 0.15  | 2.93                                              | ESMQ201VSN821MQ30S |                          | 270         | 25.4 × 30             | 0.15  | 1.66                                              | ESMQ351VSN271MQ30S |
|                          | 820         | 30 × 25               | 0.15  | 2.93                                              | ESMQ201VSN821MR25S |                          | 330         | 22 × 45               | 0.15  | 1.88                                              | ESMQ351VSN331MP45S |
|                          | 1,000       | 22 × 45               | 0.15  | 3.25                                              | ESMQ201VSN102MP45S |                          | 330         | 25.4 × 35             | 0.15  | 1.88                                              | ESMQ351VSN331MQ35S |
|                          | 1,000       | 25.4 × 35             | 0.15  | 3.25                                              | ESMQ201VSN102MQ35S |                          | 390         | 22 × 50               | 0.15  | 2.06                                              | ESMQ351VSN391MP50S |
|                          | 1,000       | 30 × 30               | 0.15  | 3.25                                              | ESMQ201VSN102MR30S |                          | 390         | 25.4 × 40             | 0.15  | 2.06                                              | ESMQ351VSN391MQ40S |
|                          | 1,000       | 35 × 25               | 0.15  | 3.25                                              | ESMQ201VSN102MA25S |                          | 390         | 30 × 30               | 0.15  | 2.06                                              | ESMQ351VSN391MR30S |
|                          | 1,200       | 25.4 × 40             | 0.15  | 3.50                                              | ESMQ201VSN122MQ40S |                          | 390         | 35 × 25               | 0.15  | 2.06                                              | ESMQ351VSN391MA25S |
|                          | 1,200       | 30 × 30               | 0.15  | 3.50                                              | ESMQ201VSN122MR30S |                          | 470         | 25.4 × 45             | 0.15  | 2.40                                              | ESMQ351VSN471MQ45S |
|                          | 1,200       | 35 × 30               | 0.15  | 3.50                                              | ESMQ201VSN122MA30S |                          | 470         | 30 × 35               | 0.15  | 2.40                                              | ESMQ351VSN471MR35S |
|                          | 1,500       | 25.4 × 50             | 0.15  | 3.87                                              | ESMQ201VSN152MQ50S |                          | 470         | 35 × 30               | 0.15  | 2.40                                              | ESMQ351VSN471MA30S |
| 250                      | 1,500       | 30 × 35               | 0.15  | 3.87                                              | ESMQ201VSN152MR35S | 350                      | 560         | 25.4 × 50             | 0.15  | 2.60                                              | ESMQ351VSN561MQ50S |
|                          | 1,500       | 35 × 30               | 0.15  | 3.87                                              | ESMQ201VSN152MA30S |                          | 560         | 30 × 40               | 0.15  | 2.60                                              | ESMQ351VSN561MR40S |
|                          | 1,800       | 30 × 45               | 0.15  | 4.32                                              | ESMQ201VSN182MR45S |                          | 560         | 35 × 30               | 0.15  | 2.60                                              | ESMQ351VSN561MA30S |
|                          | 1,800       | 35 × 35               | 0.15  | 4.32                                              | ESMQ201VSN182MA35S |                          | 680         | 30 × 45               | 0.15  | 2.96                                              | ESMQ351VSN681MR45S |
|                          | 2,200       | 30 × 50               | 0.15  | 4.92                                              | ESMQ201VSN222MR50S |                          | 680         | 35 × 35               | 0.15  | 2.96                                              | ESMQ351VSN681MA35S |
|                          | 2,200       | 35 × 40               | 0.15  | 4.92                                              | ESMQ201VSN222MA40S |                          | 820         | 30 × 50               | 0.15  | 3.25                                              | ESMQ351VSN821MR50S |
|                          | 2,700       | 35 × 50               | 0.15  | 5.45                                              | ESMQ201VSN272MA50S |                          | 820         | 35 × 45               | 0.15  | 3.25                                              | ESMQ351VSN821MA45S |
|                          |             |                       |       |                                                   |                    |                          |             |                       |       |                                                   |                    |
|                          |             |                       |       |                                                   |                    |                          |             |                       |       |                                                   |                    |
|                          |             |                       |       |                                                   |                    |                          |             |                       |       |                                                   |                    |



## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>85°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>85°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|---------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|---------------------------------------------------|--------------------|
| 350                      | 1,000       | 35 × 50               | 0.15  | 3.54                                              | ESMQ351VSN102MA50S | 420                      | 270         | 30 × 30               | 0.20  | 1.94                                              | ESMQ421VSN271MR30S |
|                          | 120         | 22 × 25               | 0.15  | 1.02                                              | ESMQ401VSN121MP25S |                          | 330         | 25.4 × 45             | 0.20  | 2.17                                              | ESMQ421VSN331MQ45S |
|                          | 150         | 22 × 30               | 0.15  | 1.16                                              | ESMQ401VSN151MP30S |                          | 330         | 30 × 35               | 0.20  | 2.17                                              | ESMQ421VSN331MR35S |
|                          | 180         | 22 × 35               | 0.15  | 1.44                                              | ESMQ401VSN181MP35S |                          | 330         | 35 × 30               | 0.20  | 2.17                                              | ESMQ421VSN331MA30S |
|                          | 220         | 22 × 40               | 0.15  | 1.49                                              | ESMQ401VSN221MP40S |                          | 390         | 25.4 × 50             | 0.20  | 2.27                                              | ESMQ421VSN391MQ50S |
|                          | 220         | 25.4 × 30             | 0.15  | 1.49                                              | ESMQ401VSN221MQ30S |                          | 390         | 30 × 35               | 0.20  | 2.27                                              | ESMQ421VSN391MR35S |
|                          | 270         | 22 × 45               | 0.15  | 1.67                                              | ESMQ401VSN271MP45S |                          | 390         | 35 × 30               | 0.20  | 2.27                                              | ESMQ421VSN391MA30S |
|                          | 270         | 25.4 × 35             | 0.15  | 1.67                                              | ESMQ401VSN271MQ35S |                          | 470         | 30 × 40               | 0.20  | 2.61                                              | ESMQ421VSN471MR40S |
|                          | 270         | 30 × 25               | 0.15  | 1.67                                              | ESMQ401VSN271MR25S |                          | 470         | 35 × 35               | 0.20  | 2.61                                              | ESMQ421VSN471MA35S |
|                          | 330         | 22 × 50               | 0.15  | 1.90                                              | ESMQ401VSN331MP50S |                          | 560         | 30 × 50               | 0.20  | 2.82                                              | ESMQ421VSN561MR50S |
|                          | 330         | 25.4 × 40             | 0.15  | 1.90                                              | ESMQ401VSN331MQ40S |                          | 560         | 35 × 40               | 0.20  | 2.82                                              | ESMQ421VSN561MA40S |
|                          | 330         | 30 × 30               | 0.15  | 1.90                                              | ESMQ401VSN331MR30S |                          | 680         | 35 × 45               | 0.20  | 3.11                                              | ESMQ421VSN681MA45S |
| 400                      | 330         | 35 × 25               | 0.15  | 1.90                                              | ESMQ401VSN331MA25S | 450                      | 82          | 22 × 25               | 0.20  | 0.83                                              | ESMQ451VSN820MP25S |
|                          | 390         | 25.4 × 45             | 0.15  | 2.13                                              | ESMQ401VSN391MQ45S |                          | 100         | 22 × 25               | 0.20  | 0.93                                              | ESMQ451VSN101MP25S |
|                          | 390         | 30 × 35               | 0.15  | 2.13                                              | ESMQ401VSN391MP35S |                          | 120         | 22 × 30               | 0.20  | 1.04                                              | ESMQ451VSN121MP30S |
|                          | 390         | 35 × 30               | 0.15  | 2.13                                              | ESMQ401VSN391MA30S |                          | 150         | 22 × 35               | 0.20  | 1.19                                              | ESMQ451VSN151MP35S |
|                          | 470         | 25.4 × 50             | 0.15  | 2.39                                              | ESMQ401VSN471MQ50S |                          | 150         | 25.4 × 25             | 0.20  | 1.19                                              | ESMQ451VSN151MQ25S |
|                          | 470         | 30 × 40               | 0.15  | 2.39                                              | ESMQ401VSN471MR40S |                          | 180         | 22 × 40               | 0.20  | 1.35                                              | ESMQ451VSN181MP40S |
|                          | 470         | 35 × 30               | 0.15  | 2.39                                              | ESMQ401VSN471MA30S |                          | 180         | 25.4 × 30             | 0.20  | 1.35                                              | ESMQ451VSN181MQ30S |
|                          | 560         | 30 × 45               | 0.15  | 2.69                                              | ESMQ401VSN561MR45S |                          | 220         | 22 × 45               | 0.20  | 1.55                                              | ESMQ451VSN221MP45S |
|                          | 560         | 35 × 35               | 0.15  | 2.69                                              | ESMQ401VSN561MA35S |                          | 220         | 25.4 × 40             | 0.20  | 1.55                                              | ESMQ451VSN221MQ40S |
|                          | 680         | 30 × 50               | 0.15  | 2.96                                              | ESMQ401VSN681MR50S |                          | 220         | 30 × 30               | 0.20  | 1.55                                              | ESMQ451VSN221MR30S |
|                          | 680         | 35 × 40               | 0.15  | 2.96                                              | ESMQ401VSN681MA40S |                          | 220         | 35 × 25               | 0.20  | 1.55                                              | ESMQ451VSN221MA25S |
|                          | 820         | 35 × 45               | 0.15  | 3.25                                              | ESMQ401VSN821MA45S |                          | 270         | 22 × 50               | 0.20  | 1.78                                              | ESMQ451VSN271MP50S |
| 420                      | 100         | 22 × 25               | 0.20  | 0.97                                              | ESMQ421VSN101MP25S |                          | 270         | 25.4 × 40             | 0.20  | 1.78                                              | ESMQ451VSN271MQ40S |
|                          | 120         | 22 × 25               | 0.20  | 1.08                                              | ESMQ421VSN121MP25S |                          | 270         | 30 × 30               | 0.20  | 1.78                                              | ESMQ451VSN271MR30S |
|                          | 150         | 22 × 30               | 0.20  | 1.30                                              | ESMQ421VSN151MP30S |                          | 330         | 25.4 × 50             | 0.20  | 2.01                                              | ESMQ451VSN331MQ50S |
|                          | 150         | 25.4 × 25             | 0.20  | 1.30                                              | ESMQ421VSN151MQ25S |                          | 330         | 30 × 40               | 0.20  | 2.01                                              | ESMQ451VSN331MR40S |
|                          | 180         | 22 × 35               | 0.20  | 1.48                                              | ESMQ421VSN181MP35S |                          | 330         | 35 × 30               | 0.20  | 2.01                                              | ESMQ451VSN331MA30S |
|                          | 180         | 25.4 × 30             | 0.20  | 1.48                                              | ESMQ421VSN181MQ30S |                          | 390         | 30 × 40               | 0.20  | 2.24                                              | ESMQ451VSN391MR40S |
|                          | 220         | 22 × 40               | 0.20  | 1.65                                              | ESMQ421VSN221MP40S |                          | 390         | 35 × 35               | 0.20  | 2.24                                              | ESMQ451VSN391MA35S |
|                          | 220         | 25.4 × 35             | 0.20  | 1.65                                              | ESMQ421VSN221MQ35S |                          | 470         | 30 × 45               | 0.20  | 2.53                                              | ESMQ451VSN471MR45S |
|                          | 220         | 30 × 25               | 0.20  | 1.65                                              | ESMQ421VSN221MR25S |                          | 470         | 35 × 40               | 0.20  | 2.53                                              | ESMQ451VSN471MA40S |
|                          | 270         | 22 × 50               | 0.20  | 1.94                                              | ESMQ421VSN271MP50S |                          | 560         | 30 × 50               | 0.20  | 2.82                                              | ESMQ451VSN561MR50S |
|                          | 270         | 25.4 × 35             | 0.20  | 1.94                                              | ESMQ421VSN271MQ35S |                          | 560         | 35 × 45               | 0.20  | 2.82                                              | ESMQ451VSN561MA45S |

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

| Frequency(Hz)             | 50   | 120  | 300  | 1k   | 10k  | 50k  |
|---------------------------|------|------|------|------|------|------|
| 160 to 250V <sub>dc</sub> | 0.81 | 1.00 | 1.17 | 1.32 | 1.45 | 1.50 |
| 315 to 450V <sub>dc</sub> | 0.77 | 1.00 | 1.16 | 1.30 | 1.41 | 1.43 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

# KHV Series

- The KMR series has been improved to have a higher capacitance and ripple current.
- Endurance with ripple current : 2,000 hours at 105°C
- Rated voltage range : 350 to 400V<sub>dc</sub>, Capacitance range : 160 to 1,610μF
- For inverter control, switching power supplies
- Non solvent resistant type
- RoHS2 Compliant
- The logo mark printed on the sleeve will be changed.

KHV

↓  
Downsized  
Higher ripple  
KMR

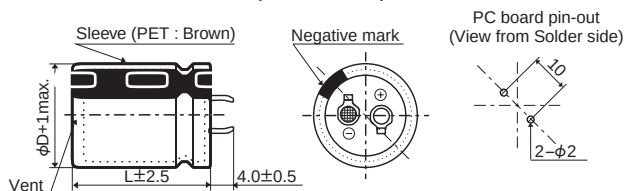


## SPECIFICATIONS

| Items                                                        | Characteristics                                                                                                                                                                                                                                                                       |                                       |                 |
|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-----------------|
| Category                                                     | -40 to +105℃                                                                                                                                                                                                                                                                          |                                       |                 |
| Temperature Range                                            |                                                                                                                                                                                                                                                                                       |                                       |                 |
| Rated Voltage Range                                          | 350 to 400V <sub>dc</sub>                                                                                                                                                                                                                                                             |                                       |                 |
| Capacitance Tolerance                                        | ± 20% (M)                                                                                                                                                                                                                                                                             |                                       | (at 20℃, 120Hz) |
| Leakage Current                                              | I ≤ 3√CV<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)<br>(at 20℃ after 5 minutes)                                                                                                                                                     |                                       |                 |
| Dissipation Factor<br>(tan δ)                                | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 350 to 400V                           | (at 20℃, 120Hz) |
|                                                              | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.15                                  |                 |
| Low Temperature<br>Characteristics<br>(Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 350 to 400V                           | (at 120Hz)      |
|                                                              | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 5                                     |                 |
|                                                              | Z(-40℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 20                                    |                 |
| Endurance                                                    | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 2,000 hours at 105℃.                                         |                                       |                 |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±20% of the initial value           |                 |
|                                                              | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤ 200% of the initial specified value |                 |
|                                                              | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value         |                 |
| Shelf Life                                                   | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                       |                 |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±15% of the initial value           |                 |
|                                                              | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤ 150% of the initial specified value |                 |
|                                                              | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value         |                 |

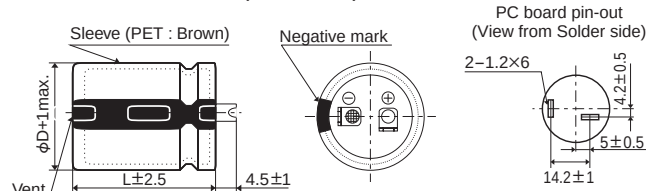
## DIMENSIONS [mm]

- Terminal Code : VS (φ22 to φ35) : Standard

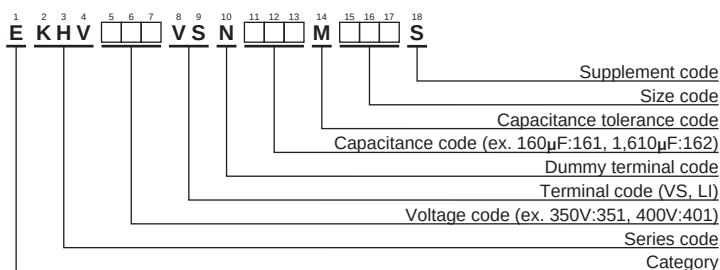


The standard design has no plastic disc.

- Terminal Code : LI (φ30, φ35)



## PART NUMBERING SYSTEM



Please refer to "Product code guide (snap-in type)"



## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|
| 350                      | 180         | 22 × 25               | 0.15  | 1.43                                               | EKHV351VSN181MP25S | 375                      | 580         | 30 × 35               | 0.15  | 2.70                                               | EKHV3H1VSN581MR35S |
|                          | 240         | 22 × 30               | 0.15  | 1.73                                               | EKHV351VSN241MP30S |                          | 600         | 25.4 × 50             | 0.15  | 2.95                                               | EKHV3H1VSN601MQ50S |
|                          | 260         | 25.4 × 25             | 0.15  | 1.72                                               | EKHV351VSN261MQ25S |                          | 610         | 35 × 30               | 0.15  | 2.51                                               | EKHV3H1VSN611MA30S |
|                          | 290         | 22 × 35               | 0.15  | 1.95                                               | EKHV351VSN291MP35S |                          | 670         | 25.4 × 55             | 0.15  | 3.17                                               | EKHV3H1VSN671MQ55S |
|                          | 330         | 25.4 × 30             | 0.15  | 1.99                                               | EKHV351VSN331MQ30S |                          | 690         | 30 × 40               | 0.15  | 3.03                                               | EKHV3H1VSN691MR40S |
|                          | 350         | 22 × 40               | 0.15  | 2.19                                               | EKHV351VSN351MP40S |                          | 740         | 25.4 × 60             | 0.15  | 3.39                                               | EKHV3H1VSN741MQ60S |
|                          | 390         | 30 × 25               | 0.15  | 2.14                                               | EKHV351VSN391MR25S |                          | 760         | 35 × 35               | 0.15  | 2.85                                               | EKHV3H1VSN761MA35S |
|                          | 400         | 22 × 45               | 0.15  | 2.39                                               | EKHV351VSN401MP45S |                          | 800         | 30 × 45               | 0.15  | 3.34                                               | EKHV3H1VSN801MR45S |
|                          | 410         | 25.4 × 35             | 0.15  | 2.31                                               | EKHV351VSN411MQ35S |                          | 910         | 30 × 50               | 0.15  | 3.63                                               | EKHV3H1VSN911MR50S |
|                          | 460         | 22 × 50               | 0.15  | 2.62                                               | EKHV351VSN461MP50S |                          | 910         | 35 × 40               | 0.15  | 3.22                                               | EKHV3H1VSN911MA40S |
|                          | 490         | 25.4 × 40             | 0.15  | 2.57                                               | EKHV351VSN491MQ40S |                          | 1,010       | 30 × 55               | 0.15  | 3.90                                               | EKHV3H1VSN102MR55S |
|                          | 500         | 35 × 25               | 0.15  | 2.24                                               | EKHV351VSN501MA25S |                          | 1,060       | 35 × 45               | 0.15  | 3.57                                               | EKHV3H1VSN1A2MA45S |
|                          | 510         | 22 × 55               | 0.15  | 2.81                                               | EKHV351VSN511MP55S |                          | 1,120       | 30 × 60               | 0.15  | 4.18                                               | EKHV3H1VSN112MR60S |
|                          | 510         | 30 × 30               | 0.15  | 2.47                                               | EKHV351VSN511MR30S |                          | 1,200       | 35 × 50               | 0.15  | 3.88                                               | EKHV3H1VSN122MA50S |
|                          | 560         | 25.4 × 45             | 0.15  | 2.81                                               | EKHV351VSN561MQ45S |                          | 1,350       | 35 × 55               | 0.15  | 4.20                                               | EKHV3H1VSN1D2MA55S |
|                          | 570         | 22 × 60               | 0.15  | 3.02                                               | EKHV351VSN571MP60S |                          | 1,500       | 35 × 60               | 0.15  | 4.51                                               | EKHV3H1VSN152MA60S |
|                          | 620         | 30 × 35               | 0.15  | 2.79                                               | EKHV351VSN621MR35S | 400                      | 160         | 22 × 25               | 0.15  | 1.35                                               | EKHV401VSN161MP25S |
|                          | 640         | 25.4 × 50             | 0.15  | 3.05                                               | EKHV351VSN641MQ50S |                          | 200         | 22 × 30               | 0.15  | 1.58                                               | EKHV401VSN201MP30S |
|                          | 660         | 35 × 30               | 0.15  | 2.62                                               | EKHV351VSN661MA30S |                          | 220         | 25.4 × 25             | 0.15  | 1.58                                               | EKHV401VSN221MQ25S |
|                          | 720         | 25.4 × 55             | 0.15  | 3.29                                               | EKHV351VSN721MQ55S |                          | 250         | 22 × 35               | 0.15  | 1.81                                               | EKHV401VSN251MP35S |
|                          | 740         | 30 × 40               | 0.15  | 3.14                                               | EKHV351VSN741MR40S |                          | 290         | 25.4 × 30             | 0.15  | 1.86                                               | EKHV401VSN291MQ30S |
|                          | 790         | 25.4 × 60             | 0.15  | 3.50                                               | EKHV351VSN791MQ60S |                          | 300         | 22 × 40               | 0.15  | 2.03                                               | EKHV401VSN301MP40S |
|                          | 820         | 35 × 35               | 0.15  | 2.96                                               | EKHV351VSN821MA35S |                          | 340         | 30 × 25               | 0.15  | 1.99                                               | EKHV401VSN341MR25S |
|                          | 860         | 30 × 45               | 0.15  | 3.47                                               | EKHV351VSN861MR45S |                          | 350         | 22 × 45               | 0.15  | 2.23                                               | EKHV401VSN351MP45S |
|                          | 970         | 30 × 50               | 0.15  | 3.74                                               | EKHV351VSN971MR50S |                          | 350         | 25.4 × 35             | 0.15  | 2.13                                               | EKHV401VSN351MQ35S |
|                          | 980         | 35 × 40               | 0.15  | 3.34                                               | EKHV351VSN981MA40S |                          | 390         | 22 × 50               | 0.15  | 2.41                                               | EKHV401VSN391MP50S |
|                          | 1,090       | 30 × 55               | 0.15  | 4.05                                               | EKHV351VSN112MR55S |                          | 420         | 25.4 × 40             | 0.15  | 2.38                                               | EKHV401VSN421MQ40S |
|                          | 1,130       | 35 × 45               | 0.15  | 3.69                                               | EKHV351VSN1B2MA45S |                          | 430         | 35 × 25               | 0.15  | 2.08                                               | EKHV401VSN431MA25S |
|                          | 1,210       | 30 × 60               | 0.15  | 4.34                                               | EKHV351VSN122MR60S |                          | 440         | 22 × 55               | 0.15  | 2.61                                               | EKHV401VSN441MP55S |
|                          | 1,290       | 35 × 50               | 0.15  | 4.02                                               | EKHV351VSN132MA50S |                          | 440         | 30 × 30               | 0.15  | 2.29                                               | EKHV401VSN441MR30S |
|                          | 1,450       | 35 × 55               | 0.15  | 4.35                                               | EKHV351VSN1E2MA55S |                          | 480         | 25.4 × 45             | 0.15  | 2.60                                               | EKHV401VSN481MQ45S |
|                          | 1,610       | 35 × 60               | 0.15  | 4.67                                               | EKHV351VSN162MA60S |                          | 490         | 22 × 60               | 0.15  | 2.80                                               | EKHV401VSN491MP60S |
| 375                      | 170         | 22 × 25               | 0.15  | 1.39                                               | EKHV3H1VSN171MP25S |                          | 540         | 30 × 35               | 0.15  | 2.60                                               | EKHV401VSN541MR35S |
|                          | 220         | 22 × 30               | 0.15  | 1.66                                               | EKHV3H1VSN221MP30S |                          | 550         | 25.4 × 50             | 0.15  | 2.83                                               | EKHV401VSN551MQ50S |
|                          | 240         | 25.4 × 25             | 0.15  | 1.65                                               | EKHV3H1VSN241MQ25S |                          | 570         | 35 × 30               | 0.15  | 2.43                                               | EKHV401VSN571MA30S |
|                          | 270         | 22 × 35               | 0.15  | 1.88                                               | EKHV3H1VSN271MP35S |                          | 620         | 25.4 × 55             | 0.15  | 3.05                                               | EKHV401VSN621MQ55S |
|                          | 310         | 25.4 × 30             | 0.15  | 1.92                                               | EKHV3H1VSN311MQ30S |                          | 640         | 30 × 40               | 0.15  | 2.92                                               | EKHV401VSN641MR40S |
|                          | 320         | 22 × 40               | 0.15  | 2.09                                               | EKHV3H1VSN321MP40S |                          | 680         | 25.4 × 60             | 0.15  | 3.25                                               | EKHV401VSN681MQ60S |
|                          | 370         | 30 × 25               | 0.15  | 2.08                                               | EKHV3H1VSN371MR25S |                          | 700         | 35 × 35               | 0.15  | 2.73                                               | EKHV401VSN701MA35S |
|                          | 380         | 22 × 45               | 0.15  | 2.33                                               | EKHV3H1VSN381MP45S |                          | 740         | 30 × 45               | 0.15  | 3.22                                               | EKHV401VSN741MR45S |
|                          | 380         | 25.4 × 35             | 0.15  | 2.22                                               | EKHV3H1VSN381MQ35S |                          | 840         | 30 × 50               | 0.15  | 3.48                                               | EKHV401VSN841MR50S |
|                          | 430         | 22 × 50               | 0.15  | 2.53                                               | EKHV3H1VSN431MP50S |                          | 840         | 35 × 40               | 0.15  | 3.10                                               | EKHV401VSN841MA40S |
|                          | 450         | 25.4 × 40             | 0.15  | 2.47                                               | EKHV3H1VSN451MQ40S |                          | 940         | 30 × 55               | 0.15  | 3.76                                               | EKHV401VSN941MR55S |
|                          | 470         | 30 × 30               | 0.15  | 2.37                                               | EKHV3H1VSN471MR30S |                          | 980         | 35 × 45               | 0.15  | 3.43                                               | EKHV401VSN981MA45S |
|                          | 470         | 35 × 25               | 0.15  | 2.17                                               | EKHV3H1VSN471MA25S |                          | 1,040       | 30 × 60               | 0.15  | 4.03                                               | EKHV401VSN1A2MR60S |
|                          | 480         | 22 × 55               | 0.15  | 2.72                                               | EKHV3H1VSN481MP55S |                          | 1,110       | 35 × 50               | 0.15  | 3.73                                               | EKHV401VSN112MA50S |
|                          | 520         | 25.4 × 45             | 0.15  | 2.70                                               | EKHV3H1VSN521MQ45S |                          | 1,250       | 35 × 55               | 0.15  | 4.04                                               | EKHV401VSN1C2MA55S |
|                          | 530         | 22 × 60               | 0.15  | 2.91                                               | EKHV3H1VSN531MP60S |                          | 1,380       | 35 × 60               | 0.15  | 4.32                                               | EKHV401VSN142MA60S |



## ◆ HIGHER RIPPLE CURRENT RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|
| 350                      | 350         | 30 × 25               | 0.15  | 2.50                                               | EKHV351VSN351MR25S | 375                      | 840         | 30 × 50               | 0.15  | 4.31                                               | EKHV3H1VSN841MR50S |
|                          | 460         | 30 × 30               | 0.15  | 2.90                                               | EKHV351VSN461MR30S |                          | 870         | 35 × 40               | 0.15  | 4.17                                               | EKHV3H1VSN871MA40S |
|                          | 480         | 35 × 25               | 0.15  | 2.90                                               | EKHV351VSN481MA25S |                          | 940         | 30 × 55               | 0.15  | 4.65                                               | EKHV3H1VSN941MR55S |
|                          | 570         | 30 × 35               | 0.15  | 3.31                                               | EKHV351VSN571MR35S |                          | 1,010       | 35 × 45               | 0.15  | 4.61                                               | EKHV3H1VSN102MA45S |
|                          | 630         | 35 × 30               | 0.15  | 3.38                                               | EKHV351VSN631MA30S |                          | 1,050       | 30 × 60               | 0.15  | 5.01                                               | EKHV3H1VSN1A2MR60S |
|                          | 680         | 30 × 40               | 0.15  | 3.72                                               | EKHV351VSN681MR40S |                          | 1,150       | 35 × 50               | 0.15  | 5.03                                               | EKHV3H1VSN1B2MA50S |
|                          | 780         | 35 × 35               | 0.15  | 3.82                                               | EKHV351VSN781MA35S |                          | 1,290       | 35 × 55               | 0.15  | 5.43                                               | EKHV3H1VSN132MA55S |
|                          | 790         | 30 × 45               | 0.15  | 4.11                                               | EKHV351VSN791MR45S |                          | 1,430       | 35 × 60               | 0.15  | 5.83                                               | EKHV3H1VSN1E2MA60S |
|                          | 900         | 30 × 50               | 0.15  | 4.46                                               | EKHV351VSN901MR50S | 400                      | 300         | 30 × 25               | 0.15  | 2.32                                               | EKHV401VSN301MR25S |
|                          | 930         | 35 × 40               | 0.15  | 4.31                                               | EKHV351VSN931MA40S |                          | 400         | 30 × 30               | 0.15  | 2.71                                               | EKHV401VSN401MR30S |
|                          | 1,010       | 30 × 55               | 0.15  | 4.82                                               | EKHV351VSN102MR55S |                          | 410         | 35 × 25               | 0.15  | 2.68                                               | EKHV401VSN411MA25S |
|                          | 1,080       | 35 × 45               | 0.15  | 4.77                                               | EKHV351VSN112MA45S |                          | 490         | 30 × 35               | 0.15  | 3.07                                               | EKHV401VSN491MR35S |
|                          | 1,120       | 30 × 60               | 0.15  | 5.17                                               | EKHV351VSN112MR60S |                          | 540         | 35 × 30               | 0.15  | 3.13                                               | EKHV401VSN541MA30S |
|                          | 1,230       | 35 × 50               | 0.15  | 5.20                                               | EKHV351VSN1C2MA50S |                          | 590         | 30 × 40               | 0.15  | 3.46                                               | EKHV401VSN591MR40S |
|                          | 1,390       | 35 × 55               | 0.15  | 5.64                                               | EKHV351VSN142MA55S |                          | 670         | 35 × 35               | 0.15  | 3.54                                               | EKHV401VSN671MA35S |
|                          | 1,540       | 35 × 60               | 0.15  | 6.05                                               | EKHV351VSN1F2MA60S |                          | 680         | 30 × 45               | 0.15  | 3.81                                               | EKHV401VSN681MR45S |
| 375                      | 330         | 30 × 25               | 0.15  | 2.43                                               | EKHV3H1VSN331MR25S |                          | 780         | 30 × 50               | 0.15  | 4.15                                               | EKHV401VSN781MR50S |
|                          | 430         | 30 × 30               | 0.15  | 2.81                                               | EKHV3H1VSN431MR30S |                          | 800         | 35 × 40               | 0.15  | 4.00                                               | EKHV401VSN801MA40S |
|                          | 450         | 35 × 25               | 0.15  | 2.81                                               | EKHV3H1VSN451MA25S |                          | 870         | 30 × 55               | 0.15  | 4.47                                               | EKHV401VSN871MR55S |
|                          | 530         | 30 × 35               | 0.15  | 3.19                                               | EKHV3H1VSN531MR35S |                          | 930         | 35 × 45               | 0.15  | 4.43                                               | EKHV401VSN931MA45S |
|                          | 590         | 35 × 30               | 0.15  | 3.27                                               | EKHV3H1VSN591MA30S |                          | 970         | 30 × 60               | 0.15  | 4.81                                               | EKHV401VSN971MR60S |
|                          | 630         | 30 × 40               | 0.15  | 3.58                                               | EKHV3H1VSN631MR40S |                          | 1,060       | 35 × 50               | 0.15  | 4.82                                               | EKHV401VSN1A2MA50S |
|                          | 730         | 35 × 35               | 0.15  | 3.70                                               | EKHV3H1VSN731MA35S |                          | 1,190       | 35 × 55               | 0.15  | 5.22                                               | EKHV401VSN122MA55S |
|                          | 740         | 30 × 45               | 0.15  | 3.98                                               | EKHV3H1VSN741MR45S |                          | 1,320       | 35 × 60               | 0.15  | 5.60                                               | EKHV401VSN132MA60S |

## ◆ RATED RIPPLE CURRENT MULTIPLIERS

## ● Frequency Multipliers

| Frequency(Hz)             | 50   | 120  | 300  | 1k   | 10k  | 50k  |
|---------------------------|------|------|------|------|------|------|
| 350 to 450V <sub>dc</sub> | 0.70 | 1.00 | 1.10 | 1.17 | 1.25 | 1.31 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

# KHE Series

- Upgraded capacitance rating
- Endurance with ripple current : 2,000 hours at 105°C
- Rated voltage range : 400 to 450V<sub>dc</sub>, Capacitance range : 210 to 1,500μF
- Non solvent resistant type
- RoHS2 Compliant

KHE

↓  
Downsized  
KMZ

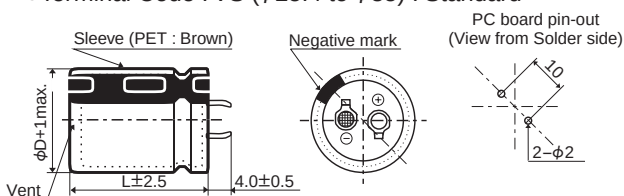


## SPECIFICATIONS

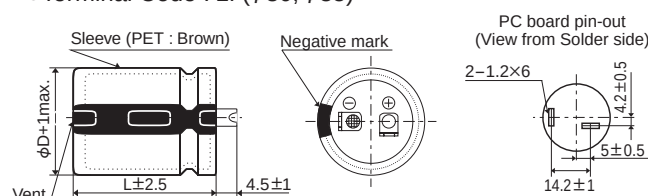
| Items                                                  | Characteristics                                                                                                                                                                                                                                                                       |                                       |                 |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-----------------|
| Category                                               | -40 to +105℃                                                                                                                                                                                                                                                                          |                                       |                 |
| Temperature Range                                      |                                                                                                                                                                                                                                                                                       |                                       |                 |
| Rated Voltage Range                                    | 400 to 450V <sub>dc</sub>                                                                                                                                                                                                                                                             |                                       |                 |
| Capacitance Tolerance                                  | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                             |                                       |                 |
| Leakage Current                                        | $I \leq 3\sqrt{CV}$<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 5 minutes)                                                                                                                                             |                                       |                 |
| Dissipation Factor (tan δ )                            | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 400 to 450V                           | (at 20℃, 120Hz) |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.20                                  |                 |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 400 to 450V                           | (at 120Hz)      |
|                                                        | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 8                                     |                 |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 2,000 hours at 105℃.                                         |                                       |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ± 20% of the initial value          |                 |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤ 200% of the initial specified value |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value         |                 |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                       |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ± 15% of the initial value          |                 |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤ 150% of the initial specified value |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value         |                 |

## DIMENSIONS [mm]

● Terminal Code : VS (φ25.4 to φ35) : Standard

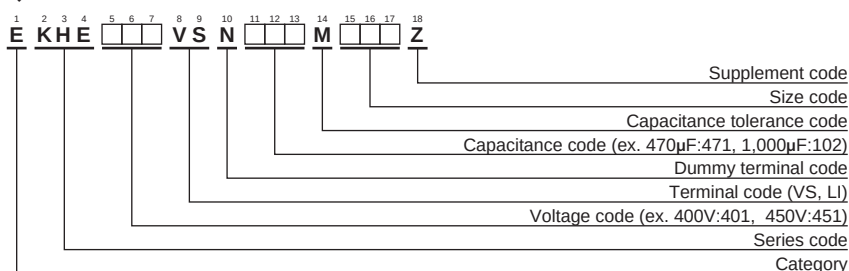


● Terminal Code : LI (φ30, φ35)



The standard design has no plastic disc.

## PART NUMBERING SYSTEM



Please refer to "Product code guide (snap-in type)"





## KHE Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|
| 400                      | 240         | 25.4 × 25             | 0.20  | 1.17                                               | EKHE401VSN241MQ25Z | 420                      | 670         | 30 × 40               | 0.20  | 2.15                                               | EKHE421VSN671MR40Z |
|                          | 310         | 25.4 × 30             | 0.20  | 1.37                                               | EKHE401VSN311MQ30Z |                          | 720         | 25.4 × 60             | 0.20  | 2.42                                               | EKHE421VSN721MQ60Z |
|                          | 370         | 30 × 25               | 0.20  | 1.50                                               | EKHE401VSN371MR25Z |                          | 730         | 35 × 35               | 0.20  | 2.00                                               | EKHE421VSN731MA35Z |
|                          | 390         | 25.4 × 35             | 0.20  | 1.60                                               | EKHE401VSN391MQ35Z |                          | 770         | 30 × 45               | 0.20  | 2.36                                               | EKHE421VSN771MR45Z |
|                          | 460         | 25.4 × 40             | 0.20  | 1.77                                               | EKHE401VSN461MQ40Z |                          | 870         | 35 × 40               | 0.20  | 2.26                                               | EKHE421VSN871MA40Z |
|                          | 470         | 35 × 25               | 0.20  | 1.55                                               | EKHE401VSN471MA25Z |                          | 880         | 30 × 50               | 0.20  | 2.57                                               | EKHE421VSN881MR50Z |
|                          | 480         | 30 × 30               | 0.20  | 1.73                                               | EKHE401VSN481MR30Z |                          | 980         | 30 × 55               | 0.20  | 2.76                                               | EKHE421VSN981MR55Z |
|                          | 530         | 25.4 × 45             | 0.20  | 1.94                                               | EKHE401VSN531MQ45Z |                          | 1,010       | 35 × 45               | 0.20  | 2.49                                               | EKHE421VSN102MA45Z |
|                          | 590         | 30 × 35               | 0.20  | 1.96                                               | EKHE401VSN591MR35Z |                          | 1,080       | 30 × 60               | 0.20  | 2.96                                               | EKHE421VSN112MR60Z |
|                          | 600         | 25.4 × 50             | 0.20  | 2.10                                               | EKHE401VSN601MQ50Z |                          | 1,150       | 35 × 50               | 0.20  | 2.71                                               | EKHE421VSN1B2MA50Z |
|                          | 620         | 35 × 30               | 0.20  | 1.81                                               | EKHE401VSN621MA30Z |                          | 1,290       | 35 × 55               | 0.20  | 2.90                                               | EKHE421VSN132MA55Z |
|                          | 680         | 25.4 × 55             | 0.20  | 2.30                                               | EKHE401VSN681MQ55Z |                          | 1,430       | 35 × 60               | 0.20  | 3.07                                               | EKHE421VSN1E2MA60Z |
|                          | 700         | 30 × 40               | 0.20  | 2.20                                               | EKHE401VSN701MR40Z | 450                      | 210         | 25.4 × 25             | 0.20  | 1.10                                               | EKHE451VSN211MQ25Z |
|                          | 750         | 25.4 × 60             | 0.20  | 2.47                                               | EKHE401VSN751MQ60Z |                          | 270         | 25.4 × 30             | 0.20  | 1.28                                               | EKHE451VSN271MQ30Z |
|                          | 760         | 35 × 35               | 0.20  | 2.04                                               | EKHE401VSN761MA35Z |                          | 320         | 30 × 25               | 0.20  | 1.39                                               | EKHE451VSN321MR25Z |
|                          | 810         | 30 × 45               | 0.20  | 2.42                                               | EKHE401VSN811MR45Z |                          | 330         | 25.4 × 35             | 0.20  | 1.48                                               | EKHE451VSN331MQ35Z |
|                          | 910         | 35 × 40               | 0.20  | 2.31                                               | EKHE401VSN911MA40Z |                          | 400         | 25.4 × 40             | 0.20  | 1.65                                               | EKHE451VSN401MQ40Z |
|                          | 930         | 30 × 50               | 0.20  | 2.64                                               | EKHE401VSN931MR50Z |                          | 400         | 35 × 25               | 0.20  | 1.43                                               | EKHE451VSN401MA25Z |
|                          | 1,030       | 30 × 55               | 0.20  | 2.83                                               | EKHE401VSN1A2MR55Z |                          | 410         | 30 × 30               | 0.20  | 1.59                                               | EKHE451VSN411MR30Z |
|                          | 1,060       | 35 × 45               | 0.20  | 2.55                                               | EKHE401VSN1A2MA45Z |                          | 460         | 25.4 × 45             | 0.20  | 1.81                                               | EKHE451VSN461MQ45Z |
|                          | 1,140       | 30 × 60               | 0.20  | 3.04                                               | EKHE401VSN1B2MR60Z |                          | 510         | 30 × 35               | 0.20  | 1.82                                               | EKHE451VSN511MR35Z |
|                          | 1,210       | 35 × 50               | 0.20  | 2.78                                               | EKHE401VSN122MA50Z |                          | 520         | 25.4 × 50             | 0.20  | 1.95                                               | EKHE451VSN521MQ50Z |
|                          | 1,350       | 35 × 55               | 0.20  | 2.97                                               | EKHE401VSN1D2MA55Z |                          | 530         | 35 × 30               | 0.20  | 1.67                                               | EKHE451VSN531MA30Z |
|                          | 1,500       | 35 × 60               | 0.20  | 3.15                                               | EKHE401VSN152MA60Z |                          | 580         | 25.4 × 55             | 0.20  | 2.13                                               | EKHE451VSN581MQ55Z |
| 420                      | 230         | 25.4 × 25             | 0.20  | 1.15                                               | EKHE421VSN231MQ25Z |                          | 600         | 30 × 40               | 0.20  | 2.03                                               | EKHE451VSN601MR40Z |
|                          | 300         | 25.4 × 30             | 0.20  | 1.35                                               | EKHE421VSN301MQ30Z |                          | 640         | 25.4 × 60             | 0.20  | 2.28                                               | EKHE451VSN641MQ60Z |
|                          | 350         | 30 × 25               | 0.20  | 1.46                                               | EKHE421VSN351MR25Z |                          | 660         | 35 × 35               | 0.20  | 1.90                                               | EKHE451VSN661MA35Z |
|                          | 370         | 25.4 × 35             | 0.20  | 1.56                                               | EKHE421VSN371MQ35Z |                          | 690         | 30 × 45               | 0.20  | 2.23                                               | EKHE451VSN691MR45Z |
|                          | 440         | 25.4 × 40             | 0.20  | 1.74                                               | EKHE421VSN441MQ40Z |                          | 780         | 35 × 40               | 0.20  | 2.14                                               | EKHE451VSN781MA40Z |
|                          | 440         | 35 × 25               | 0.20  | 1.51                                               | EKHE421VSN441MA25Z |                          | 790         | 30 × 50               | 0.20  | 2.43                                               | EKHE451VSN791MR50Z |
|                          | 460         | 30 × 30               | 0.20  | 1.68                                               | EKHE421VSN461MR30Z |                          | 890         | 30 × 55               | 0.20  | 2.63                                               | EKHE451VSN891MR55Z |
|                          | 510         | 25.4 × 45             | 0.20  | 1.90                                               | EKHE421VSN511MQ45Z |                          | 910         | 35 × 45               | 0.20  | 2.36                                               | EKHE451VSN911MA45Z |
|                          | 560         | 30 × 35               | 0.20  | 1.91                                               | EKHE421VSN561MR35Z |                          | 1,000       | 30 × 60               | 0.20  | 2.83                                               | EKHE451VSN102MR60Z |
|                          | 570         | 25.4 × 50             | 0.20  | 2.05                                               | EKHE421VSN571MQ50Z |                          | 1,040       | 35 × 50               | 0.20  | 2.58                                               | EKHE451VSN1A2MA50Z |
|                          | 580         | 35 × 30               | 0.20  | 1.75                                               | EKHE421VSN581MA30Z |                          | 1,160       | 35 × 55               | 0.20  | 2.75                                               | EKHE451VSN1B2MA55Z |
|                          | 640         | 25.4 × 55             | 0.20  | 2.23                                               | EKHE421VSN641MQ55Z |                          | 1,290       | 35 × 60               | 0.20  | 2.92                                               | EKHE451VSN132MA60Z |

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

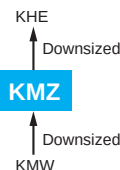
| Frequency(Hz) | 50   | 120  | 300  | 1k   | 10k  | 50k  |
|---------------|------|------|------|------|------|------|
| Multipliers   | 0.77 | 1.00 | 1.10 | 1.21 | 1.32 | 1.33 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.



# KMZ Series

- The lower temperature range of the category temperature range has been expanded.
- Downsized from KMW series
- Endurance with ripple current : 2,000 hours at 105°C
- Rated voltage range : 420 & 450V<sub>dc</sub>, Capacitance range : 120 to 820μF
- Non solvent resistant type
- RoHS2 Compliant

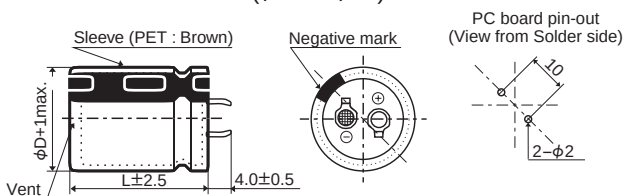


## SPECIFICATIONS

| Items                                                        | Characteristics                                                                                                                                                                                                                                                                       |                                       |                 |  |
|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-----------------|--|
| Category                                                     |                                                                                                                                                                                                                                                                                       |                                       |                 |  |
| Temperature Range                                            | -40 to +105℃                                                                                                                                                                                                                                                                          |                                       |                 |  |
| Rated Voltage Range                                          | 420 & 450V <sub>dc</sub>                                                                                                                                                                                                                                                              |                                       |                 |  |
| Capacitance Tolerance                                        | ± 20% (M)                                                                                                                                                                                                                                                                             |                                       | (at 20℃, 120Hz) |  |
| Leakage Current                                              | I ≤ 3√CV<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)<br>(at 20℃ after 5 minutes)                                                                                                                                                     |                                       |                 |  |
| Dissipation Factor<br>(tan δ )                               | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 420 & 450V                            | (at 20℃, 120Hz) |  |
|                                                              | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.20                                  |                 |  |
| Low Temperature<br>Characteristics<br>(Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 420 & 450V                            | (at 120Hz)      |  |
|                                                              | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 8                                     |                 |  |
| Endurance                                                    | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 2,000 hours at 105℃.                                         |                                       |                 |  |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ± 20% of the initial value          |                 |  |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤ 200% of the initial specified value |                 |  |
|                                                              | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value         |                 |  |
| Shelf Life                                                   | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                       |                 |  |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ± 15% of the initial value          |                 |  |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤ 150% of the initial specified value |                 |  |
|                                                              | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value         |                 |  |

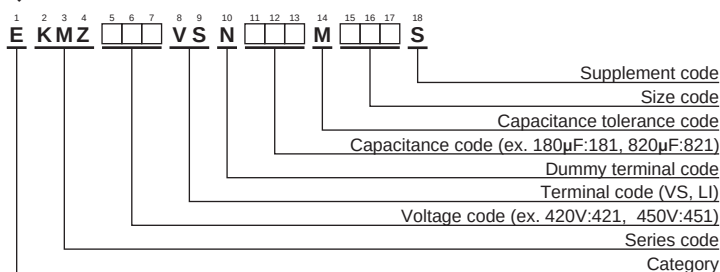
## DIMENSIONS [mm]

- Terminal Code : VS (φ22 to φ30) : Standard



The standard design has no plastic disc.

## PART NUMBERING SYSTEM



Please refer to "Product code guide (snap-in type)"

**KMZ** Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|
| 420                      | 150         | 22 × 25               | 0.20  | 0.87                                               | EKMZ421VSN151MP25S |
|                          | 180         | 22 × 30               | 0.20  | 1.00                                               | EKMZ421VSN181MP30S |
|                          | 180         | 25.4 × 25             | 0.20  | 1.02                                               | EKMZ421VSN181MQ25S |
|                          | 220         | 22 × 35               | 0.20  | 1.13                                               | EKMZ421VSN221MP35S |
|                          | 270         | 22 × 40               | 0.20  | 1.27                                               | EKMZ421VSN271MP40S |
|                          | 270         | 25.4 × 30             | 0.20  | 1.28                                               | EKMZ421VSN271MQ30S |
|                          | 270         | 30 × 25               | 0.20  | 1.28                                               | EKMZ421VSN271MR25S |
|                          | 330         | 22 × 45               | 0.20  | 1.44                                               | EKMZ421VSN331MP45S |
|                          | 330         | 25.4 × 35             | 0.20  | 1.48                                               | EKMZ421VSN331MQ35S |
|                          | 390         | 22 × 55               | 0.20  | 1.63                                               | EKMZ421VSN391MP55S |
|                          | 390         | 25.4 × 40             | 0.20  | 1.64                                               | EKMZ421VSN391MQ40S |
|                          | 390         | 30 × 30               | 0.20  | 1.55                                               | EKMZ421VSN391MR30S |
|                          | 470         | 25.4 × 50             | 0.20  | 1.86                                               | EKMZ421VSN471MQ50S |
|                          | 470         | 30 × 35               | 0.20  | 1.74                                               | EKMZ421VSN471MR35S |
|                          | 560         | 25.4 × 55             | 0.20  | 2.09                                               | EKMZ421VSN561MQ55S |
|                          | 560         | 30 × 40               | 0.20  | 1.96                                               | EKMZ421VSN561MR40S |
| 450                      | 120         | 22 × 25               | 0.20  | 0.78                                               | EKMZ451VSN121MP25S |
|                          | 180         | 22 × 30               | 0.20  | 1.00                                               | EKMZ451VSN181MP30S |
|                          | 180         | 25.4 × 25             | 0.20  | 1.02                                               | EKMZ451VSN181MQ25S |
|                          | 220         | 22 × 35               | 0.20  | 1.13                                               | EKMZ451VSN221MP35S |
|                          | 220         | 25.4 × 30             | 0.20  | 1.16                                               | EKMZ451VSN221MQ30S |
|                          | 270         | 22 × 45               | 0.20  | 1.30                                               | EKMZ451VSN271MP45S |
|                          | 270         | 25.4 × 35             | 0.20  | 1.34                                               | EKMZ451VSN271MQ35S |
|                          | 270         | 30 × 25               | 0.20  | 1.28                                               | EKMZ451VSN271MR25S |
|                          | 330         | 22 × 50               | 0.20  | 1.47                                               | EKMZ451VSN331MP50S |
|                          | 330         | 25.4 × 40             | 0.20  | 1.51                                               | EKMZ451VSN331MQ40S |
|                          | 330         | 30 × 30               | 0.20  | 1.43                                               | EKMZ451VSN331MR30S |
|                          | 390         | 22 × 55               | 0.20  | 1.63                                               | EKMZ451VSN391MP55S |
|                          | 390         | 25.4 × 45             | 0.20  | 1.67                                               | EKMZ451VSN391MQ45S |
|                          | 390         | 30 × 35               | 0.20  | 1.59                                               | EKMZ451VSN391MR35S |
|                          | 470         | 25.4 × 55             | 0.20  | 1.91                                               | EKMZ451VSN471MQ55S |
|                          | 470         | 30 × 40               | 0.20  | 1.79                                               | EKMZ451VSN471MR40S |
|                          | 560         | 25.4 × 60             | 0.20  | 2.13                                               | EKMZ451VSN561MQ60S |
|                          | 560         | 30 × 45               | 0.20  | 2.01                                               | EKMZ451VSN561MR45S |
|                          | 680         | 30 × 50               | 0.20  | 2.25                                               | EKMZ451VSN681MR50S |
|                          | 820         | 30 × 60               | 0.20  | 2.56                                               | EKMZ451VSN821MR60S |

## ◆RATED RIPPLE CURRENT MULTIPLIERS

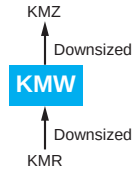
## ●Frequency Multipliers

| Frequency(Hz) | 50   | 120  | 300  | 1k   | 10k  | 50k  |
|---------------|------|------|------|------|------|------|
| Multipliers   | 0.77 | 1.00 | 1.16 | 1.30 | 1.41 | 1.43 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

# KMW Series

- Downsized from KMR series
- Endurance with ripple current : 2,000 hours at 105°C
- Rated voltage range : 400 to 450V<sub>dc</sub>, Capacitance range : 120 to 1,000μF
- Non solvent resistant type
- RoHS2 Compliant

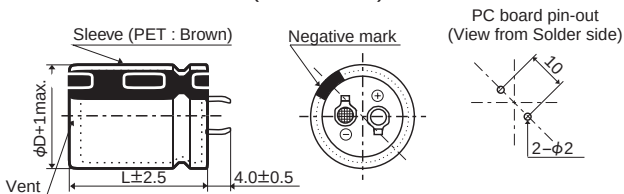


## SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                       |                                       |                      |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|----------------------|
| Category                                               | -25 to +105℃                                                                                                                                                                                                                                                                          |                                       |                      |
| Temperature Range                                      |                                                                                                                                                                                                                                                                                       |                                       |                      |
| Rated Voltage Range                                    | 400 to 450V <sub>dc</sub>                                                                                                                                                                                                                                                             |                                       |                      |
| Capacitance Tolerance                                  | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                             |                                       |                      |
| Leakage Current                                        | I ≤ 3/√CV<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 5 minutes)                                                                                                                                                       |                                       |                      |
| Dissipation Factor (tan δ )                            | Rated voltage (V <sub>ac</sub> )                                                                                                                                                                                                                                                      | 400V                                  | 420 & 450V           |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.15                                  | 0.20 (at 20℃, 120Hz) |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>ac</sub> )                                                                                                                                                                                                                                                      | 400 to 450V                           |                      |
|                                                        | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 8                                     | (at 120Hz)           |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 2,000 hours at 105℃.                                         |                                       |                      |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ± 20% of the initial value          |                      |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤ 200% of the initial specified value |                      |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value         |                      |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                       |                      |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ± 15% of the initial value          |                      |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤ 150% of the initial specified value |                      |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value         |                      |

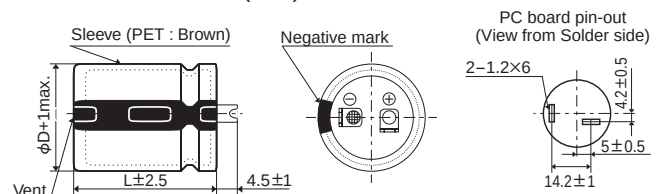
## DIMENSIONS [mm]

- Terminal Code : VS (φ22 to φ35) : Standard

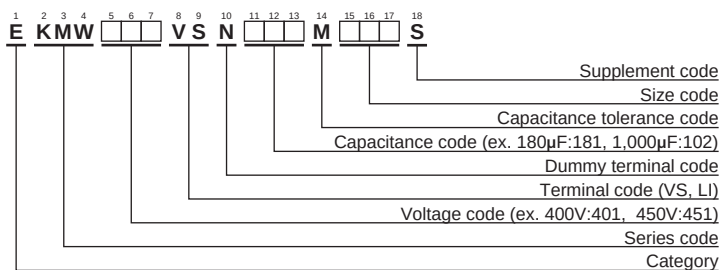


The standard design has no plastic disc.

- Terminal Code : LI (φ35)



## PART NUMBERING SYSTEM



Please refer to "Product code guide (snap-in type)"



## KMW Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|
| 400                      | 150         | 22 × 25               | 0.15  | 0.91                                               | EKMW401VSN151MP25S | 420                      | 330         | 35 × 25               | 0.20  | 1.38                                               | EKMW421VSN331MA25S |
|                          | 180         | 22 × 30               | 0.15  | 1.04                                               | EKMW401VSN181MP30S |                          | 390         | 25.4 × 45             | 0.20  | 1.67                                               | EKMW421VSN391MQ45S |
|                          | 220         | 22 × 35               | 0.15  | 1.18                                               | EKMW401VSN221MP35S |                          | 390         | 25.4 × 50             | 0.20  | 1.70                                               | EKMW421VSN391MQ50S |
|                          | 220         | 25.4 × 25             | 0.15  | 1.15                                               | EKMW401VSN221MQ25S |                          | 390         | 30 × 35               | 0.20  | 1.59                                               | EKMW421VSN391MR35S |
|                          | 270         | 25.4 × 30             | 0.15  | 1.31                                               | EKMW401VSN271MQ30S |                          | 470         | 30 × 40               | 0.20  | 1.79                                               | EKMW421VSN471MR40S |
|                          | 330         | 22 × 45               | 0.15  | 1.50                                               | EKMW401VSN331MP45S |                          | 470         | 35 × 30               | 0.20  | 1.67                                               | EKMW421VSN471MA30S |
|                          | 330         | 25.4 × 35             | 0.15  | 1.51                                               | EKMW401VSN331MQ35S |                          | 560         | 30 × 45               | 0.20  | 2.01                                               | EKMW421VSN561MR45S |
|                          | 330         | 30 × 25               | 0.15  | 1.46                                               | EKMW401VSN331MR25S |                          | 560         | 35 × 35               | 0.20  | 1.85                                               | EKMW421VSN561MA35S |
|                          | 390         | 22 × 50               | 0.15  | 1.67                                               | EKMW401VSN391MP50S |                          | 680         | 35 × 40               | 0.20  | 2.11                                               | EKMW421VSN681MA40S |
|                          | 390         | 25.4 × 40             | 0.15  | 1.67                                               | EKMW401VSN391MQ40S | 450                      | 120         | 22 × 25               | 0.20  | 0.78                                               | EKMW451VSN121MP25S |
|                          | 390         | 30 × 30               | 0.15  | 1.61                                               | EKMW401VSN391MR30S |                          | 150         | 22 × 30               | 0.20  | 0.91                                               | EKMW451VSN151MP30S |
|                          | 390         | 35 × 25               | 0.15  | 1.40                                               | EKMW401VSN391MA25S |                          | 150         | 25.4 × 25             | 0.20  | 0.93                                               | EKMW451VSN151MQ25S |
|                          | 470         | 25.4 × 45             | 0.15  | 1.87                                               | EKMW401VSN471MQ45S |                          | 180         | 22 × 35               | 0.20  | 1.02                                               | EKMW451VSN181MP35S |
|                          | 470         | 30 × 35               | 0.15  | 1.81                                               | EKMW401VSN471MR35S |                          | 180         | 25.4 × 30             | 0.20  | 1.05                                               | EKMW451VSN181MQ30S |
|                          | 560         | 30 × 40               | 0.15  | 2.03                                               | EKMW401VSN561MR40S |                          | 220         | 22 × 40               | 0.20  | 1.15                                               | EKMW451VSN221MP40S |
|                          | 560         | 35 × 30               | 0.15  | 1.70                                               | EKMW401VSN561MA30S |                          | 220         | 25.4 × 35             | 0.20  | 1.21                                               | EKMW451VSN221MQ35S |
|                          | 680         | 30 × 45               | 0.15  | 2.29                                               | EKMW401VSN681MR45S |                          | 220         | 30 × 25               | 0.20  | 1.15                                               | EKMW451VSN221MR25S |
|                          | 680         | 30 × 50               | 0.15  | 2.33                                               | EKMW401VSN681MR50S |                          | 270         | 22 × 50               | 0.20  | 1.36                                               | EKMW451VSN271MP50S |
|                          | 680         | 35 × 35               | 0.15  | 1.90                                               | EKMW401VSN681MA35S |                          | 270         | 25.4 × 40             | 0.20  | 1.36                                               | EKMW451VSN271MQ40S |
|                          | 820         | 35 × 40               | 0.15  | 2.16                                               | EKMW401VSN821MA40S |                          | 270         | 30 × 30               | 0.20  | 1.29                                               | EKMW451VSN271MR30S |
|                          | 1,000       | 35 × 50               | 0.15  | 2.50                                               | EKMW401VSN102MA50S |                          | 330         | 25.4 × 45             | 0.20  | 1.54                                               | EKMW451VSN331MQ45S |
| 420                      | 120         | 22 × 25               | 0.20  | 0.78                                               | EKMW421VSN121MP25S |                          | 330         | 30 × 35               | 0.20  | 1.46                                               | EKMW451VSN331MR35S |
|                          | 150         | 22 × 30               | 0.20  | 0.91                                               | EKMW421VSN151MP30S |                          | 390         | 25.4 × 50             | 0.20  | 1.70                                               | EKMW451VSN391MQ50S |
|                          | 180         | 25.4 × 25             | 0.20  | 1.02                                               | EKMW421VSN181MQ25S |                          | 390         | 30 × 40               | 0.20  | 1.63                                               | EKMW451VSN391MR40S |
|                          | 220         | 25.4 × 30             | 0.20  | 1.16                                               | EKMW421VSN221MQ30S |                          | 390         | 35 × 30               | 0.20  | 1.52                                               | EKMW451VSN391MA30S |
|                          | 270         | 22 × 45               | 0.20  | 1.30                                               | EKMW421VSN271MP45S |                          | 470         | 30 × 45               | 0.20  | 1.85                                               | EKMW451VSN471MR45S |
|                          | 270         | 25.4 × 35             | 0.20  | 1.34                                               | EKMW421VSN271MQ35S |                          | 470         | 35 × 35               | 0.20  | 1.77                                               | EKMW451VSN471MA35S |
|                          | 270         | 30 × 25               | 0.20  | 1.28                                               | EKMW421VSN271MR25S |                          | 560         | 30 × 50               | 0.20  | 2.04                                               | EKMW451VSN561MR50S |
|                          | 330         | 22 × 50               | 0.20  | 1.47                                               | EKMW421VSN331MP50S |                          | 560         | 35 × 40               | 0.20  | 2.02                                               | EKMW451VSN561MA40S |
|                          | 330         | 25.4 × 40             | 0.20  | 1.51                                               | EKMW421VSN331MQ40S |                          | 680         | 35 × 45               | 0.20  | 2.16                                               | EKMW451VSN681MA45S |
|                          | 330         | 30 × 30               | 0.20  | 1.43                                               | EKMW421VSN331MR30S |                          | 820         | 35 × 50               | 0.20  | 2.42                                               | EKMW451VSN821MA50S |

## ◆RATED RIPPLE CURRENT MULTIPLIERS

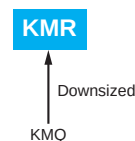
## ●Frequency Multipliers

| Frequency(Hz)             | 50   | 120  | 300  | 1k   | 10k  | 50k  |
|---------------------------|------|------|------|------|------|------|
| 400 to 450V <sub>dc</sub> | 0.77 | 1.00 | 1.16 | 1.30 | 1.41 | 1.43 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

# KMR Series

- Downsized 5mm in height from current snap-ins KMQ series
- Max. 50% up ripple current than same case size of KMQ series
- Endurance with ripple current : 2,000 hours at 105°C
- Rated voltage range : 160 to 450V<sub>dc</sub>, Capacitance range : 100 to 3,300μF
- For inverter control, switching power supplies
- Non solvent resistant type
- RoHS2 Compliant

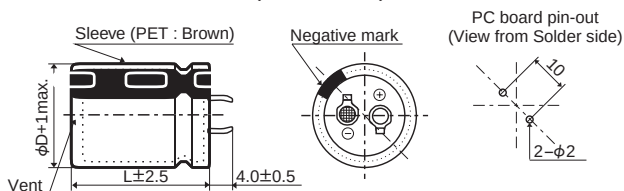


## SPECIFICATIONS

| Items                                                        | Characteristics                                                                                                                                                                                                                                                                       |                                      |             |            |                 |
|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------|------------|-----------------|
| Category                                                     | -25 to +105℃                                                                                                                                                                                                                                                                          |                                      |             |            |                 |
| Temperature Range                                            |                                                                                                                                                                                                                                                                                       |                                      |             |            |                 |
| Rated Voltage Range                                          | 160 to 450V <sub>dc</sub>                                                                                                                                                                                                                                                             |                                      |             |            |                 |
| Capacitance Tolerance                                        | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                             |                                      |             |            |                 |
| Leakage Current                                              | I≤3√CV<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 5 minutes)                                                                                                                                                          |                                      |             |            |                 |
| Dissipation Factor<br>(tan δ)                                | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 160 to 250V                          | 315 to 400V | 420 & 450V | (at 20℃, 120Hz) |
|                                                              | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.15                                 | 0.15        | 0.20       |                 |
| Low Temperature<br>Characteristics<br>(Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 160 to 250V                          | 315 to 400V | 420 & 450V | (at 120Hz)      |
|                                                              | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 4                                    | 8           | 8          |                 |
| Endurance                                                    | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 2,000 hours at 105℃.                                         |                                      |             |            |                 |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±20% of the initial value          |             |            |                 |
|                                                              | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤200% of the initial specified value |             |            |                 |
|                                                              | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value         |             |            |                 |
| Shelf Life                                                   | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                      |             |            |                 |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±15% of the initial value          |             |            |                 |
|                                                              | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤150% of the initial specified value |             |            |                 |
|                                                              | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value         |             |            |                 |

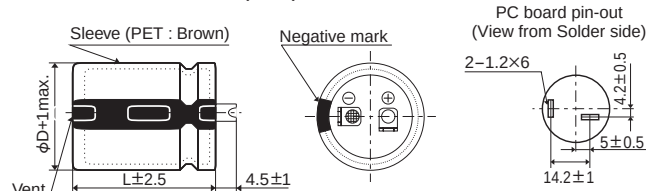
## DIMENSIONS [mm]

- Terminal Code : VS (φ22 to φ35) : Standard

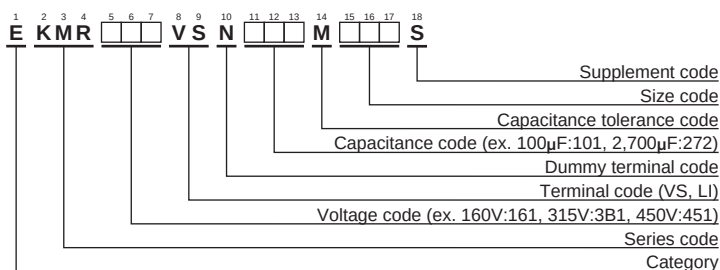


The standard design has no plastic disc.

- Terminal Code : LI (φ35)



## PART NUMBERING SYSTEM



Please refer to "Product code guide (snap-in type)"



## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | Rated ripple current<br>(Arms/105°C,120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | Rated ripple current<br>(Arms/105°C,120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|--------------------------------------------|--------------------|--------------------------|-------------|-----------------------|--------------------------------------------|--------------------|
| 160                      | 560         | 22 × 25               | 1.58                                       | EKMR161VSN561MP25S | 250                      | 330         | 22 × 25               | 1.21                                       | EKMR251VSN331MP25S |
|                          | 680         | 22 × 30               | 1.83                                       | EKMR161VSN681MP30S |                          | 390         | 22 × 30               | 1.38                                       | EKMR251VSN391MP30S |
|                          | 820         | 22 × 35               | 2.06                                       | EKMR161VSN821MP35S |                          | 470         | 22 × 35               | 1.56                                       | EKMR251VSN471MP35S |
|                          | 820         | 25.4 × 25             | 1.89                                       | EKMR161VSN821MQ25S |                          | 560         | 22 × 40               | 1.74                                       | EKMR251VSN561MP40S |
|                          | 1,000       | 22 × 40               | 2.33                                       | EKMR161VSN102MP40S |                          | 560         | 25.4 × 30             | 1.61                                       | EKMR251VSN561MQ30S |
|                          | 1,000       | 25.4 × 30             | 2.15                                       | EKMR161VSN102MQ30S |                          | 560         | 30 × 25               | 1.42                                       | EKMR251VSN561MR25S |
|                          | 1,000       | 30 × 25               | 1.90                                       | EKMR161VSN102MR25S |                          | 680         | 22 × 45               | 1.97                                       | EKMR251VSN681MP45S |
|                          | 1,200       | 22 × 45               | 2.61                                       | EKMR161VSN122MP45S |                          | 680         | 25.4 × 35             | 1.85                                       | EKMR251VSN681MQ35S |
|                          | 1,200       | 22 × 50               | 2.69                                       | EKMR161VSN122MP50S |                          | 820         | 25.4 × 40             | 2.08                                       | EKMR251VSN821MQ40S |
|                          | 1,200       | 25.4 × 35             | 2.45                                       | EKMR161VSN122MQ35S |                          | 820         | 25.4 × 45             | 2.13                                       | EKMR251VSN821MQ45S |
|                          | 1,500       | 25.4 × 40             | 2.82                                       | EKMR161VSN122MQ40S |                          | 820         | 30 × 30               | 1.77                                       | EKMR251VSN821MP30S |
|                          | 1,500       | 25.4 × 45             | 2.88                                       | EKMR161VSN152MQ45S |                          | 820         | 35 × 25               | 1.60                                       | EKMR251VSN821MA25S |
|                          | 1,500       | 30 × 30               | 2.39                                       | EKMR161VSN152MR30S |                          | 1,000       | 25.4 × 50             | 2.40                                       | EKMR251VSN102MQ50S |
|                          | 1,500       | 35 × 25               | 2.17                                       | EKMR161VSN152MA25S |                          | 1,000       | 30 × 35               | 2.03                                       | EKMR251VSN102MR35S |
|                          | 1,800       | 25.4 × 50             | 3.22                                       | EKMR161VSN182MR45S |                          | 1,200       | 30 × 40               | 2.31                                       | EKMR251VSN122MR40S |
|                          | 1,800       | 30 × 35               | 2.73                                       | EKMR161VSN182MR35S |                          | 1,200       | 30 × 45               | 2.38                                       | EKMR251VSN122MR45S |
|                          | 1,800       | 30 × 40               | 2.82                                       | EKMR161VSN182MR40S |                          | 1,200       | 35 × 35               | 2.06                                       | EKMR251VSN122MA35S |
|                          | 1,800       | 35 × 30               | 2.47                                       | EKMR161VSN182MA30S |                          | 1,500       | 30 × 50               | 2.73                                       | EKMR251VSN152MR50S |
|                          | 2,200       | 30 × 45               | 3.23                                       | EKMR161VSN222MR45S |                          | 1,500       | 35 × 40               | 2.41                                       | EKMR251VSN152MA40S |
|                          | 2,200       | 35 × 35               | 2.79                                       | EKMR161VSN222MA35S |                          | 1,800       | 35 × 45               | 2.72                                       | EKMR251VSN182MA45S |
| 180                      | 2,700       | 30 × 50               | 3.66                                       | EKMR161VSN272MR50S | 315                      | 2,200       | 35 × 50               | 3.10                                       | EKMR251VSN222MA50S |
|                          | 2,700       | 35 × 40               | 3.23                                       | EKMR161VSN272MA40S |                          | 180         | 22 × 25               | 0.91                                       | EKMR3B1VSN181MP25S |
|                          | 3,300       | 35 × 45               | 3.68                                       | EKMR161VSN332MA45S |                          | 220         | 22 × 30               | 1.06                                       | EKMR3B1VSN221MP30S |
|                          | 470         | 22 × 25               | 1.45                                       | EKMR181VSN471MP25S |                          | 270         | 22 × 35               | 1.20                                       | EKMR3B1VSN271MP35S |
|                          | 560         | 22 × 30               | 1.66                                       | EKMR181VSN561MP30S |                          | 270         | 25.4 × 25             | 1.15                                       | EKMR3B1VSN271MQ25S |
|                          | 680         | 22 × 35               | 1.87                                       | EKMR181VSN681MP35S |                          | 330         | 22 × 40               | 1.37                                       | EKMR3B1VSN331MP40S |
|                          | 680         | 25.4 × 25             | 1.72                                       | EKMR181VSN681MQ25S |                          | 330         | 25.4 × 30             | 1.30                                       | EKMR3B1VSN331MQ30S |
|                          | 820         | 22 × 40               | 2.11                                       | EKMR181VSN821MP40S |                          | 390         | 22 × 45               | 1.52                                       | EKMR3B1VSN391MP45S |
|                          | 820         | 25.4 × 30             | 1.94                                       | EKMR181VSN821MQ30S |                          | 390         | 25.4 × 35             | 1.48                                       | EKMR3B1VSN391MQ35S |
|                          | 1,000       | 22 × 45               | 2.38                                       | EKMR181VSN102MP45S |                          | 390         | 30 × 25               | 1.39                                       | EKMR3B1VSN391MR25S |
|                          | 1,000       | 25.4 × 35             | 2.24                                       | EKMR181VSN102MQ35S |                          | 470         | 22 × 50               | 1.72                                       | EKMR3B1VSN471MP50S |
|                          | 1,000       | 30 × 25               | 1.90                                       | EKMR181VSN102MR25S |                          | 470         | 25.4 × 40             | 1.67                                       | EKMR3B1VSN471MQ40S |
|                          | 1,200       | 22 × 50               | 2.69                                       | EKMR181VSN122MP50S |                          | 470         | 30 × 30               | 1.57                                       | EKMR3B1VSN471MR30S |
|                          | 1,200       | 25.4 × 40             | 2.52                                       | EKMR181VSN122MQ40S |                          | 470         | 35 × 25               | 1.52                                       | EKMR3B1VSN471MA25S |
|                          | 1,200       | 30 × 30               | 2.14                                       | EKMR181VSN122MR30S |                          | 560         | 25.4 × 45             | 1.86                                       | EKMR3B1VSN561MQ45S |
|                          | 1,200       | 35 × 25               | 1.94                                       | EKMR181VSN122MA25S |                          | 560         | 30 × 35               | 1.78                                       | EKMR3B1VSN561MR35S |
|                          | 1,500       | 25.4 × 45             | 2.88                                       | EKMR181VSN152MQ45S |                          | 680         | 25.4 × 50             | 2.10                                       | EKMR3B1VSN681MQ50S |
|                          | 1,500       | 25.4 × 50             | 2.94                                       | EKMR181VSN152MQ50S |                          | 680         | 30 × 40               | 2.03                                       | EKMR3B1VSN681MR40S |
|                          | 1,500       | 30 × 35               | 2.49                                       | EKMR181VSN152MR35S |                          | 680         | 35 × 30               | 1.90                                       | EKMR3B1VSN681MA30S |
|                          | 1,800       | 30 × 40               | 2.82                                       | EKMR181VSN182MR40S |                          | 820         | 30 × 45               | 2.31                                       | EKMR3B1VSN821MR45S |
| 200                      | 1,800       | 35 × 30               | 2.47                                       | EKMR181VSN182MA30S |                          | 820         | 35 × 35               | 2.13                                       | EKMR3B1VSN821MA35S |
|                          | 2,200       | 30 × 45               | 3.23                                       | EKMR181VSN222MR45S | 350                      | 1,000       | 30 × 50               | 2.61                                       | EKMR3B1VSN102MR50S |
|                          | 2,200       | 30 × 50               | 3.31                                       | EKMR181VSN222MR50S |                          | 1,000       | 35 × 40               | 2.46                                       | EKMR3B1VSN102MA40S |
|                          | 2,200       | 35 × 35               | 2.79                                       | EKMR181VSN222MA35S |                          | 1,200       | 35 × 45               | 2.78                                       | EKMR3B1VSN122MA45S |
|                          | 2,200       | 35 × 40               | 2.92                                       | EKMR181VSN222MA40S |                          | 1,200       | 35 × 50               | 2.86                                       | EKMR3B1VSN122MA50S |
|                          | 2,700       | 35 × 45               | 3.33                                       | EKMR181VSN272MA45S |                          | 150         | 22 × 25               | 0.84                                       | EKMR351VSN151MP25S |
|                          | 560         | 22 × 30               | 1.66                                       | EKMR201VSN561MP30S |                          | 220         | 22 × 30               | 1.06                                       | EKMR351VSN221MP30S |
|                          | 560         | 25.4 × 25             | 1.56                                       | EKMR201VSN561MQ25S |                          | 220         | 25.4 × 25             | 1.04                                       | EKMR351VSN221MQ25S |
|                          | 680         | 22 × 35               | 1.87                                       | EKMR201VSN681MP35S |                          | 270         | 22 × 35               | 1.20                                       | EKMR351VSN271MP35S |
|                          | 680         | 25.4 × 30             | 1.77                                       | EKMR201VSN681MQ30S |                          | 270         | 25.4 × 30             | 1.18                                       | EKMR351VSN271MQ30S |
|                          | 820         | 22 × 40               | 2.11                                       | EKMR201VSN821MP40S |                          | 330         | 22 × 40               | 1.37                                       | EKMR351VSN331MP40S |
|                          | 820         | 25.4 × 35             | 2.03                                       | EKMR201VSN821MQ35S |                          | 330         | 22 × 45               | 1.40                                       | EKMR351VSN331MP45S |
|                          | 820         | 30 × 25               | 1.72                                       | EKMR201VSN821MR25S |                          | 330         | 25.4 × 35             | 1.36                                       | EKMR351VSN331MQ35S |
|                          | 1,000       | 22 × 50               | 2.45                                       | EKMR201VSN102MP50S |                          | 330         | 30 × 25               | 1.28                                       | EKMR351VSN331MR25S |
|                          | 1,000       | 25.4 × 40             | 2.30                                       | EKMR201VSN102MQ40S |                          | 390         | 22 × 50               | 1.56                                       | EKMR351VSN391MP50S |
|                          | 1,000       | 30 × 30               | 1.95                                       | EKMR201VSN102MR30S |                          | 390         | 25.4 × 40             | 1.52                                       | EKMR351VSN391MQ40S |
|                          | 1,200       | 25.4 × 45             | 2.58                                       | EKMR201VSN122MQ45S |                          | 390         | 30 × 30               | 1.43                                       | EKMR351VSN391MR30S |
|                          | 1,200       | 30 × 35               | 2.23                                       | EKMR201VSN122MR35S |                          | 390         | 35 × 25               | 1.38                                       | EKMR351VSN391MA25S |
|                          | 1,200       | 35 × 25               | 1.94                                       | EKMR201VSN122MA25S |                          | 470         | 25.4 × 45             | 1.71                                       | EKMR351VSN471MQ45S |
|                          | 1,500       | 25.4 × 50             | 2.94                                       | EKMR201VSN152MQ50S |                          | 560         | 25.4 × 50             | 1.90                                       | EKMR351VSN561MQ50S |
|                          | 1,500       | 30 × 40               | 2.58                                       | EKMR201VSN152MR40S |                          | 560         | 30 × 35               | 1.78                                       | EKMR351VSN561MR35S |
|                          | 1,500       | 35 × 30               | 2.25                                       | EKMR201VSN152MA30S |                          | 560         | 30 × 40               | 1.84                                       | EKMR351VSN561MR40S |
|                          | 1,800       | 30 × 45               | 2.92                                       | EKMR201VSN182MR45S |                          | 560         | 35 × 30               | 1.72                                       | EKMR351VSN561MA30S |
|                          | 1,800       | 35 × 35               | 2.53                                       | EKMR201VSN182MA35S |                          | 680         | 30 × 45               | 2.10                                       | EKMR351VSN681MR45S |
|                          | 2,200       | 30 × 50               | 3.31                                       | EKMR201VSN222MR50S |                          | 680         | 35 × 35               | 1.94                                       | EKMR351VSN681MA35S |
|                          | 2,200       | 35 × 40               | 2.92                                       | EKMR201VSN222MA40S |                          | 820         | 30 × 50               | 2.36                                       | EKMR351VSN821MR50S |
|                          | 2,700       | 35 × 45               | 3.33                                       | EKMR201VSN272MA45S |                          |             |                       |                                            |                    |



**KMR**Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | Rated ripple<br>current<br>(Arms/105°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | Rated ripple<br>current<br>(Arms/105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|------------------------------------------------|--------------------|
| 350                      | 820         | 35 × 40               | 2.23                                           | EKMR351VSN821MA40S | 420                      | 270         | 25.4 × 40             | 1.32                                           | EKMR421VSN271MQ40S |
|                          | 1,000       | 35 × 45               | 2.54                                           | EKMR351VSN102MA45S |                          | 270         | 30 × 30               | 1.26                                           | EKMR421VSN271MR30S |
|                          | 1,200       | 35 × 50               | 2.86                                           | EKMR351VSN122MA50S |                          | 270         | 35 × 25               | 1.26                                           | EKMR421VSN271MA25S |
| 400                      | 120         | 22 × 25               | 0.75                                           | EKMR401VSN121MP25S |                          | 330         | 25.4 × 45             | 1.49                                           | EKMR421VSN331MQ45S |
|                          | 180         | 22 × 30               | 0.96                                           | EKMR401VSN181MP30S |                          | 330         | 30 × 35               | 1.45                                           | EKMR421VSN331MR35S |
|                          | 180         | 25.4 × 25             | 0.94                                           | EKMR401VSN181MQ25S |                          | 390         | 25.4 × 50             | 1.66                                           | EKMR421VSN391MQ50S |
|                          | 220         | 22 × 35               | 1.09                                           | EKMR401VSN221MP35S |                          | 390         | 30 × 40               | 1.63                                           | EKMR421VSN391MR40S |
|                          | 220         | 25.4 × 30             | 1.07                                           | EKMR401VSN221MQ30S |                          | 390         | 35 × 30               | 1.58                                           | EKMR421VSN391MA30S |
|                          | 270         | 22 × 40               | 1.24                                           | EKMR401VSN271MP40S |                          | 470         | 30 × 45               | 1.85                                           | EKMR421VSN471MR45S |
|                          | 270         | 22 × 45               | 1.26                                           | EKMR401VSN271MP45S |                          | 470         | 35 × 35               | 1.77                                           | EKMR421VSN471MA35S |
|                          | 270         | 25.4 × 35             | 1.23                                           | EKMR401VSN271MQ35S |                          | 560         | 30 × 50               | 2.07                                           | EKMR421VSN561MR50S |
|                          | 270         | 30 × 25               | 1.16                                           | EKMR401VSN271MR25S |                          | 560         | 35 × 40               | 2.02                                           | EKMR421VSN561MA40S |
|                          | 330         | 22 × 50               | 1.44                                           | EKMR401VSN331MP50S |                          | 680         | 35 × 45               | 2.29                                           | EKMR421VSN681MA45S |
|                          | 330         | 25.4 × 40             | 1.40                                           | EKMR401VSN331MQ40S |                          | 820         | 35 × 50               | 2.59                                           | EKMR421VSN821MA50S |
|                          | 330         | 30 × 30               | 1.31                                           | EKMR401VSN331MR30S | 450                      | 100         | 22 × 25               | 0.71                                           | EKMR451VSN101MP25S |
|                          | 330         | 35 × 25               | 1.27                                           | EKMR401VSN331MA25S |                          | 120         | 22 × 30               | 0.82                                           | EKMR451VSN121MP30S |
|                          | 390         | 25.4 × 45             | 1.55                                           | EKMR401VSN391MQ45S |                          | 150         | 22 × 35               | 0.94                                           | EKMR451VSN151MP35S |
|                          | 390         | 30 × 35               | 1.49                                           | EKMR401VSN391MR35S |                          | 150         | 25.4 × 25             | 0.89                                           | EKMR451VSN151MQ25S |
|                          | 470         | 25.4 × 50             | 1.74                                           | EKMR401VSN471MQ50S |                          | 180         | 22 × 40               | 1.05                                           | EKMR451VSN181MP40S |
|                          | 470         | 30 × 40               | 1.69                                           | EKMR401VSN471MR40S |                          | 180         | 25.4 × 30             | 1.00                                           | EKMR451VSN181MQ30S |
|                          | 470         | 35 × 30               | 1.58                                           | EKMR401VSN471MA30S |                          | 220         | 22 × 45               | 1.19                                           | EKMR451VSN221MP45S |
|                          | 560         | 30 × 45               | 1.91                                           | EKMR401VSN561MR45S |                          | 220         | 25.4 × 35             | 1.16                                           | EKMR451VSN221MQ35S |
|                          | 560         | 35 × 35               | 1.76                                           | EKMR401VSN561MA35S |                          | 220         | 30 × 25               | 1.11                                           | EKMR451VSN221MR25S |
|                          | 680         | 30 × 50               | 2.15                                           | EKMR401VSN681MR50S |                          | 270         | 22 × 50               | 1.36                                           | EKMR451VSN271MP50S |
|                          | 680         | 35 × 40               | 2.03                                           | EKMR401VSN681MA40S |                          | 270         | 25.4 × 40             | 1.32                                           | EKMR451VSN271MQ40S |
|                          | 820         | 35 × 45               | 2.30                                           | EKMR401VSN821MA45S |                          | 270         | 25.4 × 45             | 1.35                                           | EKMR451VSN271MQ45S |
|                          | 820         | 35 × 50               | 2.37                                           | EKMR401VSN821MA50S |                          | 270         | 30 × 30               | 1.26                                           | EKMR451VSN271MR30S |
|                          | 1,000       | 35 × 50               | 2.50                                           | EKMR401VSN102MA50S |                          | 270         | 35 × 25               | 1.26                                           | EKMR451VSN271MA25S |
| 420                      | 120         | 22 × 25               | 0.78                                           | EKMR421VSN121MP25S |                          | 330         | 25.4 × 50             | 1.52                                           | EKMR451VSN331MQ50S |
|                          | 150         | 22 × 30               | 0.91                                           | EKMR421VSN151MP30S |                          | 330         | 30 × 35               | 1.45                                           | EKMR451VSN331MR35S |
|                          | 150         | 25.4 × 25             | 0.89                                           | EKMR421VSN151MQ25S |                          | 330         | 35 × 30               | 1.45                                           | EKMR451VSN331MA30S |
|                          | 180         | 22 × 35               | 1.03                                           | EKMR421VSN181MP35S |                          | 390         | 30 × 40               | 1.63                                           | EKMR451VSN391MR40S |
|                          | 180         | 25.4 × 30             | 1.00                                           | EKMR421VSN181MQ30S |                          | 470         | 30 × 45               | 1.85                                           | EKMR451VSN471MR45S |
|                          | 220         | 22 × 40               | 1.16                                           | EKMR421VSN221MP40S |                          | 470         | 30 × 50               | 1.90                                           | EKMR451VSN471MR50S |
|                          | 220         | 22 × 45               | 1.19                                           | EKMR421VSN221MP45S |                          | 470         | 35 × 35               | 1.77                                           | EKMR451VSN471MA35S |
|                          | 220         | 25.4 × 35             | 1.16                                           | EKMR421VSN221MQ35S |                          | 560         | 35 × 40               | 2.02                                           | EKMR451VSN561MA40S |
|                          | 220         | 30 × 25               | 1.11                                           | EKMR421VSN221MR25S |                          | 560         | 35 × 45               | 2.08                                           | EKMR451VSN561MA45S |
|                          | 270         | 22 × 50               | 1.36                                           | EKMR421VSN271MP50S |                          | 680         | 35 × 50               | 2.36                                           | EKMR451VSN681MA50S |

## ◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multipliers

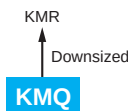
| Frequency(Hz)             | 50   | 120  | 300  | 1k   | 10k  | 50k  |
|---------------------------|------|------|------|------|------|------|
| 160 to 250V <sub>dc</sub> | 0.81 | 1.00 | 1.17 | 1.32 | 1.45 | 1.50 |
| 315 to 450V <sub>dc</sub> | 0.77 | 1.00 | 1.16 | 1.30 | 1.41 | 1.43 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.



# KMQ Series

- Endurance with ripple current : 2,000 hours at 105°C
- Non solvent resistant type
- RoHS2 Compliant

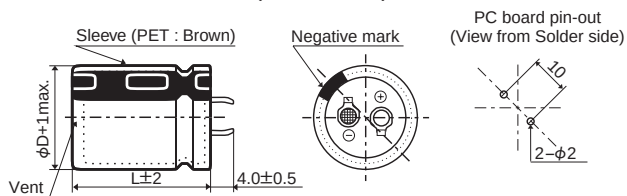


## SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                       |                                       |            |             |            |             |             |            |                 |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|------------|-------------|------------|-------------|-------------|------------|-----------------|
| Category                                               |                                                                                                                                                                                                                                                                                       |                                       |            |             |            |             |             |            |                 |
| Temperature Range                                      | -40 to +105℃ (35&50V <sub>dc</sub> ), -25 to +105℃ (160 to 450V <sub>dc</sub> )                                                                                                                                                                                                       |                                       |            |             |            |             |             |            |                 |
| Rated Voltage Range                                    | 35&50V <sub>dc</sub> , 160 to 450V <sub>dc</sub>                                                                                                                                                                                                                                      |                                       |            |             |            |             |             |            |                 |
| Capacitance Tolerance                                  | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                             |                                       |            |             |            |             |             |            |                 |
| Leakage Current                                        | I ≤ 3√C/V<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 5 minutes)                                                                                                                                                       |                                       |            |             |            |             |             |            |                 |
| Dissipation Factor (tan δ)                             | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 35V                                   |            | 50V         |            | 160 to 250V | 315 to 400V | 420 & 450V | (at 20℃, 120Hz) |
|                                                        | Nominal capacitance (μF)                                                                                                                                                                                                                                                              | 10,000>C                              | C ≥ 10,000 | 10,000>C    | C ≥ 10,000 | —           | —           | —          |                 |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.30                                  | 0.35       | 0.25        | 0.30       | 0.15        | 0.15        | 0.20       |                 |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 35&50V                                |            | 160 to 250V |            | 315 to 450V |             | (at 120Hz) |                 |
|                                                        | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 4                                     |            | 4           |            | 8           |             |            |                 |
|                                                        | Z(-40℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 10                                    |            | —           |            | —           |             |            |                 |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 2,000 hours at 105℃.                                         |                                       |            |             |            |             |             |            |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±20% of the initial value           |            |             |            |             |             |            |                 |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤ 200% of the initial specified value |            |             |            |             |             |            |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value         |            |             |            |             |             |            |                 |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                       |            |             |            |             |             |            |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±15% of the initial value           |            |             |            |             |             |            |                 |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤ 150% of the initial specified value |            |             |            |             |             |            |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value         |            |             |            |             |             |            |                 |

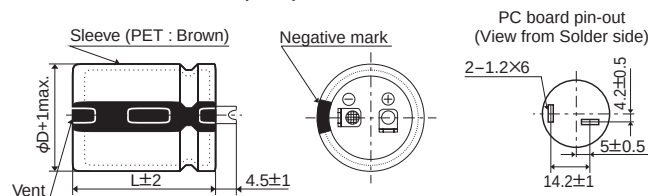
## DIMENSIONS [mm]

- Terminal Code : VS (φ22 to φ35) : Standard

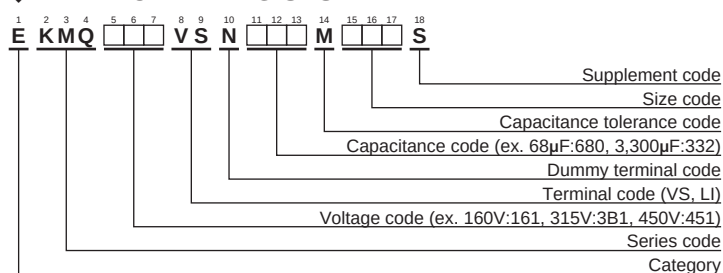


The standard design has no plastic disc.

- Terminal Code : LI (φ35)



## PART NUMBERING SYSTEM



Please refer to "Product code guide (snap-in type)"



## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|
| 35                       | 4,700       | 22 × 25               | 0.30  | 1.87                                               | EKMQ350VSN472MP25S | 160                      | 1,800       | 30 × 40               | 0.15  | 2.70                                               | EKMQ161VSN182MR40S |
|                          | 5,600       | 22 × 25               | 0.30  | 2.04                                               | EKMQ350VSN562MP25S |                          | 1,800       | 35 × 30               | 0.15  | 2.70                                               | EKMQ161VSN182MA30S |
|                          | 5,600       | 25.4 × 25             | 0.30  | 2.00                                               | EKMQ350VSN562MQ25S |                          | 2,200       | 30 × 45               | 0.15  | 2.90                                               | EKMQ161VSN222MR45S |
|                          | 6,800       | 22 × 30               | 0.30  | 2.36                                               | EKMQ350VSN682MP30S |                          | 2,200       | 35 × 35               | 0.15  | 2.90                                               | EKMQ161VSN222MA35S |
|                          | 6,800       | 25.4 × 25             | 0.30  | 2.21                                               | EKMQ350VSN682MQ25S |                          | 2,700       | 30 × 50               | 0.15  | 3.10                                               | EKMQ161VSN272MR50S |
|                          | 8,200       | 22 × 35               | 0.30  | 2.65                                               | EKMQ350VSN822MP35S |                          | 2,700       | 35 × 40               | 0.15  | 3.10                                               | EKMQ161VSN272MA40S |
|                          | 8,200       | 25.4 × 30             | 0.30  | 2.49                                               | EKMQ350VSN822MQ30S |                          | 3,300       | 35 × 50               | 0.15  | 3.30                                               | EKMQ161VSN332MA50S |
|                          | 8,200       | 30 × 25               | 0.30  | 2.62                                               | EKMQ350VSN822MR25S |                          | 390         | 22 × 25               | 0.15  | 1.30                                               | EKMQ181VSN391MP25S |
|                          | 10,000      | 22 × 40               | 0.35  | 3.00                                               | EKMQ350VSN103MP40S |                          | 470         | 22 × 30               | 0.15  | 1.40                                               | EKMQ181VSN471MP30S |
|                          | 10,000      | 25.4 × 35             | 0.35  | 2.88                                               | EKMQ350VSN103MQ35S |                          | 560         | 22 × 30               | 0.15  | 1.50                                               | EKMQ181VSN561MP30S |
|                          | 10,000      | 30 × 25               | 0.35  | 2.90                                               | EKMQ350VSN103MR25S |                          | 560         | 25.4 × 25             | 0.15  | 1.50                                               | EKMQ181VSN561MQ25S |
|                          | 12,000      | 22 × 50               | 0.35  | 3.47                                               | EKMQ350VSN123MP50S | 180                      | 680         | 22 × 35               | 0.15  | 1.70                                               | EKMQ181VSN681MP35S |
|                          | 12,000      | 25.4 × 35             | 0.35  | 3.15                                               | EKMQ350VSN123MQ35S |                          | 680         | 25.4 × 30             | 0.15  | 1.70                                               | EKMQ181VSN681MQ30S |
|                          | 12,000      | 30 × 30               | 0.35  | 3.25                                               | EKMQ350VSN123MR30S |                          | 820         | 22 × 40               | 0.15  | 2.00                                               | EKMQ181VSN821MP40S |
|                          | 12,000      | 35 × 25               | 0.35  | 3.20                                               | EKMQ350VSN123MA25S |                          | 820         | 25.4 × 30             | 0.15  | 2.00                                               | EKMQ181VSN821MQ30S |
|                          | 15,000      | 25.4 × 40             | 0.35  | 3.61                                               | EKMQ350VSN153MQ40S |                          | 820         | 30 × 25               | 0.15  | 2.00                                               | EKMQ181VSN821MR25S |
|                          | 15,000      | 30 × 35               | 0.35  | 3.78                                               | EKMQ350VSN153MR35S |                          | 1,000       | 22 × 45               | 0.15  | 2.20                                               | EKMQ181VSN102MP45S |
|                          | 15,000      | 35 × 25               | 0.35  | 3.60                                               | EKMQ350VSN153MA25S |                          | 1,000       | 25.4 × 40             | 0.15  | 2.20                                               | EKMQ181VSN102MQ40S |
|                          | 18,000      | 25.4 × 50             | 0.35  | 4.14                                               | EKMQ350VSN183MQ50S |                          | 1,000       | 30 × 30               | 0.15  | 2.20                                               | EKMQ181VSN102MR30S |
|                          | 18,000      | 30 × 40               | 0.35  | 4.30                                               | EKMQ350VSN183MR40S |                          | 1,000       | 35 × 25               | 0.15  | 2.20                                               | EKMQ181VSN102MA25S |
|                          | 18,000      | 35 × 30               | 0.35  | 4.10                                               | EKMQ350VSN183MA30S |                          | 1,200       | 25.4 × 45             | 0.15  | 2.30                                               | EKMQ181VSN122MQ45S |
|                          | 22,000      | 30 × 50               | 0.35  | 5.00                                               | EKMQ350VSN223MR50S |                          | 1,200       | 30 × 35               | 0.15  | 2.30                                               | EKMQ181VSN122MR35S |
|                          | 22,000      | 35 × 35               | 0.35  | 4.64                                               | EKMQ350VSN223MA35S |                          | 1,200       | 35 × 30               | 0.15  | 2.30                                               | EKMQ181VSN122MA30S |
|                          | 27,000      | 35 × 40               | 0.35  | 5.37                                               | EKMQ350VSN273MA40S |                          | 1,500       | 25.4 × 50             | 0.15  | 2.50                                               | EKMQ181VSN152MQ50S |
|                          | 33,000      | 35 × 50               | 0.35  | 6.00                                               | EKMQ350VSN333MA50S |                          | 1,500       | 30 × 40               | 0.15  | 2.50                                               | EKMQ181VSN152MR40S |
| 50                       | 2,700       | 22 × 25               | 0.25  | 1.65                                               | EKMQ500VSN272MP25S |                          | 1,500       | 35 × 30               | 0.15  | 2.50                                               | EKMQ181VSN152MA30S |
|                          | 3,300       | 22 × 30               | 0.25  | 1.92                                               | EKMQ500VSN332MP30S |                          | 1,800       | 30 × 45               | 0.15  | 2.70                                               | EKMQ181VSN182MR45S |
|                          | 3,300       | 25.4 × 25             | 0.25  | 1.76                                               | EKMQ500VSN332MQ25S |                          | 1,800       | 35 × 35               | 0.15  | 2.70                                               | EKMQ181VSN182MA35S |
|                          | 3,900       | 22 × 30               | 0.25  | 2.08                                               | EKMQ500VSN392MP30S |                          | 2,200       | 30 × 50               | 0.15  | 2.90                                               | EKMQ181VSN222MR50S |
|                          | 3,900       | 25.4 × 25             | 0.25  | 2.04                                               | EKMQ500VSN392MQ25S |                          | 2,200       | 35 × 40               | 0.15  | 2.90                                               | EKMQ181VSN222MA40S |
|                          | 4,700       | 22 × 35               | 0.25  | 2.43                                               | EKMQ500VSN472MP35S |                          | 2,700       | 35 × 50               | 0.15  | 3.10                                               | EKMQ181VSN272MA50S |
|                          | 4,700       | 25.4 × 30             | 0.25  | 2.50                                               | EKMQ500VSN472MQ30S | 200                      | 390         | 22 × 25               | 0.15  | 1.31                                               | EKMQ201VSN391MP25S |
|                          | 4,700       | 30 × 25               | 0.25  | 2.29                                               | EKMQ500VSN472MR25S |                          | 470         | 22 × 30               | 0.15  | 1.45                                               | EKMQ201VSN471MP30S |
|                          | 5,600       | 22 × 40               | 0.25  | 2.63                                               | EKMQ500VSN562MP40S |                          | 560         | 22 × 30               | 0.15  | 1.67                                               | EKMQ201VSN561MP30S |
|                          | 5,600       | 25.4 × 35             | 0.25  | 2.61                                               | EKMQ500VSN562MQ35S |                          | 560         | 25.4 × 25             | 0.15  | 1.67                                               | EKMQ201VSN561MQ25S |
|                          | 5,600       | 30 × 25               | 0.25  | 2.80                                               | EKMQ500VSN562MR25S |                          | 680         | 22 × 40               | 0.15  | 1.75                                               | EKMQ201VSN681MP40S |
|                          | 6,800       | 22 × 50               | 0.25  | 3.05                                               | EKMQ500VSN682MP50S |                          | 680         | 25.4 × 30             | 0.15  | 1.75                                               | EKMQ201VSN681MQ30S |
|                          | 6,800       | 25.4 × 40             | 0.25  | 2.94                                               | EKMQ500VSN682MQ40S |                          | 820         | 22 × 45               | 0.15  | 2.04                                               | EKMQ201VSN821MP45S |
|                          | 6,800       | 30 × 30               | 0.25  | 3.30                                               | EKMQ500VSN682MR30S |                          | 820         | 25.4 × 35             | 0.15  | 2.04                                               | EKMQ201VSN821MQ35S |
|                          | 6,800       | 35 × 25               | 0.25  | 2.77                                               | EKMQ500VSN682MA25S |                          | 820         | 30 × 25               | 0.15  | 2.04                                               | EKMQ201VSN821MR25S |
|                          | 8,200       | 25.4 × 45             | 0.25  | 3.60                                               | EKMQ500VSN822MQ45S |                          | 1,000       | 22 × 50               | 0.15  | 2.30                                               | EKMQ201VSN102MP50S |
|                          | 8,200       | 30 × 35               | 0.25  | 3.60                                               | EKMQ500VSN822MR35S |                          | 1,000       | 25.4 × 45             | 0.15  | 2.30                                               | EKMQ201VSN102MQ45S |
|                          | 8,200       | 35 × 30               | 0.25  | 3.60                                               | EKMQ500VSN822MA30S |                          | 1,000       | 30 × 30               | 0.15  | 2.30                                               | EKMQ201VSN102MR30S |
|                          | 10,000      | 25.4 × 50             | 0.30  | 4.00                                               | EKMQ500VSN103MQ50S |                          | 1,000       | 35 × 25               | 0.15  | 2.30                                               | EKMQ201VSN102MA25S |
|                          | 10,000      | 30 × 40               | 0.30  | 4.00                                               | EKMQ500VSN103MR40S |                          | 1,200       | 25.4 × 50             | 0.15  | 2.65                                               | EKMQ201VSN122MQ50S |
|                          | 10,000      | 35 × 30               | 0.30  | 4.00                                               | EKMQ500VSN103MA30S |                          | 1,200       | 30 × 35               | 0.15  | 2.65                                               | EKMQ201VSN122MR35S |
|                          | 12,000      | 30 × 50               | 0.30  | 4.29                                               | EKMQ500VSN123MR50S |                          | 1,200       | 35 × 30               | 0.15  | 2.65                                               | EKMQ201VSN122MA30S |
|                          | 12,000      | 35 × 35               | 0.30  | 4.37                                               | EKMQ500VSN123MA35S |                          | 1,500       | 30 × 40               | 0.15  | 2.80                                               | EKMQ201VSN152MR40S |
|                          | 15,000      | 35 × 40               | 0.30  | 4.50                                               | EKMQ500VSN153MA40S |                          | 1,500       | 35 × 30               | 0.15  | 2.80                                               | EKMQ201VSN152MA30S |
|                          | 18,000      | 35 × 50               | 0.30  | 5.30                                               | EKMQ500VSN183MA50S |                          | 1,800       | 30 × 45               | 0.15  | 3.08                                               | EKMQ201VSN182MR45S |
| 160                      | 470         | 22 × 25               | 0.15  | 1.40                                               | EKMQ161VSN471MP25S |                          | 1,800       | 35 × 40               | 0.15  | 3.08                                               | EKMQ201VSN182MA40S |
|                          | 560         | 22 × 30               | 0.15  | 1.50                                               | EKMQ161VSN561MP30S |                          | 2,200       | 35 × 45               | 0.15  | 3.48                                               | EKMQ201VSN222MA45S |
|                          | 680         | 22 × 30               | 0.15  | 1.70                                               | EKMQ161VSN681MP30S | 250                      | 220         | 22 × 25               | 0.15  | 1.00                                               | EKMQ251VSN221MP25S |
|                          | 680         | 25.4 × 25             | 0.15  | 1.70                                               | EKMQ161VSN681MQ25S |                          | 270         | 22 × 25               | 0.15  | 1.10                                               | EKMQ251VSN271MP25S |
|                          | 820         | 22 × 35               | 0.15  | 2.00                                               | EKMQ161VSN821MP35S |                          | 330         | 22 × 30               | 0.15  | 1.20                                               | EKMQ251VSN331MP30S |
|                          | 820         | 25.4 × 30             | 0.15  | 2.00                                               | EKMQ161VSN821MQ30S |                          | 330         | 25.4 × 25             | 0.15  | 1.20                                               | EKMQ251VSN331MQ25S |
|                          | 820         | 30 × 25               | 0.15  | 2.00                                               | EKMQ161VSN821MR25S |                          | 390         | 22 × 35               | 0.15  | 1.30                                               | EKMQ251VSN391MP35S |
|                          | 1,000       | 22 × 40               | 0.15  | 2.20                                               | EKMQ161VSN102MP40S |                          | 390         | 25.4 × 25             | 0.15  | 1.30                                               | EKMQ251VSN391MQ25S |
|                          | 1,000       | 25.4 × 35             | 0.15  | 2.20                                               | EKMQ161VSN102MQ35S |                          | 470         | 22 × 40               | 0.15  | 1.40                                               | EKMQ251VSN471MP40S |
|                          | 1,000       | 30 × 25               | 0.15  | 2.20                                               | EKMQ161VSN102MR25S |                          | 470         | 25.4 × 30             | 0.15  | 1.40                                               | EKMQ251VSN471MQ30S |
|                          | 1,200       | 25.4 × 40             | 0.15  | 2.30                                               | EKMQ161VSN122MQ40S |                          | 470         | 30 × 25               | 0.15  | 1.40                                               | EKMQ251VSN471MR25S |
|                          | 1,200       | 30 × 30               | 0.15  | 2.30                                               | EKMQ161VSN122MR30S |                          | 560         | 22 × 45               | 0.15  | 1.50                                               | EKMQ251VSN561MP45S |
|                          | 1,200       | 35 × 25               | 0.15  | 2.30                                               | EKMQ161VSN122MA25S |                          | 560         | 25.4 × 35             | 0.15  | 1.50                                               | EKMQ251VSN561MQ35S |
|                          | 1,500       | 25.4 × 45             | 0.15  | 2.50                                               | EKMQ161VSN152MQ45S |                          | 560         | 30 × 25               | 0.15  | 1.50                                               | EKMQ251VSN561MR25S |
|                          | 1,500       | 30 × 35               | 0.15  | 2.50                                               | EKMQ161VSN152MR35S |                          | 680         | 22 × 50               | 0.15  | 1.70                                               | EKMQ251VSN681MP50S |
|                          | 1,500       | 35 × 30               | 0.15  | 2.50                                               | EKMQ161VSN152MA30S |                          | 680         | 25.4 × 40             | 0.15  | 1.70                                               | EKMQ251VSN681MQ40S |
|                          | 1,800       | 25.4 × 50             | 0.15  | 2.70                                               | EKMQ161VSN182MQ50S |                          | 680         | 30 × 30               | 0.15  | 1.70                                               | EKMQ251VSN681MR30S |



## ◆ STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|
| 250                      | 680         | 35 × 25               | 0.15  | 1.70                                               | EKMQ251VSN681MA25S | 400                      | 270         | 25.4 × 40             | 0.15  | 1.22                                               | EKMQ401VSN271MQ40S |
|                          | 820         | 25.4 × 45             | 0.15  | 2.00                                               | EKMQ251VSN821MQ45S |                          | 270         | 30 × 30               | 0.15  | 1.22                                               | EKMQ401VSN271MR30S |
|                          | 820         | 30 × 35               | 0.15  | 2.00                                               | EKMQ251VSN821MR35S |                          | 270         | 35 × 25               | 0.15  | 1.22                                               | EKMQ401VSN271MA25S |
|                          | 820         | 35 × 30               | 0.15  | 2.00                                               | EKMQ251VSN821MA30S |                          | 330         | 25.4 × 45             | 0.15  | 1.44                                               | EKMQ401VSN331MQ45S |
|                          | 1,000       | 30 × 40               | 0.15  | 2.20                                               | EKMQ251VSN102MR40S |                          | 330         | 30 × 35               | 0.15  | 1.44                                               | EKMQ401VSN331MR35S |
|                          | 1,000       | 35 × 30               | 0.15  | 2.20                                               | EKMQ251VSN102MA30S |                          | 330         | 35 × 30               | 0.15  | 1.44                                               | EKMQ401VSN331MA30S |
|                          | 1,200       | 30 × 45               | 0.15  | 2.30                                               | EKMQ251VSN122MR45S |                          | 390         | 25.4 × 50             | 0.15  | 1.55                                               | EKMQ401VSN391MQ50S |
|                          | 1,200       | 35 × 35               | 0.15  | 2.30                                               | EKMQ251VSN122MA35S |                          | 390         | 30 × 40               | 0.15  | 1.55                                               | EKMQ401VSN391MR40S |
|                          | 1,500       | 35 × 45               | 0.15  | 2.50                                               | EKMQ251VSN152MA45S |                          | 390         | 35 × 30               | 0.15  | 1.55                                               | EKMQ401VSN391MA30S |
|                          | 1,800       | 35 × 50               | 0.15  | 2.70                                               | EKMQ251VSN182MA50S |                          | 470         | 30 × 45               | 0.15  | 1.68                                               | EKMQ401VSN471MR45S |
| 315                      | 150         | 22 × 25               | 0.15  | 0.82                                               | EKMQ3B1VSN151MP25S | 420                      | 470         | 35 × 35               | 0.15  | 1.68                                               | EKMQ401VSN471MR35S |
|                          | 180         | 22 × 30               | 0.15  | 0.90                                               | EKMQ3B1VSN181MP30S |                          | 560         | 30 × 50               | 0.15  | 1.90                                               | EKMQ401VSN561MR50S |
|                          | 220         | 22 × 30               | 0.15  | 1.00                                               | EKMQ3B1VSN221MP30S |                          | 560         | 35 × 40               | 0.15  | 1.90                                               | EKMQ401VSN561MA40S |
|                          | 220         | 25.4 × 25             | 0.15  | 1.00                                               | EKMQ3B1VSN221MQ25S |                          | 680         | 35 × 45               | 0.15  | 2.12                                               | EKMQ401VSN681MA45S |
|                          | 270         | 22 × 35               | 0.15  | 1.10                                               | EKMQ3B1VSN271MP35S |                          | 82          | 22 × 25               | 0.20  | 0.64                                               | EKMQ421VSN820MP25S |
|                          | 270         | 25.4 × 30             | 0.15  | 1.10                                               | EKMQ3B1VSN271MQ30S |                          | 100         | 22 × 25               | 0.20  | 0.66                                               | EKMQ421VSN101MP25S |
|                          | 330         | 22 × 45               | 0.15  | 1.20                                               | EKMQ3B1VSN331MP45S |                          | 100         | 25.4 × 25             | 0.20  | 0.66                                               | EKMQ421VSN101MQ25S |
|                          | 330         | 25.4 × 35             | 0.15  | 1.20                                               | EKMQ3B1VSN331MQ35S |                          | 120         | 22 × 30               | 0.20  | 0.81                                               | EKMQ421VSN121MP30S |
|                          | 330         | 30 × 25               | 0.15  | 1.20                                               | EKMQ3B1VSN331MR25S |                          | 120         | 25.4 × 25             | 0.20  | 0.81                                               | EKMQ421VSN121MQ25S |
|                          | 390         | 22 × 45               | 0.15  | 1.30                                               | EKMQ3B1VSN391MP45S |                          | 150         | 22 × 35               | 0.20  | 0.84                                               | EKMQ421VSN151MP35S |
|                          | 390         | 25.4 × 40             | 0.15  | 1.30                                               | EKMQ3B1VSN391MQ40S | 450                      | 150         | 25.4 × 30             | 0.20  | 0.84                                               | EKMQ421VSN151MQ30S |
|                          | 390         | 30 × 30               | 0.15  | 1.30                                               | EKMQ3B1VSN391MR30S |                          | 150         | 30 × 25               | 0.20  | 0.84                                               | EKMQ421VSN151MR25S |
|                          | 390         | 35 × 25               | 0.15  | 1.30                                               | EKMQ3B1VSN391MA25S |                          | 180         | 22 × 40               | 0.20  | 0.91                                               | EKMQ421VSN181MP40S |
|                          | 470         | 25.4 × 45             | 0.15  | 1.40                                               | EKMQ3B1VSN471MQ45S |                          | 180         | 25.4 × 30             | 0.20  | 0.91                                               | EKMQ421VSN181MQ30S |
|                          | 470         | 30 × 35               | 0.15  | 1.40                                               | EKMQ3B1VSN471MR35S |                          | 180         | 30 × 25               | 0.20  | 0.91                                               | EKMQ421VSN181MR25S |
|                          | 470         | 35 × 25               | 0.15  | 1.40                                               | EKMQ3B1VSN471MA25S |                          | 220         | 22 × 45               | 0.20  | 1.05                                               | EKMQ421VSN221MP45S |
|                          | 560         | 25.4 × 50             | 0.15  | 1.50                                               | EKMQ3B1VSN561MQ50S |                          | 220         | 25.4 × 35             | 0.20  | 1.05                                               | EKMQ421VSN221MQ35S |
|                          | 560         | 30 × 40               | 0.15  | 1.50                                               | EKMQ3B1VSN561MR40S |                          | 220         | 30 × 30               | 0.20  | 1.05                                               | EKMQ421VSN221MR30S |
|                          | 560         | 35 × 30               | 0.15  | 1.50                                               | EKMQ3B1VSN561MA30S |                          | 220         | 35 × 25               | 0.20  | 1.05                                               | EKMQ421VSN221MA25S |
|                          | 680         | 30 × 45               | 0.15  | 1.70                                               | EKMQ3B1VSN681MR45S |                          | 270         | 25.4 × 40             | 0.20  | 1.25                                               | EKMQ421VSN271MQ40S |
| 350                      | 680         | 35 × 35               | 0.15  | 1.70                                               | EKMQ3B1VSN681MA35S |                          | 270         | 30 × 30               | 0.20  | 1.25                                               | EKMQ421VSN271MR30S |
|                          | 820         | 30 × 50               | 0.15  | 2.00                                               | EKMQ3B1VSN821MR50S |                          | 270         | 35 × 25               | 0.20  | 1.25                                               | EKMQ421VSN271MA25S |
|                          | 820         | 35 × 40               | 0.15  | 2.00                                               | EKMQ3B1VSN821MA40S |                          | 330         | 25.4 × 50             | 0.20  | 1.42                                               | EKMQ421VSN331MQ50S |
|                          | 1,000       | 35 × 45               | 0.15  | 2.30                                               | EKMQ3B1VSN102MA45S |                          | 330         | 30 × 35               | 0.20  | 1.42                                               | EKMQ421VSN331MR35S |
|                          | 120         | 22 × 25               | 0.15  | 0.75                                               | EKMQ351VSN121MP25S |                          | 330         | 35 × 30               | 0.20  | 1.42                                               | EKMQ421VSN331MA30S |
|                          | 150         | 22 × 30               | 0.15  | 0.82                                               | EKMQ351VSN151MP30S |                          | 390         | 30 × 40               | 0.20  | 1.61                                               | EKMQ421VSN391MR40S |
|                          | 180         | 22 × 30               | 0.15  | 0.90                                               | EKMQ351VSN181MP30S |                          | 390         | 35 × 35               | 0.20  | 1.61                                               | EKMQ421VSN391MA35S |
|                          | 180         | 25.4 × 25             | 0.15  | 0.90                                               | EKMQ351VSN181MQ25S |                          | 470         | 30 × 45               | 0.20  | 1.86                                               | EKMQ421VSN471MR45S |
|                          | 220         | 22 × 35               | 0.15  | 1.00                                               | EKMQ351VSN221MP35S |                          | 470         | 35 × 40               | 0.20  | 1.86                                               | EKMQ421VSN471MA40S |
|                          | 220         | 25.4 × 30             | 0.15  | 1.00                                               | EKMQ351VSN221MQ30S |                          | 560         | 35 × 45               | 0.20  | 2.10                                               | EKMQ421VSN561MA45S |
| 400                      | 270         | 22 × 40               | 0.15  | 1.10                                               | EKMQ351VSN271MP40S |                          | 680         | 35 × 50               | 0.20  | 2.20                                               | EKMQ421VSN681MA50S |
|                          | 270         | 25.4 × 30             | 0.15  | 1.10                                               | EKMQ351VSN271MQ30S | 450                      | 68          | 22 × 25               | 0.20  | 0.50                                               | EKMQ451VSN680MP25S |
|                          | 270         | 30 × 25               | 0.15  | 1.10                                               | EKMQ351VSN271MR25S |                          | 82          | 22 × 30               | 0.20  | 0.56                                               | EKMQ451VSN820MP30S |
|                          | 330         | 22 × 45               | 0.15  | 1.20                                               | EKMQ351VSN331MP45S |                          | 100         | 22 × 30               | 0.20  | 0.64                                               | EKMQ451VSN101MP30S |
|                          | 330         | 25.4 × 40             | 0.15  | 1.20                                               | EKMQ351VSN331MQ40S |                          | 100         | 25.4 × 25             | 0.20  | 0.64                                               | EKMQ451VSN101MQ25S |
|                          | 330         | 30 × 30               | 0.15  | 1.20                                               | EKMQ351VSN331MR30S |                          | 120         | 22 × 35               | 0.20  | 0.72                                               | EKMQ451VSN121MP35S |
|                          | 390         | 25.4 × 45             | 0.15  | 1.30                                               | EKMQ351VSN391MQ45S |                          | 120         | 25.4 × 30             | 0.20  | 0.72                                               | EKMQ451VSN121MQ30S |
|                          | 390         | 30 × 35               | 0.15  | 1.30                                               | EKMQ351VSN391MR35S |                          | 150         | 22 × 40               | 0.20  | 0.79                                               | EKMQ451VSN151MP40S |
|                          | 470         | 25.4 × 50             | 0.15  | 1.40                                               | EKMQ351VSN471MQ50S |                          | 150         | 25.4 × 30             | 0.20  | 0.79                                               | EKMQ451VSN151MQ30S |
|                          | 470         | 30 × 35               | 0.15  | 1.40                                               | EKMQ351VSN471MR35S |                          | 150         | 30 × 25               | 0.20  | 0.79                                               | EKMQ451VSN151MR25S |
|                          | 470         | 35 × 30               | 0.15  | 1.40                                               | EKMQ351VSN471MA30S |                          | 180         | 22 × 45               | 0.20  | 0.87                                               | EKMQ451VSN181MP45S |
|                          | 560         | 30 × 45               | 0.15  | 1.50                                               | EKMQ351VSN561MR45S |                          | 180         | 25.4 × 40             | 0.20  | 0.87                                               | EKMQ451VSN181MQ40S |
|                          | 560         | 35 × 35               | 0.15  | 1.50                                               | EKMQ351VSN561MA35S |                          | 180         | 30 × 30               | 0.20  | 0.87                                               | EKMQ451VSN181MR30S |
|                          | 680         | 30 × 50               | 0.15  | 1.70                                               | EKMQ351VSN681MR50S |                          | 220         | 25.4 × 45             | 0.20  | 1.00                                               | EKMQ451VSN221MQ45S |
|                          | 680         | 35 × 40               | 0.15  | 1.70                                               | EKMQ351VSN681MA40S |                          | 220         | 30 × 30               | 0.20  | 1.00                                               | EKMQ451VSN221MR30S |
|                          | 820         | 35 × 45               | 0.15  | 1.90                                               | EKMQ351VSN821MA45S |                          | 220         | 35 × 25               | 0.20  | 1.00                                               | EKMQ451VSN221MA25S |
|                          | 100         | 22 × 25               | 0.15  | 0.70                                               | EKMQ401VSN101MP25S |                          | 270         | 25.4 × 50             | 0.20  | 1.19                                               | EKMQ451VSN271MQ50S |
|                          | 120         | 22 × 30               | 0.15  | 0.75                                               | EKMQ401VSN121MP30S |                          | 270         | 30 × 40               | 0.20  | 1.19                                               | EKMQ451VSN271MR40S |
|                          | 150         | 22 × 30               | 0.15  | 0.88                                               | EKMQ401VSN151MP30S |                          | 270         | 35 × 30               | 0.20  | 1.19                                               | EKMQ451VSN271MA30S |
|                          | 150         | 25.4 × 25             | 0.15  | 0.88                                               | EKMQ401VSN151MQ25S |                          | 330         | 30 × 45               | 0.20  | 1.38                                               | EKMQ451VSN331MR45S |
|                          | 180         | 22 × 35               | 0.15  | 0.95                                               | EKMQ401VSN181MP35S |                          | 330         | 35 × 35               | 0.20  | 1.38                                               | EKMQ451VSN331MA35S |
|                          | 180         | 25.4 × 30             | 0.15  | 0.95                                               | EKMQ401VSN181MQ30S |                          | 390         | 30 × 50               | 0.20  | 1.55                                               | EKMQ451VSN391MR50S |
| 400                      | 220         | 22 × 45               | 0.15  | 1.10                                               | EKMQ401VSN221MP45S |                          | 390         | 35 × 40               | 0.20  | 1.55                                               | EKMQ451VSN391MA40S |
|                          | 220         | 25.4 × 35             | 0.15  | 1.10                                               | EKMQ401VSN221MQ35S |                          | 470         | 35 × 45               | 0.20  | 1.74                                               | EKMQ451VSN471MA45S |
|                          | 220         | 30 × 25               | 0.15  | 1.10                                               | EKMQ401VSN221MR25S |                          | 560         | 35 × 50               | 0.20  | 1.90                                               | EKMQ451VSN561MA50S |
|                          | 270         | 22 × 50               | 0.15  | 1.22                                               | EKMQ401VSN271MP50S |                          |             |                       |       |                                                    |                    |



## KMQ Series

### ◆ RATED RIPPLE CURRENT MULTIPLIERS

#### ● Frequency Multipliers

| Frequency(Hz)             | 50   | 120  | 300  | 1k   | 10k  | 50k  |
|---------------------------|------|------|------|------|------|------|
| 35, 50V <sub>dc</sub>     | 0.95 | 1.00 | 1.03 | 1.05 | 1.08 | 1.08 |
| 160 to 250V <sub>dc</sub> | 0.81 | 1.00 | 1.17 | 1.32 | 1.45 | 1.50 |
| 315 to 450V <sub>dc</sub> | 0.77 | 1.00 | 1.16 | 1.30 | 1.41 | 1.43 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

# RLB Series

- Endurance with ripple current : 5,000 hours at 85°C
- High ripple current capability in a commercial frequency range
- High ripple current for inverter control like air conditioner
- Rated voltage range : 180 to 250Vdc, Capacitance range : 600 to 2,200μF
- Non solvent resistant type
- RoHS2 Compliant

RLB

Longer life

RLA

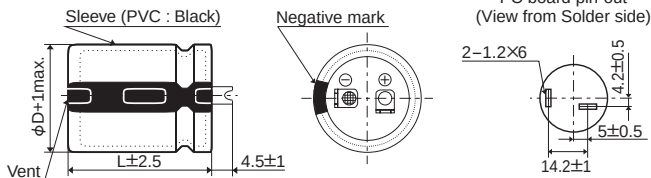


## SPECIFICATIONS

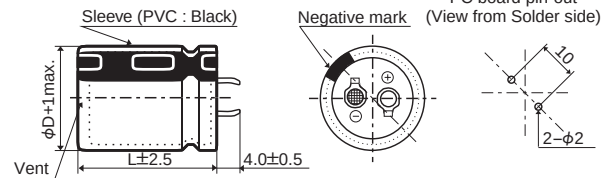
| Items                                                        | Characteristics                                                                                                                                                                                                                                                                      |                                      |                 |
|--------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-----------------|
| Category                                                     | -25 to +85℃                                                                                                                                                                                                                                                                          |                                      |                 |
| Temperature Range                                            |                                                                                                                                                                                                                                                                                      |                                      |                 |
| Rated Voltage Range                                          | 180 to 250V                                                                                                                                                                                                                                                                          |                                      |                 |
| Capacitance Tolerance                                        | ±10% (K)                                                                                                                                                                                                                                                                             |                                      | (at 20℃, 120Hz) |
| Leakage Current                                              | I≤3/CV<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)<br>(at 20℃ after 5 minutes)                                                                                                                                                      |                                      |                 |
| Dissipation Factor<br>(tan δ )                               | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                     | 180 to 250V                          | (at 20℃, 120Hz) |
|                                                              | tan δ (Max.)                                                                                                                                                                                                                                                                         | 0.15                                 |                 |
| Low Temperature<br>Characteristics<br>(Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                     | 180 to 250V                          | (at 120Hz)      |
|                                                              | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                      | 4                                    |                 |
| Endurance                                                    | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 5,000 hours at 85℃.                                         |                                      |                 |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                   | ≤ ±20% of the initial value          |                 |
|                                                              | D. F. (tan δ )                                                                                                                                                                                                                                                                       | ≤200% of the initial specified value |                 |
|                                                              | Leakage current                                                                                                                                                                                                                                                                      | ≤ The initial specified value        |                 |
| Shelf Life                                                   | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 85℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                      |                 |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                   | ≤ ±15% of the initial value          |                 |
|                                                              | D. F. (tan δ )                                                                                                                                                                                                                                                                       | ≤150% of the initial specified value |                 |
|                                                              | Leakage current                                                                                                                                                                                                                                                                      | ≤ The initial specified value        |                 |

## DIMENSIONS [mm]

### Terminal Code : LI (φ30, φ35) : Standard

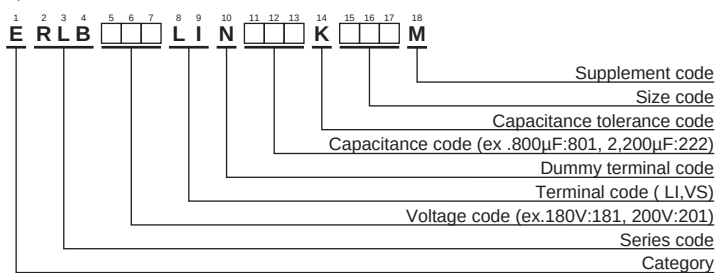


### Terminal Code : VS (φ30, φ35)



The standard design has no plastic disc.

## PART NUMBERING SYSTEM



Please refer to "Product code guide (snap-in type)"



## RLB Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>85°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>85°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|---------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|---------------------------------------------------|--------------------|
| 180                      | 900         | 30 × 35               | 0.15  | 4.66                                              | ERLB181LIN901KR35M | 210                      | 1,400       | 30 × 55               | 0.15  | 6.31                                              | ERLB211LIN142KR55M |
|                          | 1,100       | 30 × 40               | 0.15  | 5.17                                              | ERLB181LIN112KR40M |                          | 1,500       | 35 × 45               | 0.15  | 6.21                                              | ERLB211LIN152KA45M |
|                          | 1,300       | 30 × 45               | 0.15  | 5.64                                              | ERLB181LIN132KR45M |                          | 1,700       | 35 × 50               | 0.15  | 6.82                                              | ERLB211LIN172KA50M |
|                          | 1,500       | 30 × 50               | 0.15  | 6.07                                              | ERLB181LIN152KR50M |                          | 2,000       | 35 × 55               | 0.15  | 7.62                                              | ERLB211LIN202KA55M |
|                          | 1,500       | 35 × 40               | 0.15  | 5.75                                              | ERLB181LIN152KA40M | 220                      | 700         | 30 × 35               | 0.15  | 4.27                                              | ERLB221LIN701KR35M |
|                          | 1,700       | 30 × 55               | 0.15  | 6.63                                              | ERLB181LIN172KR55M |                          | 900         | 30 × 40               | 0.15  | 4.85                                              | ERLB221LIN901KR40M |
|                          | 1,800       | 35 × 45               | 0.15  | 6.37                                              | ERLB181LIN182KA45M |                          | 1,000       | 30 × 45               | 0.15  | 5.19                                              | ERLB221LIN102KR45M |
|                          | 2,000       | 35 × 50               | 0.15  | 6.84                                              | ERLB181LIN202KA50M |                          | 1,000       | 35 × 35               | 0.15  | 4.87                                              | ERLB221LIN102KA35M |
| 200                      | 900         | 30 × 35               | 0.15  | 4.66                                              | ERLB201LIN901KR35M |                          | 1,200       | 30 × 50               | 0.15  | 5.68                                              | ERLB221LIN122KR50M |
|                          | 1,000       | 30 × 40               | 0.15  | 5.01                                              | ERLB201LIN102KR40M |                          | 1,200       | 35 × 40               | 0.15  | 5.44                                              | ERLB221LIN122KA40M |
|                          | 1,200       | 30 × 45               | 0.15  | 5.51                                              | ERLB201LIN122KR45M |                          | 1,300       | 30 × 55               | 0.15  | 6.09                                              | ERLB221LIN132KR55M |
|                          | 1,200       | 35 × 35               | 0.15  | 5.14                                              | ERLB201LIN122KA35M |                          | 1,400       | 35 × 45               | 0.15  | 5.96                                              | ERLB221LIN142KA45M |
|                          | 1,400       | 30 × 50               | 0.15  | 5.95                                              | ERLB201LIN142KR50M |                          | 1,600       | 35 × 50               | 0.15  | 6.51                                              | ERLB221LIN162KA50M |
|                          | 1,400       | 35 × 40               | 0.15  | 5.66                                              | ERLB201LIN142KA40M |                          | 1,800       | 35 × 55               | 0.15  | 7.10                                              | ERLB221LIN182KA55M |
|                          | 1,500       | 30 × 55               | 0.15  | 6.36                                              | ERLB201LIN152KR55M | 250                      | 600         | 30 × 35               | 0.15  | 4.03                                              | ERLB251LIN601KR35M |
|                          | 1,600       | 35 × 45               | 0.15  | 6.14                                              | ERLB201LIN162KA45M |                          | 800         | 30 × 40               | 0.15  | 4.66                                              | ERLB251LIN801KR40M |
|                          | 1,900       | 35 × 50               | 0.15  | 6.82                                              | ERLB201LIN192KA50M |                          | 900         | 30 × 45               | 0.15  | 5.01                                              | ERLB251LIN901KR45M |
|                          | 2,200       | 35 × 55               | 0.15  | 7.60                                              | ERLB201LIN222KA55M |                          | 900         | 35 × 35               | 0.15  | 4.73                                              | ERLB251LIN901KA35M |
| 210                      | 800         | 30 × 35               | 0.15  | 4.48                                              | ERLB211LIN801KR35M |                          | 1,000       | 30 × 50               | 0.15  | 5.32                                              | ERLB251LIN102KR50M |
|                          | 900         | 30 × 40               | 0.15  | 4.86                                              | ERLB211LIN901KR40M |                          | 1,100       | 35 × 40               | 0.15  | 5.33                                              | ERLB251LIN112KA40M |
|                          | 1,100       | 30 × 45               | 0.15  | 5.39                                              | ERLB211LIN112KR45M |                          | 1,200       | 30 × 55               | 0.15  | 5.96                                              | ERLB251LIN122KR55M |
|                          | 1,100       | 35 × 35               | 0.15  | 5.06                                              | ERLB211LIN112KA35M |                          | 1,200       | 35 × 45               | 0.15  | 5.68                                              | ERLB251LIN122KA45M |
|                          | 1,200       | 30 × 50               | 0.15  | 5.71                                              | ERLB211LIN122KR50M |                          | 1,400       | 35 × 50               | 0.15  | 6.25                                              | ERLB251LIN142KA50M |
|                          | 1,300       | 35 × 40               | 0.15  | 5.65                                              | ERLB211LIN132KA40M |                          | 1,600       | 35 × 55               | 0.15  | 6.87                                              | ERLB251LIN162KA55M |

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

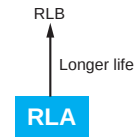
| Frequency(Hz)             | 50   | 120  | 300  | 1k   | 10k  | 50k  |
|---------------------------|------|------|------|------|------|------|
| 180 to 250V <sub>dc</sub> | 0.70 | 1.00 | 1.17 | 1.32 | 1.45 | 1.50 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.



# RLA Series

- Endurance with ripple current : 3,000 hours at 85°C
- High ripple current capability in a commercial frequency range
- High ripple current for inverter control like air conditioner
- Rated voltage range : 180 to 250Vdc, Capacitance range : 600 to 2,200 $\mu$ F
- Non solvent resistant type
- RoHS2 Compliant

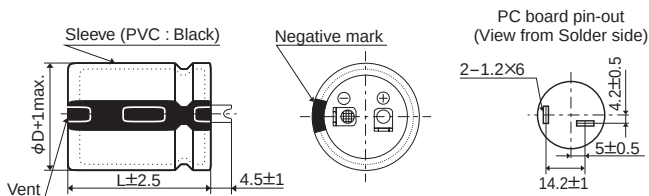


## SPECIFICATIONS

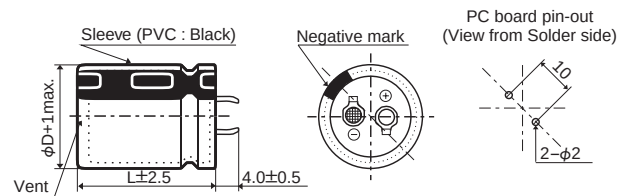
| Items                                                                                                                                                                                                                                                                                  | Characteristics                                                                                                        |             |                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|-------------|------------------|
| Category                                                                                                                                                                                                                                                                               | -25 to +85°C                                                                                                           |             |                  |
| Temperature Range                                                                                                                                                                                                                                                                      |                                                                                                                        |             |                  |
| Rated Voltage Range                                                                                                                                                                                                                                                                    | 180 to 250V                                                                                                            |             |                  |
| Capacitance Tolerance                                                                                                                                                                                                                                                                  | $\pm 10\%$ (K)                                                                                                         |             |                  |
| Leakage Current                                                                                                                                                                                                                                                                        | $I \leq 3/CV$<br>Where, I : Max. leakage current ( $\mu$ A), C : Nominal capacitance ( $\mu$ F), V : Rated voltage (V) |             |                  |
| Dissipation Factor (tan $\delta$ )                                                                                                                                                                                                                                                     | Rated voltage ( $V_{dc}$ )                                                                                             | 180 to 250V | (at 20°C, 120Hz) |
| Low Temperature Characteristics (Max. Impedance Ratio)                                                                                                                                                                                                                                 | tan $\delta$ (Max.)                                                                                                    | 0.15        | (at 20°C, 120Hz) |
| Endurance                                                                                                                                                                                                                                                                              | Rated voltage ( $V_{dc}$ )                                                                                             | 180 to 250V | (at 20°C, 120Hz) |
| Shelf Life                                                                                                                                                                                                                                                                             | Z(-25°C)/Z(+20°C)                                                                                                      | 4           | (at 120Hz)       |
| The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 3,000 hours at 85°C.                                         |                                                                                                                        |             |                  |
| Capacitance change $\leq \pm 20\%$ of the initial value                                                                                                                                                                                                                                |                                                                                                                        |             |                  |
| D. F. (tan $\delta$ ) $\leq 200\%$ of the initial specified value                                                                                                                                                                                                                      |                                                                                                                        |             |                  |
| Leakage current $\leq$ The initial specified value                                                                                                                                                                                                                                     |                                                                                                                        |             |                  |
| The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 85°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                                                                                                        |             |                  |
| Capacitance change $\leq \pm 15\%$ of the initial value                                                                                                                                                                                                                                |                                                                                                                        |             |                  |
| D. F. (tan $\delta$ ) $\leq 150\%$ of the initial specified value                                                                                                                                                                                                                      |                                                                                                                        |             |                  |
| Leakage current $\leq$ The initial specified value                                                                                                                                                                                                                                     |                                                                                                                        |             |                  |

## DIMENSIONS [mm]

- Terminal Code : LI ( $\phi 30$ ,  $\phi 35$ ) : Standard

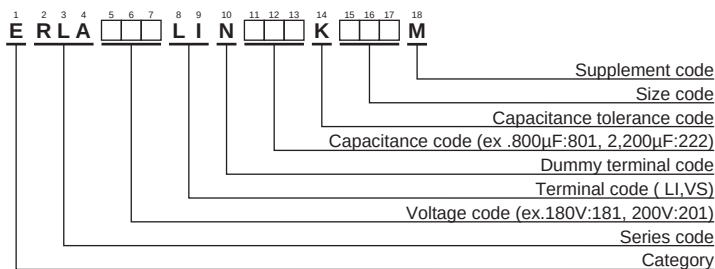


- Terminal Code : VS ( $\phi 30$ ,  $\phi 35$ )



The standard design has no plastic disc.

## PART NUMBERING SYSTEM



Please refer to "Product code guide (snap-in type)"





### ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>85°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>85°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|---------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|---------------------------------------------------|--------------------|
| 180                      | 900         | 30 × 35               | 0.15  | 4.66                                              | ERLA181LIN901KR35M | 210                      | 1,400       | 30 × 55               | 0.15  | 6.31                                              | ERLA211LIN142KR55M |
|                          | 1,100       | 30 × 40               | 0.15  | 5.17                                              | ERLA181LIN112KR40M |                          | 1,500       | 35 × 45               | 0.15  | 6.21                                              | ERLA211LIN152KA45M |
|                          | 1,300       | 30 × 45               | 0.15  | 5.64                                              | ERLA181LIN132KR45M |                          | 1,700       | 35 × 50               | 0.15  | 6.82                                              | ERLA211LIN172KA50M |
|                          | 1,500       | 30 × 50               | 0.15  | 6.07                                              | ERLA181LIN152KR50M |                          | 2,000       | 35 × 55               | 0.15  | 7.62                                              | ERLA211LIN202KA55M |
|                          | 1,500       | 35 × 40               | 0.15  | 5.75                                              | ERLA181LIN152KA40M | 220                      | 700         | 30 × 35               | 0.15  | 4.27                                              | ERLA221LIN701KR35M |
|                          | 1,700       | 30 × 55               | 0.15  | 6.63                                              | ERLA181LIN172KR55M |                          | 900         | 30 × 40               | 0.15  | 4.85                                              | ERLA221LIN901KR40M |
|                          | 1,800       | 35 × 45               | 0.15  | 6.37                                              | ERLA181LIN182KA45M |                          | 1,000       | 30 × 45               | 0.15  | 5.19                                              | ERLA221LIN102KR45M |
|                          | 2,000       | 35 × 50               | 0.15  | 6.84                                              | ERLA181LIN202KA50M |                          | 1,000       | 35 × 35               | 0.15  | 4.87                                              | ERLA221LIN102KA35M |
| 200                      | 900         | 30 × 35               | 0.15  | 4.66                                              | ERLA201LIN901KR35M |                          | 1,200       | 30 × 50               | 0.15  | 5.68                                              | ERLA221LIN122KR50M |
|                          | 1,000       | 30 × 40               | 0.15  | 5.01                                              | ERLA201LIN102KR40M |                          | 1,200       | 35 × 40               | 0.15  | 5.44                                              | ERLA221LIN122KA40M |
|                          | 1,200       | 30 × 45               | 0.15  | 5.51                                              | ERLA201LIN122KR45M |                          | 1,300       | 30 × 55               | 0.15  | 6.09                                              | ERLA221LIN132KR55M |
|                          | 1,200       | 35 × 35               | 0.15  | 5.14                                              | ERLA201LIN122KA35M |                          | 1,400       | 35 × 45               | 0.15  | 5.96                                              | ERLA221LIN142KA45M |
|                          | 1,400       | 30 × 50               | 0.15  | 5.95                                              | ERLA201LIN142KR50M |                          | 1,600       | 35 × 50               | 0.15  | 6.51                                              | ERLA221LIN162KA50M |
|                          | 1,400       | 35 × 40               | 0.15  | 5.66                                              | ERLA201LIN142KA40M |                          | 1,800       | 35 × 55               | 0.15  | 7.10                                              | ERLA221LIN182KA55M |
|                          | 1,500       | 30 × 55               | 0.15  | 6.36                                              | ERLA201LIN152KR55M | 250                      | 600         | 30 × 35               | 0.15  | 4.03                                              | ERLA251LIN601KR35M |
|                          | 1,600       | 35 × 45               | 0.15  | 6.14                                              | ERLA201LIN162KA45M |                          | 800         | 30 × 40               | 0.15  | 4.66                                              | ERLA251LIN801KR40M |
| 210                      | 1,900       | 35 × 50               | 0.15  | 6.82                                              | ERLA201LIN192KA50M |                          | 900         | 30 × 45               | 0.15  | 5.01                                              | ERLA251LIN901KR45M |
|                          | 2,200       | 35 × 55               | 0.15  | 7.60                                              | ERLA201LIN222KA55M |                          | 900         | 35 × 35               | 0.15  | 4.73                                              | ERLA251LIN901KA35M |
|                          | 800         | 30 × 35               | 0.15  | 4.48                                              | ERLA211LIN801KR35M |                          | 1,000       | 30 × 50               | 0.15  | 5.32                                              | ERLA251LIN102KR50M |
|                          | 900         | 30 × 40               | 0.15  | 4.86                                              | ERLA211LIN901KR40M |                          | 1,100       | 35 × 40               | 0.15  | 5.33                                              | ERLA251LIN112KA40M |
|                          | 1,100       | 30 × 45               | 0.15  | 5.39                                              | ERLA211LIN112KR45M |                          | 1,200       | 30 × 55               | 0.15  | 5.96                                              | ERLA251LIN122KR55M |
|                          | 1,100       | 35 × 35               | 0.15  | 5.06                                              | ERLA211LIN112KA35M |                          | 1,200       | 35 × 45               | 0.15  | 5.68                                              | ERLA251LIN122KA45M |
|                          | 1,200       | 30 × 50               | 0.15  | 5.71                                              | ERLA211LIN122KR50M |                          | 1,400       | 35 × 50               | 0.15  | 6.25                                              | ERLA251LIN142KA50M |
|                          | 1,300       | 35 × 40               | 0.15  | 5.65                                              | ERLA211LIN132KA40M |                          | 1,600       | 35 × 55               | 0.15  | 6.87                                              | ERLA251LIN162KA55M |

### ◆RATED RIPPLE CURRENT MULTIPLIERS

#### ●Frequency Multipliers

| Frequency(Hz)             | 50   | 120  | 300  | 1k   | 10k  | 50k  |
|---------------------------|------|------|------|------|------|------|
| 180 to 250V <sub>dc</sub> | 0.70 | 1.00 | 1.17 | 1.32 | 1.45 | 1.50 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.



### KLA Series

- Endurance with ripple current : 3,000 hours at 105°C
- High ripple current capability in a commercial frequency range
- High ripple current for inverter control like air conditioner
- Rated voltage range : 180 to 250V<sub>dc</sub>, Capacitance range : 600 to 2,000μF
- Non solvent resistant type
- RoHS2 Compliant

KLA

Higher temperature

RLA

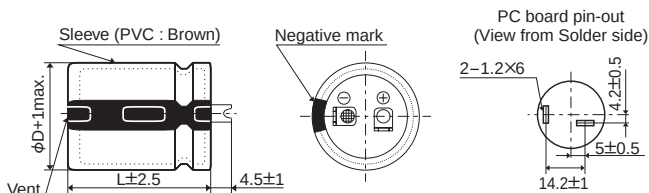


### SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                       |                                      |                 |  |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-----------------|--|
| Category                                               | -40 to +105℃                                                                                                                                                                                                                                                                          |                                      |                 |  |
| Temperature Range                                      |                                                                                                                                                                                                                                                                                       |                                      |                 |  |
| Rated Voltage Range                                    | 180 to 250V                                                                                                                                                                                                                                                                           |                                      |                 |  |
| Capacitance Tolerance                                  | ± 10% (K)                                                                                                                                                                                                                                                                             |                                      | (at 20℃, 120Hz) |  |
| Leakage Current                                        | I≤3√CV<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)<br>(at 20℃ after 5 minutes)                                                                                                                                                       |                                      |                 |  |
| Dissipation Factor (tan δ )                            | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 180 to 250V                          | (at 20℃, 120Hz) |  |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.15                                 |                 |  |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 180 to 250V                          | (at 120Hz)      |  |
|                                                        | Z(-40℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 4                                    |                 |  |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 3,000 hours at 105℃.                                         |                                      |                 |  |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±20% of the initial value          |                 |  |
|                                                        | D. F. (tan δ )                                                                                                                                                                                                                                                                        | ≤200% of the initial specified value |                 |  |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value         |                 |  |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                      |                 |  |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±15% of the initial value          |                 |  |
|                                                        | D. F. (tan δ )                                                                                                                                                                                                                                                                        | ≤150% of the initial specified value |                 |  |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value         |                 |  |

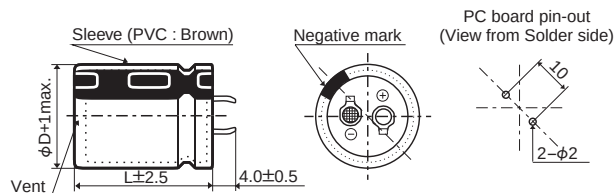
### DIMENSIONS [mm]

- Terminal Code : LI (φ30, φ35) : Standard

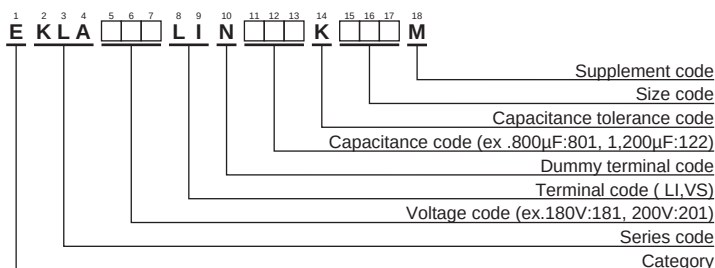


The standard design has no plastic disc.

- Terminal Code : VS (φ30, φ35)



### PART NUMBERING SYSTEM



Please refer to "Product code guide (snap-in type)"



## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(mA <sub>rms</sub> /105°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(mA <sub>rms</sub> /105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|--------------------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|--------------------------------------------------------------|--------------------|
| 180                      | 900         | 30 × 35               | 0.15  | 3.76                                                         | EKLA181LIN901KR35M | 210                      | 1,400       | 30 × 54               | 0.15  | 5.09                                                         | EKLA211LIN142KR54M |
|                          | 1,100       | 30 × 39               | 0.15  | 4.17                                                         | EKLA181LIN112KR39M |                          | 1,500       | 35 × 45               | 0.15  | 5.01                                                         | EKLA211LIN152KA45M |
|                          | 1,300       | 30 × 45               | 0.15  | 4.55                                                         | EKLA181LIN132KR45M |                          | 1,700       | 35 × 51               | 0.15  | 5.50                                                         | EKLA211LIN172KA51M |
|                          | 1,500       | 30 × 51               | 0.15  | 4.89                                                         | EKLA181LIN152KR51M |                          | 1,900       | 35 × 54               | 0.15  | 5.99                                                         | EKLA211LIN192KA54M |
|                          | 1,500       | 35 × 39               | 0.15  | 4.64                                                         | EKLA181LIN152KA39M | 220                      | 700         | 30 × 35               | 0.15  | 3.44                                                         | EKLA221LIN701KR35M |
|                          | 1,700       | 30 × 54               | 0.15  | 5.35                                                         | EKLA181LIN172KR54M |                          | 900         | 30 × 39               | 0.15  | 3.91                                                         | EKLA221LIN901KR39M |
|                          | 1,800       | 35 × 45               | 0.15  | 5.14                                                         | EKLA181LIN182KA45M |                          | 1,000       | 30 × 45               | 0.15  | 4.18                                                         | EKLA221LIN102KR45M |
|                          | 2,000       | 35 × 51               | 0.15  | 5.51                                                         | EKLA181LIN202KA51M |                          | 1,000       | 35 × 35               | 0.15  | 3.93                                                         | EKLA221LIN102KA35M |
| 200                      | 800         | 30 × 35               | 0.15  | 3.54                                                         | EKLA201LIN801KR35M |                          | 1,200       | 30 × 51               | 0.15  | 4.58                                                         | EKLA221LIN122KR51M |
|                          | 1,000       | 30 × 39               | 0.15  | 4.04                                                         | EKLA201LIN102KR39M |                          | 1,200       | 35 × 39               | 0.15  | 4.39                                                         | EKLA221LIN122KA39M |
|                          | 1,100       | 30 × 45               | 0.15  | 4.25                                                         | EKLA201LIN112KR45M |                          | 1,300       | 30 × 54               | 0.15  | 4.91                                                         | EKLA221LIN132KR54M |
|                          | 1,100       | 35 × 35               | 0.15  | 3.97                                                         | EKLA201LIN112KA35M |                          | 1,400       | 35 × 45               | 0.15  | 4.81                                                         | EKLA221LIN142KA45M |
|                          | 1,300       | 30 × 51               | 0.15  | 4.62                                                         | EKLA201LIN132KR51M |                          | 1,600       | 35 × 51               | 0.15  | 5.25                                                         | EKLA221LIN162KA51M |
|                          | 1,400       | 35 × 39               | 0.15  | 4.56                                                         | EKLA201LIN142KA39M |                          | 1,900       | 35 × 54               | 0.15  | 5.88                                                         | EKLA221LIN192KA54M |
|                          | 1,500       | 30 × 54               | 0.15  | 5.13                                                         | EKLA201LIN152KR54M | 250                      | 600         | 30 × 35               | 0.15  | 3.25                                                         | EKLA251LIN601KR35M |
|                          | 1,600       | 35 × 45               | 0.15  | 4.95                                                         | EKLA201LIN162KA45M |                          | 700         | 30 × 39               | 0.15  | 3.51                                                         | EKLA251LIN701KR39M |
|                          | 1,800       | 35 × 51               | 0.15  | 5.35                                                         | EKLA201LIN182KA51M |                          | 900         | 30 × 45               | 0.15  | 4.04                                                         | EKLA251LIN901KR45M |
| 210                      | 2,000       | 35 × 54               | 0.15  | 5.84                                                         | EKLA201LIN202KA54M |                          | 900         | 35 × 35               | 0.15  | 3.81                                                         | EKLA251LIN901KA35M |
|                          | 700         | 30 × 35               | 0.15  | 3.38                                                         | EKLA211LIN701KR35M |                          | 1,000       | 30 × 51               | 0.15  | 4.29                                                         | EKLA251LIN102KR51M |
|                          | 900         | 30 × 39               | 0.15  | 3.92                                                         | EKLA211LIN901KR39M |                          | 1,000       | 35 × 39               | 0.15  | 4.10                                                         | EKLA251LIN102KA39M |
|                          | 1,000       | 35 × 35               | 0.15  | 3.89                                                         | EKLA211LIN102KA35M |                          | 1,100       | 30 × 54               | 0.15  | 4.60                                                         | EKLA251LIN112KR54M |
|                          | 1,100       | 30 × 45               | 0.15  | 4.35                                                         | EKLA211LIN112KR45M |                          | 1,200       | 35 × 45               | 0.15  | 4.58                                                         | EKLA251LIN122KA45M |
|                          | 1,200       | 30 × 51               | 0.15  | 4.60                                                         | EKLA211LIN122KR51M |                          | 1,400       | 35 × 51               | 0.15  | 5.04                                                         | EKLA251LIN142KA51M |
|                          | 1,300       | 35 × 39               | 0.15  | 4.56                                                         | EKLA211LIN132KA39M |                          | 1,600       | 35 × 54               | 0.15  | 5.54                                                         | EKLA251LIN162KA54M |

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

| Frequency(Hz)             | 50   | 120  | 300  | 1k   | 10k  | 50k  |
|---------------------------|------|------|------|------|------|------|
| 180 to 250V <sub>dc</sub> | 0.70 | 1.00 | 1.17 | 1.32 | 1.45 | 1.50 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

# SMM Series

- Longer life from SMQ series
- Endurance with ripple current : 3,000 hours at 85°C
- Non solvent resistant type
- RoHS2 Compliant

SMM

Longer life  
↑  
SMQ

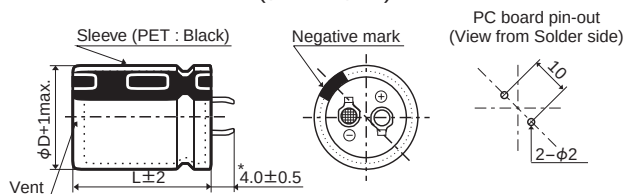


## SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                        |                                      |            |                  |
|--------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------------|------------------|
| Category                                               | -25 to +85°C                                                                                                                                                                                                                                                                           |                                      |            |                  |
| Temperature Range                                      |                                                                                                                                                                                                                                                                                        |                                      |            |                  |
| Rated Voltage Range                                    | 160 to 450V <sub>dc</sub>                                                                                                                                                                                                                                                              |                                      |            |                  |
| Capacitance Tolerance                                  | ± 20% (M) (at 20°C, 120Hz)                                                                                                                                                                                                                                                             |                                      |            |                  |
| Leakage Current                                        | $I \leq 3\sqrt{CV}$<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C after 5 minutes)                                                                                                                                             |                                      |            |                  |
| Dissipation Factor (tan δ)                             | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                       | 160 to 400V                          | 420 & 450V | (at 20°C, 120Hz) |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                           | 0.15                                 | 0.20       |                  |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                       | 160 to 400V                          | 420 & 450V | (at 120Hz)       |
|                                                        | Z(-25°C)/Z(+20°C)                                                                                                                                                                                                                                                                      | 4                                    | 8          |                  |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 3,000 hours at 85°C.                                         |                                      |            |                  |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                     | ≤ ±20% of the initial value          |            |                  |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                           | ≤200% of the initial specified value |            |                  |
|                                                        | Leakage current                                                                                                                                                                                                                                                                        | ≤ The initial specified value        |            |                  |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 85°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                      |            |                  |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                     | ≤ ±15% of the initial value          |            |                  |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                           | ≤150% of the initial specified value |            |                  |
|                                                        | Leakage current                                                                                                                                                                                                                                                                        | ≤ The initial specified value        |            |                  |

## DIMENSIONS [mm]

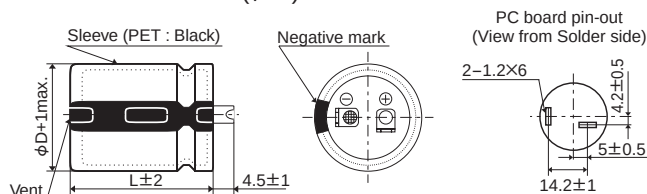
● Terminal Code : VS (φ22 to φ35) : Standard



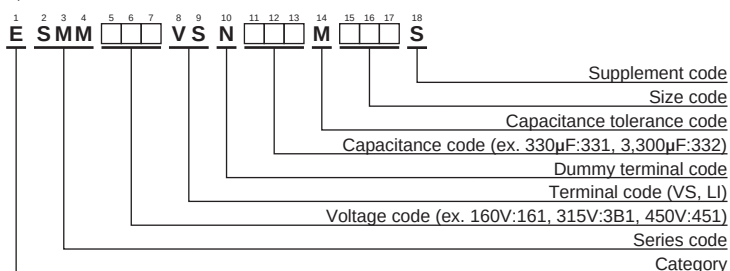
\*φD=35mm : 3.5±0.5mm

The standard design has no plastic disc.

● Terminal Code : LI (φ35)



## PART NUMBERING SYSTEM



Please refer to "Product code guide (snap-in type)"

## RATED RIPPLE CURRENT MULTIPLIERS

● Frequency Multipliers

| Frequency(Hz)             | 50   | 120  | 300  | 1k   | 10k  | 50k  |
|---------------------------|------|------|------|------|------|------|
| 160 to 250V <sub>dc</sub> | 0.81 | 1.00 | 1.17 | 1.32 | 1.45 | 1.50 |
| 315 to 450V <sub>dc</sub> | 0.77 | 1.00 | 1.16 | 1.30 | 1.41 | 1.43 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

**SMM**Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>85°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>85°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|---------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|---------------------------------------------------|--------------------|
| 160                      | 270         | 22 × 20               | 0.15  | 1.30                                              | ESMM161VSN271MP20S | 200                      | 390         | 22 × 30               | 0.15  | 1.73                                              | ESMM201VSN391MP30S |
|                          | 390         | 22 × 25               | 0.15  | 1.63                                              | ESMM161VSN391MP25S |                          | 390         | 25.4 × 25             | 0.15  | 1.71                                              | ESMM201VSN391MQ25S |
|                          | 390         | 25.4 × 20             | 0.15  | 1.62                                              | ESMM161VSN391MQ20S |                          | 390         | 30 × 20               | 0.15  | 1.71                                              | ESMM201VSN391MR20S |
|                          | 470         | 22 × 30               | 0.15  | 1.86                                              | ESMM161VSN471MP30S |                          | 470         | 22 × 30               | 0.15  | 1.97                                              | ESMM201VSN471MP30S |
|                          | 470         | 25.4 × 25             | 0.15  | 1.86                                              | ESMM161VSN471MQ25S |                          | 470         | 25.4 × 25             | 0.15  | 1.95                                              | ESMM201VSN471MQ25S |
|                          | 560         | 22 × 30               | 0.15  | 2.15                                              | ESMM161VSN561MP30S |                          | 470         | 30 × 20               | 0.15  | 1.88                                              | ESMM201VSN471MR20S |
|                          | 560         | 25.4 × 25             | 0.15  | 2.15                                              | ESMM161VSN561MQ25S |                          | 560         | 22 × 35               | 0.15  | 2.18                                              | ESMM201VSN561MP35S |
|                          | 560         | 30 × 20               | 0.15  | 2.05                                              | ESMM161VSN561MR20S |                          | 560         | 25.4 × 30             | 0.15  | 2.15                                              | ESMM201VSN561MQ30S |
|                          | 680         | 22 × 35               | 0.15  | 2.35                                              | ESMM161VSN681MP35S |                          | 560         | 30 × 25               | 0.15  | 2.15                                              | ESMM201VSN561MR25S |
|                          | 680         | 25.4 × 30             | 0.15  | 2.33                                              | ESMM161VSN681MQ30S |                          | 560         | 35 × 20               | 0.15  | 2.05                                              | ESMM201VSN561MA20S |
|                          | 680         | 30 × 25               | 0.15  | 2.33                                              | ESMM161VSN681MR25S |                          | 680         | 22 × 40               | 0.15  | 2.48                                              | ESMM201VSN681MP40S |
|                          | 680         | 35 × 20               | 0.15  | 2.26                                              | ESMM161VSN681MA20S |                          | 680         | 25.4 × 30             | 0.15  | 2.48                                              | ESMM201VSN681MQ30S |
|                          | 820         | 22 × 40               | 0.15  | 2.68                                              | ESMM161VSN821MP40S |                          | 680         | 30 × 25               | 0.15  | 2.48                                              | ESMM201VSN681MR25S |
|                          | 820         | 25.4 × 30             | 0.15  | 2.65                                              | ESMM161VSN821MQ30S |                          | 680         | 35 × 20               | 0.15  | 2.36                                              | ESMM201VSN681MA20S |
|                          | 820         | 30 × 25               | 0.15  | 2.64                                              | ESMM161VSN821MR25S |                          | 820         | 22 × 45               | 0.15  | 2.81                                              | ESMM201VSN821MP45S |
|                          | 820         | 35 × 20               | 0.15  | 2.49                                              | ESMM161VSN821MA20S |                          | 820         | 25.4 × 35             | 0.15  | 2.79                                              | ESMM201VSN821MQ35S |
|                          | 1,000       | 22 × 45               | 0.15  | 3.02                                              | ESMM161VSN102MP45S |                          | 820         | 30 × 30               | 0.15  | 2.80                                              | ESMM201VSN821MR30S |
|                          | 1,000       | 25.4 × 35             | 0.15  | 3.00                                              | ESMM161VSN102MQ35S |                          | 820         | 35 × 25               | 0.15  | 2.83                                              | ESMM201VSN821MA25S |
|                          | 1,000       | 30 × 30               | 0.15  | 2.96                                              | ESMM161VSN102MR30S |                          | 1,000       | 22 × 50               | 0.15  | 3.28                                              | ESMM201VSN102MP50S |
|                          | 1,000       | 35 × 25               | 0.15  | 3.13                                              | ESMM161VSN102MA25S |                          | 1,000       | 25.4 × 40             | 0.15  | 3.28                                              | ESMM201VSN102MQ40S |
|                          | 1,200       | 22 × 50               | 0.15  | 3.47                                              | ESMM161VSN122MP50S |                          | 1,000       | 30 × 35               | 0.15  | 3.15                                              | ESMM201VSN102MR35S |
|                          | 1,200       | 25.4 × 40             | 0.15  | 3.43                                              | ESMM161VSN122MQ40S |                          | 1,000       | 35 × 30               | 0.15  | 3.26                                              | ESMM201VSN102MA30S |
|                          | 1,200       | 30 × 30               | 0.15  | 3.41                                              | ESMM161VSN122MR30S |                          | 1,200       | 25.4 × 45             | 0.15  | 3.61                                              | ESMM201VSN122MQ45S |
|                          | 1,200       | 35 × 25               | 0.15  | 3.40                                              | ESMM161VSN122MA25S |                          | 1,200       | 30 × 35               | 0.15  | 3.61                                              | ESMM201VSN122MR35S |
|                          | 1,500       | 25.4 × 50             | 0.15  | 3.96                                              | ESMM161VSN152MQ50S |                          | 1,200       | 35 × 30               | 0.15  | 3.57                                              | ESMM201VSN122MA30S |
|                          | 1,500       | 30 × 35               | 0.15  | 3.96                                              | ESMM161VSN152MR35S |                          | 1,500       | 30 × 45               | 0.15  | 4.13                                              | ESMM201VSN152MR45S |
|                          | 1,500       | 35 × 30               | 0.15  | 3.94                                              | ESMM161VSN152MA30S |                          | 1,500       | 35 × 35               | 0.15  | 4.06                                              | ESMM201VSN152MA35S |
|                          | 1,800       | 30 × 40               | 0.15  | 4.31                                              | ESMM161VSN182MR40S |                          | 1,800       | 30 × 50               | 0.15  | 4.60                                              | ESMM201VSN182MR50S |
|                          | 1,800       | 35 × 35               | 0.15  | 4.28                                              | ESMM161VSN182MA35S |                          | 1,800       | 35 × 40               | 0.15  | 4.59                                              | ESMM201VSN182MA40S |
|                          | 2,200       | 30 × 50               | 0.15  | 4.96                                              | ESMM161VSN222MR50S |                          | 2,200       | 35 × 45               | 0.15  | 5.25                                              | ESMM201VSN222MA45S |
|                          | 2,200       | 35 × 40               | 0.15  | 4.96                                              | ESMM161VSN222MA40S | 220                      | 180         | 22 × 20               | 0.15  | 1.06                                              | ESMM221VSN181MP20S |
| 180                      | 2,700       | 35 × 45               | 0.15  | 5.57                                              | ESMM161VSN272MA45S |                          | 270         | 22 × 25               | 0.15  | 1.47                                              | ESMM221VSN271MP25S |
|                          | 3,300       | 35 × 50               | 0.15  | 6.21                                              | ESMM161VSN332MA50S |                          | 270         | 25.4 × 20             | 0.15  | 1.35                                              | ESMM221VSN271MQ20S |
|                          | 220         | 22 × 20               | 0.15  | 1.18                                              | ESMM181VSN221MP20S |                          | 330         | 22 × 30               | 0.15  | 1.70                                              | ESMM221VSN331MP30S |
|                          | 330         | 22 × 25               | 0.15  | 1.77                                              | ESMM181VSN331MP25S |                          | 330         | 25.4 × 25             | 0.15  | 1.69                                              | ESMM221VSN331MQ25S |
|                          | 330         | 25.4 × 20             | 0.15  | 1.49                                              | ESMM181VSN331MQ20S |                          | 330         | 30 × 20               | 0.15  | 1.58                                              | ESMM221VSN331MR20S |
|                          | 390         | 22 × 25               | 0.15  | 1.84                                              | ESMM181VSN391MP25S |                          | 390         | 22 × 30               | 0.15  | 1.89                                              | ESMM221VSN391MP30S |
|                          | 470         | 22 × 30               | 0.15  | 1.91                                              | ESMM181VSN471MP30S |                          | 390         | 25.4 × 25             | 0.15  | 1.84                                              | ESMM221VSN391MQ25S |
|                          | 470         | 25.4 × 25             | 0.15  | 2.08                                              | ESMM181VSN471MQ25S |                          | 390         | 30 × 20               | 0.15  | 1.71                                              | ESMM221VSN391MR20S |
|                          | 470         | 30 × 20               | 0.15  | 1.88                                              | ESMM181VSN471MR20S |                          | 470         | 22 × 35               | 0.15  | 2.08                                              | ESMM221VSN471MP35S |
|                          | 560         | 22 × 35               | 0.15  | 2.25                                              | ESMM181VSN561MP35S |                          | 470         | 25.4 × 30             | 0.15  | 2.08                                              | ESMM221VSN471MQ30S |
|                          | 560         | 25.4 × 25             | 0.15  | 2.25                                              | ESMM181VSN561MQ25S |                          | 470         | 30 × 25               | 0.15  | 2.12                                              | ESMM221VSN471MR25S |
|                          | 680         | 22 × 35               | 0.15  | 2.48                                              | ESMM181VSN681MP35S |                          | 470         | 35 × 20               | 0.15  | 1.88                                              | ESMM221VSN471MA20S |
|                          | 680         | 25.4 × 30             | 0.15  | 2.50                                              | ESMM181VSN681MQ30S |                          | 560         | 22 × 40               | 0.15  | 2.33                                              | ESMM221VSN561MP40S |
|                          | 680         | 30 × 25               | 0.15  | 2.46                                              | ESMM181VSN681MR25S |                          | 560         | 25.4 × 35             | 0.15  | 2.38                                              | ESMM221VSN561MQ35S |
|                          | 680         | 35 × 20               | 0.15  | 2.26                                              | ESMM181VSN681MA20S |                          | 560         | 30 × 25               | 0.15  | 2.31                                              | ESMM221VSN561MR25S |
|                          | 820         | 22 × 40               | 0.15  | 2.86                                              | ESMM181VSN821MP40S |                          | 560         | 35 × 20               | 0.15  | 2.14                                              | ESMM221VSN561MA20S |
|                          | 820         | 25.4 × 35             | 0.15  | 2.75                                              | ESMM181VSN821MQ35S |                          | 680         | 22 × 45               | 0.15  | 2.63                                              | ESMM221VSN681MP45S |
|                          | 820         | 30 × 25               | 0.15  | 2.69                                              | ESMM181VSN821MR25S |                          | 680         | 25.4 × 35             | 0.15  | 2.68                                              | ESMM221VSN681MQ35S |
|                          | 1,000       | 22 × 50               | 0.15  | 3.10                                              | ESMM181VSN102MP50S |                          | 680         | 30 × 30               | 0.15  | 2.62                                              | ESMM221VSN681MR30S |
|                          | 1,000       | 25.4 × 40             | 0.15  | 3.06                                              | ESMM181VSN102MQ40S |                          | 680         | 35 × 25               | 0.15  | 2.58                                              | ESMM221VSN681MA25S |
|                          | 1,000       | 30 × 30               | 0.15  | 3.10                                              | ESMM181VSN102MR30S |                          | 820         | 25.4 × 45             | 0.15  | 3.01                                              | ESMM221VSN821MQ45S |
|                          | 1,000       | 35 × 25               | 0.15  | 2.98                                              | ESMM181VSN102MA25S |                          | 820         | 30 × 35               | 0.15  | 2.99                                              | ESMM221VSN821MR35S |
|                          | 1,200       | 25.4 × 45             | 0.15  | 3.63                                              | ESMM181VSN122MQ45S |                          | 820         | 35 × 30               | 0.15  | 2.79                                              | ESMM221VSN821MA30S |
|                          | 1,200       | 30 × 35               | 0.15  | 3.55                                              | ESMM181VSN122MR35S |                          | 1,000       | 25.4 × 50             | 0.15  | 3.40                                              | ESMM221VSN102MQ50S |
|                          | 1,200       | 35 × 30               | 0.15  | 3.49                                              | ESMM181VSN122MA30S | 250                      | 150         | 22 × 20               | 0.15  | 0.97                                              | ESMM251VSN151MP20S |
| 200                      | 1,500       | 30 × 40               | 0.15  | 4.10                                              | ESMM181VSN152MR40S |                          | 180         | 22 × 20               | 0.15  | 1.06                                              | ESMM251VSN181MP20S |
|                          | 1,500       | 35 × 35               | 0.15  | 4.02                                              | ESMM181VSN152MA35S |                          | 220         | 22 × 25               | 0.15  | 1.24                                              | ESMM251VSN221MP25S |
|                          | 1,800       | 30 × 45               | 0.15  | 4.55                                              | ESMM181VSN182MR45S |                          | 220         | 25.4 × 20             | 0.15  | 1.22                                              | ESMM251VSN221MQ20S |
|                          | 1,800       | 35 × 35               | 0.15  | 4.54                                              | ESMM181VSN182MA35S |                          | 270         | 22 × 25               | 0.15  | 1.50                                              | ESMM251VSN271MP25S |
|                          | 2,200       | 35 × 40               | 0.15  | 4.83                                              | ESMM181VSN222MA40S |                          |             |                       |       |                                                   |                    |
|                          | 2,700       | 35 × 50               | 0.15  | 5.30                                              | ESMM181VSN272MA50S |                          |             |                       |       |                                                   |                    |

**SMM**Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>85°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>85°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|---------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|---------------------------------------------------|--------------------|
| 250                      | 330         | 22 × 30               | 0.15  | 1.66                                              | ESMM251VSN331MP30S | 350                      | 180         | 30 × 20               | 0.15  | 1.16                                              | ESMM351VSN181MR20S |
|                          | 330         | 25.4 × 25             | 0.15  | 1.61                                              | ESMM251VSN331MQ25S |                          | 220         | 22 × 35               | 0.15  | 1.47                                              | ESMM351VSN221MP35S |
|                          | 330         | 30 × 20               | 0.15  | 1.58                                              | ESMM251VSN331MR20S |                          | 220         | 25.4 × 30             | 0.15  | 1.53                                              | ESMM351VSN221MQ30S |
|                          | 390         | 22 × 35               | 0.15  | 1.88                                              | ESMM251VSN391MP35S |                          | 220         | 30 × 25               | 0.15  | 1.54                                              | ESMM351VSN221MR25S |
|                          | 390         | 25.4 × 30             | 0.15  | 1.88                                              | ESMM251VSN391MQ30S |                          | 220         | 35 × 20               | 0.15  | 1.29                                              | ESMM351VSN221MA20S |
|                          | 390         | 30 × 25               | 0.15  | 1.86                                              | ESMM251VSN391MR25S |                          | 270         | 22 × 40               | 0.15  | 1.70                                              | ESMM351VSN271MP40S |
|                          | 390         | 35 × 20               | 0.15  | 1.71                                              | ESMM251VSN391MA20S |                          | 270         | 25.4 × 35             | 0.15  | 1.73                                              | ESMM351VSN271MQ35S |
|                          | 470         | 22 × 35               | 0.15  | 2.15                                              | ESMM251VSN471MP35S |                          | 270         | 30 × 25               | 0.15  | 1.80                                              | ESMM351VSN271MR25S |
|                          | 470         | 25.4 × 35             | 0.15  | 2.15                                              | ESMM251VSN471MQ35S |                          | 270         | 35 × 20               | 0.15  | 1.49                                              | ESMM351VSN271MA20S |
|                          | 470         | 30 × 25               | 0.15  | 2.05                                              | ESMM251VSN471MR25S |                          | 330         | 22 × 45               | 0.15  | 1.87                                              | ESMM351VSN331MP45S |
|                          | 470         | 35 × 20               | 0.15  | 1.88                                              | ESMM251VSN471MA20S |                          | 330         | 25.4 × 35             | 0.15  | 1.97                                              | ESMM351VSN331MQ35S |
|                          | 560         | 22 × 40               | 0.15  | 2.48                                              | ESMM251VSN561MP40S |                          | 330         | 30 × 30               | 0.15  | 2.03                                              | ESMM351VSN331MR30S |
|                          | 560         | 25.4 × 35             | 0.15  | 2.35                                              | ESMM251VSN561MQ35S |                          | 330         | 35 × 25               | 0.15  | 1.80                                              | ESMM351VSN331MA25S |
|                          | 560         | 30 × 25               | 0.15  | 2.35                                              | ESMM251VSN561MR25S |                          | 390         | 25.4 × 40             | 0.15  | 2.14                                              | ESMM351VSN391MQ40S |
|                          | 680         | 22 × 50               | 0.15  | 2.61                                              | ESMM251VSN681MP50S |                          | 390         | 30 × 35               | 0.15  | 2.23                                              | ESMM351VSN391MR35S |
|                          | 680         | 25.4 × 40             | 0.15  | 2.67                                              | ESMM251VSN681MQ40S |                          | 390         | 35 × 30               | 0.15  | 2.30                                              | ESMM351VSN391MA30S |
|                          | 680         | 30 × 30               | 0.15  | 2.71                                              | ESMM251VSN681MR30S |                          | 470         | 25.4 × 50             | 0.15  | 2.55                                              | ESMM351VSN471MQ50S |
|                          | 680         | 35 × 25               | 0.15  | 2.58                                              | ESMM251VSN681MA25S |                          | 470         | 30 × 35               | 0.15  | 2.53                                              | ESMM351VSN471MR35S |
|                          | 820         | 25.4 × 45             | 0.15  | 3.01                                              | ESMM251VSN821MQ45S |                          | 470         | 35 × 30               | 0.15  | 2.55                                              | ESMM351VSN471MA30S |
|                          | 820         | 30 × 35               | 0.15  | 2.98                                              | ESMM251VSN821MR35S |                          | 560         | 30 × 40               | 0.15  | 2.73                                              | ESMM351VSN561MR40S |
|                          | 820         | 35 × 30               | 0.15  | 2.96                                              | ESMM251VSN821MA30S |                          | 560         | 35 × 35               | 0.15  | 2.75                                              | ESMM351VSN561MA35S |
|                          | 1,000       | 30 × 40               | 0.15  | 3.56                                              | ESMM251VSN102MR40S |                          | 680         | 30 × 50               | 0.15  | 3.15                                              | ESMM351VSN681MR50S |
|                          | 1,000       | 35 × 35               | 0.15  | 3.48                                              | ESMM251VSN102MA35S |                          | 680         | 35 × 40               | 0.15  | 3.15                                              | ESMM351VSN681MA40S |
|                          | 1,200       | 30 × 45               | 0.15  | 3.99                                              | ESMM251VSN122MR45S |                          | 820         | 35 × 45               | 0.15  | 3.47                                              | ESMM351VSN821MA45S |
|                          | 1,200       | 35 × 35               | 0.15  | 3.84                                              | ESMM251VSN122MA35S |                          | 1,000       | 35 × 50               | 0.15  | 3.60                                              | ESMM351VSN102MA50S |
|                          | 1,500       | 35 × 40               | 0.15  | 4.33                                              | ESMM251VSN152MA40S | 400                      | 68          | 22 × 20               | 0.15  | 0.65                                              | ESMM401VSN680MP20S |
|                          | 1,800       | 35 × 50               | 0.15  | 4.54                                              | ESMM251VSN182MA50S |                          | 82          | 22 × 25               | 0.15  | 0.84                                              | ESMM401VSN820MP25S |
| 315                      | 100         | 22 × 20               | 0.15  | 0.79                                              | ESMM3B1VSN101MP20S |                          | 82          | 25.4 × 20             | 0.15  | 0.74                                              | ESMM401VSN820MQ20S |
|                          | 120         | 25.4 × 20             | 0.15  | 0.90                                              | ESMM3B1VSN121MQ20S |                          | 100         | 22 × 25               | 0.15  | 0.99                                              | ESMM401VSN101MP25S |
|                          | 150         | 22 × 25               | 0.15  | 1.06                                              | ESMM3B1VSN151MP25S |                          | 100         | 25.4 × 20             | 0.15  | 0.82                                              | ESMM401VSN101MQ20S |
|                          | 150         | 25.4 × 20             | 0.15  | 1.00                                              | ESMM3B1VSN151MQ20S |                          | 120         | 22 × 30               | 0.15  | 1.09                                              | ESMM401VSN121MP30S |
|                          | 180         | 22 × 30               | 0.15  | 1.29                                              | ESMM3B1VSN181MP30S |                          | 120         | 25.4 × 25             | 0.15  | 1.13                                              | ESMM401VSN121MQ25S |
|                          | 180         | 25.4 × 25             | 0.15  | 1.38                                              | ESMM3B1VSN181MQ25S |                          | 120         | 30 × 20               | 0.15  | 0.95                                              | ESMM401VSN121MR20S |
|                          | 180         | 30 × 20               | 0.15  | 1.16                                              | ESMM3B1VSN181MR20S |                          | 150         | 22 × 35               | 0.15  | 1.24                                              | ESMM401VSN151MP35S |
|                          | 220         | 22 × 30               | 0.15  | 1.41                                              | ESMM3B1VSN221MP30S |                          | 150         | 25.4 × 30             | 0.15  | 1.27                                              | ESMM401VSN151MQ30S |
|                          | 220         | 25.4 × 25             | 0.15  | 1.47                                              | ESMM3B1VSN221MQ25S |                          | 150         | 30 × 25               | 0.15  | 1.20                                              | ESMM401VSN151MR25S |
|                          | 220         | 30 × 20               | 0.15  | 1.28                                              | ESMM3B1VSN221MR20S |                          | 180         | 22 × 40               | 0.15  | 1.41                                              | ESMM401VSN181MP40S |
|                          | 270         | 22 × 35               | 0.15  | 1.68                                              | ESMM3B1VSN271MP35S |                          | 180         | 25.4 × 30             | 0.15  | 1.44                                              | ESMM401VSN181MQ30S |
|                          | 270         | 25.4 × 30             | 0.15  | 1.70                                              | ESMM3B1VSN271MQ30S |                          | 180         | 30 × 25               | 0.15  | 1.52                                              | ESMM401VSN181MR25S |
|                          | 270         | 30 × 25               | 0.15  | 1.55                                              | ESMM3B1VSN271MR25S |                          | 180         | 35 × 20               | 0.15  | 1.16                                              | ESMM401VSN181MA20S |
|                          | 270         | 35 × 20               | 0.15  | 1.43                                              | ESMM3B1VSN271MA20S |                          | 220         | 22 × 45               | 0.15  | 1.58                                              | ESMM401VSN221MP45S |
|                          | 330         | 22 × 40               | 0.15  | 1.91                                              | ESMM3B1VSN331MP40S |                          | 220         | 25.4 × 35             | 0.15  | 1.64                                              | ESMM401VSN221MQ35S |
|                          | 330         | 25.4 × 35             | 0.15  | 1.94                                              | ESMM3B1VSN331MQ35S |                          | 220         | 30 × 30               | 0.15  | 1.66                                              | ESMM401VSN221MR30S |
|                          | 330         | 30 × 25               | 0.15  | 1.98                                              | ESMM3B1VSN331MR25S |                          | 220         | 35 × 25               | 0.15  | 1.47                                              | ESMM401VSN221MA25S |
|                          | 390         | 22 × 45               | 0.15  | 2.07                                              | ESMM3B1VSN391MP45S |                          | 270         | 22 × 50               | 0.15  | 1.65                                              | ESMM401VSN271MP50S |
|                          | 390         | 25.4 × 40             | 0.15  | 2.11                                              | ESMM3B1VSN391MQ40S |                          | 270         | 25.4 × 40             | 0.15  | 1.79                                              | ESMM401VSN271MQ40S |
|                          | 390         | 30 × 30               | 0.15  | 2.15                                              | ESMM3B1VSN391MR30S |                          | 270         | 30 × 30               | 0.15  | 1.82                                              | ESMM401VSN271MR30S |
|                          | 390         | 35 × 25               | 0.15  | 1.95                                              | ESMM3B1VSN391MA25S |                          | 270         | 35 × 25               | 0.15  | 1.63                                              | ESMM401VSN271MA25S |
|                          | 470         | 25.4 × 45             | 0.15  | 2.31                                              | ESMM3B1VSN471MQ45S |                          | 330         | 25.4 × 45             | 0.15  | 2.00                                              | ESMM401VSN331MQ45S |
|                          | 470         | 30 × 35               | 0.15  | 2.38                                              | ESMM3B1VSN471MR35S |                          | 330         | 30 × 35               | 0.15  | 2.05                                              | ESMM401VSN331MR35S |
|                          | 470         | 35 × 30               | 0.15  | 2.46                                              | ESMM3B1VSN471MA30S |                          | 330         | 35 × 30               | 0.15  | 2.05                                              | ESMM401VSN331MA30S |
|                          | 560         | 25.4 × 50             | 0.15  | 2.46                                              | ESMM3B1VSN561MQ50S |                          | 390         | 25.4 × 50             | 0.15  | 2.12                                              | ESMM401VSN391MQ50S |
|                          | 560         | 30 × 35               | 0.15  | 2.63                                              | ESMM3B1VSN561MR35S |                          | 390         | 30 × 40               | 0.15  | 2.26                                              | ESMM401VSN391MR40S |
|                          | 560         | 35 × 30               | 0.15  | 2.69                                              | ESMM3B1VSN561MA30S |                          | 390         | 35 × 35               | 0.15  | 2.28                                              | ESMM401VSN391MA35S |
|                          | 680         | 30 × 45               | 0.15  | 2.82                                              | ESMM3B1VSN681MR45S | 420                      | 470         | 30 × 45               | 0.15  | 2.51                                              | ESMM401VSN471MR45S |
| 350                      | 680         | 35 × 35               | 0.15  | 3.05                                              | ESMM3B1VSN681MA35S |                          | 470         | 35 × 35               | 0.15  | 2.54                                              | ESMM401VSN471MA35S |
|                          | 820         | 30 × 50               | 0.15  | 3.28                                              | ESMM3B1VSN821MR50S |                          | 560         | 30 × 50               | 0.15  | 2.85                                              | ESMM401VSN561MR50S |
|                          | 820         | 35 × 40               | 0.15  | 3.45                                              | ESMM3B1VSN821MA40S |                          | 560         | 35 × 40               | 0.15  | 2.85                                              | ESMM401VSN561MA40S |
|                          | 1,000       | 35 × 45               | 0.15  | 3.59                                              | ESMM3B1VSN102MA45S |                          | 680         | 35 × 50               | 0.15  | 3.10                                              | ESMM401VSN681MA50S |
|                          | 82          | 22 × 20               | 0.15  | 0.72                                              | ESMM351VSN820MP20S |                          | 47          | 22 × 20               | 0.20  | 0.54                                              | ESMM421VSN470MP20S |
|                          | 120         | 22 × 25               | 0.15  | 1.04                                              | ESMM351VSN121MP25S |                          | 56          | 22 × 20               | 0.20  | 0.59                                              | ESMM421VSN560MP20S |
|                          | 120         | 25.4 × 20             | 0.15  | 0.90                                              | ESMM351VSN121MQ20S |                          | 68          | 25.4 × 20             | 0.20  | 0.68                                              | ESMM421VSN680MQ20S |
|                          | 150         | 22 × 30               | 0.15  | 1.20                                              | ESMM351VSN151MP30S |                          | 82          | 22 × 25               | 0.20  | 0.85                                              | ESMM421VSN820MP25S |
|                          | 150         | 25.4 × 25             | 0.15  | 1.22                                              | ESMM351VSN151MQ25S |                          | 82          | 25.4 × 20             | 0.20  | 0.74                                              | ESMM421VSN820MQ20S |
|                          | 150         | 30 × 20               | 0.15  | 1.06                                              | ESMM351VSN151MR20S |                          | 100         | 22 × 30               | 0.20  | 0.97                                              | ESMM421VSN101MP30S |
|                          | 180         | 22 × 30               | 0.15  | 1.34                                              | ESMM351VSN181MP30S |                          | 100         | 25.4 × 25             | 0.20  | 0.98                                              | ESMM421VSN101MQ25S |
|                          | 180         | 25.4 × 25             | 0.15  | 1.37                                              | ESMM351VSN181MQ25S |                          | 100         | 30 × 20               | 0.20  | 0.87                                              | ESMM421VSN101MR20S |



**SMM**Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>85°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>85°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|---------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|---------------------------------------------------|--------------------|
| 420                      | 120         | 22 × 30               | 0.20  | 1.07                                              | ESMM421VSN121MP30S | 450                      | 82          | 25.4 × 20             | 0.20  | 0.74                                              | ESMM451VSN820MQ20S |
|                          | 120         | 25.4 × 25             | 0.20  | 1.08                                              | ESMM421VSN121MQ25S |                          | 82          | 30 × 20               | 0.20  | 0.79                                              | ESMM451VSN820MR20S |
|                          | 120         | 30 × 20               | 0.20  | 0.95                                              | ESMM421VSN121MR20S |                          | 100         | 22 × 30               | 0.20  | 0.95                                              | ESMM451VSN101MP30S |
|                          | 150         | 22 × 35               | 0.20  | 1.21                                              | ESMM421VSN151MP35S |                          | 100         | 25.4 × 25             | 0.20  | 0.97                                              | ESMM451VSN101MQ25S |
|                          | 150         | 25.4 × 30             | 0.20  | 1.26                                              | ESMM421VSN151MQ30S |                          | 100         | 30 × 20               | 0.20  | 0.87                                              | ESMM451VSN101MR20S |
|                          | 150         | 30 × 25               | 0.20  | 1.30                                              | ESMM421VSN151MR25S |                          | 120         | 22 × 35               | 0.20  | 1.07                                              | ESMM451VSN121MP35S |
|                          | 150         | 35 × 20               | 0.20  | 1.11                                              | ESMM421VSN151MA20S |                          | 120         | 25.4 × 30             | 0.20  | 1.09                                              | ESMM451VSN121MQ30S |
|                          | 180         | 22 × 40               | 0.20  | 1.33                                              | ESMM421VSN181MP40S |                          | 120         | 30 × 25               | 0.20  | 1.12                                              | ESMM451VSN121MR25S |
|                          | 180         | 25.4 × 35             | 0.20  | 1.42                                              | ESMM421VSN181MQ35S |                          | 120         | 35 × 20               | 0.20  | 0.99                                              | ESMM451VSN121MA20S |
|                          | 180         | 30 × 25               | 0.20  | 1.48                                              | ESMM421VSN181MR25S |                          | 150         | 22 × 40               | 0.20  | 1.18                                              | ESMM451VSN151MP40S |
|                          | 180         | 35 × 20               | 0.20  | 1.16                                              | ESMM421VSN181MA20S |                          | 150         | 25.4 × 30             | 0.20  | 1.25                                              | ESMM451VSN151MQ30S |
|                          | 220         | 22 × 45               | 0.20  | 1.55                                              | ESMM421VSN221MP45S |                          | 150         | 30 × 25               | 0.20  | 1.29                                              | ESMM451VSN151MR25S |
|                          | 220         | 25.4 × 35             | 0.20  | 1.58                                              | ESMM421VSN221MQ35S |                          | 150         | 35 × 20               | 0.20  | 1.06                                              | ESMM451VSN151MA20S |
|                          | 220         | 30 × 30               | 0.20  | 1.65                                              | ESMM421VSN221MR30S |                          | 180         | 22 × 45               | 0.20  | 1.32                                              | ESMM451VSN181MP45S |
|                          | 220         | 35 × 25               | 0.20  | 1.47                                              | ESMM421VSN221MA25S |                          | 180         | 25.4 × 35             | 0.20  | 1.40                                              | ESMM451VSN181MQ35S |
|                          | 270         | 25.4 × 40             | 0.20  | 1.74                                              | ESMM421VSN271MQ40S |                          | 180         | 30 × 30               | 0.20  | 1.45                                              | ESMM451VSN181MR30S |
|                          | 270         | 30 × 35               | 0.20  | 1.90                                              | ESMM421VSN271MR35S |                          | 180         | 35 × 25               | 0.20  | 1.33                                              | ESMM451VSN181MA25S |
|                          | 270         | 35 × 30               | 0.20  | 1.94                                              | ESMM421VSN271MA30S |                          | 220         | 22 × 50               | 0.20  | 1.48                                              | ESMM451VSN221MP50S |
|                          | 330         | 25.4 × 50             | 0.20  | 2.20                                              | ESMM421VSN331MQ50S |                          | 220         | 25.4 × 40             | 0.20  | 1.59                                              | ESMM451VSN221MQ40S |
|                          | 330         | 30 × 35               | 0.20  | 1.98                                              | ESMM421VSN331MR35S |                          | 220         | 30 × 30               | 0.20  | 1.64                                              | ESMM451VSN221MR30S |
|                          | 330         | 35 × 35               | 0.20  | 2.17                                              | ESMM421VSN331MA35S |                          | 220         | 35 × 25               | 0.20  | 1.66                                              | ESMM451VSN221MA25S |
|                          | 390         | 30 × 40               | 0.20  | 2.22                                              | ESMM421VSN391MR40S |                          | 270         | 25.4 × 45             | 0.20  | 1.73                                              | ESMM451VSN271MQ45S |
|                          | 390         | 35 × 35               | 0.20  | 2.27                                              | ESMM421VSN391MA35S |                          | 270         | 30 × 35               | 0.20  | 1.89                                              | ESMM451VSN271MR35S |
|                          | 470         | 30 × 45               | 0.20  | 2.50                                              | ESMM421VSN471MR45S |                          | 270         | 35 × 30               | 0.20  | 1.90                                              | ESMM451VSN271MA30S |
|                          | 470         | 35 × 40               | 0.20  | 2.61                                              | ESMM421VSN471MA40S |                          | 330         | 25.4 × 50             | 0.20  | 2.12                                              | ESMM451VSN331MQ50S |
|                          | 560         | 35 × 45               | 0.20  | 2.95                                              | ESMM421VSN561MA45S |                          | 330         | 30 × 40               | 0.20  | 2.12                                              | ESMM451VSN331MR40S |
|                          | 680         | 35 × 50               | 0.20  | 3.15                                              | ESMM421VSN681MA50S |                          | 330         | 35 × 35               | 0.20  | 2.15                                              | ESMM451VSN331MA35S |
| 450                      | 47          | 22 × 20               | 0.20  | 0.54                                              | ESMM451VSN470MP20S | 390                      | 30 × 45     | 0.20                  | 2.35  | ESMM451VSN391MR45S                                |                    |
|                          | 56          | 22 × 20               | 0.20  | 0.59                                              | ESMM451VSN560MP20S | 390                      | 35 × 40     | 0.20                  | 2.38  | ESMM451VSN391MA40S                                |                    |
|                          | 68          | 22 × 25               | 0.20  | 0.71                                              | ESMM451VSN680MP25S | 470                      | 30 × 50     | 0.20                  | 2.65  | ESMM451VSN471MR50S                                |                    |
|                          | 68          | 25.4 × 20             | 0.20  | 0.68                                              | ESMM451VSN680MQ20S | 470                      | 35 × 45     | 0.20                  | 2.68  | ESMM451VSN471MA45S                                |                    |
|                          | 82          | 22 × 25               | 0.20  | 0.86                                              | ESMM451VSN820MP25S | 560                      | 35 × 50     | 0.20                  | 2.88  | ESMM451VSN561MA50S                                |                    |



# KRB Series

- Higher ripple current on high frequency band
- Endurance with high frequency ripple current : 3,000 hours at 105°C
- Rated voltage range : 400 to 450V<sub>dc</sub>, Capacitance range : 90 to 340μF
- Ideal for high frequency drive power conversion system applications such as solar power conditioners
- Non solvent resistant type
- RoHS2 Compliant

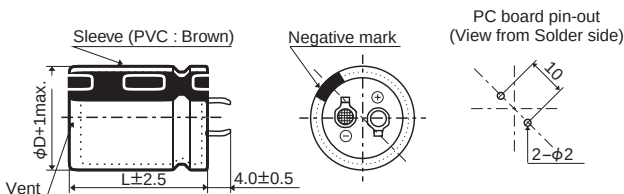


## SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                         |                                      |            |                  |
|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------------|------------------|
| Category                                               | -40 to +105°C                                                                                                                                                                                                                                                                           |                                      |            |                  |
| Temperature Range                                      |                                                                                                                                                                                                                                                                                         |                                      |            |                  |
| Rated Voltage Range                                    | 400 to 450V <sub>dc</sub>                                                                                                                                                                                                                                                               |                                      |            |                  |
| Capacitance Tolerance                                  | ± 20% (M) (at 20°C, 120Hz)                                                                                                                                                                                                                                                              |                                      |            |                  |
| Leakage Current                                        | I ≤ 3√CV<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C after 5 minutes)                                                                                                                                                         |                                      |            |                  |
| Dissipation Factor (tan δ)                             | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                        | 400V                                 | 420 & 450V | (at 20°C, 120Hz) |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                            | 0.15                                 | 0.20       |                  |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                        | 400V                                 | 420 & 450V | (at 120Hz)       |
|                                                        | Z(-25°C)/Z(+20°C)                                                                                                                                                                                                                                                                       | 3                                    | 8          |                  |
|                                                        | Z(-40°C)/Z(+20°C)                                                                                                                                                                                                                                                                       | 12                                   | 14         |                  |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 3,000 hours at 105°C.                                         |                                      |            |                  |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                      | ≤ ±20% of the initial value          |            |                  |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                            | ≤200% of the initial specified value |            |                  |
|                                                        | Leakage current                                                                                                                                                                                                                                                                         | ≤The initial specified value         |            |                  |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                      |            |                  |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                      | ≤ ±15% of the initial value          |            |                  |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                            | ≤150% of the initial specified value |            |                  |
|                                                        | Leakage current                                                                                                                                                                                                                                                                         | ≤The initial specified value         |            |                  |

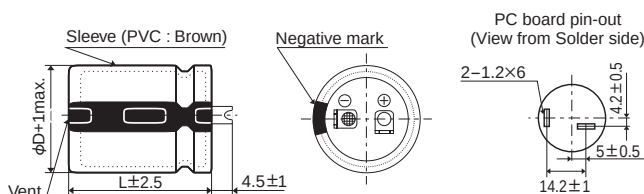
## DIMENSIONS [mm]

- Terminal Code : VS (φ30, φ35) : Standard

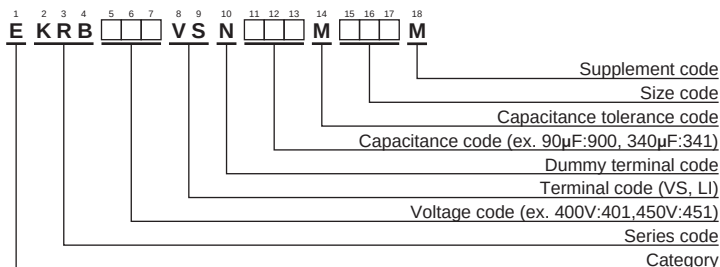


The standard design has no plastic disc.

- Terminal Code : LI (φ30, φ35)



## PART NUMBERING SYSTEM



Please refer to "Product code guide (snap-in type)"

**KRB**Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 100kHz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|-----------------------------------------------------|--------------------|
| 400                      | 120         | 30 × 35               | 0.15  | 5.54                                                | EKRB401VSN121MR35M |
|                          | 150         | 30 × 41               | 0.15  | 5.69                                                | EKRB401VSN151MR41M |
|                          | 170         | 30 × 46               | 0.15  | 5.83                                                | EKRB401VSN171MR46M |
|                          | 170         | 35 × 35               | 0.15  | 5.87                                                | EKRB401VSN171MA35M |
|                          | 200         | 30 × 51               | 0.15  | 5.97                                                | EKRB401VSN201MR51M |
|                          | 210         | 35 × 41               | 0.15  | 6.10                                                | EKRB401VSN211MA41M |
|                          | 220         | 30 × 54               | 0.15  | 6.06                                                | EKRB401VSN221MR54M |
|                          | 240         | 30 × 59               | 0.15  | 6.20                                                | EKRB401VSN241MR59M |
|                          | 240         | 35 × 46               | 0.15  | 6.30                                                | EKRB401VSN241MA46M |
|                          | 280         | 35 × 51               | 0.15  | 6.45                                                | EKRB401VSN281MA51M |
|                          | 300         | 35 × 54               | 0.15  | 6.60                                                | EKRB401VSN301MA54M |
|                          | 340         | 35 × 59               | 0.15  | 6.85                                                | EKRB401VSN341MA59M |
| 420                      | 100         | 30 × 35               | 0.20  | 4.58                                                | EKRB421VSN101MR35M |
|                          | 130         | 30 × 41               | 0.20  | 4.91                                                | EKRB421VSN131MR41M |
|                          | 140         | 30 × 46               | 0.20  | 5.15                                                | EKRB421VSN141MR46M |
|                          | 140         | 35 × 35               | 0.20  | 5.23                                                | EKRB421VSN141MA35M |
|                          | 170         | 30 × 51               | 0.20  | 5.39                                                | EKRB421VSN171MR51M |
|                          | 180         | 30 × 54               | 0.20  | 5.54                                                | EKRB421VSN181MR54M |
|                          | 180         | 35 × 41               | 0.20  | 5.63                                                | EKRB421VSN181MA41M |
|                          | 200         | 30 × 59               | 0.20  | 5.78                                                | EKRB421VSN201MR59M |
|                          | 210         | 35 × 46               | 0.20  | 5.95                                                | EKRB421VSN211MA46M |
|                          | 240         | 35 × 51               | 0.20  | 6.28                                                | EKRB421VSN241MA51M |
|                          | 260         | 35 × 54               | 0.20  | 6.47                                                | EKRB421VSN261MA54M |
|                          | 290         | 35 × 59               | 0.20  | 6.72                                                | EKRB421VSN291MA59M |

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 100kHz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|-----------------------------------------------------|--------------------|
| 450                      | 90          | 30 × 35               | 0.20  | 4.58                                                | EKRB451VSN900MR35M |
|                          | 110         | 30 × 41               | 0.20  | 4.91                                                | EKRB451VSN111MR41M |
|                          | 120         | 35 × 35               | 0.20  | 5.23                                                | EKRB451VSN121MA35M |
|                          | 130         | 30 × 46               | 0.20  | 5.15                                                | EKRB451VSN131MR46M |
|                          | 150         | 30 × 51               | 0.20  | 5.39                                                | EKRB451VSN151MR51M |
|                          | 160         | 30 × 54               | 0.20  | 5.54                                                | EKRB451VSN161MR54M |
|                          | 160         | 35 × 41               | 0.20  | 5.63                                                | EKRB451VSN161MA41M |
|                          | 180         | 30 × 59               | 0.20  | 5.78                                                | EKRB451VSN181MR59M |
|                          | 180         | 35 × 46               | 0.20  | 5.95                                                | EKRB451VSN181MA46M |
|                          | 210         | 35 × 51               | 0.20  | 6.28                                                | EKRB451VSN211MA51M |
|                          | 220         | 35 × 54               | 0.20  | 6.47                                                | EKRB451VSN221MA54M |
|                          | 250         | 35 × 59               | 0.20  | 6.72                                                | EKRB451VSN251MA59M |

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

| Frequency(Hz) | 50   | 120  | 300  | 1k   | 10k  | 50k  | 100k |
|---------------|------|------|------|------|------|------|------|
| 400 to 450V   | 0.22 | 0.33 | 0.49 | 0.73 | 1.00 | 1.00 | 1.00 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

## KHJ Series

- Higher ripple current from KMT series
- Endurance with ripple current : 3,000 hours at 105°C
- Rated voltage range : 400 to 450V<sub>dc</sub>, Capacitance range : 240 to 820μF
- For inverter control, switching power supplies
- Non solvent resistant type
- RoHS2 Compliant

KHJ

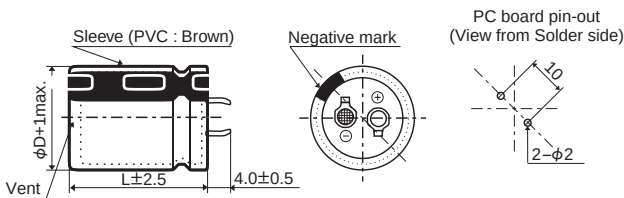
Higher ripple  
KMT

## ◆SPECIFICATIONS

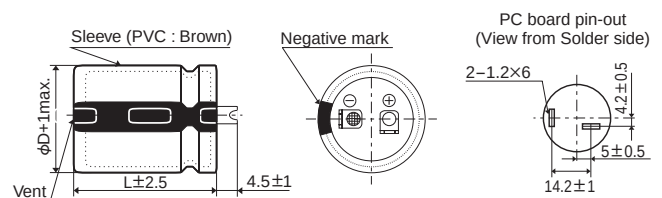
| Items                                                  | Characteristics                                                                                                                                                                                                                                                                       |                                       |            |                 |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|------------|-----------------|
| Category                                               | -40 to +105℃                                                                                                                                                                                                                                                                          |                                       |            |                 |
| Temperature Range                                      |                                                                                                                                                                                                                                                                                       |                                       |            |                 |
| Rated Voltage Range                                    | 400 to 450V <sub>dc</sub>                                                                                                                                                                                                                                                             |                                       |            |                 |
| Capacitance Tolerance                                  | ±20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                              |                                       |            |                 |
| Leakage Current                                        | I ≤ 3/CV<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 5 minutes)                                                                                                                                                        |                                       |            |                 |
| Dissipation Factor (tan δ)                             | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 400V                                  | 420 & 450V | (at 20℃, 120Hz) |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.15                                  | 0.20       |                 |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 400V                                  | 420 & 450V | (at 120Hz)      |
|                                                        | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 3                                     | 8          |                 |
|                                                        | Z(-40℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 12                                    | 14         |                 |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 3,000 hours at 105℃.                                         |                                       |            |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±20% of the initial value           |            |                 |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤ 200% of the initial specified value |            |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value         |            |                 |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                       |            |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±15% of the initial value           |            |                 |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤ 150% of the initial specified value |            |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value         |            |                 |

## ◆DIMENSIONS [mm]

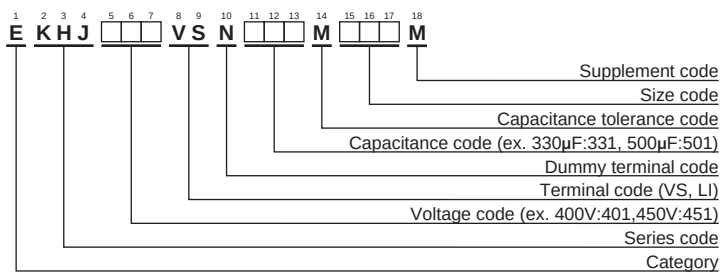
●Terminal Code : VS (φ30, φ35) : Standard



●Terminal Code : LI (φ30, φ35)



## ◆PART NUMBERING SYSTEM



Please refer to "Product code guide (snap-in type)"



## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|
| 400                      | 280         | 30 × 35               | 0.15  | 2.32                                               | EKHJ401VSN281MR35M | 420                      | 440         | 35 × 41               | 0.20  | 2.99                                               | EKHJ421VSN441MA41M |
|                          | 360         | 30 × 41               | 0.15  | 2.71                                               | EKHJ401VSN361MR41M |                          | 490         | 30 × 59               | 0.20  | 3.28                                               | EKHJ421VSN491MR59M |
|                          | 410         | 30 × 46               | 0.15  | 2.96                                               | EKHJ401VSN411MR46M |                          | 500         | 35 × 46               | 0.20  | 3.27                                               | EKHJ421VSN501MA46M |
|                          | 410         | 35 × 35               | 0.15  | 2.96                                               | EKHJ401VSN411MA35M |                          | 590         | 35 × 51               | 0.20  | 3.64                                               | EKHJ421VSN591MA51M |
|                          | 480         | 30 × 51               | 0.15  | 3.27                                               | EKHJ401VSN481MR51M |                          | 630         | 35 × 54               | 0.20  | 3.80                                               | EKHJ421VSN631MA54M |
|                          | 510         | 35 × 41               | 0.15  | 3.43                                               | EKHJ401VSN511MA41M |                          | 710         | 35 × 59               | 0.20  | 4.10                                               | EKHJ421VSN711MA59M |
|                          | 520         | 30 × 54               | 0.15  | 3.44                                               | EKHJ401VSN521MR54M | 450                      | 240         | 30 × 35               | 0.20  | 2.12                                               | EKHJ451VSN241MR35M |
|                          | 570         | 30 × 59               | 0.15  | 3.67                                               | EKHJ401VSN571MR59M |                          | 290         | 30 × 41               | 0.20  | 2.35                                               | EKHJ451VSN291MR41M |
|                          | 580         | 35 × 46               | 0.15  | 3.75                                               | EKHJ401VSN581MA46M |                          | 330         | 30 × 46               | 0.20  | 2.57                                               | EKHJ451VSN331MR46M |
|                          | 680         | 35 × 51               | 0.15  | 4.15                                               | EKHJ401VSN681MA51M |                          | 330         | 35 × 35               | 0.20  | 2.50                                               | EKHJ451VSN331MA35M |
|                          | 740         | 35 × 54               | 0.15  | 4.38                                               | EKHJ401VSN741MA54M |                          | 380         | 30 × 51               | 0.20  | 2.81                                               | EKHJ451VSN381MR51M |
|                          | 820         | 35 × 59               | 0.15  | 4.69                                               | EKHJ401VSN821MA59M |                          | 410         | 30 × 54               | 0.20  | 2.96                                               | EKHJ451VSN411MR54M |
| 420                      | 250         | 30 × 35               | 0.20  | 2.12                                               | EKHJ421VSN251MR35M |                          | 410         | 35 × 41               | 0.20  | 2.89                                               | EKHJ451VSN411MA41M |
|                          | 310         | 30 × 41               | 0.20  | 2.43                                               | EKHJ421VSN311MR41M |                          | 460         | 30 × 59               | 0.20  | 3.18                                               | EKHJ451VSN461MR59M |
|                          | 350         | 35 × 35               | 0.20  | 2.57                                               | EKHJ421VSN351MA35M |                          | 460         | 35 × 46               | 0.20  | 3.14                                               | EKHJ451VSN461MA46M |
|                          | 360         | 30 × 46               | 0.20  | 2.68                                               | EKHJ421VSN361MR46M |                          | 550         | 35 × 51               | 0.20  | 3.51                                               | EKHJ451VSN551MA51M |
|                          | 420         | 30 × 51               | 0.20  | 2.96                                               | EKHJ421VSN421MR51M |                          | 590         | 35 × 54               | 0.20  | 3.68                                               | EKHJ451VSN591MA54M |
|                          | 440         | 30 × 54               | 0.20  | 3.06                                               | EKHJ421VSN441MR54M |                          | 660         | 35 × 59               | 0.20  | 3.95                                               | EKHJ451VSN661MA59M |

## ◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multipliers

| Frequency(Hz) | 50   | 120  | 300  | 1k   | 10k  | 50k  |
|---------------|------|------|------|------|------|------|
| 400 to 450V   | 0.72 | 1.00 | 1.21 | 1.38 | 1.48 | 1.46 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

# KMT Series

- Higher ripple current from KMS series
- Endurance with ripple current : 3,000 hours at 105°C
- Rated voltage range : 420, 450V<sub>dc</sub>, Capacitance range : 82 to 680μF
- For inverter control, switching power supplies
- Non solvent resistant type
- RoHS2 Compliant

KMT

Higher ripple  
KMS

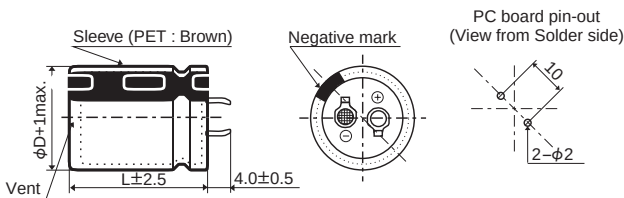


## SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                         |                                       |                  |
|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|------------------|
| Category                                               | -25 to +105°C                                                                                                                                                                                                                                                                           |                                       |                  |
| Temperature Range                                      |                                                                                                                                                                                                                                                                                         |                                       |                  |
| Rated Voltage Range                                    | 420, 450V <sub>dc</sub>                                                                                                                                                                                                                                                                 |                                       |                  |
| Capacitance Tolerance                                  | ±20% (M) (at 20°C, 120Hz)                                                                                                                                                                                                                                                               |                                       |                  |
| Leakage Current                                        | I ≤ 3/CV<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C after 5 minutes)                                                                                                                                                         |                                       |                  |
| Dissipation Factor (tan δ)                             | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                        | 420 & 450V                            | (at 20°C, 120Hz) |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                            | 0.20                                  |                  |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                        | 420 & 450V                            | (at 120Hz)       |
|                                                        | Z(-25°C)/Z(+20°C)                                                                                                                                                                                                                                                                       | 8                                     |                  |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 3,000 hours at 105°C.                                         |                                       |                  |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                      | ≤ ±20% of the initial value           |                  |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                            | ≤ 200% of the initial specified value |                  |
|                                                        | Leakage current                                                                                                                                                                                                                                                                         | ≤ The initial specified value         |                  |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                       |                  |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                      | ≤ ±15% of the initial value           |                  |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                            | ≤ 150% of the initial specified value |                  |
|                                                        | Leakage current                                                                                                                                                                                                                                                                         | ≤ The initial specified value         |                  |

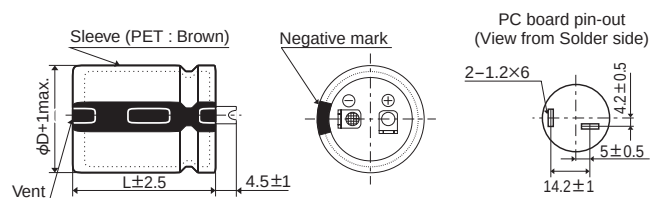
## DIMENSIONS [mm]

Terminal Code : VS (φ22 to φ35) : Standard

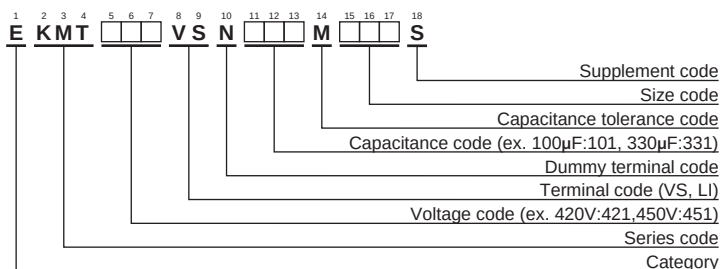


The standard design has no plastic disc.

Terminal Code : LI (φ35)



## PART NUMBERING SYSTEM



Please refer to "Product code guide (snap-in type)"

**KMT** Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|
| 420                      | 100         | 22 × 25               | 0.20  | 0.89                                               | EKMT421VSN101MP25S | 450                      | 82          | 22 × 25               | 0.20  | 0.81                                               | EKMT451VSN820MP25S |
|                          | 120         | 22 × 30               | 0.20  | 1.06                                               | EKMT421VSN121MP30S |                          | 100         | 22 × 30               | 0.20  | 0.97                                               | EKMT451VSN101MP30S |
|                          | 120         | 25.4 × 25             | 0.20  | 1.09                                               | EKMT421VSN121MQ25S |                          | 100         | 25.4 × 25             | 0.20  | 1.04                                               | EKMT451VSN101MQ25S |
|                          | 150         | 22 × 35               | 0.20  | 1.21                                               | EKMT421VSN151MP35S |                          | 120         | 22 × 35               | 0.20  | 1.08                                               | EKMT451VSN121MP35S |
|                          | 180         | 22 × 40               | 0.20  | 1.34                                               | EKMT421VSN181MP40S |                          | 150         | 22 × 40               | 0.20  | 1.22                                               | EKMT451VSN151MP40S |
|                          | 180         | 25.4 × 30             | 0.20  | 1.28                                               | EKMT421VSN181MQ30S |                          | 150         | 25.4 × 35             | 0.20  | 1.31                                               | EKMT451VSN151MQ35S |
|                          | 180         | 30 × 25               | 0.20  | 1.42                                               | EKMT421VSN181MR25S |                          | 150         | 30 × 25               | 0.20  | 1.31                                               | EKMT451VSN151MR25S |
|                          | 220         | 22 × 45               | 0.20  | 1.47                                               | EKMT421VSN221MP45S |                          | 180         | 22 × 45               | 0.20  | 1.35                                               | EKMT451VSN181MP45S |
|                          | 220         | 22 × 50               | 0.20  | 1.60                                               | EKMT421VSN221MP50S |                          | 180         | 22 × 50               | 0.20  | 1.42                                               | EKMT451VSN181MP50S |
|                          | 220         | 25.4 × 35             | 0.20  | 1.47                                               | EKMT421VSN221MQ35S |                          | 180         | 25.4 × 40             | 0.20  | 1.35                                               | EKMT451VSN181MQ40S |
|                          | 220         | 30 × 30               | 0.20  | 1.64                                               | EKMT421VSN221MR30S |                          | 180         | 30 × 30               | 0.20  | 1.49                                               | EKMT451VSN181MR30S |
|                          | 220         | 35 × 25               | 0.20  | 1.64                                               | EKMT421VSN221MA25S |                          | 180         | 35 × 25               | 0.20  | 1.60                                               | EKMT451VSN181MA25S |
|                          | 270         | 25.4 × 40             | 0.20  | 1.63                                               | EKMT421VSN271MQ40S |                          | 220         | 25.4 × 45             | 0.20  | 1.55                                               | EKMT451VSN221MQ45S |
|                          | 270         | 25.4 × 45             | 0.20  | 1.79                                               | EKMT421VSN271MQ45S |                          | 220         | 30 × 35               | 0.20  | 1.71                                               | EKMT451VSN221MR35S |
|                          | 270         | 30 × 35               | 0.20  | 1.87                                               | EKMT421VSN271MR35S |                          | 270         | 25.4 × 50             | 0.20  | 1.74                                               | EKMT451VSN271MQ50S |
|                          | 330         | 25.4 × 50             | 0.20  | 1.93                                               | EKMT421VSN331MQ50S |                          | 270         | 30 × 40               | 0.20  | 1.90                                               | EKMT451VSN271MR40S |
|                          | 330         | 30 × 40               | 0.20  | 2.10                                               | EKMT421VSN331MR40S |                          | 270         | 35 × 30               | 0.20  | 1.90                                               | EKMT451VSN271MA30S |
|                          | 330         | 35 × 30               | 0.20  | 2.05                                               | EKMT421VSN331MA30S |                          | 330         | 30 × 45               | 0.20  | 2.20                                               | EKMT451VSN331MR45S |
|                          | 390         | 30 × 45               | 0.20  | 2.32                                               | EKMT421VSN391MR45S |                          | 330         | 35 × 35               | 0.20  | 2.20                                               | EKMT451VSN331MA35S |
|                          | 390         | 35 × 35               | 0.20  | 2.32                                               | EKMT421VSN391MA35S |                          | 390         | 30 × 50               | 0.20  | 2.40                                               | EKMT451VSN391MR50S |
|                          | 470         | 30 × 50               | 0.20  | 2.51                                               | EKMT421VSN471MR50S |                          | 390         | 35 × 40               | 0.20  | 2.42                                               | EKMT451VSN391MA40S |
|                          | 470         | 35 × 40               | 0.20  | 2.62                                               | EKMT421VSN471MA40S |                          | 470         | 35 × 45               | 0.20  | 2.67                                               | EKMT451VSN471MA45S |
|                          | 560         | 35 × 45               | 0.20  | 2.88                                               | EKMT421VSN561MA45S |                          | 560         | 35 × 50               | 0.20  | 2.85                                               | EKMT451VSN561MA50S |
|                          | 680         | 35 × 50               | 0.20  | 3.10                                               | EKMT421VSN681MA50S |                          |             |                       |       |                                                    |                    |

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

| Frequency(Hz)           | 50   | 120  | 300  | 1k   | 10k  | 50k  |
|-------------------------|------|------|------|------|------|------|
| 420, 450V <sub>dc</sub> | 0.68 | 1.00 | 1.16 | 1.30 | 1.41 | 1.43 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

# KHX Series

New!

- The KMS series has been improved to have a higher capacitance and ripple current.
- Endurance with ripple current : 105°C 3,000 hours
- Rated voltage range : 350 to 400V
- Capacitance range : 150 to 1,570μF
- Suitable for use in switching power supply equipment and inverters.
- Non solvent resistant type
- The logo mark printed on the sleeve will be changed.
- RoHS2 Compliant

KHX

↑ Downsizing  
Higher ripple  
KMS

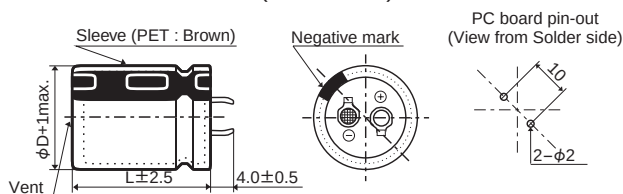


## SPECIFICATIONS

| Items                                                        | Characteristics                                                                                                                                                                                                                                                                       |                                      |                 |
|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-----------------|
| Category                                                     | -40 to +105℃                                                                                                                                                                                                                                                                          |                                      |                 |
| Temperature Range                                            |                                                                                                                                                                                                                                                                                       |                                      |                 |
| Rated Voltage Range                                          | 350 to 400V <sub>dc</sub>                                                                                                                                                                                                                                                             |                                      |                 |
| Capacitance Tolerance                                        | ± 20% (M)                                                                                                                                                                                                                                                                             |                                      | (at 20℃, 120Hz) |
| Leakage Current                                              | I ≤ 3√CV<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 5 minutes)                                                                                                                                                        |                                      |                 |
| Dissipation Factor<br>(tan δ)                                | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 350 to 400V                          | (at 20℃, 120Hz) |
|                                                              | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.15                                 |                 |
| Low Temperature<br>Characteristics<br>(Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 350 to 400V                          | (at 120Hz)      |
|                                                              | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 5                                    |                 |
|                                                              | Z(-40℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 20                                   |                 |
| Endurance                                                    | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 3,000 hours at 105℃.                                         |                                      |                 |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±20% of the initial value          |                 |
|                                                              | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤200% of the initial specified value |                 |
|                                                              | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value        |                 |
| Shelf Life                                                   | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                      |                 |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±15% of the initial value          |                 |
|                                                              | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤150% of the initial specified value |                 |
|                                                              | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value        |                 |

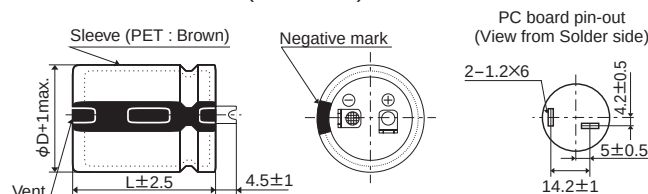
## DIMENSIONS [mm]

● Terminal Code : VS (φ22 to φ35) : Standard

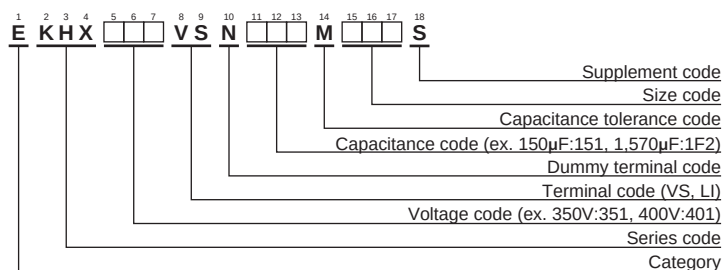


The standard design has no plastic disc.

● Terminal Code : LI (φ30, φ35)



## PART NUMBERING SYSTEM



Please refer to "Product code guide (snap-in type)"





## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.            | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|---------------------|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|
| 350                      | 180         | 22 × 25               | 0.15  | 1.43                                               | EKHX351VSN181MP25S  | 375                      | 560         | 30 × 35               | 0.15  | 2.65                                               | EKHX3H1VSN561MR35S |
|                          | 230         | 22 × 30               | 0.15  | 1.70                                               | EKHX351VSN231MP30S  |                          | 570         | 25.4 × 50             | 0.15  | 2.88                                               | EKHX3H1VSN571MQ50S |
|                          | 250         | 25.4 × 25             | 0.15  | 1.68                                               | EKHX351VSN251MQ25S  |                          | 590         | 35 × 30               | 0.15  | 2.47                                               | EKHX3H1VSN591MA30S |
|                          | 290         | 22 × 35               | 0.15  | 1.95                                               | EKHX351VSN291MP35S  |                          | 640         | 25.4 × 55             | 0.15  | 3.10                                               | EKHX3H1VSN641MQ55S |
|                          | 330         | 25.4 × 30             | 0.15  | 1.99                                               | EKHX351VSN331MQ30S  |                          | 660         | 30 × 40               | 0.15  | 2.96                                               | EKHX3H1VSN661MR40S |
|                          | 340         | 22 × 40               | 0.15  | 2.16                                               | EKHX351VSN341MP40S  |                          | 710         | 25.4 × 60             | 0.15  | 3.32                                               | EKHX3H1VSN711MQ60S |
|                          | 380         | 30 × 25               | 0.15  | 2.11                                               | EKHX351VSN381MR25S  |                          | 730         | 35 × 35               | 0.15  | 2.79                                               | EKHX3H1VSN731MA35S |
|                          | 390         | 22 × 45               | 0.15  | 2.36                                               | EKHX351VSN391MP45S  |                          | 770         | 30 × 45               | 0.15  | 3.28                                               | EKHX3H1VSN771MR45S |
|                          | 400         | 25.4 × 35             | 0.15  | 2.28                                               | EKHX351VSN401MQ35S  |                          | 870         | 30 × 50               | 0.15  | 3.54                                               | EKHX3H1VSN871MR50S |
|                          | 450         | 22 × 50               | 0.15  | 2.59                                               | EKHX351VSN451MP50S  |                          | 870         | 35 × 40               | 0.15  | 3.15                                               | EKHX3H1VSN871MA40S |
|                          | 480         | 25.4 × 40             | 0.15  | 2.55                                               | EKHX351VSN481MQ40S  |                          | 980         | 30 × 55               | 0.15  | 3.84                                               | EKHX3H1VSN981MR55S |
|                          | 490         | 35 × 25               | 0.15  | 2.22                                               | EKHX351VSN491MA25S  |                          | 1,020       | 35 × 45               | 0.15  | 3.50                                               | EKHX3H1VSN102MA45S |
|                          | 500         | 22 × 55               | 0.15  | 2.78                                               | EKHX351VSN501MP55S  |                          | 1,080       | 30 × 60               | 0.15  | 4.10                                               | EKHX3H1VSN112MR60S |
|                          | 500         | 30 × 30               | 0.15  | 2.45                                               | EKHX351VSN501MR30S  |                          | 1,160       | 35 × 50               | 0.15  | 3.81                                               | EKHX3H1VSN112MA50S |
|                          | 550         | 25.4 × 45             | 0.15  | 2.78                                               | EKHX351VSN551MQ45S  |                          | 1,300       | 35 × 55               | 0.15  | 4.12                                               | EKHX3H1VSN132MA55S |
|                          | 560         | 22 × 60               | 0.15  | 3.00                                               | EKHX351VSN561MP60S  |                          | 1,440       | 35 × 60               | 0.15  | 4.42                                               | EKHX3H1VSN1E2MA60S |
|                          | 610         | 30 × 35               | 0.15  | 2.77                                               | EKHX351VSN611MR35S  | 400                      | 150         | 22 × 25               | 0.15  | 1.31                                               | EKHX401VSN151MP25S |
|                          | 630         | 25.4 × 50             | 0.15  | 3.03                                               | EKHX351VSN631MQ50S  |                          | 200         | 22 × 30               | 0.15  | 1.58                                               | EKHX401VSN201MP30S |
|                          | 640         | 35 × 30               | 0.15  | 2.58                                               | EKHX351VSN641MA30S  |                          | 220         | 25.4 × 25             | 0.15  | 1.58                                               | EKHX401VSN221MQ25S |
|                          | 700         | 25.4 × 55             | 0.15  | 3.24                                               | EKHX351VSN701MQ55S  |                          | 250         | 22 × 35               | 0.15  | 1.81                                               | EKHX401VSN251MP35S |
|                          | 720         | 30 × 40               | 0.15  | 3.09                                               | EKHX351VSN721MR40S  |                          | 280         | 25.4 × 30             | 0.15  | 1.83                                               | EKHX401VSN281MQ30S |
|                          | 780         | 25.4 × 60             | 0.15  | 3.48                                               | EKHX351VSN781MQ60S  |                          | 290         | 22 × 40               | 0.15  | 1.99                                               | EKHX401VSN291MP40S |
|                          | 800         | 35 × 35               | 0.15  | 2.92                                               | EKHX351VSN801MA35S  |                          | 330         | 30 × 25               | 0.15  | 1.96                                               | EKHX401VSN331MR25S |
|                          | 840         | 30 × 45               | 0.15  | 3.43                                               | EKHX351VSN841MR45S  |                          | 340         | 22 × 45               | 0.15  | 2.20                                               | EKHX401VSN341MP45S |
|                          | 950         | 30 × 50               | 0.15  | 3.70                                               | EKHX351VSN951MR50S  |                          | 340         | 25.4 × 35             | 0.15  | 2.10                                               | EKHX401VSN341MQ35S |
|                          | 950         | 35 × 40               | 0.15  | 3.29                                               | EKHX351VSN951MA40S  |                          | 390         | 22 × 50               | 0.15  | 2.41                                               | EKHX401VSN391MP50S |
|                          | 1,060       | 30 × 55               | 0.15  | 3.99                                               | EKHX351VSN1061MR55S |                          | 410         | 25.4 × 40             | 0.15  | 2.35                                               | EKHX401VSN411MQ40S |
|                          | 1,110       | 35 × 45               | 0.15  | 3.65                                               | EKHX351VSN111MA45S  |                          | 420         | 35 × 25               | 0.15  | 2.05                                               | EKHX401VSN421MA25S |
|                          | 1,180       | 30 × 60               | 0.15  | 4.29                                               | EKHX351VSN118MA60S  |                          | 430         | 22 × 55               | 0.15  | 2.58                                               | EKHX401VSN431MP55S |
|                          | 1,260       | 35 × 50               | 0.15  | 3.98                                               | EKHX351VSN126MA50S  |                          | 430         | 30 × 30               | 0.15  | 2.27                                               | EKHX401VSN431MR30S |
|                          | 1,420       | 35 × 55               | 0.15  | 4.31                                               | EKHX351VSN142MA55S  |                          | 470         | 25.4 × 45             | 0.15  | 2.57                                               | EKHX401VSN471MQ45S |
|                          | 1,570       | 35 × 60               | 0.15  | 4.61                                               | EKHX351VSN157MA60S  |                          | 480         | 22 × 60               | 0.15  | 2.77                                               | EKHX401VSN481MP60S |
| 375                      | 160         | 22 × 25               | 0.15  | 1.35                                               | EKHX3H1VSN161MP25S  |                          | 520         | 30 × 35               | 0.15  | 2.55                                               | EKHX401VSN521MR35S |
|                          | 210         | 22 × 30               | 0.15  | 1.62                                               | EKHX3H1VSN211MP30S  |                          | 540         | 25.4 × 50             | 0.15  | 2.80                                               | EKHX401VSN541MQ50S |
|                          | 230         | 25.4 × 25             | 0.15  | 1.61                                               | EKHX3H1VSN231MQ25S  |                          | 550         | 35 × 30               | 0.15  | 2.39                                               | EKHX401VSN551MA30S |
|                          | 260         | 22 × 35               | 0.15  | 1.85                                               | EKHX3H1VSN261MP35S  |                          | 600         | 25.4 × 55             | 0.15  | 3.00                                               | EKHX401VSN601MQ55S |
|                          | 300         | 25.4 × 30             | 0.15  | 1.89                                               | EKHX3H1VSN301MQ30S  |                          | 620         | 30 × 40               | 0.15  | 2.87                                               | EKHX401VSN621MR40S |
|                          | 310         | 22 × 40               | 0.15  | 2.06                                               | EKHX3H1VSN311MP40S  |                          | 670         | 25.4 × 60             | 0.15  | 3.22                                               | EKHX401VSN671MQ60S |
|                          | 350         | 30 × 25               | 0.15  | 2.02                                               | EKHX3H1VSN351MR25S  |                          | 690         | 35 × 35               | 0.15  | 2.71                                               | EKHX401VSN691MA35S |
|                          | 360         | 22 × 45               | 0.15  | 2.26                                               | EKHX3H1VSN361MP45S  |                          | 720         | 30 × 45               | 0.15  | 3.17                                               | EKHX401VSN721MR45S |
|                          | 370         | 25.4 × 35             | 0.15  | 2.19                                               | EKHX3H1VSN371MQ35S  |                          | 820         | 30 × 50               | 0.15  | 3.44                                               | EKHX401VSN821MR50S |
|                          | 410         | 22 × 50               | 0.15  | 2.47                                               | EKHX3H1VSN411MP50S  |                          | 820         | 35 × 40               | 0.15  | 3.06                                               | EKHX401VSN821MA40S |
|                          | 440         | 25.4 × 40             | 0.15  | 2.44                                               | EKHX3H1VSN441MQ40S  |                          | 920         | 30 × 55               | 0.15  | 3.72                                               | EKHX401VSN921MR55S |
|                          | 450         | 30 × 30               | 0.15  | 2.32                                               | EKHX3H1VSN451MR30S  |                          | 950         | 35 × 45               | 0.15  | 3.38                                               | EKHX401VSN951MA45S |
|                          | 450         | 35 × 25               | 0.15  | 2.12                                               | EKHX3H1VSN451MA25S  |                          | 1,010       | 30 × 60               | 0.15  | 3.97                                               | EKHX401VSN102MR60S |
|                          | 460         | 22 × 55               | 0.15  | 2.67                                               | EKHX3H1VSN461MP55S  |                          | 1,090       | 35 × 50               | 0.15  | 3.70                                               | EKHX401VSN112MA50S |
|                          | 500         | 25.4 × 45             | 0.15  | 2.65                                               | EKHX3H1VSN501MQ45S  |                          | 1,220       | 35 × 55               | 0.15  | 3.99                                               | EKHX401VSN122MA55S |
|                          | 510         | 22 × 60               | 0.15  | 2.86                                               | EKHX3H1VSN511MP60S  |                          | 1,350       | 35 × 60               | 0.15  | 4.28                                               | EKHX401VSN1D2MA60S |



## ◆ HIGHER RIPPLE CURRENT RATINGS

| WV (V <sub>dc</sub> ) | Cap (μF) | Case size φD×L(mm) | tan δ | Rated ripple current (Arms/105°C, 120Hz) | Part No.           | WV (V <sub>dc</sub> ) | Cap (μF) | Case size φD×L(mm) | tan δ | Rated ripple current (Arms/105°C, 120Hz) | Part No.           |
|-----------------------|----------|--------------------|-------|------------------------------------------|--------------------|-----------------------|----------|--------------------|-------|------------------------------------------|--------------------|
| 350                   | 340      | 30 × 25            | 0.15  | 2.47                                     | EKHX351VSN341MR25S | 375                   | 810      | 30 × 50            | 0.15  | 4.23                                     | EKHX3H1VSN811MR50S |
|                       | 450      | 30 × 30            | 0.15  | 2.87                                     | EKHX351VSN451MR30S |                       | 830      | 35 × 40            | 0.15  | 4.07                                     | EKHX3H1VSN831MA40S |
|                       | 470      | 35 × 25            | 0.15  | 2.87                                     | EKHX351VSN471MA25S |                       | 910      | 30 × 55            | 0.15  | 4.57                                     | EKHX3H1VSN911MR55S |
|                       | 560      | 30 × 35            | 0.15  | 3.28                                     | EKHX351VSN561MR35S |                       | 970      | 35 × 45            | 0.15  | 4.52                                     | EKHX3H1VSN971MA45S |
|                       | 620      | 35 × 30            | 0.15  | 3.36                                     | EKHX351VSN621MA30S |                       | 1,010    | 30 × 60            | 0.15  | 4.91                                     | EKHX3H1VSN102MR60S |
|                       | 670      | 30 × 40            | 0.15  | 3.69                                     | EKHX351VSN671MR40S |                       | 1,110    | 35 × 50            | 0.15  | 4.94                                     | EKHX3H1VSN112MA50S |
|                       | 760      | 35 × 35            | 0.15  | 3.77                                     | EKHX351VSN761MA35S |                       | 1,240    | 35 × 55            | 0.15  | 5.33                                     | EKHX3H1VSN1C2MA55S |
|                       | 770      | 30 × 45            | 0.15  | 4.06                                     | EKHX351VSN771MR45S |                       | 1,380    | 35 × 60            | 0.15  | 5.72                                     | EKHX3H1VSN142MA60S |
|                       | 880      | 30 × 50            | 0.15  | 4.41                                     | EKHX351VSN881MR50S | 400                   | 290      | 30 × 25            | 0.15  | 2.28                                     | EKHX401VSN291MR25S |
|                       | 910      | 35 × 40            | 0.15  | 4.26                                     | EKHX351VSN911MA40S |                       | 390      | 30 × 30            | 0.15  | 2.67                                     | EKHX401VSN391MR30S |
|                       | 990      | 30 × 55            | 0.15  | 4.77                                     | EKHX351VSN991MR55S |                       | 400      | 35 × 25            | 0.15  | 2.65                                     | EKHX401VSN401MA25S |
|                       | 1,060    | 35 × 45            | 0.15  | 4.73                                     | EKHX351VSN1A2MA45S |                       | 480      | 30 × 35            | 0.15  | 3.04                                     | EKHX401VSN481MR35S |
|                       | 1,100    | 30 × 60            | 0.15  | 5.12                                     | EKHX351VSN112MR60S |                       | 530      | 35 × 30            | 0.15  | 3.10                                     | EKHX401VSN531MA30S |
|                       | 1,210    | 35 × 50            | 0.15  | 5.15                                     | EKHX351VSN122MA50S |                       | 570      | 30 × 40            | 0.15  | 3.40                                     | EKHX401VSN571MR40S |
|                       | 1,350    | 35 × 55            | 0.15  | 5.56                                     | EKHX351VSN1D2MA55S |                       | 660      | 35 × 35            | 0.15  | 3.51                                     | EKHX401VSN661MA35S |
|                       | 1,500    | 35 × 60            | 0.15  | 5.97                                     | EKHX351VSN152MA60S |                       | 670      | 30 × 45            | 0.15  | 3.78                                     | EKHX401VSN671MR45S |
| 375                   | 310      | 30 × 25            | 0.15  | 2.36                                     | EKHX3H1VSN311MR25S |                       | 760      | 30 × 50            | 0.15  | 4.10                                     | EKHX401VSN761MR50S |
|                       | 410      | 30 × 30            | 0.15  | 2.74                                     | EKHX3H1VSN411MR30S |                       | 780      | 35 × 40            | 0.15  | 3.95                                     | EKHX401VSN781MA40S |
|                       | 430      | 35 × 25            | 0.15  | 2.75                                     | EKHX3H1VSN431MA25S |                       | 850      | 30 × 55            | 0.15  | 4.42                                     | EKHX401VSN851MR55S |
|                       | 510      | 30 × 35            | 0.15  | 3.13                                     | EKHX3H1VSN511MR35S |                       | 910      | 35 × 45            | 0.15  | 4.38                                     | EKHX401VSN911MA45S |
|                       | 560      | 35 × 30            | 0.15  | 3.19                                     | EKHX3H1VSN561MA30S |                       | 940      | 30 × 60            | 0.15  | 4.74                                     | EKHX401VSN941MR60S |
|                       | 610      | 30 × 40            | 0.15  | 3.52                                     | EKHX3H1VSN611MR40S |                       | 1,040    | 35 × 50            | 0.15  | 4.78                                     | EKHX401VSN1A2MA50S |
|                       | 700      | 35 × 35            | 0.15  | 3.62                                     | EKHX3H1VSN701MA35S |                       | 1,160    | 35 × 55            | 0.15  | 5.15                                     | EKHX401VSN1B2MA55S |
|                       | 710      | 30 × 45            | 0.15  | 3.90                                     | EKHX3H1VSN711MR45S |                       | 1,290    | 35 × 60            | 0.15  | 5.53                                     | EKHX401VSN132MA60S |

## ◆ RATED RIPPLE CURRENT MULTIPLIERS

### ● Frequency Multipliers

| Frequency(Hz)             | 50   | 120  | 300  | 1k   | 10k  | 50k  |
|---------------------------|------|------|------|------|------|------|
| 350 to 400V <sub>dc</sub> | 0.70 | 1.00 | 1.10 | 1.17 | 1.25 | 1.31 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

# KHU Series Upgrade!

- Lineup of high withstand voltage products for server power supplies and solar power generation applications
- Endurance with ripple current : 3,000 hours at 105°C
- Rated voltage range: 400 to 500V, Capacitance range: 120 to 1,910μF
- Non solvent resistant type
- RoHS2 Compliant

**KHU**

↑ Downsizing

KHS

↑ Downsizing

KMS

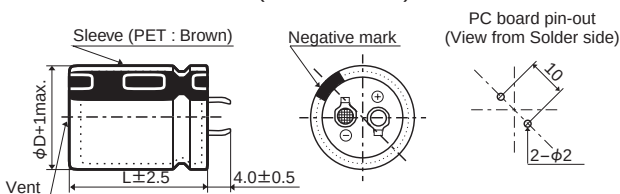


## SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                       |                                      |                 |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-----------------|
| Category                                               |                                                                                                                                                                                                                                                                                       |                                      |                 |
| Temperature Range                                      | -40 to +105℃                                                                                                                                                                                                                                                                          |                                      |                 |
| Rated Voltage Range                                    | 400 to 500V <sub>dc</sub>                                                                                                                                                                                                                                                             |                                      |                 |
| Capacitance Tolerance                                  | ± 20% (M)                                                                                                                                                                                                                                                                             |                                      | (at 20℃, 120Hz) |
| Leakage Current                                        | I ≤ 3√CV<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)<br>(at 20℃ after 5 minutes)                                                                                                                                                     |                                      |                 |
| Dissipation Factor (tan δ)                             | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 400 to 500V                          | (at 20℃, 120Hz) |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.20                                 |                 |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 400 to 500V                          | (at 120Hz)      |
|                                                        | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 8                                    |                 |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 3,000 hours at 105℃.                                         |                                      |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±20% of the initial value          |                 |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤200% of the initial specified value |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value         |                 |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                      |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±15% of the initial value          |                 |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤150% of the initial specified value |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value         |                 |

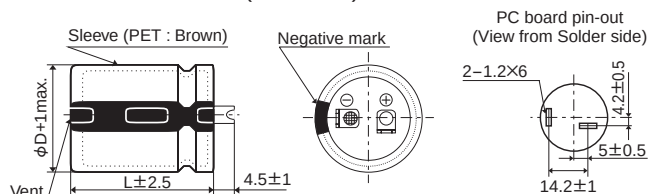
## DIMENSIONS [mm]

● Terminal Code : VS (φ25.4 to φ35) : Standard

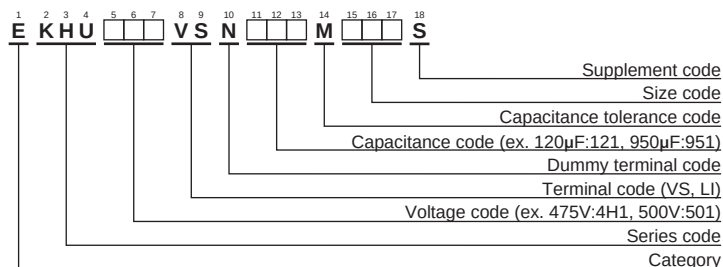


The standard design has no plastic disc.

● Terminal Code : LI (φ30, φ35)



## PART NUMBERING SYSTEM



Please refer to "Product code guide (snap-in type)"



# LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS



## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|
| 400                      | 240         | 25.4 × 25             | 0.20  | 1.17                                               | EKHU401VSN241MQ25S | 420                      | 850         | 30 × 50               | 0.20  | 2.52                                               | EKHU421VSN851MR50S |
|                          | 310         | 25.4 × 30             | 0.20  | 1.37                                               | EKHU401VSN311MQ30S |                          | 850         | 35 × 40               | 0.20  | 2.23                                               | EKHU421VSN851MA40S |
|                          | 360         | 30 × 25               | 0.20  | 1.48                                               | EKHU401VSN361MR25S |                          | 960         | 30 × 55               | 0.20  | 2.73                                               | EKHU421VSN961MR55S |
|                          | 380         | 25.4 × 35             | 0.20  | 1.58                                               | EKHU401VSN381MQ35S |                          | 980         | 35 × 45               | 0.20  | 2.45                                               | EKHU421VSN981MA45S |
|                          | 450         | 25.4 × 40             | 0.20  | 1.75                                               | EKHU401VSN451MQ40S |                          | 1,040       | 30 × 60               | 0.20  | 2.90                                               | EKHU421VSN1A2MR60S |
|                          | 460         | 35 × 25               | 0.20  | 1.53                                               | EKHU401VSN461MA25S |                          | 1,100       | 30 × 65               | 0.20  | 3.04                                               | EKHU421VSN112MR65S |
|                          | 470         | 30 × 30               | 0.20  | 1.71                                               | EKHU401VSN471MR30S |                          | 1,120       | 35 × 50               | 0.20  | 2.68                                               | EKHU421VSN112MA50S |
|                          | 520         | 25.4 × 45             | 0.20  | 1.92                                               | EKHU401VSN521MQ45S |                          | 1,180       | 30 × 70               | 0.20  | 3.20                                               | EKHU421VSN122MR70S |
|                          | 580         | 30 × 35               | 0.20  | 1.94                                               | EKHU401VSN581MR35S |                          | 1,250       | 30 × 75               | 0.20  | 3.35                                               | EKHU421VSN1C2MR75S |
|                          | 590         | 25.4 × 50             | 0.20  | 2.08                                               | EKHU401VSN591MQ50S |                          | 1,260       | 35 × 55               | 0.20  | 2.86                                               | EKHU421VSN1C2MA55S |
|                          | 600         | 35 × 30               | 0.20  | 1.78                                               | EKHU401VSN601MA30S |                          | 1,340       | 30 × 80               | 0.20  | 3.52                                               | EKHU421VSN1D2MR80S |
|                          | 660         | 25.4 × 55             | 0.20  | 2.24                                               | EKHU401VSN661MQ55S |                          | 1,400       | 35 × 60               | 0.20  | 3.04                                               | EKHU421VSN142MA60S |
|                          | 680         | 30 × 40               | 0.20  | 2.16                                               | EKHU401VSN681MR40S |                          | 1,420       | 35 × 65               | 0.20  | 3.12                                               | EKHU421VSN142MA65S |
|                          | 720         | 25.4 × 60             | 0.20  | 2.38                                               | EKHU401VSN721MQ60S |                          | 1,550       | 35 × 70               | 0.20  | 3.32                                               | EKHU421VSN1F2MA70S |
|                          | 750         | 35 × 35               | 0.20  | 2.02                                               | EKHU401VSN751MR35S |                          | 1,680       | 35 × 75               | 0.20  | 3.51                                               | EKHU421VSN172MA75S |
|                          | 790         | 30 × 45               | 0.20  | 2.39                                               | EKHU401VSN791MR45S |                          | 1,810       | 35 × 80               | 0.20  | 3.71                                               | EKHU421VSN182MA80S |
|                          | 890         | 35 × 40               | 0.20  | 2.28                                               | EKHU401VSN891MA40S | 450                      | 200         | 25.4 × 25             | 0.20  | 1.07                                               | EKHU451VSN201MQ25S |
|                          | 900         | 30 × 50               | 0.20  | 2.60                                               | EKHU401VSN901MR50S |                          | 260         | 25.4 × 30             | 0.20  | 1.25                                               | EKHU451VSN261MQ30S |
|                          | 1,010       | 30 × 55               | 0.20  | 2.80                                               | EKHU401VSN101MR55S |                          | 310         | 30 × 25               | 0.20  | 1.37                                               | EKHU451VSN311MR25S |
|                          | 1,040       | 35 × 45               | 0.20  | 2.53                                               | EKHU401VSN1A2MA45S |                          | 320         | 25.4 × 35             | 0.20  | 1.45                                               | EKHU451VSN321MQ35S |
|                          | 1,090       | 30 × 60               | 0.20  | 2.97                                               | EKHU401VSN112MR60S |                          | 390         | 25.4 × 40             | 0.20  | 1.63                                               | EKHU451VSN391MQ40S |
|                          | 1,160       | 30 × 65               | 0.20  | 3.12                                               | EKHU401VSN1B2MR65S |                          | 390         | 35 × 25               | 0.20  | 1.41                                               | EKHU451VSN391MA25S |
|                          | 1,180       | 35 × 50               | 0.20  | 2.75                                               | EKHU401VSN122MA50S |                          | 400         | 30 × 30               | 0.20  | 1.57                                               | EKHU451VSN401MR30S |
|                          | 1,240       | 30 × 70               | 0.20  | 3.28                                               | EKHU401VSN1C2MR70S |                          | 450         | 25.4 × 45             | 0.20  | 1.79                                               | EKHU451VSN451MQ45S |
|                          | 1,310       | 30 × 75               | 0.20  | 3.43                                               | EKHU401VSN132MR75S |                          | 490         | 30 × 35               | 0.20  | 1.78                                               | EKHU451VSN491MR35S |
|                          | 1,320       | 35 × 55               | 0.20  | 2.93                                               | EKHU401VSN132MA55S |                          | 510         | 25.4 × 50             | 0.20  | 1.94                                               | EKHU451VSN511MQ50S |
|                          | 1,410       | 30 × 80               | 0.20  | 3.61                                               | EKHU401VSN142MR80S |                          | 520         | 35 × 30               | 0.20  | 1.66                                               | EKHU451VSN521MA30S |
|                          | 1,470       | 35 × 60               | 0.20  | 3.11                                               | EKHU401VSN1E2MA60S |                          | 570         | 25.4 × 55             | 0.20  | 2.08                                               | EKHU451VSN571MQ55S |
|                          | 1,500       | 35 × 65               | 0.20  | 3.21                                               | EKHU401VSN152MA65S |                          | 590         | 30 × 40               | 0.20  | 2.02                                               | EKHU451VSN591MR40S |
|                          | 1,630       | 35 × 70               | 0.20  | 3.40                                               | EKHU401VSN1G2MA70S |                          | 620         | 25.4 × 60             | 0.20  | 2.21                                               | EKHU451VSN621MQ60S |
|                          | 1,770       | 35 × 75               | 0.20  | 3.61                                               | EKHU401VSN1H2MA75S |                          | 640         | 35 × 35               | 0.20  | 1.87                                               | EKHU451VSN641MA35S |
|                          | 1,910       | 35 × 80               | 0.20  | 3.81                                               | EKHU401VSN192MA80S |                          | 680         | 30 × 45               | 0.20  | 2.22                                               | EKHU451VSN681MR45S |
| 420                      | 220         | 25.4 × 25             | 0.20  | 1.12                                               | EKHU421VSN221MQ25S |                          | 770         | 30 × 50               | 0.20  | 2.40                                               | EKHU451VSN771MR50S |
|                          | 290         | 25.4 × 30             | 0.20  | 1.32                                               | EKHU421VSN291MQ30S |                          | 770         | 35 × 40               | 0.20  | 2.12                                               | EKHU451VSN771MA40S |
|                          | 340         | 30 × 25               | 0.20  | 1.44                                               | EKHU421VSN341MR25S |                          | 860         | 30 × 55               | 0.20  | 2.59                                               | EKHU451VSN861MR55S |
|                          | 360         | 25.4 × 35             | 0.20  | 1.54                                               | EKHU421VSN361MQ35S |                          | 890         | 35 × 45               | 0.20  | 2.34                                               | EKHU451VSN891MA45S |
|                          | 430         | 25.4 × 40             | 0.20  | 1.72                                               | EKHU421VSN431MQ40S |                          | 940         | 30 × 60               | 0.20  | 2.76                                               | EKHU451VSN941MR60S |
|                          | 430         | 35 × 25               | 0.20  | 1.48                                               | EKHU421VSN431MA25S |                          | 1,010       | 30 × 65               | 0.20  | 2.91                                               | EKHU451VSN102MR65S |
|                          | 440         | 30 × 30               | 0.20  | 1.65                                               | EKHU421VSN441MR30S |                          | 1,020       | 35 × 50               | 0.20  | 2.56                                               | EKHU451VSN102MA50S |
|                          | 490         | 25.4 × 45             | 0.20  | 1.87                                               | EKHU421VSN491MQ45S |                          | 1,080       | 30 × 70               | 0.20  | 3.06                                               | EKHU451VSN112MR70S |
|                          | 550         | 30 × 35               | 0.20  | 1.89                                               | EKHU421VSN551MR35S |                          | 1,140       | 30 × 75               | 0.20  | 3.20                                               | EKHU451VSN1B2MR75S |
|                          | 560         | 25.4 × 50             | 0.20  | 2.03                                               | EKHU421VSN561MQ50S |                          | 1,140       | 35 × 55               | 0.20  | 2.72                                               | EKHU451VSN1B2MA55S |
|                          | 570         | 35 × 30               | 0.20  | 1.74                                               | EKHU421VSN571MA30S |                          | 1,230       | 30 × 80               | 0.20  | 3.38                                               | EKHU451VSN1C2MR80S |
|                          | 630         | 25.4 × 55             | 0.20  | 2.19                                               | EKHU421VSN631MQ55S |                          | 1,260       | 35 × 60               | 0.20  | 2.88                                               | EKHU451VSN1C2MA60S |
|                          | 650         | 30 × 40               | 0.20  | 2.12                                               | EKHU421VSN651MR40S |                          | 1,300       | 35 × 65               | 0.20  | 2.98                                               | EKHU451VSN132MA65S |
|                          | 680         | 25.4 × 60             | 0.20  | 2.31                                               | EKHU421VSN681MQ60S |                          | 1,410       | 35 × 70               | 0.20  | 3.16                                               | EKHU451VSN142MA70S |
|                          | 710         | 35 × 35               | 0.20  | 1.97                                               | EKHU421VSN711MA35S |                          | 1,530       | 35 × 75               | 0.20  | 3.35                                               | EKHU451VSN1F2MA75S |
|                          | 750         | 30 × 45               | 0.20  | 2.33                                               | EKHU421VSN751MR45S |                          | 1,650       | 35 × 80               | 0.20  | 3.54                                               | EKHU451VSN1G2MA80S |



# LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS



## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|
| 475                      | 160         | 25.4 × 25             | 0.20  | 1.07                                               | EKHU4H1VSN161MQ25S | 500                      | 120         | 25.4 × 25             | 0.20  | 0.93                                               | EKHU501VSN121MQ25S |
|                          | 200         | 25.4 × 30             | 0.20  | 1.23                                               | EKHU4H1VSN201MQ30S |                          | 170         | 25.4 × 30             | 0.20  | 1.13                                               | EKHU501VSN171MQ30S |
|                          | 240         | 30 × 25               | 0.20  | 1.38                                               | EKHU4H1VSN241MR25S |                          | 190         | 30 × 25               | 0.20  | 1.23                                               | EKHU501VSN191MR25S |
|                          | 250         | 25.4 × 35             | 0.20  | 1.43                                               | EKHU4H1VSN251MQ35S |                          | 210         | 25.4 × 35             | 0.20  | 1.31                                               | EKHU501VSN211MQ35S |
|                          | 280         | 35 × 25               | 0.20  | 1.48                                               | EKHU4H1VSN281MA25S |                          | 250         | 25.4 × 40             | 0.20  | 1.46                                               | EKHU501VSN251MQ40S |
|                          | 300         | 25.4 × 40             | 0.20  | 1.60                                               | EKHU4H1VSN301MQ40S |                          | 250         | 30 × 30               | 0.20  | 1.43                                               | EKHU501VSN251MR30S |
|                          | 310         | 30 × 30               | 0.20  | 1.59                                               | EKHU4H1VSN311MR30S |                          | 260         | 35 × 25               | 0.20  | 1.43                                               | EKHU501VSN261MA25S |
|                          | 350         | 25.4 × 45             | 0.20  | 1.76                                               | EKHU4H1VSN351MQ45S |                          | 300         | 25.4 × 45             | 0.20  | 1.63                                               | EKHU501VSN301MQ45S |
|                          | 380         | 30 × 35               | 0.20  | 1.80                                               | EKHU4H1VSN381MR35S |                          | 320         | 30 × 35               | 0.20  | 1.65                                               | EKHU501VSN321MR35S |
|                          | 380         | 35 × 30               | 0.20  | 1.75                                               | EKHU4H1VSN381MA30S |                          | 340         | 25.4 × 50             | 0.20  | 1.76                                               | EKHU501VSN341MQ50S |
|                          | 390         | 25.4 × 50             | 0.20  | 1.89                                               | EKHU4H1VSN391MR50S |                          | 340         | 35 × 30               | 0.20  | 1.66                                               | EKHU501VSN341MA30S |
|                          | 440         | 25.4 × 55             | 0.20  | 2.04                                               | EKHU4H1VSN441MQ55S |                          | 380         | 25.4 × 55             | 0.20  | 1.89                                               | EKHU501VSN381MQ55S |
|                          | 450         | 30 × 40               | 0.20  | 2.01                                               | EKHU4H1VSN451MR40S |                          | 380         | 30 × 40               | 0.20  | 1.85                                               | EKHU501VSN381MR40S |
|                          | 480         | 35 × 35               | 0.20  | 2.00                                               | EKHU4H1VSN481MA35S |                          | 430         | 25.4 × 60             | 0.20  | 2.05                                               | EKHU501VSN431MQ60S |
|                          | 490         | 25.4 × 60             | 0.20  | 2.19                                               | EKHU4H1VSN491MQ60S |                          | 430         | 35 × 35               | 0.20  | 1.89                                               | EKHU501VSN431MA35S |
|                          | 520         | 30 × 45               | 0.20  | 2.22                                               | EKHU4H1VSN521MR45S |                          | 450         | 30 × 45               | 0.20  | 2.07                                               | EKHU501VSN451MR45S |
|                          | 570         | 35 × 40               | 0.20  | 2.26                                               | EKHU4H1VSN571MA40S |                          | 510         | 30 × 50               | 0.20  | 2.24                                               | EKHU501VSN511MR50S |
|                          | 590         | 30 × 50               | 0.20  | 2.41                                               | EKHU4H1VSN591MR50S |                          | 520         | 35 × 40               | 0.20  | 2.16                                               | EKHU501VSN521MA40S |
|                          | 660         | 30 × 55               | 0.20  | 2.59                                               | EKHU4H1VSN661MR55S |                          | 580         | 30 × 55               | 0.20  | 2.43                                               | EKHU501VSN581MR55S |
|                          | 660         | 35 × 45               | 0.20  | 2.49                                               | EKHU4H1VSN661MA45S |                          | 600         | 35 × 45               | 0.20  | 2.37                                               | EKHU501VSN601MA45S |
|                          | 730         | 30 × 60               | 0.20  | 2.78                                               | EKHU4H1VSN731MR60S |                          | 640         | 30 × 60               | 0.20  | 2.60                                               | EKHU501VSN641MR60S |
|                          | 750         | 30 × 65               | 0.20  | 2.87                                               | EKHU4H1VSN751MR65S |                          | 680         | 30 × 65               | 0.20  | 2.73                                               | EKHU501VSN681MR65S |
|                          | 760         | 35 × 50               | 0.20  | 2.72                                               | EKHU4H1VSN761MA50S |                          | 690         | 35 × 50               | 0.20  | 2.59                                               | EKHU501VSN691MA50S |
|                          | 820         | 30 × 70               | 0.20  | 3.05                                               | EKHU4H1VSN821MR70S |                          | 750         | 30 × 70               | 0.20  | 2.92                                               | EKHU501VSN751MR70S |
|                          | 860         | 35 × 55               | 0.20  | 2.96                                               | EKHU4H1VSN861MA55S |                          | 780         | 35 × 55               | 0.20  | 2.82                                               | EKHU501VSN781MA55S |
|                          | 890         | 30 × 75               | 0.20  | 3.23                                               | EKHU4H1VSN891MR75S |                          | 810         | 30 × 75               | 0.20  | 3.08                                               | EKHU501VSN811MR75S |
|                          | 950         | 35 × 60               | 0.20  | 3.16                                               | EKHU4H1VSN951MA60S |                          | 860         | 35 × 60               | 0.20  | 3.01                                               | EKHU501VSN861MA60S |
|                          | 960         | 30 × 80               | 0.20  | 3.42                                               | EKHU4H1VSN961MR80S |                          | 870         | 30 × 80               | 0.20  | 3.25                                               | EKHU501VSN871MR80S |
|                          | 1,010       | 35 × 65               | 0.20  | 3.32                                               | EKHU4H1VSN102MA65S |                          | 920         | 35 × 65               | 0.20  | 3.17                                               | EKHU501VSN921MA65S |
|                          | 1,110       | 35 × 70               | 0.20  | 3.54                                               | EKHU4H1VSN112MA70S |                          | 1,010       | 35 × 70               | 0.20  | 3.38                                               | EKHU501VSN102MA70S |
|                          | 1,200       | 35 × 75               | 0.20  | 3.75                                               | EKHU4H1VSN122MA75S |                          | 1,090       | 35 × 75               | 0.20  | 3.58                                               | EKHU501VSN112MA75S |
|                          | 1,290       | 35 × 80               | 0.20  | 3.96                                               | EKHU4H1VSN132MA80S |                          | 1,170       | 35 × 80               | 0.20  | 3.77                                               | EKHU501VSN1B2MA80S |

## ◆RATED RIPPLE CURRENT MULTIPLIERS

### ● Frequency Multipliers

| Frequency(Hz)             | 50   | 120  | 300  | 1k   | 10k  | 50k  |
|---------------------------|------|------|------|------|------|------|
| 400 to 450V <sub>dc</sub> | 0.77 | 1.00 | 1.10 | 1.21 | 1.32 | 1.33 |
| 475, 500V <sub>dc</sub>   | 0.77 | 1.00 | 1.11 | 1.20 | 1.25 | 1.33 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

# KHS Series

- For solar power generation
- Endurance with ripple current : 3,000 hours at 105°C
- Rated voltage range: 450 to 500V, Capacitance range: 68 to 1,000μF
- Non solvent resistant type
- RoHS2 Compliant

KHS

↓ Downsizing

KMS

↓ Downsizing

KMM

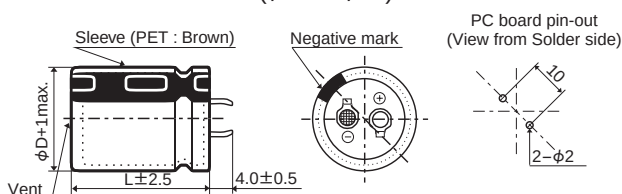


## SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                       |                                                                    |                 |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|-----------------|
| Category                                               |                                                                                                                                                                                                                                                                                       |                                                                    |                 |
| Temperature Range                                      | -40 to +105℃ (450, 475V <sub>dc</sub> ), -25 to +105℃ (500V <sub>dc</sub> )                                                                                                                                                                                                           |                                                                    |                 |
| Rated Voltage Range                                    | 450 to 500V <sub>dc</sub>                                                                                                                                                                                                                                                             |                                                                    |                 |
| Capacitance Tolerance                                  | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                             |                                                                    |                 |
| Leakage Current                                        | I ≤ 3√CV<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 5 minutes)                                                                                                                                                        |                                                                    |                 |
| Dissipation Factor (tan δ)                             | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 450 to 500V                                                        | (at 20℃, 120Hz) |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.20                                                               |                 |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 450 to 500V                                                        | (at 120Hz)      |
|                                                        | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 8                                                                  |                 |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 3,000 hours at 105℃.                                         |                                                                    |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±20% of the initial value                                        |                 |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤200% of the initial specified value (500V <sub>dc</sub> : ≤ 250%) |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value                                       |                 |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                                                    |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±15% of the initial value                                        |                 |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤150% of the initial specified value                               |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value                                       |                 |

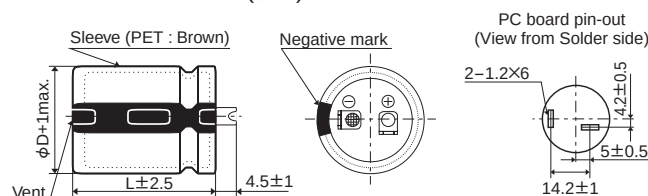
## DIMENSIONS [mm]

● Terminal Code : VS (φ22 to φ35) : Standard

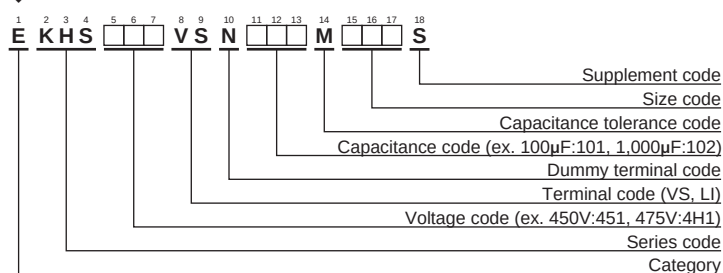


The standard design has no plastic disc.

● Terminal Code : LI (φ35)



## PART NUMBERING SYSTEM



Please refer to "Product code guide (snap-in type)"





## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|
| 450                      | 100         | 22 × 25               | 0.20  | 0.71                                               | EKHS451VSN101MP25S | 475                      | 330         | 30 × 35               | 0.20  | 1.53                                               | EKHS4H1VSN331MR35S |
|                          | 150         | 22 × 30               | 0.20  | 0.91                                               | EKHS451VSN151MP30S |                          | 350         | 25.4 × 50             | 0.20  | 1.63                                               | EKHS4H1VSN351MQ50S |
|                          | 180         | 22 × 35               | 0.20  | 1.02                                               | EKHS451VSN181MP35S |                          | 360         | 35 × 30               | 0.20  | 1.56                                               | EKHS4H1VSN361MA30S |
|                          | 180         | 22 × 40               | 0.20  | 1.04                                               | EKHS451VSN181MP40S |                          | 390         | 30 × 40               | 0.20  | 1.71                                               | EKHS4H1VSN391MR40S |
|                          | 180         | 25.4 × 25             | 0.20  | 1.02                                               | EKHS451VSN181MQ25S |                          | 400         | 25.4 × 55             | 0.20  | 1.77                                               | EKHS4H1VSN401MQ55S |
|                          | 220         | 22 × 45               | 0.20  | 1.17                                               | EKHS451VSN221MP45S |                          | 440         | 25.4 × 60             | 0.20  | 1.89                                               | EKHS4H1VSN441MQ60S |
|                          | 220         | 25.4 × 30             | 0.20  | 1.16                                               | EKHS451VSN221MQ30S |                          | 440         | 35 × 35               | 0.20  | 1.75                                               | EKHS4H1VSN441MA35S |
|                          | 270         | 22 × 50               | 0.20  | 1.33                                               | EKHS451VSN271MP50S |                          | 450         | 30 × 45               | 0.20  | 1.89                                               | EKHS4H1VSN451MR45S |
|                          | 270         | 25.4 × 35             | 0.20  | 1.34                                               | EKHS451VSN271MQ35S |                          | 510         | 30 × 50               | 0.20  | 2.04                                               | EKHS4H1VSN511MR50S |
|                          | 270         | 30 × 25               | 0.20  | 1.28                                               | EKHS451VSN271MR25S |                          | 530         | 35 × 40               | 0.20  | 1.99                                               | EKHS4H1VSN531MA40S |
|                          | 270         | 35 × 25               | 0.20  | 1.24                                               | EKHS451VSN271MA25S |                          | 560         | 35 × 50               | 0.20  | 2.13                                               | EKHS4H1VSN561MA50S |
|                          | 330         | 22 × 60               | 0.20  | 1.54                                               | EKHS451VSN331MP60S |                          | 570         | 30 × 55               | 0.20  | 2.20                                               | EKHS4H1VSN571MR55S |
|                          | 330         | 25.4 × 40             | 0.20  | 1.51                                               | EKHS451VSN331MQ40S |                          | 610         | 35 × 45               | 0.20  | 2.18                                               | EKHS4H1VSN611MA45S |
|                          | 330         | 30 × 30               | 0.20  | 1.43                                               | EKHS451VSN331MR30S |                          | 640         | 30 × 60               | 0.20  | 2.38                                               | EKHS4H1VSN641MR60S |
|                          | 390         | 25.4 × 45             | 0.20  | 1.67                                               | EKHS451VSN391MQ45S |                          | 700         | 35 × 50               | 0.20  | 2.39                                               | EKHS4H1VSN701MA50S |
|                          | 390         | 30 × 35               | 0.20  | 1.59                                               | EKHS451VSN391MR35S |                          | 790         | 35 × 55               | 0.20  | 2.59                                               | EKHS4H1VSN791MA55S |
|                          | 390         | 35 × 30               | 0.20  | 1.52                                               | EKHS451VSN391MA30S |                          | 870         | 35 × 60               | 0.20  | 2.77                                               | EKHS4H1VSN871MA60S |
|                          | 470         | 25.4 × 50             | 0.20  | 1.86                                               | EKHS451VSN471MQ50S | 500                      | 68          | 22 × 25               | 0.20  | 0.61                                               | EKHS501VSN680MP25S |
|                          | 470         | 30 × 40               | 0.20  | 1.79                                               | EKHS451VSN471MR40S |                          | 82          | 22 × 30               | 0.20  | 0.70                                               | EKHS501VSN820MP30S |
|                          | 470         | 35 × 35               | 0.20  | 1.69                                               | EKHS451VSN471MA35S |                          | 82          | 25.4 × 25             | 0.20  | 0.72                                               | EKHS501VSN820MQ25S |
|                          | 560         | 25.4 × 60             | 0.20  | 2.09                                               | EKHS451VSN561MQ60S |                          | 100         | 22 × 35               | 0.20  | 0.79                                               | EKHS501VSN101MP35S |
|                          | 560         | 30 × 45               | 0.20  | 2.01                                               | EKHS451VSN561MR45S |                          | 120         | 22 × 40               | 0.20  | 0.89                                               | EKHS501VSN121MP40S |
|                          | 560         | 35 × 40               | 0.20  | 1.95                                               | EKHS451VSN561MA40S |                          | 120         | 25.4 × 30             | 0.20  | 0.89                                               | EKHS501VSN121MQ30S |
|                          | 680         | 30 × 50               | 0.20  | 2.25                                               | EKHS451VSN681MR50S |                          | 120         | 30 × 25               | 0.20  | 0.90                                               | EKHS501VSN121MR25S |
|                          | 680         | 35 × 45               | 0.20  | 2.16                                               | EKHS451VSN681MA45S |                          | 150         | 22 × 45               | 0.20  | 1.01                                               | EKHS501VSN151MP45S |
|                          | 680         | 35 × 50               | 0.20  | 2.22                                               | EKHS451VSN681MA50S |                          | 150         | 25.4 × 35             | 0.20  | 1.04                                               | EKHS501VSN151MQ35S |
|                          | 820         | 30 × 60               | 0.20  | 2.56                                               | EKHS451VSN821MR60S |                          | 180         | 22 × 50               | 0.20  | 1.13                                               | EKHS501VSN181MP50S |
|                          | 820         | 35 × 55               | 0.20  | 2.47                                               | EKHS451VSN821MA55S |                          | 180         | 25.4 × 40             | 0.20  | 1.16                                               | EKHS501VSN181MQ40S |
|                          | 1,000       | 35 × 60               | 0.20  | 2.78                                               | EKHS451VSN102MA60S |                          | 180         | 25.4 × 45             | 0.20  | 1.18                                               | EKHS501VSN181MQ45S |
| 475                      | 100         | 22 × 25               | 0.20  | 0.76                                               | EKHS4H1VSN101MP25S |                          | 180         | 30 × 30               | 0.20  | 1.11                                               | EKHS501VSN181MR30S |
|                          | 130         | 22 × 30               | 0.20  | 0.90                                               | EKHS4H1VSN131MP30S |                          | 180         | 35 × 25               | 0.20  | 1.08                                               | EKHS501VSN181MA25S |
|                          | 140         | 25.4 × 25             | 0.20  | 0.91                                               | EKHS4H1VSN141MQ25S |                          | 220         | 22 × 60               | 0.20  | 1.31                                               | EKHS501VSN221MP60S |
|                          | 160         | 22 × 35               | 0.20  | 1.03                                               | EKHS4H1VSN161MP35S |                          | 220         | 25.4 × 50             | 0.20  | 1.33                                               | EKHS501VSN221MQ50S |
|                          | 180         | 25.4 × 30             | 0.20  | 1.06                                               | EKHS4H1VSN181MQ30S |                          | 220         | 30 × 35               | 0.20  | 1.26                                               | EKHS501VSN221MR35S |
|                          | 190         | 22 × 40               | 0.20  | 1.14                                               | EKHS4H1VSN191MP40S |                          | 220         | 35 × 30               | 0.20  | 1.22                                               | EKHS501VSN221MA30S |
|                          | 200         | 30 × 25               | 0.20  | 1.15                                               | EKHS4H1VSN201MR25S |                          | 270         | 25.4 × 60             | 0.20  | 1.51                                               | EKHS501VSN271MQ60S |
|                          | 220         | 22 × 45               | 0.20  | 1.25                                               | EKHS4H1VSN221MP45S |                          | 270         | 30 × 40               | 0.20  | 1.44                                               | EKHS501VSN271MR40S |
|                          | 230         | 25.4 × 35             | 0.20  | 1.25                                               | EKHS4H1VSN231MQ35S |                          | 270         | 30 × 45               | 0.20  | 1.47                                               | EKHS501VSN271MR45S |
|                          | 250         | 22 × 50               | 0.20  | 1.37                                               | EKHS4H1VSN251MP50S |                          | 270         | 35 × 35               | 0.20  | 1.37                                               | EKHS501VSN271MA35S |
|                          | 270         | 25.4 × 40             | 0.20  | 1.38                                               | EKHS4H1VSN271MQ40S |                          | 330         | 30 × 50               | 0.20  | 1.66                                               | EKHS501VSN331MR50S |
|                          | 270         | 30 × 30               | 0.20  | 1.35                                               | EKHS4H1VSN271MR30S |                          | 330         | 35 × 40               | 0.20  | 1.57                                               | EKHS501VSN331MA40S |
|                          | 270         | 35 × 25               | 0.20  | 1.33                                               | EKHS4H1VSN271MA25S |                          | 390         | 30 × 60               | 0.20  | 1.87                                               | EKHS501VSN391MR60S |
|                          | 290         | 22 × 55               | 0.20  | 1.50                                               | EKHS4H1VSN291MP55S |                          | 390         | 35 × 45               | 0.20  | 1.74                                               | EKHS501VSN391MA45S |
|                          | 310         | 25.4 × 45             | 0.20  | 1.51                                               | EKHS4H1VSN311MQ45S |                          | 470         | 35 × 50               | 0.20  | 1.95                                               | EKHS501VSN471MA50S |
|                          | 320         | 22 × 60               | 0.20  | 1.60                                               | EKHS4H1VSN321MP60S |                          | 560         | 35 × 60               | 0.20  | 2.22                                               | EKHS501VSN561MA60S |

## ◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multipliers

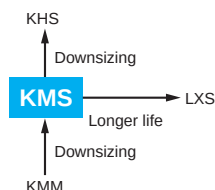
| Frequency(Hz)      | 50   | 120  | 300  | 1k   | 10k  | 50k  |
|--------------------|------|------|------|------|------|------|
| 450V <sub>dc</sub> | 0.77 | 1.00 | 1.16 | 1.30 | 1.41 | 1.43 |
| 475V <sub>dc</sub> | 0.77 | 1.00 | 1.11 | 1.20 | 1.25 | 1.33 |
| 500V <sub>dc</sub> | 0.70 | 1.00 | 1.16 | 1.30 | 1.41 | 1.43 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.



# KMS Series

- The lower temperature range of the category temperature range has been expanded.
- For solar power generation
- Endurance with ripple current : 105°C 3,000 hours
- Rated voltage range : 160 to 600V
- Capacitance range : 47 to 3,300μF
- Non solvent resistant type
- RoHS2 Compliant



**600V  
Lineup!**

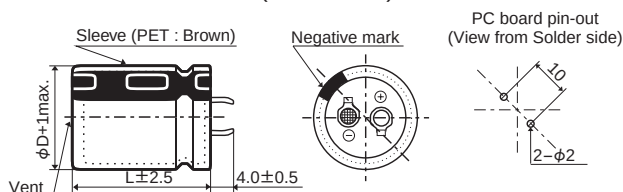


## SPECIFICATIONS

| Items                                                        | Characteristics                                                                                                                                                                                                                                                                       |                                                                   |                                          |                 |
|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|------------------------------------------|-----------------|
| Category                                                     |                                                                                                                                                                                                                                                                                       |                                                                   |                                          |                 |
| Temperature Range                                            | -40 to +105℃(160 to 500V <sub>dc</sub> )                                                                                                                                                                                                                                              |                                                                   | -25 to +105℃(550 to 600V <sub>dc</sub> ) |                 |
| Rated Voltage Range                                          | 160 to 600V <sub>dc</sub>                                                                                                                                                                                                                                                             |                                                                   |                                          |                 |
| Capacitance Tolerance                                        | ± 20% (M)                                                                                                                                                                                                                                                                             |                                                                   | (at 20℃, 120Hz)                          |                 |
| Leakage Current                                              | I ≤ 3√CV<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 5 minutes)                                                                                                                                                        |                                                                   |                                          |                 |
| Dissipation Factor<br>(tan δ)                                | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 160 to 400V                                                       | 420 to 600V                              | (at 20℃, 120Hz) |
|                                                              | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.15                                                              | 0.20                                     |                 |
| Low Temperature<br>Characteristics<br>(Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 160 to 400V                                                       | 420 to 600V                              | (at 120Hz)      |
|                                                              | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 4                                                                 | 8                                        |                 |
| Endurance                                                    | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 3,000 hours at 105℃.                                         |                                                                   |                                          |                 |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±20% of the initial value                                       |                                          |                 |
|                                                              | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤200% of the initial specified value (600V <sub>dc</sub> : ≤300%) |                                          |                 |
|                                                              | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value                                     |                                          |                 |
| Shelf Life                                                   | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                                                   |                                          |                 |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±15% of the initial value                                       |                                          |                 |
|                                                              | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤150% of the initial specified value                              |                                          |                 |
|                                                              | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value                                     |                                          |                 |

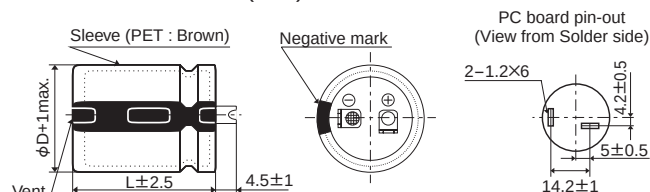
## DIMENSIONS [mm]

● Terminal Code : VS (φ22 to φ35) : Standard

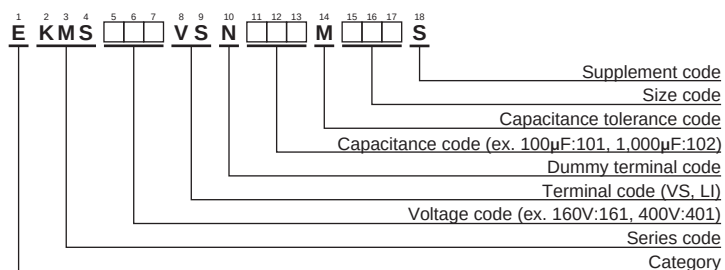


The standard design has no plastic disc.

● Terminal Code : LI (φ35)



## PART NUMBERING SYSTEM



Please refer to "Product code guide (snap-in type)"



KMS Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|
| 160                      | 470         | 22 × 25               | 0.15  | 1.47                                               | EKMS161VSN471MP25S | 200                      | 1,800       | 30 × 45               | 0.15  | 3.66                                               | EKMS201VSN182MR45S |
|                          | 680         | 22 × 30               | 0.15  | 1.86                                               | EKMS161VSN681MP30S |                          | 1,800       | 30 × 50               | 0.15  | 3.72                                               | EKMS201VSN182MR50S |
|                          | 680         | 25.4 × 25             | 0.15  | 1.84                                               | EKMS161VSN681MQ25S |                          | 1,800       | 35 × 40               | 0.15  | 3.81                                               | EKMS201VSN182MA40S |
|                          | 820         | 22 × 35               | 0.15  | 2.09                                               | EKMS161VSN821MP35S |                          | 2,200       | 35 × 45               | 0.15  | 4.32                                               | EKMS201VSN222MA45S |
|                          | 820         | 25.4 × 30             | 0.15  | 2.08                                               | EKMS161VSN821MQ30S |                          | 2,700       | 35 × 50               | 0.15  | 4.88                                               | EKMS201VSN272MA50S |
|                          | 1,000       | 22 × 40               | 0.15  | 2.35                                               | EKMS161VSN102MP40S | 250                      | 270         | 22 × 25               | 0.15  | 1.11                                               | EKMS251VSN271MP25S |
|                          | 1,000       | 22 × 45               | 0.15  | 2.40                                               | EKMS161VSN102MP45S |                          | 330         | 22 × 30               | 0.15  | 1.29                                               | EKMS251VSN331MP30S |
|                          | 1,000       | 25.4 × 35             | 0.15  | 2.40                                               | EKMS161VSN102MQ35S |                          | 390         | 22 × 35               | 0.15  | 1.44                                               | EKMS251VSN391MP35S |
|                          | 1,000       | 30 × 25               | 0.15  | 2.50                                               | EKMS161VSN102MR25S |                          | 390         | 25.4 × 25             | 0.15  | 1.40                                               | EKMS251VSN391MQ25S |
|                          | 1,200       | 22 × 50               | 0.15  | 2.69                                               | EKMS161VSN122MP50S |                          | 470         | 22 × 40               | 0.15  | 1.61                                               | EKMS251VSN471MP40S |
|                          | 1,200       | 25.4 × 40             | 0.15  | 2.68                                               | EKMS161VSN122MQ40S |                          | 470         | 25.4 × 30             | 0.15  | 1.57                                               | EKMS251VSN471MQ30S |
|                          | 1,200       | 30 × 30               | 0.15  | 2.77                                               | EKMS161VSN122MR30S |                          | 560         | 22 × 45               | 0.15  | 1.79                                               | EKMS251VSN561MP45S |
|                          | 1,200       | 35 × 25               | 0.15  | 2.91                                               | EKMS161VSN122MA25S |                          | 560         | 25.4 × 35             | 0.15  | 1.79                                               | EKMS251VSN561MQ35S |
|                          | 1,500       | 25.4 × 45             | 0.15  | 3.05                                               | EKMS161VSN152MQ45S |                          | 560         | 30 × 25               | 0.15  | 1.87                                               | EKMS251VSN561MR25S |
|                          | 1,500       | 30 × 35               | 0.15  | 3.17                                               | EKMS161VSN152MR35S |                          | 680         | 22 × 50               | 0.15  | 2.02                                               | EKMS251VSN681MP50S |
|                          | 1,800       | 25.4 × 50             | 0.15  | 3.40                                               | EKMS161VSN182MQ50S |                          | 680         | 25.4 × 40             | 0.15  | 2.02                                               | EKMS251VSN681MQ40S |
|                          | 1,800       | 30 × 40               | 0.15  | 3.57                                               | EKMS161VSN182MR40S |                          | 680         | 30 × 30               | 0.15  | 2.08                                               | EKMS251VSN681MR30S |
|                          | 1,800       | 35 × 30               | 0.15  | 3.62                                               | EKMS161VSN182MA30S |                          | 680         | 35 × 25               | 0.15  | 2.19                                               | EKMS251VSN681MA25S |
|                          | 2,200       | 30 × 45               | 0.15  | 4.05                                               | EKMS161VSN222MR45S |                          | 820         | 25.4 × 45             | 0.15  | 2.26                                               | EKMS251VSN821MQ45S |
|                          | 2,200       | 35 × 35               | 0.15  | 4.07                                               | EKMS161VSN222MA35S |                          | 820         | 30 × 35               | 0.15  | 2.34                                               | EKMS251VSN821MR35S |
|                          | 2,700       | 30 × 50               | 0.15  | 4.56                                               | EKMS161VSN272MR50S |                          | 1,000       | 25.4 × 50             | 0.15  | 2.53                                               | EKMS251VSN102MQ50S |
|                          | 2,700       | 35 × 40               | 0.15  | 4.67                                               | EKMS161VSN272MA40S |                          | 1,000       | 30 × 40               | 0.15  | 2.66                                               | EKMS251VSN102MR40S |
|                          | 2,700       | 35 × 45               | 0.15  | 4.78                                               | EKMS161VSN272MA45S |                          | 1,000       | 35 × 30               | 0.15  | 2.70                                               | EKMS251VSN102MA30S |
| 180                      | 3,300       | 35 × 50               | 0.15  | 5.40                                               | EKMS161VSN332MA50S |                          | 1,200       | 30 × 45               | 0.15  | 2.99                                               | EKMS251VSN122MR45S |
|                          | 390         | 22 × 25               | 0.15  | 1.34                                               | EKMS181VSN391MP25S |                          | 1,200       | 30 × 50               | 0.15  | 3.04                                               | EKMS251VSN122MR50S |
|                          | 560         | 22 × 30               | 0.15  | 1.68                                               | EKMS181VSN561MP30S |                          | 1,200       | 35 × 35               | 0.15  | 3.00                                               | EKMS251VSN122MA35S |
|                          | 560         | 25.4 × 25             | 0.15  | 1.67                                               | EKMS181VSN561MQ25S |                          | 1,500       | 35 × 40               | 0.15  | 3.48                                               | EKMS251VSN152MA40S |
|                          | 680         | 22 × 35               | 0.15  | 1.90                                               | EKMS181VSN681MP35S |                          | 1,500       | 35 × 45               | 0.15  | 3.56                                               | EKMS251VSN152MA45S |
|                          | 820         | 22 × 40               | 0.15  | 2.13                                               | EKMS181VSN821MP40S |                          | 1,800       | 35 × 50               | 0.15  | 3.98                                               | EKMS251VSN182MA50S |
|                          | 820         | 25.4 × 30             | 0.15  | 2.08                                               | EKMS181VSN821MQ30S | 315                      | 180         | 22 × 25               | 0.15  | 0.95                                               | EKMS3B1VSN181MP25S |
|                          | 820         | 30 × 25               | 0.15  | 2.26                                               | EKMS181VSN821MR25S |                          | 220         | 22 × 30               | 0.15  | 1.10                                               | EKMS3B1VSN221MP30S |
|                          | 1,000       | 22 × 45               | 0.15  | 2.40                                               | EKMS181VSN102MP45S |                          | 220         | 25.4 × 25             | 0.15  | 1.10                                               | EKMS3B1VSN221MQ25S |
|                          | 1,000       | 22 × 50               | 0.15  | 2.45                                               | EKMS181VSN102MP50S |                          | 270         | 22 × 35               | 0.15  | 1.24                                               | EKMS3B1VSN271MP35S |
|                          | 1,000       | 25.4 × 35             | 0.15  | 2.40                                               | EKMS181VSN102MQ35S |                          | 330         | 22 × 40               | 0.15  | 1.40                                               | EKMS3B1VSN331MP40S |
|                          | 1,000       | 25.4 × 40             | 0.15  | 2.45                                               | EKMS181VSN102MQ40S |                          | 330         | 25.4 × 30             | 0.15  | 1.38                                               | EKMS3B1VSN331MQ30S |
|                          | 1,000       | 30 × 30               | 0.15  | 2.52                                               | EKMS181VSN102MR30S |                          | 330         | 30 × 25               | 0.15  | 1.43                                               | EKMS3B1VSN331MR25S |
|                          | 1,200       | 25.4 × 45             | 0.15  | 2.73                                               | EKMS181VSN122MQ45S |                          | 390         | 22 × 45               | 0.15  | 1.56                                               | EKMS3B1VSN391MP45S |
|                          | 1,200       | 30 × 35               | 0.15  | 2.83                                               | EKMS181VSN122MR35S |                          | 390         | 22 × 50               | 0.15  | 1.59                                               | EKMS3B1VSN391MP50S |
|                          | 1,200       | 35 × 25               | 0.15  | 2.91                                               | EKMS181VSN122MA25S |                          | 390         | 25.4 × 35             | 0.15  | 1.57                                               | EKMS3B1VSN391MQ35S |
|                          | 1,500       | 25.4 × 50             | 0.15  | 3.10                                               | EKMS181VSN152MQ50S |                          | 470         | 25.4 × 40             | 0.15  | 1.76                                               | EKMS3B1VSN471MQ40S |
|                          | 1,500       | 30 × 40               | 0.15  | 3.26                                               | EKMS181VSN152MR40S |                          | 470         | 30 × 30               | 0.15  | 1.73                                               | EKMS3B1VSN471MR30S |
|                          | 1,500       | 35 × 30               | 0.15  | 3.31                                               | EKMS181VSN152MA30S |                          | 470         | 35 × 25               | 0.15  | 1.82                                               | EKMS3B1VSN471MA25S |
|                          | 1,800       | 30 × 45               | 0.15  | 3.66                                               | EKMS181VSN182MR45S |                          | 560         | 25.4 × 45             | 0.15  | 1.96                                               | EKMS3B1VSN561MQ45S |
|                          | 1,800       | 35 × 35               | 0.15  | 3.68                                               | EKMS181VSN182MA35S |                          | 560         | 25.4 × 50             | 0.15  | 1.99                                               | EKMS3B1VSN561MQ50S |
|                          | 2,200       | 30 × 50               | 0.15  | 4.11                                               | EKMS181VSN222MR50S |                          | 560         | 30 × 35               | 0.15  | 1.93                                               | EKMS3B1VSN561MR35S |
|                          | 2,200       | 35 × 40               | 0.15  | 4.22                                               | EKMS181VSN222MA40S |                          | 560         | 35 × 30               | 0.15  | 2.02                                               | EKMS3B1VSN561MA30S |
|                          | 2,700       | 35 × 45               | 0.15  | 4.78                                               | EKMS181VSN272MA45S |                          | 680         | 30 × 40               | 0.15  | 2.19                                               | EKMS3B1VSN681MR40S |
|                          | 2,700       | 35 × 50               | 0.15  | 4.88                                               | EKMS181VSN272MA50S |                          | 680         | 35 × 35               | 0.15  | 2.26                                               | EKMS3B1VSN681MA35S |
| 200                      | 390         | 22 × 25               | 0.15  | 1.34                                               | EKMS201VSN391MP25S |                          | 820         | 30 × 45               | 0.15  | 2.47                                               | EKMS3B1VSN821MR45S |
|                          | 470         | 22 × 30               | 0.15  | 1.54                                               | EKMS201VSN471MP30S |                          | 820         | 30 × 50               | 0.15  | 2.51                                               | EKMS3B1VSN821MR50S |
|                          | 560         | 22 × 35               | 0.15  | 1.72                                               | EKMS201VSN561MP35S |                          | 820         | 35 × 40               | 0.15  | 2.57                                               | EKMS3B1VSN821MA40S |
|                          | 560         | 25.4 × 25             | 0.15  | 1.67                                               | EKMS201VSN561MQ25S |                          | 1,000       | 35 × 45               | 0.15  | 2.91                                               | EKMS3B1VSN102MA45S |
|                          | 680         | 22 × 40               | 0.15  | 1.94                                               | EKMS201VSN681MP40S |                          | 1,200       | 35 × 50               | 0.15  | 3.25                                               | EKMS3B1VSN122MA50S |
|                          | 680         | 25.4 × 30             | 0.15  | 1.89                                               | EKMS201VSN681MQ30S | 400                      | 120         | 22 × 25               | 0.15  | 0.77                                               | EKMS401VSN121MP25S |
|                          | 820         | 22 × 45               | 0.15  | 2.17                                               | EKMS201VSN821MP45S |                          | 150         | 22 × 30               | 0.15  | 0.90                                               | EKMS401VSN151MP30S |
|                          | 820         | 25.4 × 35             | 0.15  | 2.17                                               | EKMS201VSN821MQ35S |                          | 180         | 22 × 35               | 0.15  | 1.02                                               | EKMS401VSN181MP35S |
|                          | 820         | 30 × 25               | 0.15  | 2.26                                               | EKMS201VSN821MR25S |                          | 180         | 25.4 × 25             | 0.15  | 0.99                                               | EKMS401VSN181MQ25S |
|                          | 1,000       | 22 × 50               | 0.15  | 2.45                                               | EKMS201VSN102MP50S |                          | 220         | 22 × 40               | 0.15  | 1.15                                               | EKMS401VSN221MP40S |
|                          | 1,000       | 25.4 × 40             | 0.15  | 2.45                                               | EKMS201VSN102MQ40S |                          | 220         | 25.4 × 30             | 0.15  | 1.13                                               | EKMS401VSN221MQ30S |
|                          | 1,000       | 30 × 30               | 0.15  | 2.52                                               | EKMS201VSN102MR30S |                          | 270         | 22 × 45               | 0.15  | 1.29                                               | EKMS401VSN271MP45S |
|                          | 1,000       | 35 × 25               | 0.15  | 2.66                                               | EKMS201VSN102MA25S |                          | 270         | 25.4 × 35             | 0.15  | 1.30                                               | EKMS401VSN271MQ35S |
|                          | 1,200       | 25.4 × 45             | 0.15  | 2.73                                               | EKMS201VSN122MQ45S |                          | 270         | 30 × 25               | 0.15  | 1.29                                               | EKMS401VSN271MR25S |
|                          | 1,200       | 25.4 × 50             | 0.15  | 2.78                                               | EKMS201VSN122MQ50S |                          | 330         | 22 × 50               | 0.15  | 1.47                                               | EKMS401VSN331MP50S |
|                          | 1,200       | 30 × 35               | 0.15  | 2.83                                               | EKMS201VSN122MR35S |                          | 330         | 25.4 × 40             | 0.15  | 1.47                                               | EKMS401VSN331MQ40S |
|                          | 1,200       | 35 × 30               | 0.15  | 2.96                                               | EKMS201VSN122MA30S |                          | 330         | 30 × 30               | 0.15  | 1.45                                               | EKMS401VSN331MR30S |
|                          | 1,500       | 30 × 40               | 0.15  | 3.26                                               | EKMS201VSN152MR40S |                          | 330         | 35 × 25               | 0.15  | 1.52                                               | EKMS401VSN331MA25S |
|                          | 1,500       | 35 × 35               | 0.15  | 3.36                                               | EKMS201VSN152MA35S |                          | 390         | 25.4 × 45             | 0.15  | 1.63                                               | EKMS401VSN391MQ45S |



## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|
| 400                      | 390         | 25.4 × 50             | 0.15  | 1.66                                               | EKMS401VSN391MQ50S | 500                      | 47          | 22 × 25               | 0.20  | 0.51                                               | EKMS501VSN470MP25S |
|                          | 390         | 30 × 35               | 0.15  | 1.61                                               | EKMS401VSN391MR35S |                          | 56          | 22 × 30               | 0.20  | 0.58                                               | EKMS501VSN560MP30S |
|                          | 470         | 30 × 40               | 0.15  | 1.82                                               | EKMS401VSN471MR40S |                          | 68          | 25.4 × 25             | 0.20  | 0.65                                               | EKMS501VSN680MQ25S |
|                          | 470         | 35 × 30               | 0.15  | 1.85                                               | EKMS401VSN471MA30S |                          | 82          | 22 × 35               | 0.20  | 0.72                                               | EKMS501VSN820MP35S |
|                          | 560         | 30 × 45               | 0.15  | 2.04                                               | EKMS401VSN561MR45S |                          | 82          | 25.4 × 30             | 0.20  | 0.74                                               | EKMS501VSN820MQ30S |
|                          | 560         | 30 × 50               | 0.15  | 2.07                                               | EKMS401VSN561MR50S |                          | 100         | 22 × 45               | 0.20  | 0.83                                               | EKMS501VSN101MP45S |
|                          | 560         | 35 × 35               | 0.15  | 2.05                                               | EKMS401VSN561MA35S |                          | 100         | 30 × 25               | 0.20  | 0.82                                               | EKMS501VSN101MR25S |
|                          | 680         | 35 × 40               | 0.15  | 2.34                                               | EKMS401VSN681MA40S |                          | 120         | 22 × 50               | 0.20  | 0.93                                               | EKMS501VSN121MP50S |
|                          | 680         | 35 × 45               | 0.15  | 2.40                                               | EKMS401VSN681MA45S |                          | 120         | 25.4 × 35             | 0.20  | 0.93                                               | EKMS501VSN121MQ35S |
| 420                      | 820         | 35 × 50               | 0.15  | 2.69                                               | EKMS401VSN821MA50S |                          | 120         | 30 × 30               | 0.20  | 0.91                                               | EKMS501VSN121MR30S |
|                          | 100         | 22 × 25               | 0.20  | 0.70                                               | EKMS421VSN101MP25S | 550                      | 150         | 25.4 × 45             | 0.20  | 1.08                                               | EKMS501VSN151MQ45S |
|                          | 120         | 22 × 30               | 0.20  | 0.81                                               | EKMS421VSN121MP30S |                          | 150         | 30 × 35               | 0.20  | 1.04                                               | EKMS501VSN151MR35S |
|                          | 120         | 25.4 × 25             | 0.20  | 0.81                                               | EKMS421VSN121MQ25S |                          | 150         | 35 × 25               | 0.20  | 0.99                                               | EKMS501VSN151MA25S |
|                          | 150         | 22 × 35               | 0.20  | 0.93                                               | EKMS421VSN151MP35S |                          | 180         | 25.4 × 50             | 0.20  | 1.20                                               | EKMS501VSN181MQ50S |
|                          | 180         | 22 × 40               | 0.20  | 1.04                                               | EKMS421VSN181MP40S |                          | 180         | 30 × 40               | 0.20  | 1.17                                               | EKMS501VSN181MR40S |
|                          | 180         | 25.4 × 30             | 0.20  | 1.02                                               | EKMS421VSN181MQ30S |                          | 180         | 35 × 30               | 0.20  | 1.10                                               | EKMS501VSN181MA30S |
|                          | 180         | 30 × 25               | 0.20  | 1.06                                               | EKMS421VSN181MR25S |                          | 220         | 30 × 45               | 0.20  | 1.33                                               | EKMS501VSN221MR45S |
|                          | 220         | 22 × 45               | 0.20  | 1.17                                               | EKMS421VSN221MP45S |                          | 220         | 35 × 35               | 0.20  | 1.23                                               | EKMS501VSN221MA35S |
|                          | 220         | 22 × 50               | 0.20  | 1.20                                               | EKMS421VSN221MP50S | 600                      | 270         | 30 × 50               | 0.20  | 1.50                                               | EKMS501VSN271MR50S |
| 450                      | 220         | 25.4 × 35             | 0.20  | 1.18                                               | EKMS421VSN221MQ35S |                          | 270         | 35 × 40               | 0.20  | 1.42                                               | EKMS501VSN271MA40S |
|                          | 220         | 30 × 30               | 0.20  | 1.18                                               | EKMS421VSN221MR30S |                          | 330         | 35 × 45               | 0.20  | 1.60                                               | EKMS501VSN331MA45S |
|                          | 270         | 25.4 × 40             | 0.20  | 1.33                                               | EKMS421VSN271MQ40S |                          | 390         | 35 × 50               | 0.20  | 1.78                                               | EKMS501VSN391MA50S |
|                          | 270         | 25.4 × 45             | 0.20  | 1.36                                               | EKMS421VSN271MQ45S |                          | 470         | 35 × 60               | 0.20  | 2.03                                               | EKMS501VSN471MA60S |
|                          | 270         | 35 × 25               | 0.20  | 1.38                                               | EKMS421VSN271MA25S | 550                      | 82          | 22 × 35               | 0.20  | 0.72                                               | EKMS551VSN820MP35S |
|                          | 330         | 25.4 × 50             | 0.20  | 1.52                                               | EKMS421VSN331MQ50S |                          | 82          | 25.4 × 30             | 0.20  | 0.74                                               | EKMS551VSN820MQ30S |
|                          | 330         | 30 × 35               | 0.20  | 1.48                                               | EKMS421VSN331MR35S |                          | 100         | 22 × 45               | 0.20  | 0.83                                               | EKMS551VSN101MP45S |
|                          | 330         | 30 × 40               | 0.20  | 1.52                                               | EKMS421VSN331MR40S |                          | 100         | 25.4 × 35             | 0.20  | 0.85                                               | EKMS551VSN101MQ35S |
|                          | 330         | 35 × 30               | 0.20  | 1.55                                               | EKMS421VSN331MA30S |                          | 100         | 30 × 25               | 0.20  | 0.82                                               | EKMS551VSN101MR25S |
|                          | 390         | 30 × 45               | 0.20  | 1.70                                               | EKMS421VSN391MR45S |                          | 120         | 22 × 50               | 0.20  | 0.93                                               | EKMS551VSN121MP50S |
|                          | 390         | 35 × 35               | 0.20  | 1.71                                               | EKMS421VSN391MA35S |                          | 120         | 25.4 × 40             | 0.20  | 0.95                                               | EKMS551VSN121MQ40S |
|                          | 470         | 30 × 50               | 0.20  | 1.90                                               | EKMS421VSN471MR50S |                          | 120         | 30 × 30               | 0.20  | 0.91                                               | EKMS551VSN121MR30S |
|                          | 470         | 35 × 40               | 0.20  | 1.95                                               | EKMS421VSN471MA40S |                          | 120         | 35 × 25               | 0.20  | 0.88                                               | EKMS551VSN121MA25S |
| 450                      | 560         | 35 × 45               | 0.20  | 2.17                                               | EKMS421VSN561MA45S |                          | 150         | 25.4 × 45             | 0.20  | 1.08                                               | EKMS551VSN151MQ45S |
|                          | 680         | 35 × 50               | 0.20  | 2.45                                               | EKMS421VSN681MA50S |                          | 150         | 30 × 35               | 0.20  | 1.04                                               | EKMS551VSN151MR35S |
|                          | 82          | 22 × 25               | 0.20  | 0.64                                               | EKMS451VSN820MP25S |                          | 180         | 25.4 × 50             | 0.20  | 1.20                                               | EKMS551VSN181MQ50S |
|                          | 120         | 22 × 30               | 0.20  | 0.81                                               | EKMS451VSN121MP30S |                          | 180         | 30 × 40               | 0.20  | 1.17                                               | EKMS551VSN181MR40S |
|                          | 120         | 22 × 35               | 0.20  | 0.83                                               | EKMS451VSN121MP35S |                          | 180         | 35 × 30               | 0.20  | 1.10                                               | EKMS551VSN181MA30S |
|                          | 120         | 25.4 × 25             | 0.20  | 0.81                                               | EKMS451VSN121MQ25S |                          | 220         | 30 × 45               | 0.20  | 1.33                                               | EKMS551VSN221MR45S |
|                          | 150         | 22 × 40               | 0.20  | 0.94                                               | EKMS451VSN151MP40S |                          | 220         | 35 × 35               | 0.20  | 1.23                                               | EKMS551VSN221MA35S |
|                          | 150         | 25.4 × 30             | 0.20  | 0.93                                               | EKMS451VSN151MQ30S |                          | 270         | 30 × 50               | 0.20  | 1.50                                               | EKMS551VSN271MR50S |
|                          | 180         | 22 × 45               | 0.20  | 1.06                                               | EKMS451VSN181MP45S | 600                      | 270         | 35 × 40               | 0.20  | 1.42                                               | EKMS551VSN271MA40S |
| 450                      | 180         | 25.4 × 35             | 0.20  | 1.06                                               | EKMS451VSN181MQ35S |                          | 330         | 35 × 45               | 0.20  | 1.60                                               | EKMS551VSN331MA45S |
|                          | 180         | 30 × 25               | 0.20  | 1.06                                               | EKMS451VSN181MR25S |                          | 330         | 35 × 50               | 0.20  | 1.64                                               | EKMS551VSN331MA50S |
|                          | 220         | 22 × 50               | 0.20  | 1.20                                               | EKMS451VSN221MP50S |                          | 470         | 35 × 60               | 0.20  | 2.03                                               | EKMS551VSN471MA60S |
|                          | 220         | 25.4 × 40             | 0.20  | 1.20                                               | EKMS451VSN221MQ40S |                          | 100         | 30 × 30               | 0.20  | 0.83                                               | EKMS601VSN101MR30S |
|                          | 220         | 30 × 30               | 0.20  | 1.18                                               | EKMS451VSN221MR30S |                          | 100         | 35 × 25               | 0.20  | 0.85                                               | EKMS601VSN101MA25S |
|                          | 220         | 35 × 25               | 0.20  | 1.24                                               | EKMS451VSN221MA25S |                          | 120         | 30 × 35               | 0.20  | 0.93                                               | EKMS601VSN121MR35S |
|                          | 270         | 25.4 × 45             | 0.20  | 1.36                                               | EKMS451VSN271MQ45S |                          | 150         | 30 × 40               | 0.20  | 1.07                                               | EKMS601VSN151MR40S |
|                          | 270         | 25.4 × 50             | 0.20  | 1.38                                               | EKMS451VSN271MQ50S |                          | 150         | 35 × 30               | 0.20  | 1.06                                               | EKMS601VSN151MA30S |
|                          | 270         | 30 × 35               | 0.20  | 1.34                                               | EKMS451VSN271MR35S |                          | 180         | 30 × 45               | 0.20  | 1.20                                               | EKMS601VSN181MR45S |
| 450                      | 270         | 35 × 30               | 0.20  | 1.40                                               | EKMS451VSN271MA30S |                          | 180         | 30 × 50               | 0.20  | 1.22                                               | EKMS601VSN181MR50S |
|                          | 330         | 30 × 40               | 0.20  | 1.52                                               | EKMS451VSN331MR40S |                          | 180         | 35 × 35               | 0.20  | 1.18                                               | EKMS601VSN181MA35S |
|                          | 390         | 30 × 45               | 0.20  | 1.70                                               | EKMS451VSN391MR45S |                          | 220         | 30 × 60               | 0.20  | 1.40                                               | EKMS601VSN221MR60S |
|                          | 390         | 30 × 50               | 0.20  | 1.73                                               | EKMS451VSN391MR50S |                          | 220         | 35 × 40               | 0.20  | 1.35                                               | EKMS601VSN221MA40S |
|                          | 390         | 35 × 35               | 0.20  | 1.71                                               | EKMS451VSN391MA35S |                          | 220         | 35 × 45               | 0.20  | 1.38                                               | EKMS601VSN221MA45S |
|                          | 470         | 35 × 40               | 0.20  | 1.95                                               | EKMS451VSN471MA40S |                          | 270         | 35 × 50               | 0.20  | 1.56                                               | EKMS601VSN271MA50S |
|                          | 470         | 35 × 45               | 0.20  | 1.99                                               | EKMS451VSN471MA45S |                          | 330         | 35 × 60               | 0.20  | 1.79                                               | EKMS601VSN331MA60S |
|                          | 560         | 35 × 50               | 0.20  | 2.22                                               | EKMS451VSN561MA50S |                          |             |                       |       |                                                    |                    |

## ◆RATED RIPPLE CURRENT MULTIPLIERS

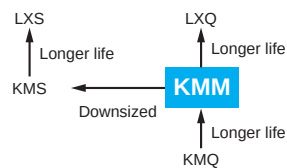
## ●Frequency Multipliers

| Frequency(Hz)             | 50   | 120  | 300  | 1k   | 10k  | 50k  |
|---------------------------|------|------|------|------|------|------|
| 160 to 250V <sub>dc</sub> | 0.81 | 1.00 | 1.17 | 1.32 | 1.45 | 1.50 |
| 315 to 450V <sub>dc</sub> | 0.77 | 1.00 | 1.16 | 1.30 | 1.41 | 1.43 |
| 500 to 600V <sub>dc</sub> | 0.70 | 1.00 | 1.16 | 1.30 | 1.41 | 1.43 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

# KMM Series

- Longer life from KMQ series
- Endurance with ripple current : 2,000 to 3,000 hours at 105°C
- Non solvent resistant type
- RoHS2 Compliant

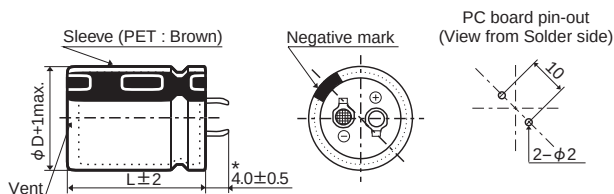


## SPECIFICATIONS

| Items                                                        | Characteristics                                                                                                                                                                                                                                                                       |                                      |            |                 |
|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------------|-----------------|
| Category                                                     | -25 to +105℃                                                                                                                                                                                                                                                                          |                                      |            |                 |
| Temperature Range                                            |                                                                                                                                                                                                                                                                                       |                                      |            |                 |
| Rated Voltage Range                                          | 160 to 450V <sub>dc</sub>                                                                                                                                                                                                                                                             |                                      |            |                 |
| Capacitance Tolerance                                        | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                             |                                      |            |                 |
| Leakage Current                                              | $I \leq 3\sqrt{CV}$<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 5 minutes)                                                                                                                                             |                                      |            |                 |
| Dissipation Factor<br>(tan δ )                               | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 160 to 400V                          | 420 & 450V | (at 20℃, 120Hz) |
|                                                              | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.15                                 | 0.20       |                 |
| Low Temperature<br>Characteristics<br>(Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 160 to 400V                          | 420 & 450V | (at 120Hz)      |
|                                                              | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 4                                    | 8          |                 |
| Endurance                                                    | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage)for 3,000 hours at 105℃.                                          |                                      |            |                 |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±20% of the initial value          |            |                 |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤200% of the initial specified value |            |                 |
|                                                              | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value         |            |                 |
| Shelf Life                                                   | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                      |            |                 |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±15% of the initial value          |            |                 |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤150% of the initial specified value |            |                 |
|                                                              | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value         |            |                 |

## DIMENSIONS [mm]

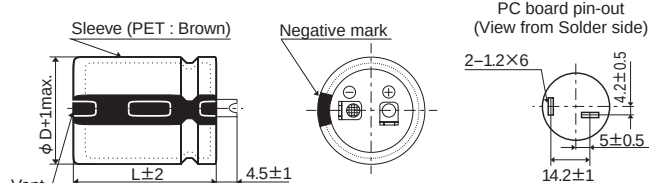
- Terminal Code : VS (φ22 to φ35) : Standard



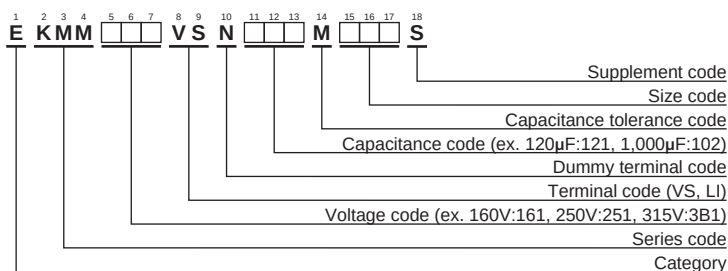
\*φD=35mm : 3.5±0.5mm

The standard design has no plastic disc.

- Terminal Code : LI (φ30, φ35)



## PART NUMBERING SYSTEM



Please refer to "Product code guide (snap-in type)"





KMM Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|
| 160                      | 220         | 22 × 20               | 0.15  | 0.81                                               | EKMM161VSN221MP20S | 180                      | 1,200       | 25.4 × 50             | 0.15  | 2.55                                               | EKMM181VSN122MQ50S |
|                          | 270         | 25.4 × 20             | 0.15  | 0.98                                               | EKMM161VSN271MQ20S |                          | 1,200       | 30 × 40               | 0.15  | 2.55                                               | EKMM181VSN122MR40S |
|                          | 330         | 22 × 25               | 0.15  | 1.20                                               | EKMM161VSN331MP25S |                          | 1,200       | 35 × 30               | 0.15  | 2.55                                               | EKMM181VSN122MA30S |
|                          | 330         | 25.4 × 20             | 0.15  | 1.02                                               | EKMM161VSN331MQ20S |                          | 1,500       | 30 × 45               | 0.15  | 2.90                                               | EKMM181VSN152MR45S |
|                          | 390         | 22 × 25               | 0.15  | 1.30                                               | EKMM161VSN391MP25S |                          | 1,500       | 35 × 35               | 0.15  | 2.90                                               | EKMM181VSN152MA35S |
|                          | 390         | 25.4 × 25             | 0.15  | 1.26                                               | EKMM161VSN391MQ25S |                          | 1,800       | 30 × 60               | 0.15  | 3.49                                               | EKMM181VSN182MR60S |
|                          | 390         | 30 × 20               | 0.15  | 1.25                                               | EKMM161VSN391MR20S |                          | 1,800       | 35 × 40               | 0.15  | 3.30                                               | EKMM181VSN182MA40S |
|                          | 470         | 22 × 30               | 0.15  | 1.55                                               | EKMM161VSN471MP30S |                          | 2,200       | 35 × 50               | 0.15  | 3.65                                               | EKMM181VSN222MA50S |
|                          | 470         | 25.4 × 25             | 0.15  | 1.55                                               | EKMM161VSN471MQ25S |                          | 2,700       | 35 × 60               | 0.15  | 4.19                                               | EKMM181VSN272MA60S |
|                          | 470         | 30 × 20               | 0.15  | 1.30                                               | EKMM161VSN471MR20S | 200                      | 150         | 22 × 20               | 0.15  | 0.73                                               | EKMM201VSN151MP20S |
|                          | 560         | 22 × 35               | 0.15  | 1.67                                               | EKMM161VSN561MP35S |                          | 180         | 22 × 20               | 0.15  | 0.80                                               | EKMM201VSN181MP20S |
|                          | 560         | 25.4 × 30             | 0.15  | 1.67                                               | EKMM161VSN561MQ30S |                          | 220         | 25.4 × 20             | 0.15  | 0.85                                               | EKMM201VSN221MQ20S |
|                          | 560         | 30 × 25               | 0.15  | 1.67                                               | EKMM161VSN561MR25S |                          | 270         | 22 × 25               | 0.15  | 1.10                                               | EKMM201VSN271MP25S |
|                          | 560         | 35 × 20               | 0.15  | 1.46                                               | EKMM161VSN561MA20S |                          | 270         | 30 × 20               | 0.15  | 1.05                                               | EKMM201VSN271MR20S |
|                          | 680         | 22 × 40               | 0.15  | 1.82                                               | EKMM161VSN681MP40S |                          | 330         | 22 × 30               | 0.15  | 1.25                                               | EKMM201VSN331MP30S |
|                          | 680         | 25.4 × 30             | 0.15  | 1.82                                               | EKMM161VSN681MQ30S |                          | 330         | 25.4 × 25             | 0.15  | 1.25                                               | EKMM201VSN331MQ25S |
|                          | 680         | 30 × 25               | 0.15  | 1.82                                               | EKMM161VSN681MR25S |                          | 330         | 30 × 20               | 0.15  | 1.10                                               | EKMM201VSN331MR20S |
|                          | 680         | 35 × 20               | 0.15  | 1.51                                               | EKMM161VSN681MA20S |                          | 390         | 22 × 30               | 0.15  | 1.35                                               | EKMM201VSN391MP30S |
|                          | 820         | 22 × 45               | 0.15  | 2.04                                               | EKMM161VSN821MP45S |                          | 390         | 25.4 × 25             | 0.15  | 1.35                                               | EKMM201VSN391MQ25S |
|                          | 820         | 25.4 × 35             | 0.15  | 2.04                                               | EKMM161VSN821MQ35S |                          | 390         | 35 × 20               | 0.15  | 1.30                                               | EKMM201VSN391MA20S |
|                          | 820         | 30 × 30               | 0.15  | 2.04                                               | EKMM161VSN821MR30S |                          | 470         | 22 × 35               | 0.15  | 1.50                                               | EKMM201VSN471MP35S |
|                          | 820         | 35 × 25               | 0.15  | 2.04                                               | EKMM161VSN821MA25S |                          | 470         | 25.4 × 30             | 0.15  | 1.50                                               | EKMM201VSN471MQ30S |
|                          | 1,000       | 22 × 50               | 0.15  | 2.25                                               | EKMM161VSN102MP50S |                          | 470         | 30 × 25               | 0.15  | 1.50                                               | EKMM201VSN471MR25S |
|                          | 1,000       | 25.4 × 40             | 0.15  | 2.25                                               | EKMM161VSN102MQ40S |                          | 470         | 35 × 20               | 0.15  | 1.41                                               | EKMM201VSN471MA20S |
|                          | 1,000       | 30 × 30               | 0.15  | 2.25                                               | EKMM161VSN102MR30S |                          | 560         | 22 × 40               | 0.15  | 1.67                                               | EKMM201VSN561MP40S |
|                          | 1,000       | 35 × 25               | 0.15  | 2.25                                               | EKMM161VSN102MA25S |                          | 560         | 25.4 × 30             | 0.15  | 1.67                                               | EKMM201VSN561MQ30S |
|                          | 1,200       | 25.4 × 45             | 0.15  | 2.49                                               | EKMM161VSN122MQ45S |                          | 560         | 30 × 25               | 0.15  | 1.67                                               | EKMM201VSN561MR25S |
|                          | 1,200       | 30 × 35               | 0.15  | 2.49                                               | EKMM161VSN122MR35S |                          | 680         | 22 × 45               | 0.15  | 1.78                                               | EKMM201VSN681MP45S |
|                          | 1,200       | 35 × 30               | 0.15  | 2.49                                               | EKMM161VSN122MA30S |                          | 680         | 25.4 × 35             | 0.15  | 1.78                                               | EKMM201VSN681MQ35S |
|                          | 1,500       | 25.4 × 60             | 0.15  | 2.97                                               | EKMM161VSN152MQ60S |                          | 680         | 30 × 30               | 0.15  | 1.78                                               | EKMM201VSN681MR30S |
|                          | 1,500       | 30 × 40               | 0.15  | 2.84                                               | EKMM161VSN152MR40S |                          | 680         | 35 × 25               | 0.15  | 1.78                                               | EKMM201VSN681MA25S |
|                          | 1,500       | 35 × 30               | 0.15  | 2.84                                               | EKMM161VSN152MA30S |                          | 820         | 25.4 × 45             | 0.15  | 2.04                                               | EKMM201VSN821MQ45S |
|                          | 1,800       | 30 × 45               | 0.15  | 3.32                                               | EKMM161VSN182MR45S |                          | 820         | 30 × 30               | 0.15  | 2.04                                               | EKMM201VSN821MR30S |
|                          | 1,800       | 35 × 35               | 0.15  | 3.00                                               | EKMM161VSN182MA35S |                          | 820         | 35 × 25               | 0.15  | 2.04                                               | EKMM201VSN821MA25S |
|                          | 2,200       | 30 × 60               | 0.15  | 3.86                                               | EKMM161VSN222MR60S |                          | 1,000       | 25.4 × 50             | 0.15  | 2.30                                               | EKMM201VSN102MQ50S |
|                          | 2,200       | 35 × 45               | 0.15  | 3.50                                               | EKMM161VSN222MA45S |                          | 1,000       | 30 × 35               | 0.15  | 2.30                                               | EKMM201VSN102MR35S |
|                          | 2,700       | 35 × 50               | 0.15  | 4.00                                               | EKMM161VSN272MA50S |                          | 1,000       | 35 × 30               | 0.15  | 2.30                                               | EKMM201VSN102MA30S |
|                          | 3,300       | 35 × 60               | 0.15  | 4.63                                               | EKMM161VSN332MA60S |                          | 1,200       | 25.4 × 60             | 0.15  | 2.66                                               | EKMM201VSN122MQ60S |
| 180                      | 180         | 22 × 20               | 0.15  | 0.80                                               | EKMM181VSN181MP20S |                          | 1,200       | 30 × 40               | 0.15  | 2.65                                               | EKMM201VSN122MR40S |
|                          | 220         | 25.4 × 20             | 0.15  | 0.90                                               | EKMM181VSN221MQ20S |                          | 1,200       | 35 × 35               | 0.15  | 2.65                                               | EKMM201VSN122MA35S |
|                          | 270         | 22 × 25               | 0.15  | 1.00                                               | EKMM181VSN271MP25S |                          | 1,500       | 30 × 50               | 0.15  | 3.08                                               | EKMM201VSN152MR50S |
|                          | 270         | 25.4 × 20             | 0.15  | 0.95                                               | EKMM181VSN271MQ20S |                          | 1,500       | 35 × 40               | 0.15  | 3.08                                               | EKMM201VSN152MA40S |
|                          | 330         | 22 × 25               | 0.15  | 1.20                                               | EKMM181VSN331MP25S |                          | 1,800       | 30 × 60               | 0.15  | 3.49                                               | EKMM201VSN182MR60S |
|                          | 330         | 25.4 × 25             | 0.15  | 1.16                                               | EKMM181VSN331MQ25S |                          | 1,800       | 35 × 45               | 0.15  | 3.48                                               | EKMM201VSN182MA45S |
|                          | 330         | 30 × 20               | 0.15  | 1.15                                               | EKMM181VSN331MR20S |                          | 2,200       | 35 × 50               | 0.15  | 3.78                                               | EKMM201VSN222MA50S |
|                          | 390         | 22 × 30               | 0.15  | 1.35                                               | EKMM181VSN391MP30S | 220                      | 150         | 22 × 20               | 0.15  | 0.67                                               | EKMM221VSN151MP20S |
|                          | 390         | 25.4 × 25             | 0.15  | 1.35                                               | EKMM181VSN391MQ25S |                          | 180         | 25.4 × 20             | 0.15  | 0.76                                               | EKMM221VSN181MQ20S |
|                          | 390         | 30 × 20               | 0.15  | 1.20                                               | EKMM181VSN391MR20S |                          | 220         | 22 × 25               | 0.15  | 1.00                                               | EKMM221VSN221MP25S |
|                          | 470         | 22 × 35               | 0.15  | 1.50                                               | EKMM181VSN471MP35S |                          | 220         | 25.4 × 20             | 0.15  | 0.84                                               | EKMM221VSN221MQ20S |
|                          | 470         | 25.4 × 30             | 0.15  | 1.50                                               | EKMM181VSN471MQ30S |                          | 270         | 22 × 30               | 0.15  | 1.15                                               | EKMM221VSN271MP30S |
|                          | 470         | 30 × 25               | 0.15  | 1.50                                               | EKMM181VSN471MR25S |                          | 270         | 25.4 × 25             | 0.15  | 1.08                                               | EKMM221VSN271MQ25S |
|                          | 470         | 35 × 20               | 0.15  | 1.36                                               | EKMM181VSN471MA20S |                          | 270         | 30 × 20               | 0.15  | 0.98                                               | EKMM221VSN271MR20S |
|                          | 560         | 22 × 40               | 0.15  | 1.67                                               | EKMM181VSN561MP40S |                          | 330         | 22 × 35               | 0.15  | 1.25                                               | EKMM221VSN331MP35S |
|                          | 560         | 25.4 × 30             | 0.15  | 1.67                                               | EKMM181VSN561MQ30S |                          | 330         | 25.4 × 25             | 0.15  | 1.25                                               | EKMM221VSN331MQ25S |
|                          | 560         | 30 × 25               | 0.15  | 1.67                                               | EKMM181VSN561MR25S |                          | 330         | 35 × 20               | 0.15  | 1.13                                               | EKMM221VSN331MA20S |
|                          | 560         | 35 × 20               | 0.15  | 1.43                                               | EKMM181VSN561MA20S |                          | 390         | 22 × 35               | 0.15  | 1.40                                               | EKMM221VSN391MP35S |
|                          | 680         | 22 × 45               | 0.15  | 1.78                                               | EKMM181VSN681MP45S |                          | 390         | 25.4 × 30             | 0.15  | 1.40                                               | EKMM221VSN391MQ30S |
|                          | 680         | 25.4 × 35             | 0.15  | 1.78                                               | EKMM181VSN681MQ35S |                          | 390         | 30 × 25               | 0.15  | 1.36                                               | EKMM221VSN391MR25S |
|                          | 680         | 30 × 30               | 0.15  | 1.78                                               | EKMM181VSN681MR30S |                          | 390         | 35 × 20               | 0.15  | 1.23                                               | EKMM221VSN391MA20S |
|                          | 680         | 35 × 25               | 0.15  | 1.83                                               | EKMM181VSN681MA25S |                          | 470         | 22 × 40               | 0.15  | 1.51                                               | EKMM221VSN471MP40S |
|                          | 820         | 22 × 50               | 0.15  | 2.04                                               | EKMM181VSN821MP50S |                          | 470         | 25.4 × 35             | 0.15  | 1.54                                               | EKMM221VSN471MQ35S |
|                          | 820         | 25.4 × 40             | 0.15  | 2.04                                               | EKMM181VSN821MQ40S |                          | 470         | 30 × 25               | 0.15  | 1.50                                               | EKMM221VSN471MR25S |
|                          | 820         | 30 × 30               | 0.15  | 2.04                                               | EKMM181VSN821MR30S |                          | 560         | 22 × 45               | 0.15  | 1.70                                               | EKMM221VSN561MP45S |
|                          | 820         | 35 × 25               | 0.15  | 2.04                                               | EKMM181VSN821MA25S |                          | 560         | 25.4 × 40             | 0.15  | 1.72                                               | EKMM221VSN561MQ40S |
|                          | 1,000       | 25.4 × 45             | 0.15  | 2.30                                               | EKMM181VSN102MQ45S |                          | 560         | 30 × 30               | 0.15  | 1.70                                               | EKMM221VSN561MR30S |
|                          | 1,000       | 30 × 35               | 0.15  | 2.30                                               | EKMM181VSN102MR35S |                          | 560         | 35 × 25               | 0.15  | 1.71                                               | EKMM221VSN561MA25S |
|                          | 1,000       | 35 × 30               | 0.15  | 2.30                                               | EKMM181VSN102MA30S |                          | 680         | 25.4 × 45             | 0.15  | 1.94                                               | EKMM221VSN681MQ45S |

## ◆ STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|
| 220                      | 680         | 30 × 35               | 0.15  | 1.93                                               | EKMM221VSN681MR35S | 315                      | 220         | 25.4 × 30             | 0.15  | 1.04                                               | EKMM3B1VSN221MQ30S |
|                          | 680         | 35 × 25               | 0.15  | 1.89                                               | EKMM221VSN681MA25S |                          | 220         | 30 × 25               | 0.15  | 1.04                                               | EKMM3B1VSN221MR25S |
|                          | 820         | 25.4 × 50             | 0.15  | 2.18                                               | EKMM221VSN821MQ50S |                          | 220         | 35 × 20               | 0.15  | 0.90                                               | EKMM3B1VSN221MA20S |
|                          | 820         | 30 × 40               | 0.15  | 2.19                                               | EKMM221VSN821MR40S |                          | 270         | 22 × 45               | 0.15  | 1.16                                               | EKMM3B1VSN271MP45S |
|                          | 820         | 35 × 30               | 0.15  | 2.16                                               | EKMM221VSN821MA30S |                          | 270         | 25.4 × 35             | 0.15  | 1.16                                               | EKMM3B1VSN271MQ35S |
|                          | 1,000       | 25.4 × 60             | 0.15  | 2.54                                               | EKMM221VSN102MQ60S |                          | 270         | 30 × 25               | 0.15  | 1.16                                               | EKMM3B1VSN271MR25S |
|                          | 1,000       | 30 × 45               | 0.15  | 2.50                                               | EKMM221VSN102MR45S |                          | 270         | 35 × 25               | 0.15  | 1.15                                               | EKMM3B1VSN271MA25S |
|                          | 1,000       | 35 × 35               | 0.15  | 2.44                                               | EKMM221VSN102MA35S |                          | 330         | 22 × 50               | 0.15  | 1.33                                               | EKMM3B1VSN331MP50S |
|                          | 1,200       | 30 × 50               | 0.15  | 2.81                                               | EKMM221VSN122MR50S |                          | 330         | 25.4 × 40             | 0.15  | 1.33                                               | EKMM3B1VSN331MQ40S |
|                          | 1,200       | 35 × 40               | 0.15  | 2.79                                               | EKMM221VSN122MA40S |                          | 330         | 30 × 30               | 0.15  | 1.33                                               | EKMM3B1VSN331MR30S |
|                          | 1,500       | 30 × 60               | 0.15  | 3.30                                               | EKMM221VSN152MR60S |                          | 330         | 35 × 25               | 0.15  | 1.33                                               | EKMM3B1VSN331MA25S |
|                          | 1,500       | 35 × 45               | 0.15  | 3.22                                               | EKMM221VSN152MA45S |                          | 390         | 25.4 × 45             | 0.15  | 1.47                                               | EKMM3B1VSN391MQ45S |
|                          | 1,800       | 35 × 50               | 0.15  | 3.63                                               | EKMM221VSN182MA50S |                          | 390         | 30 × 35               | 0.15  | 1.47                                               | EKMM3B1VSN391MR35S |
|                          | 2,200       | 35 × 60               | 0.15  | 4.23                                               | EKMM221VSN222MA60S |                          | 390         | 35 × 30               | 0.15  | 1.47                                               | EKMM3B1VSN391MA30S |
| 250                      | 120         | 22 × 20               | 0.15  | 0.60                                               | EKMM251VSN121MP20S | 350                      | 470         | 25.4 × 50             | 0.15  | 1.70                                               | EKMM3B1VSN471MQ50S |
|                          | 150         | 25.4 × 20             | 0.15  | 0.74                                               | EKMM251VSN151MQ20S |                          | 470         | 30 × 40               | 0.15  | 1.70                                               | EKMM3B1VSN471MR40S |
|                          | 180         | 22 × 25               | 0.15  | 0.78                                               | EKMM251VSN181MP25S |                          | 470         | 35 × 30               | 0.15  | 1.70                                               | EKMM3B1VSN471MA30S |
|                          | 180         | 25.4 × 20             | 0.15  | 0.75                                               | EKMM251VSN181MQ20S |                          | 560         | 30 × 45               | 0.15  | 2.05                                               | EKMM3B1VSN561MR45S |
|                          | 220         | 22 × 25               | 0.15  | 1.00                                               | EKMM251VSN221MP25S |                          | 560         | 35 × 35               | 0.15  | 2.05                                               | EKMM3B1VSN561MA35S |
|                          | 220         | 25.4 × 25             | 0.15  | 0.95                                               | EKMM251VSN221MQ25S |                          | 680         | 30 × 50               | 0.15  | 2.17                                               | EKMM3B1VSN681MR50S |
|                          | 220         | 30 × 20               | 0.15  | 0.95                                               | EKMM251VSN221MR20S |                          | 680         | 35 × 40               | 0.15  | 2.17                                               | EKMM3B1VSN681MA40S |
|                          | 270         | 22 × 30               | 0.15  | 1.18                                               | EKMM251VSN271MP30S |                          | 820         | 35 × 45               | 0.15  | 2.20                                               | EKMM3B1VSN821MA45S |
|                          | 270         | 25.4 × 25             | 0.15  | 1.18                                               | EKMM251VSN271MQ25S |                          | 1,000       | 35 × 60               | 0.15  | 2.55                                               | EKMM3B1VSN102MA60S |
|                          | 270         | 30 × 20               | 0.15  | 1.00                                               | EKMM251VSN271MR20S |                          | 56          | 22 × 20               | 0.15  | 0.41                                               | EKMM351VSN560MP20S |
|                          | 330         | 22 × 35               | 0.15  | 1.30                                               | EKMM251VSN331MP35S |                          | 68          | 25.4 × 20             | 0.15  | 0.46                                               | EKMM351VSN680MQ20S |
|                          | 330         | 25.4 × 30             | 0.15  | 1.30                                               | EKMM251VSN331MQ30S |                          | 82          | 22 × 25               | 0.15  | 0.55                                               | EKMM351VSN820MP25S |
|                          | 330         | 30 × 25               | 0.15  | 1.30                                               | EKMM251VSN331MR25S |                          | 82          | 25.4 × 20             | 0.15  | 0.51                                               | EKMM351VSN820MQ20S |
|                          | 330         | 35 × 20               | 0.15  | 1.16                                               | EKMM251VSN331MA20S |                          | 100         | 22 × 25               | 0.15  | 0.69                                               | EKMM351VSN101MP25S |
|                          | 390         | 22 × 40               | 0.15  | 1.49                                               | EKMM251VSN391MP40S |                          | 100         | 30 × 20               | 0.15  | 0.60                                               | EKMM351VSN101MR20S |
|                          | 390         | 25.4 × 35             | 0.15  | 1.49                                               | EKMM251VSN391MQ35S | 400                      | 120         | 22 × 30               | 0.15  | 0.75                                               | EKMM351VSN121MP30S |
|                          | 390         | 30 × 25               | 0.15  | 1.49                                               | EKMM251VSN391MR25S |                          | 120         | 25.4 × 25             | 0.15  | 0.75                                               | EKMM351VSN121MQ25S |
|                          | 470         | 22 × 45               | 0.15  | 1.65                                               | EKMM251VSN471MP45S |                          | 120         | 30 × 20               | 0.15  | 0.65                                               | EKMM351VSN121MR20S |
|                          | 470         | 25.4 × 35             | 0.15  | 1.65                                               | EKMM251VSN471MQ35S |                          | 150         | 22 × 35               | 0.15  | 0.82                                               | EKMM351VSN151MP35S |
|                          | 470         | 30 × 30               | 0.15  | 1.65                                               | EKMM251VSN471MR30S |                          | 150         | 25.4 × 30             | 0.15  | 0.83                                               | EKMM351VSN151MQ30S |
|                          | 470         | 35 × 25               | 0.15  | 1.65                                               | EKMM251VSN471MA25S |                          | 150         | 30 × 25               | 0.15  | 0.82                                               | EKMM351VSN151MR25S |
|                          | 560         | 22 × 50               | 0.15  | 1.67                                               | EKMM251VSN561MP50S |                          | 150         | 35 × 20               | 0.15  | 0.76                                               | EKMM351VSN151MA20S |
|                          | 560         | 25.4 × 40             | 0.15  | 1.80                                               | EKMM251VSN561MQ40S |                          | 180         | 22 × 40               | 0.15  | 0.92                                               | EKMM351VSN181MP40S |
|                          | 560         | 30 × 30               | 0.15  | 1.80                                               | EKMM251VSN561MR30S |                          | 180         | 25.4 × 30             | 0.15  | 0.92                                               | EKMM351VSN181MQ30S |
|                          | 560         | 35 × 25               | 0.15  | 1.80                                               | EKMM251VSN561MA25S |                          | 180         | 30 × 25               | 0.15  | 0.90                                               | EKMM351VSN181MR25S |
|                          | 680         | 25.4 × 50             | 0.15  | 2.00                                               | EKMM251VSN681MQ50S |                          | 220         | 22 × 45               | 0.15  | 1.05                                               | EKMM351VSN221MP45S |
|                          | 680         | 30 × 35               | 0.15  | 2.00                                               | EKMM251VSN681MR35S |                          | 220         | 25.4 × 35             | 0.15  | 1.04                                               | EKMM351VSN221MQ35S |
|                          | 680         | 35 × 30               | 0.15  | 2.00                                               | EKMM251VSN681MA30S |                          | 220         | 30 × 30               | 0.15  | 1.02                                               | EKMM351VSN221MR30S |
|                          | 820         | 25.4 × 60             | 0.15  | 2.20                                               | EKMM251VSN821MQ60S |                          | 220         | 35 × 25               | 0.15  | 1.04                                               | EKMM351VSN221MA25S |
|                          | 820         | 30 × 40               | 0.15  | 2.30                                               | EKMM251VSN821MR40S |                          | 270         | 22 × 50               | 0.15  | 1.16                                               | EKMM351VSN271MP50S |
|                          | 820         | 35 × 35               | 0.15  | 2.30                                               | EKMM251VSN821MA35S |                          | 270         | 25.4 × 40             | 0.15  | 1.18                                               | EKMM351VSN271MQ40S |
|                          | 1,000       | 30 × 50               | 0.15  | 2.47                                               | EKMM251VSN102MR50S |                          | 270         | 30 × 30               | 0.15  | 1.17                                               | EKMM351VSN271MR30S |
|                          | 1,000       | 35 × 40               | 0.15  | 2.47                                               | EKMM251VSN102MA40S |                          | 270         | 35 × 25               | 0.15  | 1.20                                               | EKMM351VSN271MA25S |
|                          | 1,200       | 30 × 60               | 0.15  | 2.85                                               | EKMM251VSN122MR60S |                          | 330         | 25.4 × 45             | 0.15  | 1.29                                               | EKMM351VSN331MQ45S |
|                          | 1,200       | 35 × 45               | 0.15  | 2.60                                               | EKMM251VSN122MA45S |                          | 330         | 30 × 35               | 0.15  | 1.34                                               | EKMM351VSN331MR35S |
|                          | 1,500       | 35 × 50               | 0.15  | 3.00                                               | EKMM251VSN152MA50S |                          | 330         | 35 × 30               | 0.15  | 1.22                                               | EKMM351VSN331MA30S |
|                          | 1,800       | 35 × 60               | 0.15  | 3.42                                               | EKMM251VSN182MA60S |                          | 390         | 25.4 × 50             | 0.15  | 1.51                                               | EKMM351VSN391MQ50S |
| 315                      | 68          | 22 × 20               | 0.15  | 0.45                                               | EKMM3B1VSN680MP20S |                          | 390         | 30 × 40               | 0.15  | 1.51                                               | EKMM351VSN391MR40S |
|                          | 82          | 22 × 20               | 0.15  | 0.47                                               | EKMM3B1VSN820MP20S |                          | 390         | 35 × 35               | 0.15  | 1.47                                               | EKMM351VSN391MA35S |
|                          | 100         | 22 × 25               | 0.15  | 0.61                                               | EKMM3B1VSN101MP25S |                          | 470         | 25.4 × 60             | 0.15  | 1.66                                               | EKMM351VSN471MQ60S |
|                          | 100         | 25.4 × 20             | 0.15  | 0.56                                               | EKMM3B1VSN101MQ20S |                          | 470         | 30 × 45               | 0.15  | 1.65                                               | EKMM351VSN471MR45S |
|                          | 120         | 22 × 25               | 0.15  | 0.75                                               | EKMM3B1VSN121MP25S |                          | 470         | 35 × 35               | 0.15  | 1.69                                               | EKMM351VSN471MA35S |
|                          | 120         | 25.4 × 20             | 0.15  | 0.62                                               | EKMM3B1VSN121MQ20S |                          | 560         | 30 × 50               | 0.15  | 1.85                                               | EKMM351VSN561MR50S |
|                          | 120         | 30 × 20               | 0.15  | 0.65                                               | EKMM3B1VSN121MR20S |                          | 560         | 35 × 40               | 0.15  | 1.90                                               | EKMM351VSN561MA40S |
|                          | 150         | 22 × 30               | 0.15  | 0.82                                               | EKMM3B1VSN151MP30S |                          | 680         | 30 × 60               | 0.15  | 2.15                                               | EKMM351VSN681MR60S |
|                          | 150         | 25.4 × 25             | 0.15  | 0.82                                               | EKMM3B1VSN151MQ25S |                          | 680         | 35 × 50               | 0.15  | 1.99                                               | EKMM351VSN681MA50S |
|                          | 150         | 30 × 20               | 0.15  | 0.70                                               | EKMM3B1VSN151MR20S |                          | 820         | 35 × 60               | 0.15  | 2.31                                               | EKMM351VSN821MA60S |
|                          | 150         | 35 × 20               | 0.15  | 0.76                                               | EKMM3B1VSN151MA20S |                          | 47          | 22 × 20               | 0.15  | 0.37                                               | EKMM401VSN470MP20S |
|                          | 180         | 22 × 35               | 0.15  | 0.92                                               | EKMM3B1VSN181MP35S |                          | 56          | 25.4 × 20             | 0.15  | 0.42                                               | EKMM401VSN560MQ20S |
|                          | 180         | 25.4 × 25             | 0.15  | 0.92                                               | EKMM3B1VSN181MQ25S |                          | 68          | 22 × 25               | 0.15  | 0.50                                               | EKMM401VSN680MP25S |
|                          | 180         | 30 × 25               | 0.15  | 0.90                                               | EKMM3B1VSN181MR25S |                          | 68          | 25.4 × 20             | 0.15  | 0.46                                               | EKMM401VSN680MQ20S |
|                          | 180         | 35 × 20               | 0.15  | 0.85                                               | EKMM3B1VSN181MA20S |                          | 82          | 22 × 25               | 0.15  | 0.64                                               | EKMM401VSN820MP25S |
|                          | 220         | 22 × 40               | 0.15  | 1.04                                               | EKMM3B1VSN221MP40S |                          | 82          | 30 × 20               | 0.15  | 0.55                                               | EKMM401VSN820MR20S |



KMM Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|
| 400                      | 100         | 22 × 30               | 0.15  | 0.70                                               | EKMM401VSN101MP30S | 420                      | 180         | 25.4 × 35             | 0.20  | 0.95                                               | EKMM421VSN181MQ35S |
|                          | 100         | 25.4 × 25             | 0.15  | 0.70                                               | EKMM401VSN101MQ25S |                          | 180         | 30 × 30               | 0.20  | 0.95                                               | EKMM421VSN181MR30S |
|                          | 100         | 30 × 20               | 0.15  | 0.60                                               | EKMM401VSN101MR20S |                          | 180         | 35 × 25               | 0.20  | 0.94                                               | EKMM421VSN181MA25S |
|                          | 120         | 22 × 35               | 0.15  | 0.75                                               | EKMM401VSN121MP35S |                          | 220         | 22 × 50               | 0.20  | 1.10                                               | EKMM421VSN221MP50S |
|                          | 120         | 25.4 × 25             | 0.15  | 0.75                                               | EKMM401VSN121MQ25S |                          | 220         | 25.4 × 45             | 0.20  | 1.10                                               | EKMM421VSN221MQ45S |
|                          | 120         | 30 × 25               | 0.15  | 0.73                                               | EKMM401VSN121MR25S |                          | 220         | 30 × 35               | 0.20  | 1.10                                               | EKMM421VSN221MR35S |
|                          | 120         | 35 × 20               | 0.15  | 0.75                                               | EKMM401VSN121MA20S |                          | 220         | 35 × 25               | 0.20  | 1.10                                               | EKMM421VSN221MA25S |
|                          | 150         | 22 × 40               | 0.15  | 0.88                                               | EKMM401VSN151MP40S |                          | 270         | 25.4 × 50             | 0.20  | 1.22                                               | EKMM421VSN271MQ50S |
|                          | 150         | 25.4 × 30             | 0.15  | 0.88                                               | EKMM401VSN151MQ30S |                          | 270         | 30 × 40               | 0.20  | 1.22                                               | EKMM421VSN271MR40S |
|                          | 150         | 30 × 25               | 0.15  | 0.88                                               | EKMM401VSN151MR25S |                          | 270         | 35 × 30               | 0.20  | 1.22                                               | EKMM421VSN271MA30S |
|                          | 150         | 35 × 20               | 0.15  | 0.80                                               | EKMM401VSN151MA20S |                          | 330         | 25.4 × 60             | 0.20  | 1.41                                               | EKMM421VSN331MQ60S |
|                          | 180         | 22 × 45               | 0.15  | 0.98                                               | EKMM401VSN181MP45S |                          | 330         | 30 × 45               | 0.20  | 1.45                                               | EKMM421VSN331MR45S |
|                          | 180         | 25.4 × 35             | 0.15  | 0.98                                               | EKMM401VSN181MQ35S |                          | 330         | 35 × 35               | 0.20  | 1.45                                               | EKMM421VSN331MA35S |
|                          | 180         | 30 × 30               | 0.15  | 0.98                                               | EKMM401VSN181MR30S |                          | 390         | 30 × 50               | 0.20  | 1.55                                               | EKMM421VSN391MR50S |
|                          | 180         | 35 × 25               | 0.15  | 0.98                                               | EKMM401VSN181MA25S |                          | 390         | 35 × 40               | 0.20  | 1.55                                               | EKMM421VSN391MA40S |
|                          | 220         | 22 × 50               | 0.15  | 1.10                                               | EKMM401VSN221MP50S |                          | 470         | 30 × 60               | 0.20  | 1.79                                               | EKMM421VSN471MR60S |
|                          | 220         | 25.4 × 40             | 0.15  | 1.10                                               | EKMM401VSN221MQ40S |                          | 470         | 35 × 45               | 0.20  | 1.90                                               | EKMM421VSN471MA45S |
|                          | 220         | 30 × 30               | 0.15  | 1.10                                               | EKMM401VSN221MR30S |                          | 560         | 35 × 50               | 0.20  | 2.15                                               | EKMM421VSN561MA50S |
|                          | 220         | 35 × 25               | 0.15  | 1.10                                               | EKMM401VSN221MA25S |                          | 680         | 35 × 60               | 0.20  | 2.27                                               | EKMM421VSN681MA60S |
|                          | 270         | 25.4 × 45             | 0.15  | 1.22                                               | EKMM401VSN271MQ45S | 450                      | 56          | 22 × 25               | 0.20  | 0.40                                               | EKMM451VSN560MP25S |
|                          | 270         | 30 × 35               | 0.15  | 1.22                                               | EKMM401VSN271MR35S |                          | 68          | 22 × 30               | 0.20  | 0.53                                               | EKMM451VSN680MP30S |
|                          | 270         | 35 × 30               | 0.15  | 1.22                                               | EKMM401VSN271MA30S |                          | 68          | 25.4 × 25             | 0.20  | 0.50                                               | EKMM451VSN680MQ25S |
|                          | 330         | 25.4 × 50             | 0.15  | 1.44                                               | EKMM401VSN331MQ50S |                          | 82          | 22 × 30               | 0.20  | 0.64                                               | EKMM451VSN820MP30S |
|                          | 330         | 30 × 40               | 0.15  | 1.44                                               | EKMM401VSN331MR40S |                          | 82          | 25.4 × 25             | 0.20  | 0.64                                               | EKMM451VSN820MQ25S |
|                          | 330         | 35 × 30               | 0.15  | 1.44                                               | EKMM401VSN331MA30S |                          | 100         | 22 × 35               | 0.20  | 0.69                                               | EKMM451VSN101MP35S |
|                          | 390         | 25.4 × 60             | 0.15  | 1.51                                               | EKMM401VSN391MQ60S |                          | 100         | 25.4 × 30             | 0.20  | 0.69                                               | EKMM451VSN101MQ30S |
|                          | 390         | 30 × 45               | 0.15  | 1.60                                               | EKMM401VSN391MR45S |                          | 100         | 30 × 25               | 0.20  | 0.64                                               | EKMM451VSN101MR25S |
|                          | 390         | 35 × 35               | 0.15  | 1.60                                               | EKMM401VSN391MA35S |                          | 120         | 22 × 40               | 0.20  | 0.80                                               | EKMM451VSN121MP40S |
|                          | 470         | 30 × 50               | 0.15  | 1.90                                               | EKMM401VSN471MR50S |                          | 120         | 25.4 × 30             | 0.20  | 0.80                                               | EKMM451VSN121MQ30S |
|                          | 470         | 35 × 40               | 0.15  | 1.90                                               | EKMM401VSN471MA40S |                          | 120         | 30 × 25               | 0.20  | 0.80                                               | EKMM451VSN121MR25S |
|                          | 560         | 30 × 60               | 0.15  | 2.10                                               | EKMM401VSN561MR60S |                          | 120         | 35 × 25               | 0.20  | 0.73                                               | EKMM451VSN121MA25S |
|                          | 560         | 35 × 45               | 0.15  | 2.12                                               | EKMM401VSN561MA45S |                          | 150         | 22 × 45               | 0.20  | 0.88                                               | EKMM451VSN151MP45S |
|                          | 680         | 35 × 60               | 0.15  | 2.27                                               | EKMM401VSN681MA60S |                          | 150         | 25.4 × 35             | 0.20  | 0.88                                               | EKMM451VSN151MQ35S |
| 420                      | 47          | 22 × 20               | 0.20  | 0.37                                               | EKMM421VSN470MP20S |                          | 150         | 30 × 30               | 0.20  | 0.88                                               | EKMM451VSN151MR30S |
|                          | 56          | 25.4 × 20             | 0.20  | 0.42                                               | EKMM421VSN560MQ20S |                          | 150         | 35 × 25               | 0.20  | 0.75                                               | EKMM451VSN151MA25S |
|                          | 68          | 22 × 25               | 0.20  | 0.50                                               | EKMM421VSN680MP25S |                          | 180         | 22 × 50               | 0.20  | 1.00                                               | EKMM451VSN181MP50S |
|                          | 68          | 25.4 × 20             | 0.20  | 0.46                                               | EKMM421VSN680MQ20S |                          | 180         | 25.4 × 40             | 0.20  | 1.00                                               | EKMM451VSN181MQ40S |
|                          | 82          | 22 × 25               | 0.20  | 0.64                                               | EKMM421VSN820MP25S |                          | 180         | 30 × 30               | 0.20  | 1.00                                               | EKMM451VSN181MR30S |
|                          | 82          | 25.4 × 25             | 0.20  | 0.58                                               | EKMM421VSN820MQ25S |                          | 220         | 25.4 × 45             | 0.20  | 1.12                                               | EKMM451VSN221MQ45S |
|                          | 82          | 30 × 20               | 0.20  | 0.53                                               | EKMM421VSN820MR20S |                          | 220         | 30 × 35               | 0.20  | 1.12                                               | EKMM451VSN221MR35S |
|                          | 100         | 22 × 30               | 0.20  | 0.70                                               | EKMM421VSN101MP30S |                          | 220         | 35 × 30               | 0.20  | 1.12                                               | EKMM451VSN221MA30S |
|                          | 100         | 25.4 × 25             | 0.20  | 0.70                                               | EKMM421VSN101MQ25S |                          | 270         | 25.4 × 60             | 0.20  | 1.18                                               | EKMM451VSN271MQ60S |
|                          | 100         | 30 × 20               | 0.20  | 0.59                                               | EKMM421VSN101MR20S |                          | 270         | 30 × 40               | 0.20  | 1.28                                               | EKMM451VSN271MR40S |
|                          | 120         | 22 × 35               | 0.20  | 0.75                                               | EKMM421VSN121MP35S |                          | 270         | 35 × 35               | 0.20  | 1.28                                               | EKMM451VSN271MA35S |
|                          | 120         | 25.4 × 30             | 0.20  | 0.75                                               | EKMM421VSN121MQ30S |                          | 330         | 30 × 50               | 0.20  | 1.45                                               | EKMM451VSN331MR50S |
|                          | 120         | 30 × 25               | 0.20  | 0.73                                               | EKMM421VSN121MR25S |                          | 330         | 35 × 40               | 0.20  | 1.45                                               | EKMM451VSN331MA40S |
|                          | 120         | 35 × 20               | 0.20  | 0.67                                               | EKMM421VSN121MA20S |                          | 390         | 30 × 60               | 0.20  | 1.51                                               | EKMM451VSN391MR60S |
|                          | 150         | 22 × 40               | 0.20  | 0.88                                               | EKMM421VSN151MP40S |                          | 390         | 35 × 40               | 0.20  | 1.55                                               | EKMM451VSN391MA40S |
|                          | 150         | 25.4 × 35             | 0.20  | 0.88                                               | EKMM421VSN151MQ35S |                          | 470         | 35 × 50               | 0.20  | 1.85                                               | EKMM451VSN471MA50S |
|                          | 150         | 30 × 25               | 0.20  | 0.88                                               | EKMM421VSN151MR25S |                          | 560         | 35 × 60               | 0.20  | 1.91                                               | EKMM451VSN561MA60S |
|                          | 180         | 22 × 45               | 0.20  | 0.95                                               | EKMM421VSN181MP45S |                          |             |                       |       |                                                    |                    |

## ◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multipliers

| Frequency(Hz)             | 50   | 120  | 300  | 1k   | 10k  | 50k  |
|---------------------------|------|------|------|------|------|------|
| 160 to 250V <sub>dc</sub> | 0.81 | 1.00 | 1.17 | 1.32 | 1.45 | 1.50 |
| 315 to 450V <sub>dc</sub> | 0.77 | 1.00 | 1.16 | 1.30 | 1.41 | 1.43 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.



# SMH Series

- Endurance with ripple current : 2,000 hours at 85°C
- Non solvent resistant type
- RoHS2 Compliant

SMM  
↓  
Downsized  
Longer life

SMH

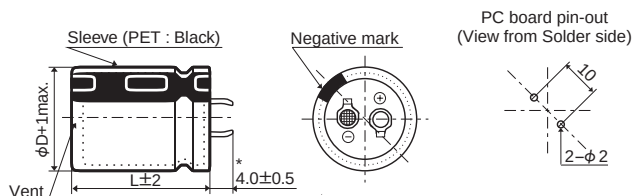


## ◆SPECIFICATIONS

| Items                                                        | Characteristics                                                                                                                                                                                                                                                                        |                                      |      |      |      |      |      |      |      |      |                  |
|--------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------|------|------|------|------|------|------|------|------------------|
| Category                                                     | -40 to +85°C                                                                                                                                                                                                                                                                           |                                      |      |      |      |      |      |      |      |      |                  |
| Temperature Range                                            |                                                                                                                                                                                                                                                                                        |                                      |      |      |      |      |      |      |      |      |                  |
| Rated Voltage Range                                          | 6.3 to 100V <sub>dc</sub>                                                                                                                                                                                                                                                              |                                      |      |      |      |      |      |      |      |      |                  |
| Capacitance Tolerance                                        | ± 20% (M) (at 20°C, 120Hz)                                                                                                                                                                                                                                                             |                                      |      |      |      |      |      |      |      |      |                  |
| Leakage Current                                              | I=0.02CV or 3mA, whichever is smaller.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C after 5 minutes)                                                                                                                          |                                      |      |      |      |      |      |      |      |      |                  |
| Dissipation Factor<br>(tan δ )                               | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                       | 6.3V                                 | 10V  | 16V  | 25V  | 35V  | 50V  | 63V  | 80V  | 100V | (at 20°C, 120Hz) |
|                                                              | tan δ (Max.)                                                                                                                                                                                                                                                                           | 0.60                                 | 0.50 | 0.40 | 0.30 | 0.25 | 0.20 | 0.15 | 0.15 | 0.15 |                  |
| Low Temperature<br>Characteristics<br>(Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                       | 6.3V                                 | 10V  | 16V  | 25V  | 35V  | 50V  | 63V  | 80V  | 100V | (at 120Hz)       |
|                                                              | Z(-25°C)/Z(+20°C)                                                                                                                                                                                                                                                                      | 4                                    | 4    | 4    | 3    | 3    | 2    | 2    | 2    | 2    |                  |
|                                                              | Z(-40°C)/Z(+20°C)                                                                                                                                                                                                                                                                      | 15                                   | 15   | 15   | 10   | 8    | 6    | 6    | 5    | 5    |                  |
| Endurance                                                    | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 2,000 hours at 85°C.                                         |                                      |      |      |      |      |      |      |      |      |                  |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                     | ≤ ±20% of the initial value          |      |      |      |      |      |      |      |      |                  |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                          | ≤200% of the initial specified value |      |      |      |      |      |      |      |      |                  |
|                                                              | Leakage current                                                                                                                                                                                                                                                                        | ≤The initial specified value         |      |      |      |      |      |      |      |      |                  |
| Shelf Life                                                   | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 85°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                      |      |      |      |      |      |      |      |      |                  |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                     | ≤ ±20% of the initial value          |      |      |      |      |      |      |      |      |                  |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                          | ≤150% of the initial specified value |      |      |      |      |      |      |      |      |                  |
|                                                              | Leakage current                                                                                                                                                                                                                                                                        | ≤The initial specified value         |      |      |      |      |      |      |      |      |                  |

## ◆DIMENSIONS [mm]

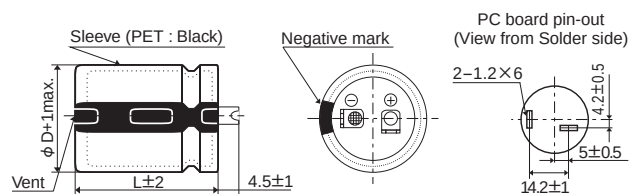
● Terminal Code : VS (φ22 to φ35) : Standard



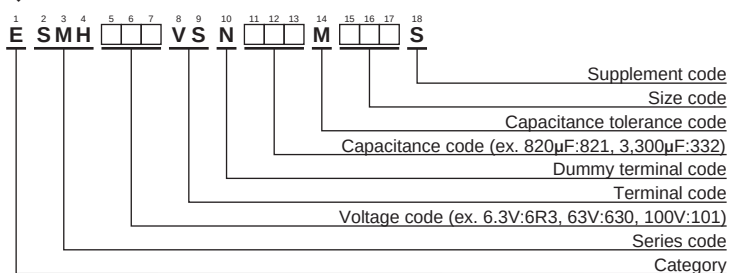
\*φD=35mm : 3.5±0.5mm

The standard design has no plastic disc.

● Terminal Code : LI (φ35)



## ◆PART NUMBERING SYSTEM



Please refer to "Product code guide (snap-in type)"



## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>85°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>85°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|---------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|---------------------------------------------------|--------------------|
| 6.3                      | 15,000      | 22 × 25               | 0.60  | 2.44                                              | ESMH6R3VSN153MP25S | 16                       | 27,000      | 25.4 × 45             | 0.40  | 4.72                                              | ESMH160VSN273MQ45S |
|                          | 18,000      | 22 × 30               | 0.60  | 2.67                                              | ESMH6R3VSN183MP30S |                          | 27,000      | 30 × 35               | 0.40  | 4.82                                              | ESMH160VSN273MR35S |
|                          | 18,000      | 25.4 × 25             | 0.60  | 2.70                                              | ESMH6R3VSN183MQ25S |                          | 27,000      | 35 × 30               | 0.40  | 4.65                                              | ESMH160VSN273MA30S |
|                          | 22,000      | 22 × 30               | 0.60  | 3.06                                              | ESMH6R3VSN223MP30S |                          | 33,000      | 25.4 × 50             | 0.40  | 5.33                                              | ESMH160VSN333MQ50S |
|                          | 22,000      | 25.4 × 25             | 0.60  | 3.07                                              | ESMH6R3VSN223MQ25S |                          | 33,000      | 30 × 40               | 0.40  | 5.36                                              | ESMH160VSN333MR40S |
|                          | 27,000      | 22 × 35               | 0.60  | 3.49                                              | ESMH6R3VSN273MP35S |                          | 33,000      | 35 × 30               | 0.40  | 5.15                                              | ESMH160VSN333MA30S |
|                          | 27,000      | 25.4 × 30             | 0.60  | 3.52                                              | ESMH6R3VSN273MQ30S |                          | 39,000      | 30 × 45               | 0.40  | 6.01                                              | ESMH160VSN393MR45S |
|                          | 27,000      | 30 × 25               | 0.60  | 3.57                                              | ESMH6R3VSN273MR25S |                          | 39,000      | 35 × 35               | 0.40  | 5.95                                              | ESMH160VSN393MA35S |
|                          | 33,000      | 22 × 40               | 0.60  | 3.97                                              | ESMH6R3VSN333MP40S |                          | 47,000      | 30 × 50               | 0.40  | 6.79                                              | ESMH160VSN473MR50S |
|                          | 33,000      | 25.4 × 35             | 0.60  | 4.02                                              | ESMH6R3VSN333MQ35S |                          | 47,000      | 35 × 40               | 0.40  | 6.76                                              | ESMH160VSN473MA40S |
|                          | 33,000      | 30 × 25               | 0.60  | 3.95                                              | ESMH6R3VSN333MR25S |                          | 56,000      | 25.4 × 45             | 0.40  | 7.62                                              | ESMH160VSN563MQ45S |
|                          | 39,000      | 22 × 50               | 0.60  | 4.55                                              | ESMH6R3VSN393MP50S |                          | 68,000      | 35 × 50               | 0.40  | 8.63                                              | ESMH160VSN683MA50S |
|                          | 39,000      | 25.4 × 40             | 0.60  | 4.50                                              | ESMH6R3VSN393MQ40S | 25                       | 5,600       | 22 × 25               | 0.30  | 2.21                                              | ESMH250VSN562MP25S |
|                          | 39,000      | 30 × 30               | 0.60  | 4.45                                              | ESMH6R3VSN393MR30S |                          | 6,800       | 22 × 30               | 0.30  | 2.40                                              | ESMH250VSN682MP30S |
|                          | 39,000      | 35 × 25               | 0.60  | 4.51                                              | ESMH6R3VSN393MA25S |                          | 6,800       | 25.4 × 25             | 0.30  | 2.56                                              | ESMH250VSN682MQ25S |
|                          | 47,000      | 25.4 × 45             | 0.60  | 5.09                                              | ESMH6R3VSN473MQ45S |                          | 8,200       | 22 × 35               | 0.30  | 2.72                                              | ESMH250VSN822MP35S |
|                          | 47,000      | 30 × 35               | 0.60  | 5.06                                              | ESMH6R3VSN473MR35S |                          | 8,200       | 25.4 × 25             | 0.30  | 2.80                                              | ESMH250VSN822MQ25S |
|                          | 47,000      | 35 × 30               | 0.60  | 5.01                                              | ESMH6R3VSN473MA30S |                          | 10,000      | 22 × 40               | 0.30  | 3.09                                              | ESMH250VSN103MP40S |
|                          | 56,000      | 25.4 × 50             | 0.60  | 5.71                                              | ESMH6R3VSN563MQ50S |                          | 10,000      | 25.4 × 30             | 0.30  | 3.12                                              | ESMH250VSN103MQ30S |
|                          | 56,000      | 30 × 40               | 0.60  | 5.70                                              | ESMH6R3VSN563MR40S |                          | 10,000      | 30 × 25               | 0.30  | 3.21                                              | ESMH250VSN103MR25S |
|                          | 56,000      | 35 × 30               | 0.60  | 5.77                                              | ESMH6R3VSN563MA30S |                          | 12,000      | 22 × 45               | 0.30  | 3.48                                              | ESMH250VSN123MP45S |
|                          | 68,000      | 30 × 45               | 0.60  | 6.48                                              | ESMH6R3VSN683MR45S |                          | 12,000      | 25.4 × 35             | 0.30  | 3.43                                              | ESMH250VSN123MQ35S |
|                          | 68,000      | 35 × 35               | 0.60  | 6.42                                              | ESMH6R3VSN683MA35S |                          | 12,000      | 30 × 30               | 0.30  | 3.86                                              | ESMH250VSN123MR30S |
|                          | 82,000      | 30 × 50               | 0.60  | 7.32                                              | ESMH6R3VSN823MR50S |                          | 12,000      | 35 × 25               | 0.30  | 3.54                                              | ESMH250VSN123MA25S |
|                          | 82,000      | 35 × 40               | 0.60  | 7.29                                              | ESMH6R3VSN823MA40S |                          | 15,000      | 22 × 50               | 0.30  | 4.00                                              | ESMH250VSN153MP50S |
|                          | 100,000     | 35 × 45               | 0.60  | 8.31                                              | ESMH6R3VSN104MA45S |                          | 15,000      | 25.4 × 40             | 0.30  | 3.95                                              | ESMH250VSN153MQ40S |
| 10                       | 12,000      | 22 × 25               | 0.50  | 2.39                                              | ESMH100VSN123MP25S |                          | 15,000      | 30 × 30               | 0.30  | 4.00                                              | ESMH250VSN153MR30S |
|                          | 15,000      | 22 × 30               | 0.50  | 2.76                                              | ESMH100VSN153MP30S |                          | 15,000      | 35 × 25               | 0.30  | 3.95                                              | ESMH250VSN153MA25S |
|                          | 15,000      | 25.4 × 25             | 0.50  | 2.77                                              | ESMH100VSN153MQ25S |                          | 18,000      | 25.4 × 45             | 0.30  | 4.45                                              | ESMH250VSN183MQ45S |
|                          | 18,000      | 22 × 35               | 0.50  | 3.12                                              | ESMH100VSN183MP35S |                          | 18,000      | 30 × 35               | 0.30  | 4.46                                              | ESMH250VSN183MR35S |
|                          | 18,000      | 25.4 × 25             | 0.50  | 3.04                                              | ESMH100VSN183MQ25S |                          | 18,000      | 35 × 30               | 0.30  | 4.63                                              | ESMH250VSN183MA30S |
|                          | 22,000      | 22 × 40               | 0.50  | 3.55                                              | ESMH100VSN223MP40S |                          | 22,000      | 25.4 × 50             | 0.30  | 5.02                                              | ESMH250VSN223MQ50S |
|                          | 22,000      | 25.4 × 30             | 0.50  | 3.48                                              | ESMH100VSN223MQ30S |                          | 22,000      | 30 × 45               | 0.30  | 5.21                                              | ESMH250VSN223MR45S |
|                          | 22,000      | 30 × 25               | 0.50  | 3.53                                              | ESMH100VSN223MR25S |                          | 22,000      | 35 × 35               | 0.30  | 5.16                                              | ESMH250VSN223MA35S |
|                          | 27,000      | 22 × 45               | 0.50  | 4.04                                              | ESMH100VSN273MP45S |                          | 27,000      | 30 × 50               | 0.30  | 5.94                                              | ESMH250VSN273MR50S |
|                          | 27,000      | 25.4 × 35             | 0.50  | 3.98                                              | ESMH100VSN273MQ35S |                          | 27,000      | 35 × 40               | 0.30  | 5.92                                              | ESMH250VSN273MA40S |
|                          | 27,000      | 30 × 30               | 0.50  | 3.73                                              | ESMH100VSN273MR30S |                          | 33,000      | 35 × 45               | 0.30  | 6.75                                              | ESMH250VSN333MA45S |
|                          | 27,000      | 35 × 25               | 0.50  | 3.73                                              | ESMH100VSN273MA25S |                          | 39,000      | 35 × 50               | 0.30  | 7.56                                              | ESMH250VSN393MA50S |
|                          | 33,000      | 22 × 50               | 0.50  | 4.58                                              | ESMH100VSN333MP50S | 35                       | 3,900       | 22 × 25               | 0.25  | 2.22                                              | ESMH350VSN392MP25S |
|                          | 33,000      | 25.4 × 40             | 0.50  | 4.54                                              | ESMH100VSN333MQ40S |                          | 4,700       | 22 × 30               | 0.25  | 2.41                                              | ESMH350VSN472MP30S |
|                          | 33,000      | 30 × 30               | 0.50  | 4.13                                              | ESMH100VSN333MR30S |                          | 4,700       | 25.4 × 25             | 0.25  | 2.42                                              | ESMH350VSN472MQ25S |
|                          | 33,000      | 35 × 25               | 0.50  | 4.13                                              | ESMH100VSN333MA25S |                          | 5,600       | 22 × 35               | 0.25  | 2.75                                              | ESMH350VSN562MP35S |
|                          | 39,000      | 25.4 × 45             | 0.50  | 5.08                                              | ESMH100VSN393MQ45S |                          | 5,600       | 25.4 × 25             | 0.25  | 2.64                                              | ESMH350VSN562MQ25S |
|                          | 39,000      | 30 × 35               | 0.50  | 5.05                                              | ESMH100VSN393MR35S |                          | 6,800       | 22 × 40               | 0.25  | 2.80                                              | ESMH350VSN682MP40S |
|                          | 39,000      | 35 × 30               | 0.50  | 4.80                                              | ESMH100VSN393MA30S |                          | 6,800       | 25.4 × 30             | 0.25  | 2.74                                              | ESMH350VSN682MQ30S |
|                          | 47,000      | 25.4 × 50             | 0.50  | 5.73                                              | ESMH100VSN473MQ50S |                          | 6,800       | 30 × 25               | 0.25  | 2.97                                              | ESMH350VSN682MR25S |
|                          | 47,000      | 30 × 40               | 0.50  | 5.72                                              | ESMH100VSN473MR40S |                          | 8,200       | 22 × 45               | 0.25  | 3.47                                              | ESMH350VSN822MP45S |
|                          | 47,000      | 35 × 30               | 0.50  | 5.27                                              | ESMH100VSN473MA30S |                          | 8,200       | 25.4 × 35             | 0.25  | 3.10                                              | ESMH350VSN822MQ35S |
|                          | 56,000      | 30 × 45               | 0.50  | 6.44                                              | ESMH100VSN563MR45S |                          | 8,200       | 30 × 30               | 0.25  | 3.13                                              | ESMH350VSN822MR30S |
|                          | 56,000      | 35 × 35               | 0.50  | 6.38                                              | ESMH100VSN563MA35S |                          | 8,200       | 35 × 25               | 0.25  | 2.73                                              | ESMH350VSN822MA25S |
|                          | 68,000      | 30 × 50               | 0.50  | 7.27                                              | ESMH100VSN683MR50S |                          | 10,000      | 22 × 50               | 0.25  | 3.57                                              | ESMH350VSN103MP50S |
|                          | 68,000      | 35 × 40               | 0.50  | 7.27                                              | ESMH100VSN683MA40S |                          | 10,000      | 25.4 × 40             | 0.25  | 3.53                                              | ESMH350VSN103MQ40S |
|                          | 82,000      | 35 × 50               | 0.50  | 8.49                                              | ESMH100VSN823MA50S |                          | 10,000      | 30 × 30               | 0.25  | 3.46                                              | ESMH350VSN103MR30S |
| 16                       | 8,200       | 22 × 25               | 0.40  | 2.51                                              | ESMH160VSN822MP25S |                          | 10,000      | 35 × 25               | 0.25  | 3.02                                              | ESMH350VSN103MA25S |
|                          | 10,000      | 22 × 25               | 0.40  | 2.77                                              | ESMH160VSN103MP25S |                          | 12,000      | 25.4 × 45             | 0.25  | 3.98                                              | ESMH350VSN123MQ45S |
|                          | 12,000      | 22 × 30               | 0.40  | 2.86                                              | ESMH160VSN123MP30S |                          | 12,000      | 30 × 35               | 0.25  | 4.01                                              | ESMH350VSN123MR35S |
|                          | 12,000      | 25.4 × 25             | 0.40  | 2.95                                              | ESMH160VSN123MQ25S |                          | 12,000      | 35 × 30               | 0.25  | 4.42                                              | ESMH350VSN123MA30S |
|                          | 15,000      | 22 × 35               | 0.40  | 3.29                                              | ESMH160VSN153MP35S |                          | 15,000      | 25.4 × 50             | 0.25  | 4.54                                              | ESMH350VSN153MQ50S |
|                          | 15,000      | 25.4 × 30             | 0.40  | 3.46                                              | ESMH160VSN153MQ30S |                          | 15,000      | 30 × 40               | 0.25  | 4.52                                              | ESMH350VSN153MR40S |
|                          | 15,000      | 30 × 25               | 0.40  | 3.66                                              | ESMH160VSN153MR25S |                          | 15,000      | 35 × 35               | 0.25  | 5.01                                              | ESMH350VSN153MA35S |
|                          | 18,000      | 22 × 40               | 0.40  | 3.72                                              | ESMH160VSN183MP40S |                          | 18,000      | 30 × 45               | 0.25  | 4.71                                              | ESMH350VSN183MR45S |
|                          | 18,000      | 25.4 × 35             | 0.40  | 3.98                                              | ESMH160VSN183MQ35S |                          | 18,000      | 35 × 40               | 0.25  | 5.54                                              | ESMH350VSN183MA40S |
|                          | 18,000      | 30 × 25               | 0.40  | 4.00                                              | ESMH160VSN183MR25S |                          | 22,000      | 30 × 50               | 0.25  | 5.33                                              | ESMH350VSN223MR50S |
|                          | 22,000      | 22 × 50               | 0.40  | 4.37                                              | ESMH160VSN223MP50S |                          | 22,000      | 35 × 45               | 0.25  | 6.04                                              | ESMH350VSN223MA45S |
|                          | 22,000      | 25.4 × 40             | 0.40  | 4.26                                              | ESMH160VSN223MQ40S |                          | 27,000      | 35 × 50               | 0.25  | 6.89                                              | ESMH350VSN273MA50S |
|                          | 22,000      | 30 × 30               | 0.40  | 4.21                                              | ESMH160VSN223MR30S | 50                       | 2,200       | 22 × 25               | 0.20  | 1.91                                              | ESMH500VSN222MP25S |
|                          | 22,000      | 35 × 25               | 0.40  | 4.15                                              | ESMH160VSN223MA25S |                          | 3,300       | 22 × 30               | 0.20  | 2.37                                              | ESMH500VSN332MP30S |



## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>85°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|---------------------------------------------------|--------------------|
| 50                       | 3,300       | 25.4 × 25             | 0.20  | 2.38                                              | ESMH500VSN332MQ25S |
|                          | 3,900       | 22 × 35               | 0.20  | 2.65                                              | ESMH500VSN392MP35S |
|                          | 3,900       | 25.4 × 30             | 0.20  | 2.68                                              | ESMH500VSN392MQ30S |
|                          | 3,900       | 30 × 25               | 0.20  | 2.55                                              | ESMH500VSN392MR25S |
|                          | 4,700       | 22 × 40               | 0.20  | 2.99                                              | ESMH500VSN472MP40S |
|                          | 4,700       | 25.4 × 35             | 0.20  | 3.03                                              | ESMH500VSN472MQ35S |
|                          | 4,700       | 30 × 25               | 0.20  | 2.81                                              | ESMH500VSN472MR25S |
|                          | 5,600       | 22 × 45               | 0.20  | 3.36                                              | ESMH500VSN562MP45S |
|                          | 5,600       | 25.4 × 35             | 0.20  | 3.31                                              | ESMH500VSN562MQ35S |
|                          | 5,600       | 30 × 30               | 0.20  | 3.37                                              | ESMH500VSN562MR30S |
|                          | 5,600       | 35 × 25               | 0.20  | 3.42                                              | ESMH500VSN562MA25S |
|                          | 6,800       | 22 × 50               | 0.20  | 3.81                                              | ESMH500VSN682MP50S |
|                          | 6,800       | 25.4 × 40             | 0.20  | 3.81                                              | ESMH500VSN682MQ40S |
|                          | 6,800       | 30 × 35               | 0.20  | 3.85                                              | ESMH500VSN682MR35S |
|                          | 6,800       | 35 × 30               | 0.20  | 3.85                                              | ESMH500VSN682MA30S |
|                          | 8,200       | 25.4 × 50             | 0.20  | 4.37                                              | ESMH500VSN822MQ50S |
|                          | 8,200       | 30 × 40               | 0.20  | 4.36                                              | ESMH500VSN822MR40S |
|                          | 8,200       | 35 × 30               | 0.20  | 4.41                                              | ESMH500VSN822MA30S |
|                          | 10,000      | 30 × 45               | 0.20  | 4.97                                              | ESMH500VSN103MR45S |
|                          | 10,000      | 35 × 35               | 0.20  | 4.92                                              | ESMH500VSN103MA35S |
| 63                       | 12,000      | 30 × 50               | 0.20  | 5.60                                              | ESMH500VSN123MR50S |
|                          | 12,000      | 35 × 40               | 0.20  | 5.58                                              | ESMH500VSN123MA40S |
|                          | 15,000      | 35 × 45               | 0.20  | 6.44                                              | ESMH500VSN153MA45S |
|                          | 18,000      | 35 × 50               | 0.20  | 6.71                                              | ESMH500VSN183MA50S |
|                          | 1,800       | 22 × 25               | 0.15  | 1.82                                              | ESMH630VSN182MP25S |
|                          | 2,200       | 22 × 30               | 0.15  | 2.31                                              | ESMH630VSN222MP30S |
|                          | 2,200       | 25.4 × 25             | 0.15  | 2.30                                              | ESMH630VSN222MQ25S |
|                          | 2,700       | 22 × 35               | 0.15  | 2.40                                              | ESMH630VSN272MP35S |
|                          | 2,700       | 25.4 × 25             | 0.15  | 2.40                                              | ESMH630VSN272MQ25S |
|                          | 3,300       | 22 × 35               | 0.15  | 2.62                                              | ESMH630VSN332MP35S |
|                          | 3,300       | 25.4 × 30             | 0.15  | 2.64                                              | ESMH630VSN332MQ30S |
|                          | 3,300       | 30 × 25               | 0.15  | 2.78                                              | ESMH630VSN332MR25S |
|                          | 3,900       | 22 × 40               | 0.15  | 2.93                                              | ESMH630VSN392MP40S |
|                          | 3,900       | 25.4 × 35             | 0.15  | 2.97                                              | ESMH630VSN392MQ35S |
|                          | 3,900       | 30 × 30               | 0.15  | 3.00                                              | ESMH630VSN392MR30S |
|                          | 3,900       | 35 × 25               | 0.15  | 3.00                                              | ESMH630VSN392MA25S |
|                          | 4,700       | 22 × 50               | 0.15  | 3.39                                              | ESMH630VSN472MP50S |
|                          | 4,700       | 25.4 × 40             | 0.15  | 3.36                                              | ESMH630VSN472MQ40S |
|                          | 4,700       | 30 × 30               | 0.15  | 3.32                                              | ESMH630VSN472MR30S |
|                          | 4,700       | 35 × 25               | 0.15  | 3.36                                              | ESMH630VSN472MA25S |
| 80                       | 5,600       | 25.4 × 45             | 0.15  | 3.77                                              | ESMH630VSN562MQ45S |
|                          | 5,600       | 30 × 35               | 0.15  | 3.75                                              | ESMH630VSN562MR35S |
|                          | 5,600       | 35 × 30               | 0.15  | 3.76                                              | ESMH630VSN562MA30S |
|                          | 6,800       | 25.4 × 50             | 0.15  | 4.27                                              | ESMH630VSN682MQ50S |
|                          | 6,800       | 30 × 40               | 0.15  | 4.27                                              | ESMH630VSN682MR40S |
|                          | 6,800       | 35 × 30               | 0.15  | 4.15                                              | ESMH630VSN682MA30S |
|                          | 8,200       | 30 × 45               | 0.15  | 4.83                                              | ESMH630VSN822MR45S |
|                          | 8,200       | 35 × 35               | 0.15  | 4.79                                              | ESMH630VSN822MA35S |
|                          | 10,000      | 30 × 50               | 0.15  | 5.49                                              | ESMH630VSN103MR50S |
|                          | 10,000      | 35 × 40               | 0.15  | 5.47                                              | ESMH630VSN103MA40S |
|                          | 12,000      | 35 × 45               | 0.15  | 6.19                                              | ESMH630VSN123MA45S |
|                          | 1,200       | 22 × 25               | 0.15  | 1.69                                              | ESMH800VSN122MP25S |
|                          | 1,500       | 22 × 25               | 0.15  | 1.88                                              | ESMH800VSN152MP25S |
|                          | 1,800       | 22 × 30               | 0.15  | 2.14                                              | ESMH800VSN182MP30S |
|                          | 1,800       | 25.4 × 25             | 0.15  | 2.26                                              | ESMH800VSN182MQ25S |
|                          | 2,200       | 22 × 35               | 0.15  | 2.44                                              | ESMH800VSN222MP35S |
|                          | 2,200       | 25.4 × 30             | 0.15  | 2.46                                              | ESMH800VSN222MQ30S |
|                          | 2,200       | 30 × 25               | 0.15  | 2.49                                              | ESMH800VSN222MR25S |
|                          | 2,700       | 22 × 40               | 0.15  | 2.78                                              | ESMH800VSN272MP40S |
|                          | 2,700       | 25.4 × 35             | 0.15  | 2.81                                              | ESMH800VSN272MQ35S |
|                          | 2,700       | 30 × 25               | 0.15  | 2.75                                              | ESMH800VSN272MR25S |
| 100                      | 3,300       | 22 × 45               | 0.15  | 3.16                                              | ESMH800VSN332MP45S |
|                          | 3,300       | 25.4 × 40             | 0.15  | 3.21                                              | ESMH800VSN332MQ40S |
|                          | 3,300       | 30 × 30               | 0.15  | 3.17                                              | ESMH800VSN332MR30S |
|                          | 3,300       | 35 × 25               | 0.15  | 3.21                                              | ESMH800VSN332MA25S |
|                          | 3,900       | 22 × 50               | 0.15  | 3.52                                              | ESMH800VSN392MP50S |
|                          | 3,900       | 25.4 × 45             | 0.15  | 3.59                                              | ESMH800VSN392MQ45S |
|                          | 3,900       | 30 × 35               | 0.15  | 3.57                                              | ESMH800VSN392MR35S |
|                          | 3,900       | 35 × 25               | 0.15  | 3.50                                              | ESMH800VSN392MA25S |
|                          | 4,700       | 25.4 × 50             | 0.15  | 4.05                                              | ESMH800VSN472MQ50S |
|                          | 4,700       | 30 × 40               | 0.15  | 4.05                                              | ESMH800VSN472MR40S |
|                          | 4,700       | 35 × 30               | 0.15  | 4.09                                              | ESMH800VSN472MA30S |
|                          | 5,600       | 30 × 45               | 0.15  | 4.55                                              | ESMH800VSN562MR45S |
|                          | 5,600       | 35 × 35               | 0.15  | 4.51                                              | ESMH800VSN562MA35S |
|                          | 6,800       | 30 × 50               | 0.15  | 5.16                                              | ESMH800VSN682MR50S |
|                          | 6,800       | 35 × 40               | 0.15  | 5.14                                              | ESMH800VSN682MA40S |
|                          | 8,200       | 35 × 45               | 0.15  | 5.83                                              | ESMH800VSN822MA45S |
|                          | 10,000      | 35 × 50               | 0.15  | 6.63                                              | ESMH800VSN103MA50S |
|                          | 820         | 22 × 25               | 0.15  | 1.86                                              | ESMH101VSN821MP25S |
|                          | 1,200       | 22 × 30               | 0.15  | 2.09                                              | ESMH101VSN122MP30S |
|                          | 1,200       | 25.4 × 25             | 0.15  | 2.10                                              | ESMH101VSN122MQ25S |
| 100                      | 1,500       | 22 × 35               | 0.15  | 2.41                                              | ESMH101VSN152MP35S |
|                          | 1,500       | 25.4 × 30             | 0.15  | 2.43                                              | ESMH101VSN152MQ30S |
|                          | 1,500       | 30 × 25               | 0.15  | 2.46                                              | ESMH101VSN152MR25S |
|                          | 1,800       | 22 × 40               | 0.15  | 2.71                                              | ESMH101VSN182MP40S |
|                          | 1,800       | 25.4 × 35             | 0.15  | 2.75                                              | ESMH101VSN182MQ35S |
|                          | 1,800       | 30 × 25               | 0.15  | 2.72                                              | ESMH101VSN182MR25S |
|                          | 2,200       | 22 × 45               | 0.15  | 3.08                                              | ESMH101VSN222MP45S |
|                          | 2,200       | 25.4 × 40             | 0.15  | 3.13                                              | ESMH101VSN222MQ40S |
|                          | 2,200       | 30 × 30               | 0.15  | 3.09                                              | ESMH101VSN222MR30S |
|                          | 2,200       | 35 × 25               | 0.15  | 3.14                                              | ESMH101VSN222MA25S |
|                          | 2,700       | 22 × 50               | 0.15  | 3.53                                              | ESMH101VSN272MP50S |
|                          | 2,700       | 25.4 × 45             | 0.15  | 3.57                                              | ESMH101VSN272MQ45S |
|                          | 2,700       | 30 × 35               | 0.15  | 3.55                                              | ESMH101VSN272MR35S |
|                          | 2,700       | 35 × 30               | 0.15  | 3.71                                              | ESMH101VSN272MA30S |
|                          | 3,300       | 25.4 × 50             | 0.15  | 4.06                                              | ESMH101VSN332MQ50S |
|                          | 3,300       | 30 × 40               | 0.15  | 4.05                                              | ESMH101VSN332MR40S |
|                          | 3,300       | 35 × 30               | 0.15  | 4.05                                              | ESMH101VSN332MA30S |
|                          | 3,900       | 30 × 45               | 0.15  | 4.54                                              | ESMH101VSN392MR45S |
|                          | 3,900       | 35 × 35               | 0.15  | 4.49                                              | ESMH101VSN392MA35S |
|                          | 4,700       | 30 × 50               | 0.15  | 5.13                                              | ESMH101VSN472MR50S |
|                          | 4,700       | 35 × 40               | 0.15  | 5.11                                              | ESMH101VSN472MA40S |
|                          | 5,600       | 35 × 45               | 0.15  | 5.75                                              | ESMH101VSN562MA45S |
|                          | 6,800       | 35 × 50               | 0.15  | 6.50                                              | ESMH101VSN682MA50S |

\*For the rated voltage ≥ 160V<sub>dc</sub>, please use SMQ series

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ● Frequency Multipliers

| Frequency(Hz)            | 50   | 120  | 300  | 1k   | 10k  | 50k  |
|--------------------------|------|------|------|------|------|------|
| 6.3 to 50V <sub>dc</sub> | 0.95 | 1.00 | 1.03 | 1.05 | 1.08 | 1.08 |
| 63 to 100V <sub>dc</sub> | 0.92 | 1.00 | 1.07 | 1.13 | 1.19 | 1.20 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

# KMH Series

- Endurance with ripple current : 2,000 hours at 105°C
- Non solvent resistant type
- RoHS2 Compliant

KMM

Downsized  
Longer life

KMH

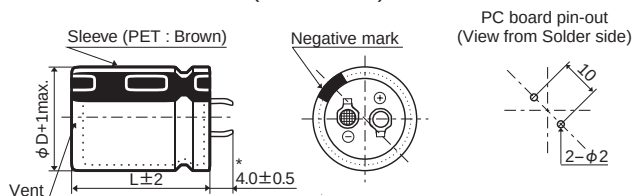


## SPECIFICATIONS

| Items                                                        | Characteristics                                                                                                                                                                                                                                                                       |                                      |      |      |      |      |      |      |      |      |                 |
|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------|------|------|------|------|------|------|------|-----------------|
| Category                                                     | -40 to +105℃                                                                                                                                                                                                                                                                          |                                      |      |      |      |      |      |      |      |      |                 |
| Temperature Range                                            |                                                                                                                                                                                                                                                                                       |                                      |      |      |      |      |      |      |      |      |                 |
| Rated Voltage Range                                          | 6.3 to 100V <sub>dc</sub>                                                                                                                                                                                                                                                             |                                      |      |      |      |      |      |      |      |      |                 |
| Capacitance Tolerance                                        | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                             |                                      |      |      |      |      |      |      |      |      |                 |
| Leakage Current                                              | I=0.02CV or 3mA, whichever is smaller<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 5 minutes)                                                                                                                           |                                      |      |      |      |      |      |      |      |      |                 |
| Dissipation Factor<br>(tan δ )                               | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 6.3V                                 | 10V  | 16V  | 25V  | 35V  | 50V  | 63V  | 80V  | 100V | (at 20℃, 120Hz) |
|                                                              | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.60                                 | 0.50 | 0.40 | 0.30 | 0.25 | 0.20 | 0.15 | 0.15 | 0.15 |                 |
| Low Temperature<br>Characteristics<br>(Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 6.3V                                 | 10V  | 16V  | 25V  | 35V  | 50V  | 63V  | 80V  | 100V | (at 120Hz)      |
|                                                              | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 4                                    | 4    | 4    | 3    | 3    | 2    | 2    | 2    | 2    |                 |
|                                                              | Z(-40℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 15                                   | 15   | 15   | 10   | 8    | 6    | 6    | 5    | 5    |                 |
| Endurance                                                    | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 2,000 hours at 105℃                                          |                                      |      |      |      |      |      |      |      |      |                 |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±20% of the initial value          |      |      |      |      |      |      |      |      |                 |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤200% of the initial specified value |      |      |      |      |      |      |      |      |                 |
|                                                              | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value         |      |      |      |      |      |      |      |      |                 |
| Shelf Life                                                   | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                      |      |      |      |      |      |      |      |      |                 |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±20% of the initial value          |      |      |      |      |      |      |      |      |                 |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤150% of the initial specified value |      |      |      |      |      |      |      |      |                 |
|                                                              | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value         |      |      |      |      |      |      |      |      |                 |

## DIMENSIONS [mm]

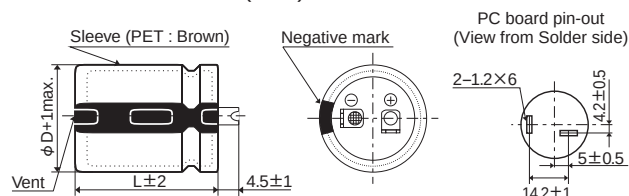
●Terminal Code : VS (φ22 to φ35) : Standard



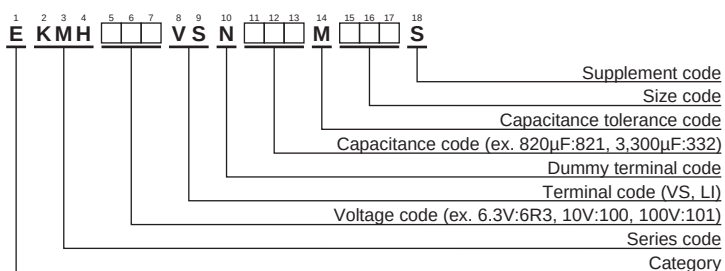
\*φD=35mm : 3.5±0.5mm

The standard design has no plastic disc.

●Terminal Code : LI (φ35)



## PART NUMBERING SYSTEM



Please refer to "Product code guide (snap-in type)"



## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.          | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.          |
|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|-------------------|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|-------------------|
| 6.3                      | 12,000      | 22 × 25               | 0.60  | 1.54                                               | EKM6R3VSN123MP25S | 16                       | 27,000      | 35 × 30               | 0.40  | 3.45                                               | EKM160VSN273MA30S |
|                          | 15,000      | 22 × 25               | 0.60  | 1.72                                               | EKM6R3VSN153MP25S |                          | 33,000      | 30 × 45               | 0.40  | 4.30                                               | EKM160VSN333MR45S |
|                          | 18,000      | 22 × 30               | 0.60  | 1.95                                               | EKM6R3VSN183MP30S |                          | 33,000      | 35 × 35               | 0.40  | 4.26                                               | EKM160VSN333MA35S |
|                          | 18,000      | 25.4 × 25             | 0.60  | 1.96                                               | EKM6R3VSN183MQ25S |                          | 39,000      | 30 × 50               | 0.40  | 4.81                                               | EKM160VSN393MR50S |
|                          | 22,000      | 22 × 35               | 0.60  | 2.23                                               | EKM6R3VSN223MP35S |                          | 39,000      | 35 × 40               | 0.40  | 4.79                                               | EKM160VSN393MA40S |
|                          | 22,000      | 25.4 × 30             | 0.60  | 2.25                                               | EKM6R3VSN223MQ30S |                          | 47,000      | 35 × 45               | 0.40  | 5.43                                               | EKM160VSN473MA45S |
|                          | 22,000      | 30 × 25               | 0.60  | 2.28                                               | EKM6R3VSN223MR25S | 25                       | 4,700       | 22 × 25               | 0.30  | 1.50                                               | EKM250VSN472MP25S |
|                          | 27,000      | 22 × 40               | 0.60  | 2.54                                               | EKM6R3VSN273MP40S |                          | 5,600       | 22 × 25               | 0.30  | 1.63                                               | EKM250VSN562MP25S |
|                          | 27,000      | 25.4 × 35             | 0.60  | 2.57                                               | EKM6R3VSN273MQ35S |                          | 6,800       | 22 × 30               | 0.30  | 1.86                                               | EKM250VSN682MP30S |
|                          | 27,000      | 30 × 25               | 0.60  | 2.52                                               | EKM6R3VSN273MR25S |                          | 6,800       | 25.4 × 25             | 0.30  | 1.87                                               | EKM250VSN682MQ25S |
|                          | 33,000      | 22 × 45               | 0.60  | 2.88                                               | EKM6R3VSN333MP45S |                          | 8,200       | 22 × 35               | 0.30  | 2.11                                               | EKM250VSN822MP35S |
|                          | 33,000      | 25.4 × 40             | 0.60  | 2.93                                               | EKM6R3VSN333MQ40S |                          | 8,200       | 25.4 × 30             | 0.30  | 2.12                                               | EKM250VSN822MQ30S |
|                          | 33,000      | 30 × 30               | 0.60  | 2.89                                               | EKM6R3VSN333MR30S |                          | 8,200       | 30 × 25               | 0.30  | 2.15                                               | EKM250VSN822MR25S |
|                          | 33,000      | 35 × 25               | 0.60  | 2.93                                               | EKM6R3VSN333MA25S |                          | 10,000      | 22 × 40               | 0.30  | 2.39                                               | EKM250VSN103MP40S |
|                          | 39,000      | 25.4 × 40             | 0.60  | 3.18                                               | EKM6R3VSN393MP40S |                          | 10,000      | 25.4 × 35             | 0.30  | 2.42                                               | EKM250VSN103MQ35S |
|                          | 39,000      | 30 × 35               | 0.60  | 3.26                                               | EKM6R3VSN393MR35S |                          | 10,000      | 30 × 25               | 0.30  | 2.37                                               | EKM250VSN103MR25S |
|                          | 39,000      | 35 × 30               | 0.60  | 3.40                                               | EKM6R3VSN393MA30S |                          | 12,000      | 22 × 45               | 0.30  | 2.69                                               | EKM250VSN123MP45S |
|                          | 47,000      | 25.4 × 50             | 0.60  | 3.69                                               | EKM6R3VSN473MQ50S |                          | 12,000      | 25.4 × 40             | 0.30  | 2.74                                               | EKM250VSN123MQ40S |
|                          | 47,000      | 30 × 40               | 0.60  | 3.69                                               | EKM6R3VSN473MR40S |                          | 12,000      | 30 × 30               | 0.30  | 2.70                                               | EKM250VSN123MR30S |
|                          | 47,000      | 35 × 30               | 0.60  | 3.73                                               | EKM6R3VSN473MA30S |                          | 12,000      | 35 × 25               | 0.30  | 2.74                                               | EKM250VSN123MA25S |
|                          | 56,000      | 30 × 45               | 0.60  | 4.16                                               | EKM6R3VSN563MR45S |                          | 15,000      | 25.4 × 45             | 0.30  | 3.15                                               | EKM250VSN153MQ45S |
|                          | 56,000      | 35 × 35               | 0.60  | 4.12                                               | EKM6R3VSN563MA35S |                          | 15,000      | 30 × 35               | 0.30  | 3.13                                               | EKM250VSN153MR35S |
|                          | 68,000      | 30 × 50               | 0.60  | 4.71                                               | EKM6R3VSN683MR50S |                          | 15,000      | 35 × 30               | 0.30  | 3.27                                               | EKM250VSN153MA30S |
|                          | 68,000      | 35 × 40               | 0.60  | 4.69                                               | EKM6R3VSN683MA40S |                          | 18,000      | 25.4 × 50             | 0.30  | 3.54                                               | EKM250VSN183MQ50S |
|                          | 82,000      | 35 × 45               | 0.60  | 5.32                                               | EKM6R3VSN823MA45S |                          | 18,000      | 30 × 40               | 0.30  | 3.54                                               | EKM250VSN183MR40S |
| 10                       | 10,000      | 22 × 25               | 0.50  | 1.55                                               | EKM100VSN103MP25S | 35                       | 18,000      | 35 × 30               | 0.30  | 3.58                                               | EKM250VSN183MA30S |
|                          | 12,000      | 22 × 30               | 0.50  | 1.77                                               | EKM100VSN123MP30S |                          | 22,000      | 30 × 45               | 0.30  | 4.04                                               | EKM250VSN223MP45S |
|                          | 15,000      | 22 × 30               | 0.50  | 1.97                                               | EKM100VSN153MP30S |                          | 22,000      | 35 × 35               | 0.30  | 3.64                                               | EKM250VSN223MA35S |
|                          | 15,000      | 25.4 × 25             | 0.50  | 1.96                                               | EKM100VSN153MQ25S |                          | 27,000      | 35 × 45               | 0.30  | 4.73                                               | EKM250VSN273MA45S |
|                          | 18,000      | 22 × 35               | 0.50  | 2.21                                               | EKM100VSN183MP35S |                          | 33,000      | 35 × 50               | 0.30  | 5.39                                               | EKM250VSN333MA50S |
|                          | 18,000      | 25.4 × 30             | 0.50  | 2.23                                               | EKM100VSN183MQ30S | 50                       | 3,300       | 22 × 25               | 0.25  | 1.40                                               | EKM350VSN332MP25S |
|                          | 22,000      | 22 × 40               | 0.50  | 2.51                                               | EKM100VSN223MP40S |                          | 3,900       | 22 × 30               | 0.25  | 1.57                                               | EKM350VSN392MP30S |
|                          | 22,000      | 25.4 × 35             | 0.50  | 2.54                                               | EKM100VSN223MQ35S |                          | 4,700       | 22 × 30               | 0.25  | 1.72                                               | EKM350VSN472MP30S |
|                          | 22,000      | 30 × 25               | 0.50  | 2.40                                               | EKM100VSN223MR25S |                          | 4,700       | 25.4 × 25             | 0.25  | 1.80                                               | EKM350VSN472MQ25S |
|                          | 27,000      | 22 × 50               | 0.50  | 2.93                                               | EKM100VSN273MP50S |                          | 5,600       | 22 × 35               | 0.25  | 1.95                                               | EKM350VSN562MP35S |
|                          | 27,000      | 25.4 × 40             | 0.50  | 2.90                                               | EKM100VSN273MQ40S |                          | 5,600       | 25.4 × 30             | 0.25  | 1.96                                               | EKM350VSN562MQ30S |
|                          | 27,000      | 30 × 30               | 0.50  | 2.87                                               | EKM100VSN273MR30S |                          | 5,600       | 30 × 25               | 0.25  | 1.99                                               | EKM350VSN562MR25S |
|                          | 27,000      | 35 × 25               | 0.50  | 2.73                                               | EKM100VSN273MA25S |                          | 6,800       | 22 × 40               | 0.25  | 2.20                                               | EKM350VSN682MP40S |
|                          | 33,000      | 25.4 × 45             | 0.50  | 3.30                                               | EKM100VSN333MP45S |                          | 6,800       | 25.4 × 35             | 0.25  | 2.23                                               | EKM350VSN682MQ35S |
|                          | 33,000      | 30 × 35               | 0.50  | 3.28                                               | EKM100VSN333MR35S |                          | 6,800       | 30 × 25               | 0.25  | 2.19                                               | EKM350VSN682MR25S |
|                          | 33,000      | 35 × 30               | 0.50  | 3.16                                               | EKM100VSN333MA30S |                          | 8,200       | 22 × 50               | 0.25  | 2.55                                               | EKM350VSN822MP50S |
|                          | 39,000      | 25.4 × 50             | 0.50  | 3.68                                               | EKM100VSN393MQ50S |                          | 8,200       | 25.4 × 40             | 0.25  | 2.53                                               | EKM350VSN822MQ40S |
|                          | 39,000      | 30 × 40               | 0.50  | 3.69                                               | EKM100VSN393MR40S |                          | 8,200       | 30 × 30               | 0.25  | 2.75                                               | EKM350VSN822MR30S |
|                          | 39,000      | 35 × 30               | 0.50  | 3.43                                               | EKM100VSN393MA30S |                          | 8,200       | 35 × 25               | 0.25  | 2.75                                               | EKM350VSN822MA25S |
|                          | 47,000      | 30 × 45               | 0.50  | 4.17                                               | EKM100VSN473MR45S |                          | 10,000      | 25.4 × 45             | 0.25  | 2.87                                               | EKM350VSN103MQ45S |
|                          | 47,000      | 35 × 35               | 0.50  | 3.76                                               | EKM100VSN473MA35S |                          | 10,000      | 30 × 35               | 0.25  | 2.90                                               | EKM350VSN103MR35S |
|                          | 56,000      | 30 × 50               | 0.50  | 4.68                                               | EKM100VSN563MR50S |                          | 10,000      | 35 × 30               | 0.25  | 2.91                                               | EKM350VSN103MA30S |
|                          | 56,000      | 35 × 40               | 0.50  | 4.67                                               | EKM100VSN563MA40S |                          | 12,000      | 25.4 × 50             | 0.25  | 3.24                                               | EKM350VSN123MQ50S |
|                          | 68,000      | 35 × 50               | 0.50  | 5.46                                               | EKM100VSN683MA50S |                          | 12,000      | 30 × 40               | 0.25  | 3.23                                               | EKM350VSN123MR40S |
| 16                       | 6,800       | 22 × 25               | 0.40  | 1.57                                               | EKM160VSN682MP25S |                          | 12,000      | 35 × 30               | 0.25  | 2.99                                               | EKM350VSN123MA30S |
|                          | 10,000      | 22 × 30               | 0.40  | 1.97                                               | EKM160VSN103MP30S | 16                       | 15,000      | 30 × 45               | 0.25  | 3.72                                               | EKM350VSN153MR45S |
|                          | 10,000      | 25.4 × 25             | 0.40  | 1.97                                               | EKM160VSN103MQ25S |                          | 15,000      | 35 × 35               | 0.25  | 3.67                                               | EKM350VSN153MA35S |
|                          | 12,000      | 22 × 35               | 0.40  | 2.22                                               | EKM160VSN123MP35S |                          | 18,000      | 35 × 40               | 0.25  | 4.37                                               | EKM350VSN183MA40S |
|                          | 12,000      | 25.4 × 30             | 0.40  | 2.24                                               | EKM160VSN123MQ30S |                          | 22,000      | 35 × 50               | 0.25  | 4.92                                               | EKM350VSN223MA50S |
|                          | 12,000      | 30 × 25               | 0.40  | 2.45                                               | EKM160VSN123MR25S |                          | 1,800       | 22 × 25               | 0.20  | 1.33                                               | EKM500VSN182MP25S |
|                          | 15,000      | 22 × 40               | 0.40  | 2.55                                               | EKM160VSN153MP40S |                          | 2,700       | 22 × 30               | 0.20  | 1.69                                               | EKM500VSN272MP30S |
|                          | 15,000      | 25.4 × 35             | 0.40  | 2.58                                               | EKM160VSN153MQ35S |                          | 2,700       | 25.4 × 25             | 0.20  | 1.70                                               | EKM500VSN272MQ25S |
|                          | 15,000      | 30 × 25               | 0.40  | 2.52                                               | EKM160VSN153MR25S |                          | 3,300       | 22 × 35               | 0.20  | 1.93                                               | EKM500VSN332MP35S |
|                          | 18,000      | 22 × 45               | 0.40  | 2.87                                               | EKM160VSN183MP45S |                          | 3,300       | 25.4 × 30             | 0.20  | 1.85                                               | EKM500VSN332MQ30S |
|                          | 18,000      | 25.4 × 40             | 0.40  | 2.92                                               | EKM160VSN183MQ40S |                          | 3,900       | 22 × 40               | 0.20  | 2.16                                               | EKM500VSN392MP40S |
|                          | 18,000      | 30 × 30               | 0.40  | 2.88                                               | EKM160VSN183MR30S |                          | 3,900       | 25.4 × 35             | 0.20  | 2.18                                               | EKM500VSN392MQ35S |
|                          | 18,000      | 35 × 25               | 0.40  | 2.92                                               | EKM160VSN183MA25S |                          | 3,900       | 30 × 25               | 0.20  | 1.95                                               | EKM500VSN392MR25S |
|                          | 22,000      | 25.4 × 45             | 0.40  | 3.32                                               | EKM160VSN223MQ45S |                          | 4,700       | 22 × 45               | 0.20  | 2.43                                               | EKM500VSN472MP45S |
|                          | 22,000      | 30 × 35               | 0.40  | 3.29                                               | EKM160VSN223MR35S |                          | 4,700       | 25.4 × 35             | 0.20  | 2.39                                               | EKM500VSN472MQ35S |
|                          | 22,000      | 35 × 25               | 0.40  | 3.23                                               | EKM160VSN223MA25S |                          | 4,700       | 30 × 30               | 0.20  | 2.25                                               | EKM500VSN472MR30S |
|                          | 27,000      | 25.4 × 50             | 0.40  | 3.78                                               | EKM160VSN273MQ50S |                          | 4,700       | 35 × 25               | 0.20  | 2.48                                               | EKM500VSN472MA25S |
|                          | 27,000      | 30 × 40               | 0.40  | 3.77                                               | EKM160VSN273MR40S |                          | 5,600       | 22 × 50               | 0.20  | 2.75                                               | EKM500VSN562MP50S |





## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|
| 50                       | 5,600       | 25.4 × 40             | 0.20  | 2.70                                               | EKMH500VSN562MQ40S | 80                       | 1,800       | 25.4 × 30             | 0.15  | 1.76                                               | EKMH800VSN182MQ30S |
|                          | 5,600       | 30 × 35               | 0.20  | 2.76                                               | EKMH500VSN562MR35S |                          | 1,800       | 30 × 25               | 0.15  | 1.65                                               | EKMH800VSN182MR25S |
|                          | 5,600       | 35 × 25               | 0.20  | 2.70                                               | EKMH500VSN562MA25S |                          | 2,200       | 22 × 45               | 0.15  | 2.04                                               | EKMH800VSN222MP45S |
|                          | 6,800       | 25.4 × 50             | 0.20  | 3.30                                               | EKMH500VSN682MQ50S |                          | 2,200       | 25.4 × 35             | 0.15  | 2.01                                               | EKMH800VSN222MQ35S |
|                          | 6,800       | 30 × 40               | 0.20  | 3.30                                               | EKMH500VSN682MR40S |                          | 2,200       | 30 × 30               | 0.15  | 2.05                                               | EKMH800VSN222MR30S |
|                          | 6,800       | 35 × 30               | 0.20  | 3.25                                               | EKMH500VSN682MA30S |                          | 2,200       | 35 × 25               | 0.15  | 2.07                                               | EKMH800VSN222MA25S |
|                          | 8,200       | 30 × 45               | 0.20  | 3.60                                               | EKMH500VSN822MR45S |                          | 2,700       | 25.4 × 45             | 0.15  | 2.36                                               | EKMH800VSN272MQ45S |
|                          | 8,200       | 35 × 35               | 0.20  | 3.55                                               | EKMH500VSN822MA35S |                          | 2,700       | 30 × 35               | 0.15  | 2.35                                               | EKMH800VSN272MR35S |
|                          | 10,000      | 30 × 50               | 0.20  | 4.04                                               | EKMH500VSN103MR50S |                          | 2,700       | 35 × 25               | 0.15  | 2.29                                               | EKMH800VSN272MA25S |
|                          | 10,000      | 35 × 40               | 0.20  | 4.03                                               | EKMH500VSN103MA40S | 100                      | 3,300       | 25.4 × 50             | 0.15  | 2.68                                               | EKMH800VSN332MQ50S |
| 63                       | 12,000      | 35 × 45               | 0.20  | 4.55                                               | EKMH500VSN123MA45S |                          | 3,300       | 30 × 40               | 0.15  | 2.68                                               | EKMH800VSN332MR40S |
|                          | 1,200       | 22 × 25               | 0.15  | 1.19                                               | EKMH630VSN122MP25S |                          | 3,300       | 35 × 30               | 0.15  | 2.45                                               | EKMH800VSN332MA30S |
|                          | 1,500       | 22 × 25               | 0.15  | 1.33                                               | EKMH630VSN152MP25S |                          | 3,900       | 30 × 45               | 0.15  | 3.00                                               | EKMH800VSN392MR45S |
|                          | 1,800       | 22 × 30               | 0.15  | 1.51                                               | EKMH630VSN182MP30S |                          | 3,900       | 35 × 35               | 0.15  | 2.98                                               | EKMH800VSN392MA35S |
|                          | 1,800       | 25.4 × 25             | 0.15  | 1.52                                               | EKMH630VSN182MQ25S |                          | 4,700       | 30 × 50               | 0.15  | 3.39                                               | EKMH800VSN472MR50S |
|                          | 2,200       | 22 × 35               | 0.15  | 1.73                                               | EKMH630VSN222MP35S |                          | 4,700       | 35 × 40               | 0.15  | 3.38                                               | EKMH800VSN472MA40S |
|                          | 2,200       | 25.4 × 30             | 0.15  | 1.74                                               | EKMH630VSN222MQ30S |                          | 5,600       | 35 × 45               | 0.15  | 3.80                                               | EKMH800VSN562MA45S |
|                          | 2,700       | 22 × 40               | 0.15  | 1.97                                               | EKMH630VSN272MP40S |                          | 6,800       | 35 × 50               | 0.15  | 3.90                                               | EKMH800VSN682MA50S |
|                          | 2,700       | 25.4 × 35             | 0.15  | 1.99                                               | EKMH630VSN272MQ35S |                          | 560         | 22 × 25               | 0.15  | 1.05                                               | EKMH101VSN561MP25S |
|                          | 2,700       | 30 × 25               | 0.15  | 1.76                                               | EKMH630VSN272MR25S |                          | 820         | 22 × 30               | 0.15  | 1.32                                               | EKMH101VSN821MP30S |
|                          | 3,300       | 22 × 50               | 0.15  | 2.29                                               | EKMH630VSN332MP50S |                          | 820         | 25.4 × 25             | 0.15  | 1.33                                               | EKMH101VSN821MQ25S |
|                          | 3,300       | 25.4 × 40             | 0.15  | 2.27                                               | EKMH630VSN332MQ40S |                          | 1,000       | 22 × 35               | 0.15  | 1.50                                               | EKMH101VSN102MP35S |
|                          | 3,300       | 30 × 30               | 0.15  | 2.24                                               | EKMH630VSN332MR30S |                          | 1,000       | 25.4 × 30             | 0.15  | 1.51                                               | EKMH101VSN102MQ30S |
|                          | 3,300       | 35 × 25               | 0.15  | 2.06                                               | EKMH630VSN332MA25S |                          | 1,200       | 22 × 40               | 0.15  | 1.69                                               | EKMH101VSN122MP40S |
|                          | 3,900       | 25.4 × 45             | 0.15  | 2.54                                               | EKMH630VSN392MQ45S |                          | 1,200       | 25.4 × 35             | 0.15  | 1.71                                               | EKMH101VSN122MQ35S |
|                          | 3,900       | 30 × 35               | 0.15  | 2.55                                               | EKMH630VSN392MR35S |                          | 1,200       | 30 × 25               | 0.15  | 1.68                                               | EKMH101VSN122MR25S |
|                          | 3,900       | 35 × 25               | 0.15  | 2.24                                               | EKMH630VSN392MA25S |                          | 1,500       | 22 × 45               | 0.15  | 1.94                                               | EKMH101VSN152MP45S |
|                          | 4,700       | 25.4 × 50             | 0.15  | 2.86                                               | EKMH630VSN472MQ50S |                          | 1,500       | 25.4 × 40             | 0.15  | 1.98                                               | EKMH101VSN152MQ40S |
|                          | 4,700       | 30 × 40               | 0.15  | 2.86                                               | EKMH630VSN472MR40S |                          | 1,500       | 30 × 30               | 0.15  | 1.95                                               | EKMH101VSN152MR30S |
|                          | 4,700       | 35 × 30               | 0.15  | 2.79                                               | EKMH630VSN472MA30S |                          | 1,500       | 35 × 25               | 0.15  | 1.98                                               | EKMH101VSN152MA25S |
| 80                       | 5,600       | 30 × 45               | 0.15  | 3.22                                               | EKMH630VSN562MR45S |                          | 1,800       | 25.4 × 45             | 0.15  | 2.23                                               | EKMH101VSN182MQ45S |
|                          | 5,600       | 35 × 35               | 0.15  | 3.19                                               | EKMH630VSN562MA35S |                          | 1,800       | 30 × 35               | 0.15  | 2.50                                               | EKMH101VSN182MR35S |
|                          | 6,800       | 30 × 50               | 0.15  | 3.65                                               | EKMH630VSN682MR50S |                          | 1,800       | 35 × 25               | 0.15  | 2.17                                               | EKMH101VSN182MA25S |
|                          | 6,800       | 35 × 40               | 0.15  | 3.64                                               | EKMH630VSN682MA40S |                          | 2,200       | 25.4 × 50             | 0.15  | 2.53                                               | EKMH101VSN222MQ50S |
|                          | 8,200       | 35 × 45               | 0.15  | 3.90                                               | EKMH630VSN822MR45S |                          | 2,200       | 30 × 40               | 0.15  | 2.70                                               | EKMH101VSN222MR40S |
|                          | 10,000      | 35 × 50               | 0.15  | 4.40                                               | EKMH630VSN103MA50S |                          | 2,200       | 35 × 30               | 0.15  | 2.50                                               | EKMH101VSN222MA30S |
|                          | 820         | 22 × 25               | 0.15  | 1.11                                               | EKMH800VSN821MP25S |                          | 2,700       | 30 × 45               | 0.15  | 2.88                                               | EKMH101VSN272MR45S |
|                          | 1,000       | 22 × 25               | 0.15  | 1.22                                               | EKMH800VSN102MP25S |                          | 2,700       | 35 × 35               | 0.15  | 2.86                                               | EKMH101VSN272MA35S |
|                          | 1,200       | 22 × 30               | 0.15  | 1.38                                               | EKMH800VSN122MP30S |                          | 3,300       | 30 × 50               | 0.15  | 3.28                                               | EKMH101VSN332MR50S |
|                          | 1,200       | 25.4 × 25             | 0.15  | 1.39                                               | EKMH800VSN122MQ25S |                          | 3,300       | 35 × 40               | 0.15  | 3.27                                               | EKMH101VSN332MA40S |
| 80                       | 1,500       | 22 × 35               | 0.15  | 1.59                                               | EKMH800VSN152MP35S |                          | 3,900       | 35 × 45               | 0.15  | 3.67                                               | EKMH101VSN392MA45S |
|                          | 1,500       | 25.4 × 30             | 0.15  | 1.61                                               | EKMH800VSN152MQ30S |                          | 4,700       | 35 × 50               | 0.15  | 3.80                                               | EKMH101VSN472MA50S |
|                          | 1,800       | 22 × 40               | 0.15  | 1.80                                               | EKMH800VSN182MP40S |                          |             |                       |       |                                                    |                    |

\*For the rated voltage  $\geq 160V_{dc}$ , please use KMR and KMQ series.

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

| Frequency(Hz)            | 50   | 120  | 300  | 1k   | 10k  | 50k  |
|--------------------------|------|------|------|------|------|------|
| 6.3 to 50V <sub>dc</sub> | 0.95 | 1.00 | 1.03 | 1.05 | 1.08 | 1.08 |
| 63 to 100V <sub>dc</sub> | 0.92 | 1.00 | 1.07 | 1.13 | 1.19 | 1.20 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.



## TXH Series

- Endurance with ripple current : 10,000 hours at 105°C
- Non solvent resistant type
- RoHS2 Compliant

TXH

Longer life

LXM

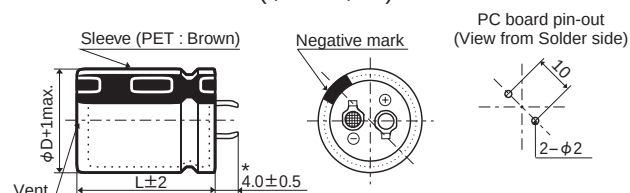


## ◆ SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                       |                                      |      |                 |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------|-----------------|
| Category                                               | -25 to +105℃                                                                                                                                                                                                                                                                          |                                      |      |                 |
| Temperature Range                                      |                                                                                                                                                                                                                                                                                       |                                      |      |                 |
| Rated Voltage Range                                    | 200 to 450V <sub>dc</sub>                                                                                                                                                                                                                                                             |                                      |      |                 |
| Capacitance Tolerance                                  | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                             |                                      |      |                 |
| Leakage Current                                        | $I \leq 3\sqrt{CV}$<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 5 minutes)                                                                                                                                             |                                      |      |                 |
| Dissipation Factor (tan δ )                            | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 200 to 400V                          | 450V | (at 20℃, 120Hz) |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.15                                 | 0.20 |                 |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 200 to 400V                          | 450V | (at 120Hz)      |
|                                                        | Z (-25℃)/Z (+20℃)                                                                                                                                                                                                                                                                     | 4                                    | 8    |                 |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 10,000 hours at 105℃.                                        |                                      |      |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±20% of the initial value          |      |                 |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤200% of the initial specified value |      |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value        |      |                 |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                      |      |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±15% of the initial value          |      |                 |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤150% of the initial specified value |      |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value        |      |                 |

## ◆ DIMENSIONS [mm]

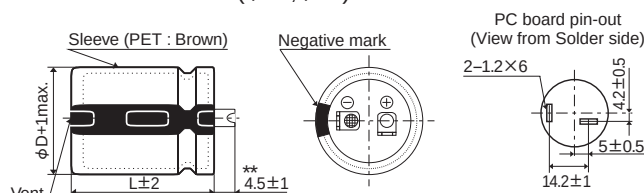
- Terminal Code : VS (φ30 to φ40) : Standard



\* φD=40mm : 3.5±0.5mm

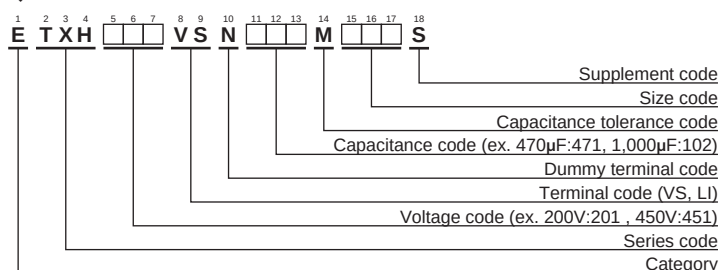
The standard design has no plastic disc.

- Terminal Code : LI (φ35, φ40)



\*\* φD=40mm : 4.0±1

## ◆ PART NUMBERING SYSTEM



Please refer to "Product code guide (snap-in type)"

## ◆ STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|
| 200                      | 560         | 30 × 30               | 0.15  | 1.50                                               | ETXH201VSN561MR30S | 400                      | 220         | 30 × 35               | 0.15  | 1.00                                               | ETXH401VSN221MR35S |
|                          | 680         | 30 × 35               | 0.15  | 1.70                                               | ETXH201VSN681MR35S |                          | 270         | 30 × 40               | 0.15  | 1.15                                               | ETXH401VSN271MR40S |
|                          | 820         | 30 × 40               | 0.15  | 2.00                                               | ETXH201VSN821MR40S |                          | 270         | 35 × 30               | 0.15  | 1.13                                               | ETXH401VSN271MA30S |
|                          | 820         | 35 × 30               | 0.15  | 2.00                                               | ETXH201VSN821MA30S |                          | 330         | 30 × 45               | 0.15  | 1.29                                               | ETXH401VSN331MR45S |
|                          | 1,000       | 30 × 45               | 0.15  | 2.20                                               | ETXH201VSN102MR45S |                          | 330         | 35 × 35               | 0.15  | 1.26                                               | ETXH401VSN331MA35S |
|                          | 1,000       | 35 × 35               | 0.15  | 2.20                                               | ETXH201VSN102MA35S |                          | 330         | 40 × 30               | 0.15  | 1.28                                               | ETXH401VSN331MB30S |
|                          | 1,000       | 40 × 30               | 0.15  | 2.17                                               | ETXH201VSN102MB30S |                          | 390         | 30 × 50               | 0.15  | 1.44                                               | ETXH401VSN391MR50S |
|                          | 1,200       | 35 × 40               | 0.15  | 2.40                                               | ETXH201VSN122MA40S |                          | 390         | 35 × 40               | 0.15  | 1.43                                               | ETXH401VSN391MA40S |
|                          | 1,200       | 40 × 35               | 0.15  | 2.45                                               | ETXH201VSN122MB35S |                          | 470         | 35 × 45               | 0.15  | 1.60                                               | ETXH401VSN471MA45S |
|                          | 1,500       | 35 × 50               | 0.15  | 2.81                                               | ETXH201VSN152MA50S |                          | 470         | 40 × 35               | 0.15  | 1.58                                               | ETXH401VSN471MB35S |
|                          | 1,500       | 40 × 40               | 0.15  | 2.79                                               | ETXH201VSN152MB40S |                          | 560         | 35 × 50               | 0.15  | 1.79                                               | ETXH401VSN561MA50S |
|                          | 1,800       | 40 × 50               | 0.15  | 3.24                                               | ETXH201VSN182MB50S |                          | 560         | 40 × 40               | 0.15  | 1.78                                               | ETXH401VSN561MB40S |
| 250                      | 390         | 30 × 30               | 0.15  | 1.30                                               | ETXH251VSN391MR30S | 450                      | 680         | 40 × 50               | 0.15  | 2.05                                               | ETXH401VSN681MB50S |
|                          | 470         | 30 × 35               | 0.15  | 1.42                                               | ETXH251VSN471MR35S |                          | 820         | 40 × 60               | 0.15  | 2.36                                               | ETXH401VSN821MB60S |
|                          | 560         | 35 × 30               | 0.15  | 1.58                                               | ETXH251VSN561MA30S |                          | 220         | 30 × 40               | 0.20  | 1.04                                               | ETXH451VSN221MR40S |
|                          | 680         | 30 × 45               | 0.15  | 1.80                                               | ETXH251VSN681MR45S |                          | 220         | 35 × 30               | 0.20  | 1.02                                               | ETXH451VSN221MA30S |
|                          | 680         | 35 × 35               | 0.15  | 1.76                                               | ETXH251VSN681MA35S |                          | 270         | 30 × 45               | 0.20  | 1.19                                               | ETXH451VSN271MR45S |
|                          | 820         | 30 × 50               | 0.15  | 2.03                                               | ETXH251VSN821MR50S |                          | 270         | 35 × 35               | 0.20  | 1.16                                               | ETXH451VSN271MA35S |
|                          | 820         | 35 × 40               | 0.15  | 2.01                                               | ETXH251VSN821MA40S |                          | 330         | 30 × 50               | 0.20  | 1.33                                               | ETXH451VSN331MR50S |
|                          | 820         | 40 × 30               | 0.15  | 1.96                                               | ETXH251VSN821MB30S |                          | 330         | 35 × 40               | 0.20  | 1.32                                               | ETXH451VSN331MA40S |
|                          | 1,000       | 35 × 45               | 0.15  | 2.30                                               | ETXH251VSN102MA45S |                          | 390         | 35 × 45               | 0.20  | 1.48                                               | ETXH451VSN391MA45S |
|                          | 1,000       | 40 × 35               | 0.15  | 2.27                                               | ETXH251VSN102MB35S |                          | 470         | 35 × 50               | 0.20  | 1.64                                               | ETXH451VSN471MA50S |
|                          | 1,200       | 35 × 50               | 0.15  | 2.55                                               | ETXH251VSN122MA50S |                          | 560         | 40 × 60               | 0.20  | 1.98                                               | ETXH451VSN561MB60S |
|                          | 1,200       | 40 × 40               | 0.15  | 2.53                                               | ETXH251VSN122MB40S |                          |             |                       |       |                                                    |                    |
|                          | 1,500       | 40 × 50               | 0.15  | 2.96                                               | ETXH251VSN152MB50S |                          |             |                       |       |                                                    |                    |
|                          | 1,800       | 40 × 60               | 0.15  | 3.39                                               | ETXH251VSN182MB60S |                          |             |                       |       |                                                    |                    |

## ◆ RATED RIPPLE CURRENT MULTIPLIERS

## ● Frequency Multipliers

| Frequency(Hz)           | 50   | 120  | 300  | 1k   | 10k  | 50k  |
|-------------------------|------|------|------|------|------|------|
| 200, 250V <sub>dc</sub> | 0.81 | 1.00 | 1.17 | 1.32 | 1.45 | 1.50 |
| 400, 450V <sub>dc</sub> | 0.77 | 1.00 | 1.16 | 1.30 | 1.41 | 1.43 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

# LXM Series

- Endurance with ripple current : 7,000 hours at 105°C
- Non solvent resistant type
- RoHS2 Compliant

LXM

Longer life

LXQ

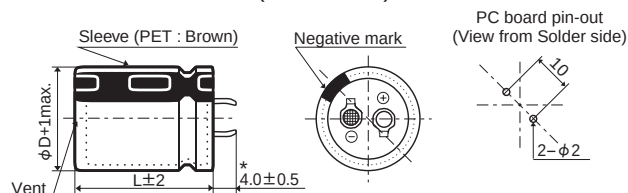


## SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                       |                                      |            |                 |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------------|-----------------|
| Category                                               | -25 to +105℃                                                                                                                                                                                                                                                                          |                                      |            |                 |
| Temperature Range                                      |                                                                                                                                                                                                                                                                                       |                                      |            |                 |
| Rated Voltage Range                                    | 160 to 450V <sub>dc</sub>                                                                                                                                                                                                                                                             |                                      |            |                 |
| Capacitance Tolerance                                  | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                             |                                      |            |                 |
| Leakage Current                                        | $I \leq 3\sqrt{CV}$<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 5 minutes)                                                                                                                                             |                                      |            |                 |
| Dissipation Factor (tan δ )                            | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 160 to 400V                          | 420 & 450V | (at 20℃, 120Hz) |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.15                                 | 0.20       |                 |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 160 to 400V                          | 420 & 450V | (at 120Hz)      |
|                                                        | Z (-25℃)/Z (+20℃)                                                                                                                                                                                                                                                                     | 4                                    | 8          |                 |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 7,000 hours at 105℃.                                         |                                      |            |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±20% of the initial value          |            |                 |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤250% of the initial specified value |            |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value         |            |                 |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                      |            |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±15% of the initial value          |            |                 |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤150% of the initial specified value |            |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value         |            |                 |

## DIMENSIONS [mm]

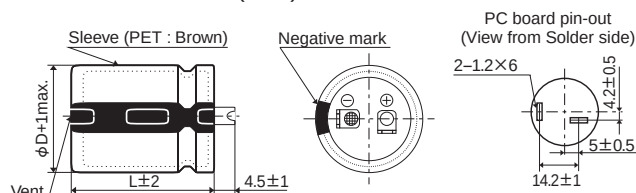
- Terminal Code : VS (φ22 to φ35) : Standard



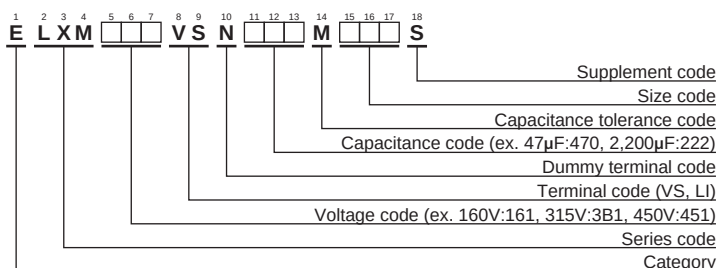
\* φD=35mm : 3.5±0.5mm

The standard design has no plastic disc.

- Terminal Code : LI (φ35)



## PART NUMBERING SYSTEM



Please refer to "Product code guide (snap-in type)"



## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|
| 160                      | 330         | 22 × 25               | 0.15  | 1.11                                               | ELXM161VSN331MP25S | 220                      | 220         | 22 × 25               | 0.15  | 0.90                                               | ELXM221VSN221MP25S |
|                          | 390         | 22 × 30               | 0.15  | 1.26                                               | ELXM161VSN391MP30S |                          | 270         | 22 × 30               | 0.15  | 1.05                                               | ELXM221VSN271MP30S |
|                          | 470         | 22 × 30               | 0.15  | 1.39                                               | ELXM161VSN471MP30S |                          | 330         | 22 × 35               | 0.15  | 1.19                                               | ELXM221VSN331MP35S |
|                          | 470         | 25.4 × 25             | 0.15  | 1.38                                               | ELXM161VSN471MQ25S |                          | 330         | 25.4 × 25             | 0.15  | 1.16                                               | ELXM221VSN331MQ25S |
|                          | 560         | 22 × 35               | 0.15  | 1.55                                               | ELXM161VSN561MP35S |                          | 390         | 22 × 40               | 0.15  | 1.33                                               | ELXM221VSN391MP40S |
|                          | 560         | 25.4 × 30             | 0.15  | 1.55                                               | ELXM161VSN561MQ30S |                          | 390         | 25.4 × 30             | 0.15  | 1.29                                               | ELXM221VSN391MQ30S |
|                          | 680         | 22 × 40               | 0.15  | 1.75                                               | ELXM161VSN681MP40S |                          | 470         | 22 × 45               | 0.15  | 1.49                                               | ELXM221VSN471MP45S |
|                          | 680         | 25.4 × 35             | 0.15  | 1.78                                               | ELXM161VSN681MQ35S |                          | 470         | 25.4 × 35             | 0.15  | 1.48                                               | ELXM221VSN471MQ35S |
|                          | 680         | 30 × 25               | 0.15  | 1.74                                               | ELXM161VSN681MR25S |                          | 470         | 30 × 25               | 0.15  | 1.45                                               | ELXM221VSN471MR25S |
|                          | 820         | 22 × 50               | 0.15  | 1.97                                               | ELXM161VSN821MP50S |                          | 560         | 22 × 50               | 0.15  | 1.63                                               | ELXM221VSN561MP50S |
|                          | 820         | 25.4 × 40             | 0.15  | 2.01                                               | ELXM161VSN821MQ40S |                          | 560         | 25.4 × 40             | 0.15  | 1.71                                               | ELXM221VSN561MQ40S |
|                          | 820         | 30 × 30               | 0.15  | 1.96                                               | ELXM161VSN821MR30S |                          | 560         | 30 × 30               | 0.15  | 1.62                                               | ELXM221VSN561MR30S |
|                          | 1,000       | 25.4 × 45             | 0.15  | 2.27                                               | ELXM161VSN102MQ45S |                          | 680         | 25.4 × 45             | 0.15  | 1.87                                               | ELXM221VSN681MQ45S |
|                          | 1,000       | 30 × 35               | 0.15  | 2.26                                               | ELXM161VSN102MR35S |                          | 680         | 30 × 35               | 0.15  | 1.86                                               | ELXM221VSN681MR35S |
|                          | 1,200       | 25.4 × 50             | 0.15  | 2.54                                               | ELXM161VSN122MQ50S |                          | 820         | 25.4 × 50             | 0.15  | 2.10                                               | ELXM221VSN821MQ50S |
|                          | 1,200       | 30 × 40               | 0.15  | 2.56                                               | ELXM161VSN122MR40S |                          | 820         | 30 × 40               | 0.15  | 2.12                                               | ELXM221VSN821MR40S |
|                          | 1,200       | 35 × 30               | 0.15  | 2.52                                               | ELXM161VSN122MA30S |                          | 820         | 35 × 30               | 0.15  | 2.08                                               | ELXM221VSN821MA30S |
|                          | 1,500       | 30 × 45               | 0.15  | 2.96                                               | ELXM161VSN152MR45S |                          | 1,000       | 30 × 50               | 0.15  | 2.48                                               | ELXM221VSN102MR50S |
|                          | 1,500       | 35 × 35               | 0.15  | 2.89                                               | ELXM161VSN152MA35S |                          | 1,000       | 35 × 40               | 0.15  | 2.46                                               | ELXM221VSN102MA40S |
|                          | 1,800       | 30 × 50               | 0.15  | 3.32                                               | ELXM161VSN182MR50S |                          | 1,200       | 35 × 45               | 0.15  | 2.78                                               | ELXM221VSN122MA45S |
|                          | 1,800       | 35 × 40               | 0.15  | 3.30                                               | ELXM161VSN182MA40S |                          | 1,500       | 35 × 50               | 0.15  | 3.20                                               | ELXM221VSN152MA50S |
|                          | 2,200       | 35 × 50               | 0.15  | 3.87                                               | ELXM161VSN222MA50S | 250                      | 180         | 22 × 25               | 0.15  | 0.82                                               | ELXM251VSN181MP25S |
| 180                      | 270         | 22 × 25               | 0.15  | 1.00                                               | ELXM181VSN271MP25S |                          | 220         | 22 × 30               | 0.15  | 0.95                                               | ELXM251VSN221MP30S |
|                          | 330         | 22 × 30               | 0.15  | 1.16                                               | ELXM181VSN331MP30S |                          | 270         | 22 × 35               | 0.15  | 1.08                                               | ELXM251VSN271MP35S |
|                          | 390         | 22 × 30               | 0.15  | 1.26                                               | ELXM181VSN391MP30S |                          | 270         | 25.4 × 25             | 0.15  | 1.05                                               | ELXM251VSN271MQ25S |
|                          | 390         | 25.4 × 25             | 0.15  | 1.26                                               | ELXM181VSN391MQ25S |                          | 330         | 22 × 40               | 0.15  | 1.22                                               | ELXM251VSN331MP40S |
|                          | 470         | 22 × 35               | 0.15  | 1.42                                               | ELXM181VSN471MP35S |                          | 330         | 25.4 × 30             | 0.15  | 1.19                                               | ELXM251VSN331MQ30S |
|                          | 470         | 25.4 × 30             | 0.15  | 1.42                                               | ELXM181VSN471MQ30S |                          | 390         | 22 × 45               | 0.15  | 1.36                                               | ELXM251VSN391MP45S |
|                          | 560         | 22 × 40               | 0.15  | 1.59                                               | ELXM181VSN561MP40S |                          | 390         | 25.4 × 35             | 0.15  | 1.35                                               | ELXM251VSN391MQ35S |
|                          | 560         | 25.4 × 30             | 0.15  | 1.55                                               | ELXM181VSN561MQ30S |                          | 390         | 30 × 25               | 0.15  | 1.32                                               | ELXM251VSN391MR25S |
|                          | 560         | 30 × 25               | 0.15  | 1.58                                               | ELXM181VSN561MR25S |                          | 470         | 22 × 50               | 0.15  | 1.49                                               | ELXM251VSN471MP50S |
|                          | 680         | 22 × 45               | 0.15  | 1.79                                               | ELXM181VSN681MP45S |                          | 470         | 25.4 × 40             | 0.15  | 1.52                                               | ELXM251VSN471MQ40S |
|                          | 680         | 25.4 × 35             | 0.15  | 1.78                                               | ELXM181VSN681MQ35S |                          | 470         | 30 × 30               | 0.15  | 1.49                                               | ELXM251VSN471MR30S |
|                          | 680         | 30 × 30               | 0.15  | 1.79                                               | ELXM181VSN681MR30S |                          | 560         | 25.4 × 45             | 0.15  | 1.70                                               | ELXM251VSN561MQ45S |
|                          | 820         | 25.4 × 40             | 0.15  | 2.01                                               | ELXM181VSN821MQ40S |                          | 560         | 30 × 35               | 0.15  | 1.69                                               | ELXM251VSN561MR35S |
|                          | 820         | 30 × 35               | 0.15  | 2.04                                               | ELXM181VSN821MR35S |                          | 680         | 25.4 × 50             | 0.15  | 1.91                                               | ELXM251VSN681MQ50S |
|                          | 1,000       | 25.4 × 50             | 0.15  | 2.32                                               | ELXM181VSN102MQ50S |                          | 680         | 30 × 40               | 0.15  | 1.93                                               | ELXM251VSN681MR40S |
|                          | 1,000       | 30 × 35               | 0.15  | 2.26                                               | ELXM181VSN102MR35S |                          | 680         | 35 × 30               | 0.15  | 1.90                                               | ELXM251VSN681MA30S |
|                          | 1,000       | 35 × 30               | 0.15  | 2.30                                               | ELXM181VSN102MA30S |                          | 820         | 30 × 45               | 0.15  | 2.19                                               | ELXM251VSN821MR45S |
|                          | 1,200       | 30 × 45               | 0.15  | 2.65                                               | ELXM181VSN122MR45S |                          | 820         | 35 × 35               | 0.15  | 2.13                                               | ELXM251VSN821MA35S |
|                          | 1,200       | 35 × 35               | 0.15  | 2.58                                               | ELXM181VSN122MA35S |                          | 1,000       | 35 × 40               | 0.15  | 2.46                                               | ELXM251VSN102MA40S |
| 200                      | 1,500       | 30 × 50               | 0.15  | 3.03                                               | ELXM181VSN152MR50S |                          | 1,200       | 35 × 50               | 0.15  | 2.86                                               | ELXM251VSN122MA50S |
|                          | 1,500       | 35 × 40               | 0.15  | 3.01                                               | ELXM181VSN152MA40S | 315                      | 100         | 22 × 25               | 0.15  | 0.67                                               | ELXM3B1VSN101MP25S |
|                          | 1,800       | 35 × 45               | 0.15  | 3.41                                               | ELXM181VSN182MA45S |                          | 120         | 22 × 30               | 0.15  | 0.77                                               | ELXM3B1VSN121MP30S |
|                          | 2,200       | 35 × 50               | 0.15  | 3.87                                               | ELXM181VSN222MA50S |                          | 150         | 22 × 30               | 0.15  | 0.86                                               | ELXM3B1VSN151MP30S |
|                          | 220         | 22 × 25               | 0.15  | 0.90                                               | ELXM201VSN221MP25S |                          | 150         | 25.4 × 25             | 0.15  | 0.85                                               | ELXM3B1VSN151MQ25S |
|                          | 270         | 22 × 30               | 0.15  | 1.05                                               | ELXM201VSN271MP30S |                          | 180         | 22 × 35               | 0.15  | 0.96                                               | ELXM3B1VSN181MP35S |
|                          | 330         | 22 × 30               | 0.15  | 1.16                                               | ELXM201VSN331MP30S |                          | 180         | 25.4 × 30             | 0.15  | 0.96                                               | ELXM3B1VSN181MQ30S |
|                          | 330         | 25.4 × 25             | 0.15  | 1.16                                               | ELXM201VSN331MQ25S |                          | 220         | 22 × 40               | 0.15  | 1.09                                               | ELXM3B1VSN221MP40S |
|                          | 390         | 22 × 35               | 0.15  | 1.29                                               | ELXM201VSN391MP35S |                          | 220         | 25.4 × 30             | 0.15  | 1.06                                               | ELXM3B1VSN221MQ30S |
|                          | 390         | 25.4 × 30             | 0.15  | 1.29                                               | ELXM201VSN391MQ30S |                          | 220         | 30 × 25               | 0.15  | 1.08                                               | ELXM3B1VSN221MR25S |
|                          | 470         | 22 × 40               | 0.15  | 1.46                                               | ELXM201VSN471MP40S |                          | 270         | 22 × 45               | 0.15  | 1.24                                               | ELXM3B1VSN271MP45S |
|                          | 470         | 25.4 × 30             | 0.15  | 1.42                                               | ELXM201VSN471MQ30S |                          | 270         | 25.4 × 35             | 0.15  | 1.23                                               | ELXM3B1VSN271MQ35S |
|                          | 470         | 30 × 25               | 0.15  | 1.45                                               | ELXM201VSN471MR25S |                          | 270         | 30 × 30               | 0.15  | 1.23                                               | ELXM3B1VSN271MR30S |
|                          | 560         | 22 × 45               | 0.15  | 1.63                                               | ELXM201VSN561MP45S |                          | 330         | 25.4 × 40             | 0.15  | 1.40                                               | ELXM3B1VSN331MQ40S |
|                          | 560         | 25.4 × 35             | 0.15  | 1.62                                               | ELXM201VSN561MQ35S |                          | 330         | 30 × 35               | 0.15  | 1.42                                               | ELXM3B1VSN331MR35S |
|                          | 560         | 30 × 30               | 0.15  | 1.62                                               | ELXM201VSN561MR30S |                          | 330         | 35 × 30               | 0.15  | 1.45                                               | ELXM3B1VSN331MA30S |
|                          | 680         | 25.4 × 40             | 0.15  | 1.83                                               | ELXM201VSN681MQ40S |                          | 390         | 25.4 × 50             | 0.15  | 1.59                                               | ELXM3B1VSN391MQ50S |
|                          | 680         | 30 × 30               | 0.15  | 1.79                                               | ELXM201VSN681MR30S |                          | 390         | 30 × 35               | 0.15  | 1.54                                               | ELXM3B1VSN391MR35S |
|                          | 820         | 25.4 × 45             | 0.15  | 2.06                                               | ELXM201VSN821MQ45S |                          | 390         | 35 × 30               | 0.15  | 1.57                                               | ELXM3B1VSN391MA30S |
|                          | 820         | 30 × 35               | 0.15  | 2.04                                               | ELXM201VSN821MR35S |                          | 470         | 30 × 45               | 0.15  | 1.81                                               | ELXM3B1VSN471MR45S |
|                          | 1,000       | 30 × 45               | 0.15  | 2.42                                               | ELXM201VSN102MR45S |                          | 470         | 35 × 35               | 0.15  | 1.77                                               | ELXM3B1VSN471MA35S |
|                          | 1,000       | 35 × 30               | 0.15  | 2.30                                               | ELXM201VSN102MA30S |                          | 560         | 30 × 50               | 0.15  | 2.03                                               | ELXM3B1VSN561MR50S |
|                          | 1,200       | 30 × 50               | 0.15  | 2.71                                               | ELXM201VSN122MR50S |                          | 560         | 35 × 40               | 0.15  | 2.02                                               | ELXM3B1VSN561MA40S |
|                          | 1,200       | 35 × 40               | 0.15  | 2.70                                               | ELXM201VSN122MA40S |                          | 680         | 35 × 45               | 0.15  | 2.29                                               | ELXM3B1VSN681MA45S |
|                          | 1,500       | 35 × 45               | 0.15  | 3.11                                               | ELXM201VSN152MA45S |                          | 820         | 35 × 50               | 0.15  | 2.59                                               | ELXM3B1VSN821MA50S |
|                          | 1,800       | 35 × 50               | 0.15  | 3.50                                               | ELXM201VSN182MA50S |                          |             |                       |       |                                                    |                    |



## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|
| 350                      | 100         | 22 × 25               | 0.15  | 0.67                                               | ELXM351VSN101MP25S |
|                          | 120         | 22 × 30               | 0.15  | 0.77                                               | ELXM351VSN121MP30S |
|                          | 120         | 25.4 × 25             | 0.15  | 0.76                                               | ELXM351VSN121MQ25S |
|                          | 150         | 22 × 35               | 0.15  | 0.88                                               | ELXM351VSN151MP35S |
|                          | 150         | 25.4 × 30             | 0.15  | 0.88                                               | ELXM351VSN151MQ30S |
|                          | 180         | 22 × 40               | 0.15  | 0.99                                               | ELXM351VSN181MP40S |
|                          | 180         | 25.4 × 30             | 0.15  | 0.96                                               | ELXM351VSN181MQ30S |
|                          | 180         | 30 × 25               | 0.15  | 0.98                                               | ELXM351VSN181MR25S |
|                          | 220         | 22 × 45               | 0.15  | 1.12                                               | ELXM351VSN221MP45S |
|                          | 220         | 25.4 × 35             | 0.15  | 1.11                                               | ELXM351VSN221MQ35S |
|                          | 220         | 30 × 30               | 0.15  | 1.11                                               | ELXM351VSN221MR30S |
|                          | 270         | 25.4 × 40             | 0.15  | 1.26                                               | ELXM351VSN271MQ40S |
|                          | 270         | 30 × 35               | 0.15  | 1.28                                               | ELXM351VSN271MR35S |
|                          | 330         | 25.4 × 45             | 0.15  | 1.40                                               | ELXM351VSN331MQ45S |
|                          | 330         | 30 × 35               | 0.15  | 1.42                                               | ELXM351VSN331MR35S |
|                          | 330         | 35 × 30               | 0.15  | 1.45                                               | ELXM351VSN331MA30S |
|                          | 390         | 30 × 40               | 0.15  | 1.60                                               | ELXM351VSN391MR40S |
|                          | 390         | 35 × 35               | 0.15  | 1.61                                               | ELXM351VSN391MA35S |
|                          | 470         | 30 × 50               | 0.15  | 1.86                                               | ELXM351VSN471MR50S |
|                          | 470         | 35 × 40               | 0.15  | 1.85                                               | ELXM351VSN471MA40S |
|                          | 560         | 35 × 40               | 0.15  | 2.02                                               | ELXM351VSN561MA40S |
|                          | 680         | 35 × 50               | 0.15  | 2.36                                               | ELXM351VSN681MA50S |
| 400                      | 68          | 22 × 25               | 0.15  | 0.55                                               | ELXM401VSN680MP25S |
|                          | 82          | 22 × 30               | 0.15  | 0.63                                               | ELXM401VSN820MP30S |
|                          | 100         | 22 × 30               | 0.15  | 0.70                                               | ELXM401VSN101MP30S |
|                          | 100         | 25.4 × 25             | 0.15  | 0.70                                               | ELXM401VSN101MQ25S |
|                          | 120         | 22 × 35               | 0.15  | 0.79                                               | ELXM401VSN121MP35S |
|                          | 120         | 25.4 × 30             | 0.15  | 0.79                                               | ELXM401VSN121MQ30S |
|                          | 150         | 22 × 40               | 0.15  | 0.90                                               | ELXM401VSN151MP40S |
|                          | 150         | 25.4 × 30             | 0.15  | 0.88                                               | ELXM401VSN151MQ30S |
|                          | 150         | 30 × 25               | 0.15  | 0.90                                               | ELXM401VSN151MR25S |
|                          | 180         | 22 × 45               | 0.15  | 0.99                                               | ELXM401VSN181MP45S |
|                          | 180         | 25.4 × 35             | 0.15  | 1.01                                               | ELXM401VSN181MQ35S |
|                          | 180         | 30 × 30               | 0.15  | 1.01                                               | ELXM401VSN181MR30S |
|                          | 220         | 25.4 × 40             | 0.15  | 1.14                                               | ELXM401VSN221MQ40S |
|                          | 220         | 30 × 35               | 0.15  | 1.16                                               | ELXM401VSN221MR35S |
|                          | 270         | 25.4 × 50             | 0.15  | 1.32                                               | ELXM401VSN271MQ50S |
|                          | 270         | 30 × 40               | 0.15  | 1.33                                               | ELXM401VSN271MR40S |
|                          | 270         | 35 × 30               | 0.15  | 1.31                                               | ELXM401VSN271MA30S |
|                          | 330         | 30 × 45               | 0.15  | 1.52                                               | ELXM401VSN331MR45S |
|                          | 330         | 35 × 35               | 0.15  | 1.48                                               | ELXM401VSN331MA35S |
|                          | 390         | 30 × 50               | 0.15  | 1.69                                               | ELXM401VSN391MR50S |
|                          | 390         | 35 × 40               | 0.15  | 1.68                                               | ELXM401VSN391MA40S |
|                          | 470         | 35 × 45               | 0.15  | 1.91                                               | ELXM401VSN471MA45S |
|                          | 560         | 35 × 50               | 0.15  | 2.14                                               | ELXM401VSN561MA50S |
| 420                      | 56          | 22 × 25               | 0.20  | 0.50                                               | ELXM421VSN560MP25S |
|                          | 68          | 22 × 30               | 0.20  | 0.58                                               | ELXM421VSN680MP30S |
|                          | 82          | 22 × 30               | 0.20  | 0.63                                               | ELXM421VSN820MP30S |
|                          | 82          | 25.4 × 25             | 0.20  | 0.63                                               | ELXM421VSN820MQ25S |
|                          | 100         | 22 × 35               | 0.20  | 0.72                                               | ELXM421VSN101MP35S |
|                          | 100         | 25.4 × 30             | 0.20  | 0.72                                               | ELXM421VSN101MQ30S |
|                          | 120         | 22 × 40               | 0.20  | 0.81                                               | ELXM421VSN121MP40S |
|                          | 120         | 25.4 × 30             | 0.20  | 0.79                                               | ELXM421VSN121MQ30S |
|                          | 120         | 30 × 25               | 0.20  | 0.80                                               | ELXM421VSN121MR25S |
|                          | 150         | 22 × 45               | 0.20  | 0.92                                               | ELXM421VSN151MP45S |
|                          | 150         | 25.4 × 35             | 0.20  | 0.92                                               | ELXM421VSN151MQ35S |
|                          | 150         | 30 × 30               | 0.20  | 0.92                                               | ELXM421VSN151MR30S |
|                          | 180         | 25.4 × 40             | 0.20  | 1.03                                               | ELXM421VSN181MQ40S |
|                          | 180         | 30 × 35               | 0.20  | 1.05                                               | ELXM421VSN181MR35S |
|                          | 220         | 25.4 × 50             | 0.20  | 1.19                                               | ELXM421VSN221MP50S |
|                          | 220         | 30 × 35               | 0.20  | 1.16                                               | ELXM421VSN221MR35S |
|                          | 220         | 35 × 30               | 0.20  | 1.18                                               | ELXM421VSN221MA30S |
|                          | 270         | 30 × 45               | 0.20  | 1.38                                               | ELXM421VSN271MR45S |
|                          | 270         | 35 × 35               | 0.20  | 1.34                                               | ELXM421VSN271MA35S |
|                          | 330         | 30 × 50               | 0.20  | 1.56                                               | ELXM421VSN331MR50S |
|                          | 330         | 35 × 40               | 0.20  | 1.55                                               | ELXM421VSN331MA40S |
|                          | 390         | 35 × 45               | 0.20  | 1.74                                               | ELXM421VSN391MA45S |
|                          | 470         | 35 × 50               | 0.20  | 1.96                                               | ELXM421VSN471MA50S |
| 450                      | 47          | 22 × 25               | 0.20  | 0.46                                               | ELXM451VSN470MP25S |
|                          | 56          | 22 × 30               | 0.20  | 0.52                                               | ELXM451VSN560MP30S |
|                          | 68          | 22 × 30               | 0.20  | 0.58                                               | ELXM451VSN680MP30S |
|                          | 68          | 25.4 × 25             | 0.20  | 0.58                                               | ELXM451VSN680MQ25S |
|                          | 82          | 22 × 35               | 0.20  | 0.65                                               | ELXM451VSN820MP35S |
|                          | 82          | 25.4 × 30             | 0.20  | 0.65                                               | ELXM451VSN820MQ30S |
|                          | 100         | 22 × 40               | 0.20  | 0.74                                               | ELXM451VSN101MP40S |
|                          | 100         | 25.4 × 30             | 0.20  | 0.72                                               | ELXM451VSN101MQ30S |
|                          | 100         | 30 × 25               | 0.20  | 0.73                                               | ELXM451VSN101MR25S |
|                          | 120         | 22 × 45               | 0.20  | 0.83                                               | ELXM451VSN121MP45S |
|                          | 120         | 25.4 × 35             | 0.20  | 0.82                                               | ELXM451VSN121MQ35S |
|                          | 120         | 30 × 30               | 0.20  | 0.82                                               | ELXM451VSN121MR30S |
|                          | 150         | 25.4 × 40             | 0.20  | 0.94                                               | ELXM451VSN151MQ40S |
|                          | 150         | 30 × 35               | 0.20  | 0.96                                               | ELXM451VSN151MR35S |
|                          | 180         | 25.4 × 45             | 0.20  | 1.06                                               | ELXM451VSN181MQ45S |
|                          | 180         | 30 × 35               | 0.20  | 1.05                                               | ELXM451VSN181MR35S |
|                          | 180         | 35 × 30               | 0.20  | 1.07                                               | ELXM451VSN181MA30S |
|                          | 220         | 30 × 40               | 0.20  | 1.20                                               | ELXM451VSN221MR40S |
|                          | 220         | 35 × 35               | 0.20  | 1.21                                               | ELXM451VSN221MA35S |
|                          | 270         | 30 × 50               | 0.20  | 1.41                                               | ELXM451VSN271MR50S |
|                          | 270         | 35 × 40               | 0.20  | 1.40                                               | ELXM451VSN271MA40S |
|                          | 330         | 35 × 45               | 0.20  | 1.60                                               | ELXM451VSN331MA45S |
|                          | 390         | 35 × 50               | 0.20  | 1.79                                               | ELXM451VSN391MA50S |

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

| Frequency(Hz)             | 50   | 120  | 300  | 1k   | 10k  | 50k  |
|---------------------------|------|------|------|------|------|------|
| 160 to 250V <sub>dc</sub> | 0.81 | 1.00 | 1.17 | 1.32 | 1.45 | 1.50 |
| 315 to 450V <sub>dc</sub> | 0.77 | 1.00 | 1.16 | 1.30 | 1.41 | 1.43 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

# LRB Series

- Higher ripple current on high frequency band
- Endurance with high frequency ripple current : 5,000 hours at 105°C
- Rated voltage range : 400 to 450V<sub>dc</sub>, Capacitance range : 85 to 330μF
- Ideal for high frequency drive power conversion system applications such as solar power conditioners
- Non solvent resistant type
- RoHS2 Compliant

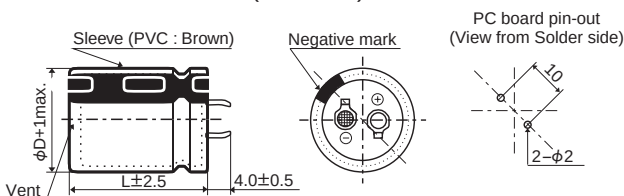


## SPECIFICATIONS

| Items                                                        | Characteristics                                                                                                                                                                                                                                                                       |                                      |            |                 |
|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------------|-----------------|
| Category                                                     | -40 to +105℃                                                                                                                                                                                                                                                                          |                                      |            |                 |
| Temperature Range                                            |                                                                                                                                                                                                                                                                                       |                                      |            |                 |
| Rated Voltage Range                                          | 400 to 450V <sub>dc</sub>                                                                                                                                                                                                                                                             |                                      |            |                 |
| Capacitance Tolerance                                        | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                             |                                      |            |                 |
| Leakage Current                                              | I ≤ 3√CV<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 5 minutes)                                                                                                                                                        |                                      |            |                 |
| Dissipation Factor<br>(tan δ)                                | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 400V                                 | 420 & 450V | (at 20℃, 120Hz) |
|                                                              | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.15                                 | 0.20       |                 |
| Low Temperature<br>Characteristics<br>(Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 400V                                 | 420 & 450V | (at 120Hz)      |
|                                                              | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 3                                    | 8          |                 |
|                                                              | Z(-40℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 12                                   | 14         |                 |
| Endurance                                                    | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 5,000 hours at 105℃.                                         |                                      |            |                 |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±20% of the initial value          |            |                 |
|                                                              | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤200% of the initial specified value |            |                 |
|                                                              | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value         |            |                 |
| Shelf Life                                                   | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                      |            |                 |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±15% of the initial value          |            |                 |
|                                                              | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤150% of the initial specified value |            |                 |
|                                                              | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value         |            |                 |

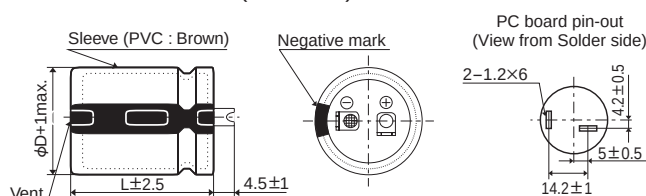
## DIMENSIONS [mm]

- Terminal Code : VS (φ30, φ35) : Standard

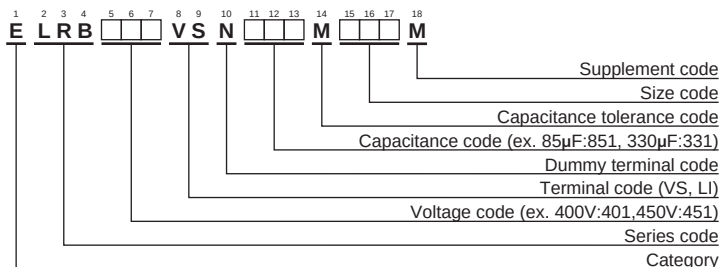


The standard design has no plastic disc.

- Terminal Code : LI (φ30, φ35)



## PART NUMBERING SYSTEM



Please refer to "Product code guide (snap-in type)"





## LRB Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 100kHz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|-----------------------------------------------------|--------------------|
| 400                      | 120         | 30 × 35               | 0.15  | 5.54                                                | ELRB401VSN121MR35M |
|                          | 150         | 30 × 41               | 0.15  | 5.69                                                | ELRB401VSN151MR41M |
|                          | 170         | 30 × 46               | 0.15  | 5.83                                                | ELRB401VSN171MR46M |
|                          | 170         | 35 × 35               | 0.15  | 5.87                                                | ELRB401VSN171MA35M |
|                          | 190         | 30 × 51               | 0.15  | 5.97                                                | ELRB401VSN191MR51M |
|                          | 210         | 30 × 54               | 0.15  | 6.06                                                | ELRB401VSN211MR54M |
|                          | 210         | 35 × 41               | 0.15  | 6.10                                                | ELRB401VSN211MA41M |
|                          | 230         | 30 × 59               | 0.15  | 6.20                                                | ELRB401VSN231MR59M |
|                          | 230         | 35 × 46               | 0.15  | 6.30                                                | ELRB401VSN231MA46M |
|                          | 270         | 35 × 51               | 0.15  | 6.45                                                | ELRB401VSN271MA51M |
|                          | 290         | 35 × 54               | 0.15  | 6.60                                                | ELRB401VSN291MA54M |
|                          | 330         | 35 × 59               | 0.15  | 6.85                                                | ELRB401VSN331MA59M |
| 420                      | 100         | 30 × 35               | 0.20  | 4.58                                                | ELRB421VSN101MR35M |
|                          | 120         | 30 × 41               | 0.20  | 4.91                                                | ELRB421VSN121MR41M |
|                          | 140         | 30 × 46               | 0.20  | 5.15                                                | ELRB421VSN141MR46M |
|                          | 140         | 35 × 35               | 0.20  | 5.23                                                | ELRB421VSN141MA35M |
|                          | 160         | 30 × 51               | 0.20  | 5.39                                                | ELRB421VSN161MR51M |
|                          | 170         | 30 × 54               | 0.20  | 5.54                                                | ELRB421VSN171MR54M |
|                          | 170         | 35 × 41               | 0.20  | 5.63                                                | ELRB421VSN171MA41M |
|                          | 190         | 30 × 59               | 0.20  | 5.78                                                | ELRB421VSN191MR59M |
|                          | 200         | 35 × 46               | 0.20  | 5.95                                                | ELRB421VSN201MA46M |
|                          | 230         | 35 × 51               | 0.20  | 6.28                                                | ELRB421VSN231MA51M |
|                          | 250         | 35 × 54               | 0.20  | 6.47                                                | ELRB421VSN251MA54M |
|                          | 280         | 35 × 59               | 0.20  | 6.72                                                | ELRB421VSN281MA59M |

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 100kHz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|-----------------------------------------------------|--------------------|
| 450                      | 85          | 30 × 35               | 0.20  | 4.58                                                | ELRB451VSN850MR35M |
|                          | 110         | 30 × 41               | 0.20  | 4.91                                                | ELRB451VSN111MR41M |
|                          | 120         | 30 × 46               | 0.20  | 5.15                                                | ELRB451VSN121MR46M |
|                          | 120         | 35 × 35               | 0.20  | 5.23                                                | ELRB451VSN121MA35M |
|                          | 140         | 30 × 51               | 0.20  | 5.39                                                | ELRB451VSN141MR51M |
|                          | 150         | 30 × 54               | 0.20  | 5.54                                                | ELRB451VSN151MR54M |
|                          | 150         | 35 × 41               | 0.20  | 5.63                                                | ELRB451VSN151MA41M |
|                          | 170         | 30 × 59               | 0.20  | 5.78                                                | ELRB451VSN171MR59M |
|                          | 170         | 35 × 46               | 0.20  | 5.95                                                | ELRB451VSN171MA46M |
|                          | 200         | 35 × 51               | 0.20  | 6.28                                                | ELRB451VSN201MA51M |
|                          | 210         | 35 × 54               | 0.20  | 6.47                                                | ELRB451VSN211MA54M |
|                          | 240         | 35 × 59               | 0.20  | 6.72                                                | ELRB451VSN241MA59M |

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

| Frequency(Hz) | 50   | 120  | 300  | 1k   | 10k  | 50k  | 100k |
|---------------|------|------|------|------|------|------|------|
| 400 to 450V   | 0.22 | 0.33 | 0.49 | 0.73 | 1.00 | 1.00 | 1.00 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

# LHX Series

New!

- The LXS series has been improved to have a higher capacitance and ripple current.
- Endurance with ripple current : 5,000 hours at 105°C
- Rated voltage range : 350 to 400V, Capacitance range: 190 to 1,530μF
- Suitable for use in switching power supply equipment and inverters.
- Non solvent resistant type
- The logo mark printed on the sleeve will be changed.
- RoHS2 Compliant

LHX

↑  
Downsizing  
Higher ripple  
LXS

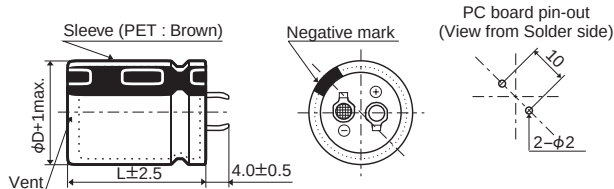


## SPECIFICATIONS

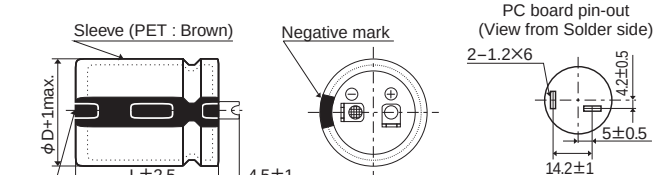
| Items                                                        | Characteristics                                                                                                                                                                                                                                                                       |                                      |                 |
|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-----------------|
| Category                                                     | -40 to +105℃                                                                                                                                                                                                                                                                          |                                      |                 |
| Temperature Range                                            |                                                                                                                                                                                                                                                                                       |                                      |                 |
| Rated Voltage Range                                          | 350 to 400V <sub>dc</sub>                                                                                                                                                                                                                                                             |                                      |                 |
| Capacitance Tolerance                                        | ±20% (M)                                                                                                                                                                                                                                                                              |                                      | (at 20℃, 120Hz) |
| Leakage Current                                              | I ≤ 3/√CV<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)<br>(at 20℃ after 5 minutes)                                                                                                                                                    |                                      |                 |
| Dissipation Factor<br>(tan δ )                               | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 350 to 400V                          | (at 20℃, 120Hz) |
|                                                              | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.15                                 |                 |
| Low Temperature<br>Characteristics<br>(Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 350 to 400V                          | (at 120Hz)      |
|                                                              | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 5                                    |                 |
|                                                              | Z(-40℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 20                                   |                 |
| Endurance                                                    | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 5,000 hours at 105℃.                                         |                                      |                 |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±20% of the initial value          |                 |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤200% of the initial specified value |                 |
|                                                              | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value        |                 |
| Shelf Life                                                   | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                      |                 |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±15% of the initial value          |                 |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤150% of the initial specified value |                 |
|                                                              | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value        |                 |

## DIMENSIONS [mm]

- Terminal Code : VS (φ22 to φ35) : Standard

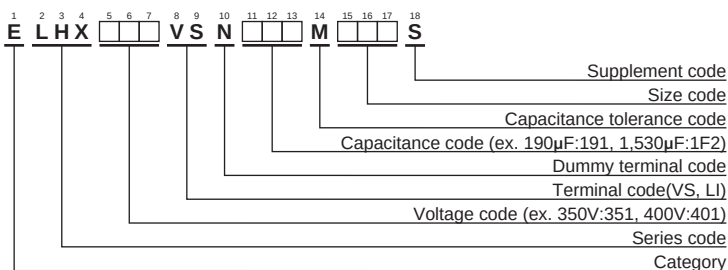


- Terminal Code : LI (φ30, φ35)



The standard design has no plastic disc.

## PART NUMBERING SYSTEM



Please refer to "Product code guide (snap-in type)"



## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|
| 350                      | 230         | 22 × 30               | 0.15  | 1.70                                               | ELHX351VSN231MP30S | 375                      | 560         | 25.4 × 50             | 0.15  | 2.85                                               | ELHX3H1VSN561MQ50S |
|                          | 280         | 22 × 35               | 0.15  | 1.92                                               | ELHX351VSN281MP35S |                          | 580         | 35 × 30               | 0.15  | 2.45                                               | ELHX3H1VSN581MA30S |
|                          | 320         | 25.4 × 30             | 0.15  | 1.95                                               | ELHX351VSN321MQ30S |                          | 630         | 25.4 × 55             | 0.15  | 3.07                                               | ELHX3H1VSN631MQ55S |
|                          | 330         | 22 × 40               | 0.15  | 2.13                                               | ELHX351VSN331MP40S |                          | 650         | 30 × 40               | 0.15  | 2.94                                               | ELHX3H1VSN651MR40S |
|                          | 370         | 30 × 25               | 0.15  | 2.08                                               | ELHX351VSN371MR25S |                          | 700         | 25.4 × 60             | 0.15  | 3.30                                               | ELHX3H1VSN701MQ60S |
|                          | 380         | 22 × 45               | 0.15  | 2.33                                               | ELHX351VSN381MP45S |                          | 720         | 35 × 35               | 0.15  | 2.77                                               | ELHX3H1VSN721MA35S |
|                          | 390         | 25.4 × 35             | 0.15  | 2.25                                               | ELHX351VSN391MQ35S |                          | 750         | 30 × 45               | 0.15  | 3.24                                               | ELHX3H1VSN751MR45S |
|                          | 440         | 22 × 50               | 0.15  | 2.56                                               | ELHX351VSN441MP50S |                          | 850         | 30 × 50               | 0.15  | 3.50                                               | ELHX3H1VSN851MR50S |
|                          | 460         | 25.4 × 40             | 0.15  | 2.49                                               | ELHX351VSN461MQ40S |                          | 860         | 35 × 40               | 0.15  | 3.13                                               | ELHX3H1VSN861MA40S |
|                          | 480         | 30 × 30               | 0.15  | 2.40                                               | ELHX351VSN481MR30S |                          | 960         | 30 × 55               | 0.15  | 3.80                                               | ELHX3H1VSN961MR55S |
|                          | 480         | 35 × 25               | 0.15  | 2.19                                               | ELHX351VSN481MA25S |                          | 1,000       | 35 × 45               | 0.15  | 3.47                                               | ELHX3H1VSN102MA45S |
|                          | 490         | 22 × 55               | 0.15  | 2.75                                               | ELHX351VSN491MP55S |                          | 1,060       | 30 × 60               | 0.15  | 4.07                                               | ELHX3H1VSN1A2MR60S |
|                          | 540         | 22 × 60               | 0.15  | 2.94                                               | ELHX351VSN541MP60S |                          | 1,140       | 35 × 50               | 0.15  | 3.78                                               | ELHX3H1VSN1B2MA50S |
|                          | 540         | 25.4 × 45             | 0.15  | 2.76                                               | ELHX351VSN541MQ45S |                          | 1,280       | 35 × 55               | 0.15  | 4.09                                               | ELHX3H1VSN132MA55S |
|                          | 590         | 30 × 35               | 0.15  | 2.72                                               | ELHX351VSN591MR35S |                          | 1,410       | 35 × 60               | 0.15  | 4.37                                               | ELHX3H1VSN142MA60S |
|                          | 610         | 25.4 × 50             | 0.15  | 2.98                                               | ELHX351VSN611MQ50S | 400                      | 190         | 22 × 30               | 0.15  | 1.54                                               | ELHX401VSN191MP30S |
|                          | 630         | 35 × 30               | 0.15  | 2.56                                               | ELHX351VSN631MA30S |                          | 240         | 22 × 35               | 0.15  | 1.78                                               | ELHX401VSN241MP35S |
|                          | 680         | 25.4 × 55             | 0.15  | 3.19                                               | ELHX351VSN681MQ55S |                          | 270         | 25.4 × 30             | 0.15  | 1.80                                               | ELHX401VSN271MQ30S |
|                          | 710         | 30 × 40               | 0.15  | 3.07                                               | ELHX351VSN711MR40S |                          | 290         | 22 × 40               | 0.15  | 1.99                                               | ELHX401VSN291MP40S |
|                          | 760         | 25.4 × 60             | 0.15  | 3.43                                               | ELHX351VSN761MQ60S |                          | 320         | 30 × 25               | 0.15  | 1.93                                               | ELHX401VSN321MR25S |
|                          | 780         | 35 × 35               | 0.15  | 2.89                                               | ELHX351VSN781MA35S |                          | 330         | 22 × 45               | 0.15  | 2.17                                               | ELHX401VSN331MP45S |
|                          | 820         | 30 × 45               | 0.15  | 3.38                                               | ELHX351VSN821MR45S |                          | 340         | 25.4 × 35             | 0.15  | 2.10                                               | ELHX401VSN341MQ35S |
|                          | 930         | 30 × 50               | 0.15  | 3.67                                               | ELHX351VSN931MR50S |                          | 380         | 22 × 50               | 0.15  | 2.38                                               | ELHX401VSN381MP50S |
|                          | 930         | 35 × 40               | 0.15  | 3.26                                               | ELHX351VSN931MA40S |                          | 400         | 25.4 × 40             | 0.15  | 2.33                                               | ELHX401VSN401MQ40S |
|                          | 1,040       | 30 × 55               | 0.15  | 3.95                                               | ELHX351VSN1A2MR55S |                          | 410         | 35 × 25               | 0.15  | 2.03                                               | ELHX401VSN411MA25S |
|                          | 1,080       | 35 × 45               | 0.15  | 3.60                                               | ELHX351VSN112MA45S |                          | 420         | 22 × 55               | 0.15  | 2.55                                               | ELHX401VSN421MP55S |
|                          | 1,150       | 30 × 60               | 0.15  | 4.24                                               | ELHX351VSN1B2MR60S |                          | 420         | 30 × 30               | 0.15  | 2.24                                               | ELHX401VSN421MR30S |
|                          | 1,230       | 35 × 50               | 0.15  | 3.93                                               | ELHX351VSN1C2MA50S |                          | 460         | 25.4 × 45             | 0.15  | 2.54                                               | ELHX401VSN461MQ45S |
|                          | 1,380       | 35 × 55               | 0.15  | 4.25                                               | ELHX351VSN142MA55S |                          | 470         | 22 × 60               | 0.15  | 2.74                                               | ELHX401VSN471MP60S |
|                          | 1,530       | 35 × 60               | 0.15  | 4.55                                               | ELHX351VSN1F2MA60S |                          | 510         | 30 × 35               | 0.15  | 2.53                                               | ELHX401VSN511MR35S |
| 375                      | 210         | 22 × 30               | 0.15  | 1.62                                               | ELHX3H1VSN211MP30S |                          | 530         | 25.4 × 50             | 0.15  | 2.77                                               | ELHX401VSN531MQ50S |
|                          | 260         | 22 × 35               | 0.15  | 1.85                                               | ELHX3H1VSN261MP35S |                          | 540         | 35 × 30               | 0.15  | 2.37                                               | ELHX401VSN541MA30S |
|                          | 290         | 25.4 × 30             | 0.15  | 1.86                                               | ELHX3H1VSN291MQ30S |                          | 590         | 25.4 × 55             | 0.15  | 2.97                                               | ELHX401VSN591MQ55S |
|                          | 310         | 22 × 40               | 0.15  | 2.06                                               | ELHX3H1VSN311MP40S |                          | 610         | 30 × 40               | 0.15  | 2.85                                               | ELHX401VSN611MR40S |
|                          | 350         | 22 × 45               | 0.15  | 2.23                                               | ELHX3H1VSN351MP45S |                          | 650         | 25.4 × 60             | 0.15  | 3.18                                               | ELHX401VSN651MQ60S |
|                          | 350         | 30 × 25               | 0.15  | 2.02                                               | ELHX3H1VSN351MR25S |                          | 670         | 35 × 35               | 0.15  | 2.68                                               | ELHX401VSN671MA35S |
|                          | 360         | 25.4 × 35             | 0.15  | 2.16                                               | ELHX3H1VSN361MQ35S |                          | 700         | 30 × 45               | 0.15  | 3.13                                               | ELHX401VSN701MR45S |
|                          | 400         | 22 × 50               | 0.15  | 2.44                                               | ELHX3H1VSN401MP50S |                          | 800         | 30 × 50               | 0.15  | 3.40                                               | ELHX401VSN801MR50S |
|                          | 430         | 25.4 × 40             | 0.15  | 2.41                                               | ELHX3H1VSN431MQ40S |                          | 800         | 35 × 40               | 0.15  | 3.02                                               | ELHX401VSN801MA40S |
|                          | 440         | 35 × 25               | 0.15  | 2.10                                               | ELHX3H1VSN441MA25S |                          | 900         | 30 × 55               | 0.15  | 3.68                                               | ELHX401VSN901MR55S |
|                          | 450         | 22 × 55               | 0.15  | 2.64                                               | ELHX3H1VSN451MP55S |                          | 930         | 35 × 45               | 0.15  | 3.34                                               | ELHX401VSN931MA45S |
|                          | 450         | 30 × 30               | 0.15  | 2.32                                               | ELHX3H1VSN451MR30S |                          | 990         | 30 × 60               | 0.15  | 3.93                                               | ELHX401VSN991MR60S |
|                          | 500         | 22 × 60               | 0.15  | 2.83                                               | ELHX3H1VSN501MP60S |                          | 1,060       | 35 × 50               | 0.15  | 3.65                                               | ELHX401VSN1A2MA50S |
|                          | 500         | 25.4 × 45             | 0.15  | 2.65                                               | ELHX3H1VSN501MQ45S |                          | 1,190       | 35 × 55               | 0.15  | 3.94                                               | ELHX401VSN122MA55S |
|                          | 550         | 30 × 35               | 0.15  | 2.63                                               | ELHX3H1VSN551MR35S |                          | 1,320       | 35 × 60               | 0.15  | 4.23                                               | ELHX401VSN132MA60S |

## ◆ HIGHER RIPPLE CURRENT RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|
| 350                      | 330         | 30 × 25               | 0.15  | 2.43                                               | ELHX351VSN331MR25S | 375                      | 790         | 30 × 50               | 0.15  | 4.18                                               | ELHX3H1VSN791MR50S |
|                          | 440         | 30 × 30               | 0.15  | 2.84                                               | ELHX351VSN441MR30S |                          | 820         | 35 × 40               | 0.15  | 4.05                                               | ELHX3H1VSN821MA40S |
|                          | 460         | 35 × 25               | 0.15  | 2.84                                               | ELHX351VSN461MA25S |                          | 890         | 30 × 55               | 0.15  | 4.52                                               | ELHX3H1VSN891MR55S |
|                          | 540         | 30 × 35               | 0.15  | 3.22                                               | ELHX351VSN541MR35S |                          | 950         | 35 × 45               | 0.15  | 4.47                                               | ELHX3H1VSN951MA45S |
|                          | 600         | 35 × 30               | 0.15  | 3.30                                               | ELHX351VSN601MA30S |                          | 990         | 30 × 60               | 0.15  | 4.86                                               | ELHX3H1VSN991MR60S |
|                          | 650         | 30 × 40               | 0.15  | 3.64                                               | ELHX351VSN651MR40S |                          | 1,080       | 35 × 50               | 0.15  | 4.87                                               | ELHX3H1VSN112MA50S |
|                          | 740         | 35 × 35               | 0.15  | 3.72                                               | ELHX351VSN741MA35S |                          | 1,220       | 35 × 55               | 0.15  | 5.28                                               | ELHX3H1VSN122MA55S |
|                          | 750         | 30 × 45               | 0.15  | 4.00                                               | ELHX351VSN751MR45S |                          | 1,350       | 35 × 60               | 0.15  | 5.66                                               | ELHX3H1VSN1D2MA60S |
|                          | 860         | 30 × 50               | 0.15  | 4.36                                               | ELHX351VSN861MR50S | 400                      | 290         | 30 × 25               | 0.15  | 2.28                                               | ELHX401VSN291MR25S |
|                          | 890         | 35 × 40               | 0.15  | 4.22                                               | ELHX351VSN891MA40S |                          | 380         | 30 × 30               | 0.15  | 2.64                                               | ELHX401VSN381MR30S |
|                          | 970         | 30 × 55               | 0.15  | 4.72                                               | ELHX351VSN971MR55S |                          | 390         | 35 × 25               | 0.15  | 2.62                                               | ELHX401VSN391MA25S |
|                          | 1,030       | 35 × 45               | 0.15  | 4.66                                               | ELHX351VSN1A2MA45S |                          | 470         | 30 × 35               | 0.15  | 3.00                                               | ELHX401VSN471MR35S |
|                          | 1,070       | 30 × 60               | 0.15  | 5.05                                               | ELHX351VSN1A2MR60S |                          | 520         | 35 × 30               | 0.15  | 3.07                                               | ELHX401VSN521MA30S |
|                          | 1,180       | 35 × 50               | 0.15  | 5.09                                               | ELHX351VSN122MA50S |                          | 560         | 30 × 40               | 0.15  | 3.37                                               | ELHX401VSN561MR40S |
|                          | 1,320       | 35 × 55               | 0.15  | 5.50                                               | ELHX351VSN132MA55S |                          | 640         | 35 × 35               | 0.15  | 3.46                                               | ELHX401VSN641MA35S |
|                          | 1,460       | 35 × 60               | 0.15  | 5.89                                               | ELHX351VSN1E2MA60S |                          | 650         | 30 × 45               | 0.15  | 3.73                                               | ELHX401VSN651MR45S |
| 375                      | 310         | 30 × 25               | 0.15  | 2.36                                               | ELHX3H1VSN311MR25S |                          | 740         | 30 × 50               | 0.15  | 4.04                                               | ELHX401VSN741MR50S |
|                          | 400         | 30 × 30               | 0.15  | 2.71                                               | ELHX3H1VSN401MR30S |                          | 770         | 35 × 40               | 0.15  | 3.92                                               | ELHX401VSN771MA40S |
|                          | 420         | 35 × 25               | 0.15  | 2.72                                               | ELHX3H1VSN421MA25S |                          | 830         | 30 × 55               | 0.15  | 4.37                                               | ELHX401VSN831MR55S |
|                          | 500         | 30 × 35               | 0.15  | 3.10                                               | ELHX3H1VSN501MR35S |                          | 890         | 35 × 45               | 0.15  | 4.33                                               | ELHX401VSN891MA45S |
|                          | 550         | 35 × 30               | 0.15  | 3.16                                               | ELHX3H1VSN551MA30S |                          | 920         | 30 × 60               | 0.15  | 4.69                                               | ELHX401VSN921MR60S |
|                          | 600         | 30 × 40               | 0.15  | 3.49                                               | ELHX3H1VSN601MR40S |                          | 1,020       | 35 × 50               | 0.15  | 4.73                                               | ELHX401VSN102MA50S |
|                          | 690         | 35 × 35               | 0.15  | 3.59                                               | ELHX3H1VSN691MA35S |                          | 1,140       | 35 × 55               | 0.15  | 5.11                                               | ELHX401VSN1B2MA55S |
|                          | 700         | 30 × 45               | 0.15  | 3.87                                               | ELHX3H1VSN701MR45S |                          | 1,260       | 35 × 60               | 0.15  | 5.47                                               | ELHX401VSN1C2MA60S |

## ◆ RATED RIPPLE CURRENT MULTIPLIERS

## ● Frequency Multipliers

| Frequency(Hz)             | 50   | 120  | 300  | 1k   | 10k  | 50k  |
|---------------------------|------|------|------|------|------|------|
| 350 to 400V <sub>dc</sub> | 0.70 | 1.00 | 1.10 | 1.17 | 1.25 | 1.31 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

# LHJ Series

- Higher ripple current from LXS series
- Endurance with ripple current : 5,000 hours at 105°C
- Rated voltage range : 400 to 450V<sub>dc</sub>, Capacitance range : 220 to 810μF
- For inverter control, switching power supplies
- Non solvent resistant type
- RoHS2 Compliant

LHJ

Higher ripple  
LXS

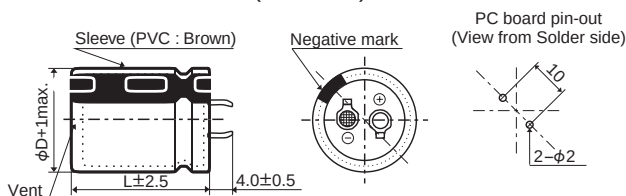


## SPECIFICATIONS

| Items                                                        | Characteristics                                                                                                                                                                                                                                                                         |                                       |            |                  |
|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|------------|------------------|
| Category                                                     | -40 to +105°C                                                                                                                                                                                                                                                                           |                                       |            |                  |
| Temperature Range                                            |                                                                                                                                                                                                                                                                                         |                                       |            |                  |
| Rated Voltage Range                                          | 400 to 450V <sub>dc</sub>                                                                                                                                                                                                                                                               |                                       |            |                  |
| Capacitance Tolerance                                        | ± 20% (M) (at 20°C, 120Hz)                                                                                                                                                                                                                                                              |                                       |            |                  |
| Leakage Current                                              | I ≤ 3√CV<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C after 5 minutes)                                                                                                                                                         |                                       |            |                  |
| Dissipation Factor<br>(tan δ)                                | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                        | 400V                                  | 420 & 450V | (at 20°C, 120Hz) |
|                                                              | tan δ (Max.)                                                                                                                                                                                                                                                                            | 0.15                                  | 0.20       |                  |
| Low Temperature<br>Characteristics<br>(Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                        | 400V                                  | 420 & 450V | (at 120Hz)       |
|                                                              | Z(-25°C)/Z(+20°C)                                                                                                                                                                                                                                                                       | 3                                     | 8          |                  |
|                                                              | Z(-40°C)/Z(+20°C)                                                                                                                                                                                                                                                                       | 12                                    | 14         |                  |
| Endurance                                                    | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 5,000 hours at 105°C.                                         |                                       |            |                  |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                      | ≤ ±20% of the initial value           |            |                  |
|                                                              | D.F. (tan δ)                                                                                                                                                                                                                                                                            | ≤ 200% of the initial specified value |            |                  |
|                                                              | Leakage current                                                                                                                                                                                                                                                                         | ≤ The initial specified value         |            |                  |
| Shelf Life                                                   | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                       |            |                  |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                      | ≤ ±15% of the initial value           |            |                  |
|                                                              | D.F. (tan δ)                                                                                                                                                                                                                                                                            | ≤ 150% of the initial specified value |            |                  |
|                                                              | Leakage current                                                                                                                                                                                                                                                                         | ≤ The initial specified value         |            |                  |

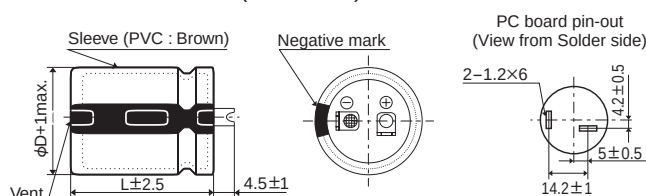
## DIMENSIONS [mm]

- Terminal Code : VS (φ30, φ35) : Standard

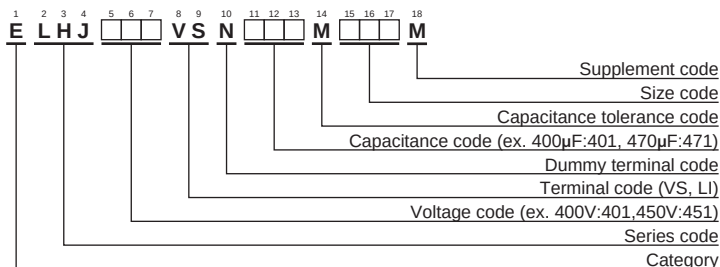


The standard design has no plastic disc.

- Terminal Code : LI (φ30, φ35)



## PART NUMBERING SYSTEM



Please refer to "Product code guide (snap-in type)"



## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|
| 400                      | 280         | 30 × 35               | 0.15  | 2.31                                               | ELHJ401VSN281MR35M | 420                      | 440         | 30 × 54               | 0.20  | 3.06                                               | ELHJ421VSN441MR54M |
|                          | 350         | 30 × 41               | 0.15  | 2.67                                               | ELHJ401VSN351MR41M |                          | 490         | 30 × 59               | 0.20  | 3.28                                               | ELHJ421VSN491MR59M |
|                          | 400         | 30 × 46               | 0.15  | 2.92                                               | ELHJ401VSN401MR46M |                          | 490         | 35 × 46               | 0.20  | 3.22                                               | ELHJ421VSN491MA46M |
|                          | 400         | 35 × 35               | 0.15  | 2.92                                               | ELHJ401VSN401MA35M |                          | 580         | 35 × 51               | 0.20  | 3.60                                               | ELHJ421VSN581MA51M |
|                          | 470         | 30 × 51               | 0.15  | 3.23                                               | ELHJ401VSN471MR51M |                          | 620         | 35 × 54               | 0.20  | 3.76                                               | ELHJ421VSN621MA54M |
|                          | 500         | 35 × 41               | 0.15  | 3.39                                               | ELHJ401VSN501MA41M |                          | 700         | 35 × 59               | 0.20  | 4.06                                               | ELHJ421VSN701MA59M |
|                          | 510         | 30 × 54               | 0.15  | 3.41                                               | ELHJ401VSN511MR54M | 450                      | 220         | 30 × 35               | 0.20  | 1.98                                               | ELHJ451VSN221MR35M |
|                          | 570         | 30 × 59               | 0.15  | 3.66                                               | ELHJ401VSN571MR59M |                          | 280         | 30 × 41               | 0.20  | 2.31                                               | ELHJ451VSN281MR41M |
|                          | 570         | 35 × 46               | 0.15  | 3.70                                               | ELHJ401VSN571MA46M |                          | 310         | 30 × 46               | 0.20  | 2.48                                               | ELHJ451VSN311MR46M |
|                          | 670         | 35 × 51               | 0.15  | 4.12                                               | ELHJ401VSN671MA51M |                          | 320         | 35 × 35               | 0.20  | 2.45                                               | ELHJ451VSN321MA35M |
|                          | 720         | 35 × 54               | 0.15  | 4.32                                               | ELHJ401VSN721MA54M |                          | 370         | 30 × 51               | 0.20  | 2.77                                               | ELHJ451VSN371MR51M |
|                          | 810         | 35 × 59               | 0.15  | 4.66                                               | ELHJ401VSN811MA59M |                          | 400         | 30 × 54               | 0.20  | 2.91                                               | ELHJ451VSN401MR54M |
| 420                      | 240         | 30 × 35               | 0.20  | 2.07                                               | ELHJ421VSN241MR35M |                          | 400         | 35 × 41               | 0.20  | 2.85                                               | ELHJ451VSN401MA41M |
|                          | 300         | 30 × 41               | 0.20  | 2.39                                               | ELHJ421VSN301MR41M |                          | 450         | 30 × 59               | 0.20  | 3.14                                               | ELHJ451VSN451MR59M |
|                          | 340         | 30 × 46               | 0.20  | 2.60                                               | ELHJ421VSN341MR46M |                          | 450         | 35 × 46               | 0.20  | 3.09                                               | ELHJ451VSN451MA46M |
|                          | 350         | 35 × 35               | 0.20  | 2.57                                               | ELHJ421VSN351MA35M |                          | 530         | 35 × 51               | 0.20  | 3.44                                               | ELHJ451VSN531MA51M |
|                          | 410         | 30 × 51               | 0.20  | 2.92                                               | ELHJ421VSN411MR51M |                          | 570         | 35 × 54               | 0.20  | 3.61                                               | ELHJ451VSN571MA54M |
|                          | 430         | 35 × 41               | 0.20  | 2.95                                               | ELHJ421VSN431MA41M |                          | 640         | 35 × 59               | 0.20  | 3.89                                               | ELHJ451VSN641MA59M |

## ◆RATED RIPPLE CURRENT MULTIPLIERS

● Frequency Multipliers

| Frequency(Hz) | 50   | 120  | 300  | 1k   | 10k  | 50k  |
|---------------|------|------|------|------|------|------|
| 400 to 450V   | 0.72 | 1.00 | 1.21 | 1.38 | 1.48 | 1.46 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.



# LHU Series

Upgrade!

- Lineup of high withstand voltage products for server power supplies and solar power generation applications
- Endurance with ripple current : 5,000 hours at 105°C
- Rated voltage range: 400 to 500V, Capacitance range: 120 to 1,910μF
- Non solvent resistant type
- RoHS2 Compliant

LHU

↑ Downsizing

LHS

↑ Downsizing

LXS

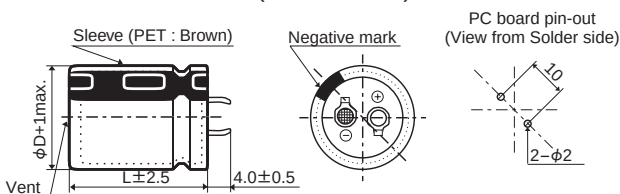


## SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                       |                                      |                 |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-----------------|
| Category                                               | -40 to +105℃                                                                                                                                                                                                                                                                          |                                      |                 |
| Temperature Range                                      |                                                                                                                                                                                                                                                                                       |                                      |                 |
| Rated Voltage Range                                    | 400 to 500V <sub>dc</sub>                                                                                                                                                                                                                                                             |                                      |                 |
| Capacitance Tolerance                                  | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                             |                                      |                 |
| Leakage Current                                        | I ≤ 3√CV<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 5 minutes)                                                                                                                                                        |                                      |                 |
| Dissipation Factor (tan δ)                             | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 400 to 500V                          | (at 20℃, 120Hz) |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.20                                 |                 |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 400 to 500V                          | (at 120Hz)      |
|                                                        | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 8                                    |                 |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 5,000 hours at 105℃.                                         |                                      |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±20% of the initial value          |                 |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤200% of the initial specified value |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value         |                 |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                      |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±15% of the initial value          |                 |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤150% of the initial specified value |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value         |                 |

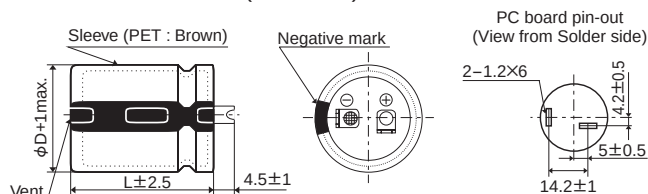
## DIMENSIONS [mm]

- Terminal Code : VS (φ25.4 to φ35) : Standard

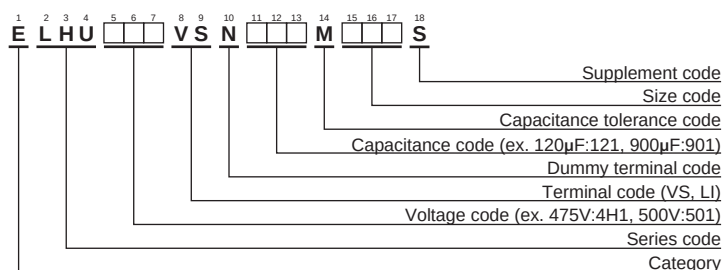


The standard design has no plastic disc.

- Terminal Code : LI (φ30, φ35)



## PART NUMBERING SYSTEM



Please refer to "Product code guide (snap-in type)"



# LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS



## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|
| 400                      | 380         | 25.4 × 35             | 0.20  | 1.58                                               | ELHU401VSN381MQ35S |
|                          | 450         | 25.4 × 40             | 0.20  | 1.75                                               | ELHU401VSN451MQ40S |
|                          | 460         | 35 × 25               | 0.20  | 1.53                                               | ELHU401VSN461MA25S |
|                          | 470         | 30 × 30               | 0.20  | 1.71                                               | ELHU401VSN471MR30S |
|                          | 520         | 25.4 × 45             | 0.20  | 1.92                                               | ELHU401VSN521MQ45S |
|                          | 580         | 30 × 35               | 0.20  | 1.94                                               | ELHU401VSN581MR35S |
|                          | 590         | 25.4 × 50             | 0.20  | 2.08                                               | ELHU401VSN591MQ50S |
|                          | 600         | 35 × 30               | 0.20  | 1.78                                               | ELHU401VSN601MA30S |
|                          | 660         | 25.4 × 55             | 0.20  | 2.24                                               | ELHU401VSN661MQ55S |
|                          | 680         | 30 × 40               | 0.20  | 2.16                                               | ELHU401VSN681MR40S |
|                          | 720         | 25.4 × 60             | 0.20  | 2.38                                               | ELHU401VSN721MQ60S |
|                          | 750         | 35 × 35               | 0.20  | 2.02                                               | ELHU401VSN751MA35S |
|                          | 790         | 30 × 45               | 0.20  | 2.39                                               | ELHU401VSN791MR45S |
|                          | 890         | 35 × 40               | 0.20  | 2.28                                               | ELHU401VSN891MA40S |
|                          | 900         | 30 × 50               | 0.20  | 2.60                                               | ELHU401VSN901MR50S |
|                          | 1,010       | 30 × 55               | 0.20  | 2.80                                               | ELHU401VSN102MR55S |
|                          | 1,040       | 35 × 45               | 0.20  | 2.53                                               | ELHU401VSN1A2MA45S |
|                          | 1,090       | 30 × 60               | 0.20  | 2.97                                               | ELHU401VSN112MR60S |
|                          | 1,160       | 30 × 65               | 0.20  | 3.12                                               | ELHU401VSN1B2MR65S |
|                          | 1,180       | 35 × 50               | 0.20  | 2.75                                               | ELHU401VSN122MA50S |
|                          | 1,240       | 30 × 70               | 0.20  | 3.28                                               | ELHU401VSN1C2MR70S |
|                          | 1,310       | 30 × 75               | 0.20  | 3.43                                               | ELHU401VSN132MR75S |
|                          | 1,320       | 35 × 55               | 0.20  | 2.93                                               | ELHU401VSN132MA55S |
|                          | 1,410       | 30 × 80               | 0.20  | 3.61                                               | ELHU401VSN142MR80S |
|                          | 1,470       | 35 × 60               | 0.20  | 3.11                                               | ELHU401VSN1E2MA60S |
| 420                      | 360         | 25.4 × 35             | 0.20  | 1.54                                               | ELHU421VSN361MQ35S |
|                          | 430         | 25.4 × 40             | 0.20  | 1.72                                               | ELHU421VSN431MQ40S |
|                          | 430         | 35 × 25               | 0.20  | 1.48                                               | ELHU421VSN431MA25S |
|                          | 440         | 30 × 30               | 0.20  | 1.65                                               | ELHU421VSN441MR30S |
|                          | 490         | 25.4 × 45             | 0.20  | 1.87                                               | ELHU421VSN491MQ45S |
|                          | 550         | 30 × 35               | 0.20  | 1.89                                               | ELHU421VSN551MR35S |
|                          | 560         | 25.4 × 50             | 0.20  | 2.03                                               | ELHU421VSN561MQ50S |
|                          | 570         | 35 × 30               | 0.20  | 1.74                                               | ELHU421VSN571MA30S |
|                          | 630         | 25.4 × 55             | 0.20  | 2.19                                               | ELHU421VSN631MQ55S |
|                          | 650         | 30 × 40               | 0.20  | 2.12                                               | ELHU421VSN651MR40S |
|                          | 680         | 25.4 × 60             | 0.20  | 2.31                                               | ELHU421VSN681MQ60S |
|                          | 710         | 35 × 35               | 0.20  | 1.97                                               | ELHU421VSN711MA35S |
|                          | 750         | 30 × 45               | 0.20  | 2.33                                               | ELHU421VSN751MR45S |
|                          | 850         | 30 × 50               | 0.20  | 2.52                                               | ELHU421VSN851MR50S |
|                          | 850         | 35 × 40               | 0.20  | 2.23                                               | ELHU421VSN851MA40S |
| 420                      | 960         | 30 × 55               | 0.20  | 2.73                                               | ELHU421VSN961MR55S |
|                          | 980         | 35 × 45               | 0.20  | 2.45                                               | ELHU421VSN981MA45S |
|                          | 1,040       | 30 × 60               | 0.20  | 2.90                                               | ELHU421VSN1A2MR60S |
|                          | 1,100       | 30 × 65               | 0.20  | 3.04                                               | ELHU421VSN112MR65S |
|                          | 1,120       | 35 × 50               | 0.20  | 2.68                                               | ELHU421VSN112MA50S |
|                          | 1,180       | 30 × 70               | 0.20  | 3.20                                               | ELHU421VSN122MR70S |
|                          | 1,250       | 30 × 75               | 0.20  | 3.35                                               | ELHU421VSN1C2MR75S |
|                          | 1,260       | 35 × 55               | 0.20  | 2.86                                               | ELHU421VSN1C2MA55S |
|                          | 1,340       | 30 × 80               | 0.20  | 3.52                                               | ELHU421VSN1D2MR80S |
|                          | 1,400       | 35 × 60               | 0.20  | 3.04                                               | ELHU421VSN142MA60S |
|                          | 1,420       | 35 × 65               | 0.20  | 3.12                                               | ELHU421VSN142MR65S |
|                          | 1,550       | 35 × 70               | 0.20  | 3.32                                               | ELHU421VSN1F2MA70S |
|                          | 1,680       | 35 × 75               | 0.20  | 3.51                                               | ELHU421VSN172MA75S |
|                          | 1,810       | 35 × 80               | 0.20  | 3.71                                               | ELHU421VSN182MA80S |
| 450                      | 320         | 25.4 × 35             | 0.20  | 1.45                                               | ELHU451VSN321MQ35S |
|                          | 390         | 25.4 × 40             | 0.20  | 1.63                                               | ELHU451VSN391MQ40S |
|                          | 390         | 35 × 25               | 0.20  | 1.41                                               | ELHU451VSN391MA25S |
|                          | 400         | 30 × 30               | 0.20  | 1.57                                               | ELHU451VSN401MR30S |
|                          | 450         | 25.4 × 45             | 0.20  | 1.79                                               | ELHU451VSN451MQ45S |
|                          | 490         | 30 × 35               | 0.20  | 1.78                                               | ELHU451VSN491MR35S |
|                          | 510         | 25.4 × 50             | 0.20  | 1.94                                               | ELHU451VSN511MQ50S |
|                          | 520         | 35 × 30               | 0.20  | 1.66                                               | ELHU451VSN521MA30S |
|                          | 570         | 25.4 × 55             | 0.20  | 2.08                                               | ELHU451VSN571MQ55S |
|                          | 590         | 30 × 40               | 0.20  | 2.02                                               | ELHU451VSN591MR40S |
|                          | 620         | 25.4 × 60             | 0.20  | 2.21                                               | ELHU451VSN621MQ60S |
|                          | 640         | 35 × 35               | 0.20  | 1.87                                               | ELHU451VSN641MA35S |
|                          | 680         | 30 × 45               | 0.20  | 2.22                                               | ELHU451VSN681MR45S |
|                          | 770         | 30 × 50               | 0.20  | 2.40                                               | ELHU451VSN771MR50S |
|                          | 770         | 35 × 40               | 0.20  | 2.12                                               | ELHU451VSN771MA40S |
|                          | 860         | 30 × 55               | 0.20  | 2.59                                               | ELHU451VSN861MR55S |
|                          | 890         | 35 × 45               | 0.20  | 2.34                                               | ELHU451VSN891MA45S |
|                          | 940         | 30 × 60               | 0.20  | 2.76                                               | ELHU451VSN941MR60S |
|                          | 1,010       | 30 × 65               | 0.20  | 2.91                                               | ELHU451VSN102MR65S |
|                          | 1,020       | 35 × 50               | 0.20  | 2.56                                               | ELHU451VSN102MA50S |
|                          | 1,080       | 30 × 70               | 0.20  | 3.06                                               | ELHU451VSN112MR70S |
|                          | 1,140       | 30 × 75               | 0.20  | 3.20                                               | ELHU451VSN1B2MR75S |
|                          | 1,140       | 35 × 55               | 0.20  | 2.72                                               | ELHU451VSN1B2MA55S |
|                          | 1,230       | 30 × 80               | 0.20  | 3.38                                               | ELHU451VSN1C2MR80S |
|                          | 1,260       | 35 × 60               | 0.20  | 2.88                                               | ELHU451VSN1C2MA60S |
|                          | 1,300       | 35 × 65               | 0.20  | 2.98                                               | ELHU451VSN132MA65S |
|                          | 1,410       | 35 × 70               | 0.20  | 3.16                                               | ELHU451VSN142MA70S |
|                          | 1,530       | 35 × 75               | 0.20  | 3.35                                               | ELHU451VSN1F2MA75S |
|                          | 1,650       | 35 × 80               | 0.20  | 3.54                                               | ELHU451VSN1G2MA80S |



# LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS



## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|
| 475                      | 150         | 25.4 × 25             | 0.20  | 1.03                                               | ELHU4H1VSN151MQ25S | 500                      | 120         | 25.4 × 25             | 0.20  | 0.93                                               | ELHU501VSN121MQ25S |
|                          | 190         | 25.4 × 30             | 0.20  | 1.20                                               | ELHU4H1VSN191MQ30S |                          | 160         | 25.4 × 30             | 0.20  | 1.10                                               | ELHU501VSN161MQ30S |
|                          | 220         | 30 × 25               | 0.20  | 1.32                                               | ELHU4H1VSN221MR25S |                          | 180         | 30 × 25               | 0.20  | 1.20                                               | ELHU501VSN181MR25S |
|                          | 240         | 25.4 × 35             | 0.20  | 1.40                                               | ELHU4H1VSN241MQ35S |                          | 200         | 25.4 × 35             | 0.20  | 1.28                                               | ELHU501VSN201MQ35S |
|                          | 270         | 35 × 25               | 0.20  | 1.48                                               | ELHU4H1VSN271MA25S |                          | 240         | 25.4 × 40             | 0.20  | 1.43                                               | ELHU501VSN241MQ40S |
|                          | 280         | 25.4 × 40             | 0.20  | 1.54                                               | ELHU4H1VSN281MQ40S |                          | 240         | 30 × 30               | 0.20  | 1.40                                               | ELHU501VSN241MR30S |
|                          | 290         | 30 × 30               | 0.20  | 1.54                                               | ELHU4H1VSN291MR30S |                          | 240         | 35 × 25               | 0.20  | 1.37                                               | ELHU501VSN241MA25S |
|                          | 330         | 25.4 × 45             | 0.20  | 1.71                                               | ELHU4H1VSN331MQ45S |                          | 280         | 25.4 × 45             | 0.20  | 1.57                                               | ELHU501VSN281MQ45S |
|                          | 360         | 30 × 35               | 0.20  | 1.75                                               | ELHU4H1VSN361MR35S |                          | 300         | 30 × 35               | 0.20  | 1.60                                               | ELHU501VSN301MR35S |
|                          | 360         | 35 × 30               | 0.20  | 1.71                                               | ELHU4H1VSN361MA30S |                          | 320         | 25.4 × 50             | 0.20  | 1.71                                               | ELHU501VSN321MQ50S |
|                          | 370         | 25.4 × 50             | 0.20  | 1.84                                               | ELHU4H1VSN371MR50S |                          | 330         | 35 × 30               | 0.20  | 1.63                                               | ELHU501VSN331MA30S |
|                          | 420         | 25.4 × 55             | 0.20  | 1.99                                               | ELHU4H1VSN421MQ55S |                          | 370         | 25.4 × 55             | 0.20  | 1.87                                               | ELHU501VSN371MQ55S |
|                          | 420         | 30 × 40               | 0.20  | 1.95                                               | ELHU4H1VSN421MR40S |                          | 370         | 30 × 40               | 0.20  | 1.83                                               | ELHU501VSN371MR40S |
|                          | 450         | 35 × 35               | 0.20  | 1.94                                               | ELHU4H1VSN451MA35S |                          | 410         | 25.4 × 60             | 0.20  | 2.00                                               | ELHU501VSN411MQ60S |
|                          | 460         | 25.4 × 60             | 0.20  | 2.12                                               | ELHU4H1VSN461MQ60S |                          | 410         | 35 × 35               | 0.20  | 1.85                                               | ELHU501VSN411MA35S |
|                          | 490         | 30 × 45               | 0.20  | 2.16                                               | ELHU4H1VSN491MR45S |                          | 430         | 30 × 45               | 0.20  | 2.02                                               | ELHU501VSN431MR45S |
|                          | 540         | 35 × 40               | 0.20  | 2.20                                               | ELHU4H1VSN541MA40S |                          | 490         | 30 × 50               | 0.20  | 2.19                                               | ELHU501VSN491MR50S |
|                          | 560         | 30 × 50               | 0.20  | 2.34                                               | ELHU4H1VSN561MR50S |                          | 490         | 35 × 40               | 0.20  | 2.09                                               | ELHU501VSN491MA40S |
|                          | 620         | 30 × 55               | 0.20  | 2.51                                               | ELHU4H1VSN621MR55S |                          | 550         | 30 × 55               | 0.20  | 2.37                                               | ELHU501VSN551MR55S |
|                          | 630         | 35 × 45               | 0.20  | 2.43                                               | ELHU4H1VSN631MA45S |                          | 580         | 35 × 45               | 0.20  | 2.33                                               | ELHU501VSN581MA45S |
|                          | 690         | 30 × 60               | 0.20  | 2.70                                               | ELHU4H1VSN691MR60S |                          | 610         | 30 × 60               | 0.20  | 2.54                                               | ELHU501VSN611MR60S |
|                          | 710         | 30 × 65               | 0.20  | 2.79                                               | ELHU4H1VSN711MR65S |                          | 650         | 30 × 65               | 0.20  | 2.67                                               | ELHU501VSN651MR65S |
|                          | 720         | 35 × 50               | 0.20  | 2.65                                               | ELHU4H1VSN721MA50S |                          | 660         | 35 × 50               | 0.20  | 2.54                                               | ELHU501VSN661MA50S |
|                          | 770         | 30 × 70               | 0.20  | 2.96                                               | ELHU4H1VSN771MR70S |                          | 710         | 30 × 70               | 0.20  | 2.84                                               | ELHU501VSN711MR70S |
|                          | 810         | 35 × 55               | 0.20  | 2.87                                               | ELHU4H1VSN811MA55S |                          | 740         | 35 × 55               | 0.20  | 2.74                                               | ELHU501VSN741MA55S |
|                          | 840         | 30 × 75               | 0.20  | 3.14                                               | ELHU4H1VSN841MR75S |                          | 770         | 30 × 75               | 0.20  | 3.01                                               | ELHU501VSN771MR75S |
|                          | 900         | 30 × 80               | 0.20  | 3.31                                               | ELHU4H1VSN901MR80S |                          | 830         | 30 × 80               | 0.20  | 3.18                                               | ELHU501VSN831MR80S |
|                          | 900         | 35 × 60               | 0.20  | 3.08                                               | ELHU4H1VSN901MA60S |                          | 830         | 35 × 60               | 0.20  | 2.95                                               | ELHU501VSN831MA60S |
|                          | 960         | 35 × 65               | 0.20  | 3.24                                               | ELHU4H1VSN961MA65S |                          | 880         | 35 × 65               | 0.20  | 3.10                                               | ELHU501VSN881MA65S |
|                          | 1,040       | 35 × 70               | 0.20  | 3.43                                               | ELHU4H1VSN1A2MA70S |                          | 960         | 35 × 70               | 0.20  | 3.29                                               | ELHU501VSN961MA70S |
|                          | 1,130       | 35 × 75               | 0.20  | 3.64                                               | ELHU4H1VSN1B2MA75S |                          | 1,040       | 35 × 75               | 0.20  | 3.49                                               | ELHU501VSN1A2MA75S |
|                          | 1,220       | 35 × 80               | 0.20  | 3.85                                               | ELHU4H1VSN122MA80S |                          | 1,120       | 35 × 80               | 0.20  | 3.69                                               | ELHU501VSN112MA80S |

## ◆RATED RIPPLE CURRENT MULTIPLIERS

### ● Frequency Multipliers

| Frequency(Hz)             | 50   | 120  | 300  | 1k   | 10k  | 50k  |
|---------------------------|------|------|------|------|------|------|
| 400 to 450V <sub>dc</sub> | 0.77 | 1.00 | 1.10 | 1.21 | 1.32 | 1.33 |
| 475, 500V <sub>dc</sub>   | 0.77 | 1.00 | 1.11 | 1.20 | 1.25 | 1.33 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

# LHS Series

- The lower temperature range of the category temperature range has been expanded.
- For solar power generation
- Endurance with ripple current : 5,000 hours at 105°C
- Rated voltage range : 450 to 500V
- For inverter control, switching power supplies
- Non solvent resistant type
- RoHS2 Compliant

**LHS**

↑ Downsizing  
LXS  
↑ Longer life  
KMS

**500V  
Lineup!**

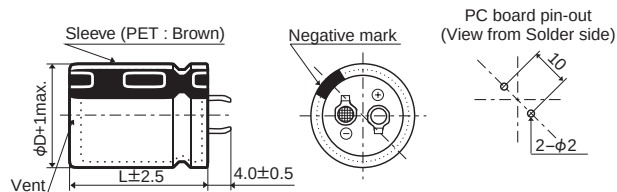


## SPECIFICATIONS

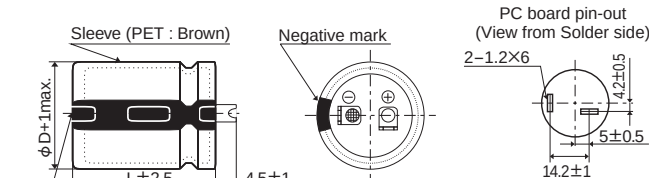
| Items                                                  | Characteristics                                                                                                                                                                                                                                                                         |                                                                          |
|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| Category Temperature Range                             | -40 to +105°C                                                                                                                                                                                                                                                                           |                                                                          |
| Rated Voltage Range                                    | 450 to 500V <sub>dc</sub>                                                                                                                                                                                                                                                               |                                                                          |
| Capacitance Tolerance                                  | ±20% (M) (at 20°C, 120Hz)                                                                                                                                                                                                                                                               |                                                                          |
| Leakage Current                                        | $I \leq 3\sqrt{CV}$<br>Where, I : Max. leakage current (µA), C : Nominal capacitance (µF), V : Rated voltage (V) (at 20°C after 5 minutes)                                                                                                                                              |                                                                          |
| Dissipation Factor (tan δ)                             | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                        | 450 to 500V                                                              |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                            | 0.20 (at 20°C, 120Hz)                                                    |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                        | 450 to 500V                                                              |
|                                                        | Z(-25°C)/Z(+20°C)                                                                                                                                                                                                                                                                       | 8 (at 120Hz)                                                             |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 5,000 hours at 105°C.                                         |                                                                          |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                      | ≤ ±20% of the initial value                                              |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                            | ≤ 200% of the initial specified value (475, 500V <sub>dc</sub> : ≤ 250%) |
|                                                        | Leakage current                                                                                                                                                                                                                                                                         | ≤ The initial specified value                                            |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                                                          |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                      | ≤ ±15% of the initial value                                              |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                            | ≤ 150% of the initial specified value                                    |
|                                                        | Leakage current                                                                                                                                                                                                                                                                         | ≤ The initial specified value                                            |

## DIMENSIONS [mm]

• Terminal Code : VS (φ22 to φ35) : Standard

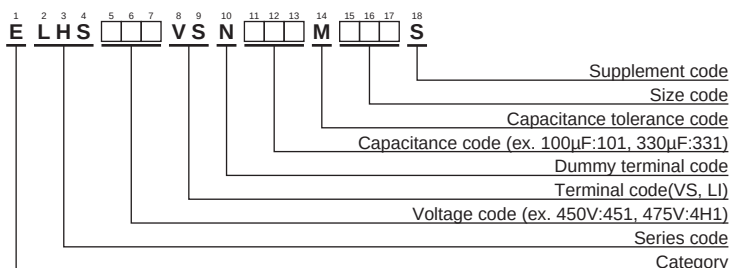


• Terminal Code : LI (φ30, φ35)



The standard design has no plastic disc.

## PART NUMBERING SYSTEM



Please refer to "Product code guide (snap-in type)"



LHS Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|
| 450                      | 100         | 22 × 25               | 0.20  | 0.71                                               | ELHS451VSN101MP25S | 475                      | 150         | 30 × 25               | 0.20  | 1.01                                               | ELHS4H1VSN151MR25S |
|                          | 120         | 22 × 30               | 0.20  | 0.81                                               | ELHS451VSN121MP30S |                          | 180         | 30 × 30               | 0.20  | 1.11                                               | ELHS4H1VSN181MR30S |
|                          | 150         | 22 × 35               | 0.20  | 0.93                                               | ELHS451VSN151MP35S |                          | 180         | 35 × 25               | 0.20  | 1.08                                               | ELHS4H1VSN181MA25S |
|                          | 150         | 25.4 × 25             | 0.20  | 0.93                                               | ELHS451VSN151MQ25S |                          | 220         | 30 × 35               | 0.20  | 1.26                                               | ELHS4H1VSN221MR35S |
|                          | 180         | 22 × 40               | 0.20  | 1.04                                               | ELHS451VSN181MP40S |                          | 270         | 30 × 40               | 0.20  | 1.44                                               | ELHS4H1VSN271MR40S |
|                          | 180         | 25.4 × 30             | 0.20  | 1.05                                               | ELHS451VSN181MQ30S |                          | 270         | 35 × 30               | 0.20  | 1.35                                               | ELHS4H1VSN271MA30S |
|                          | 220         | 22 × 45               | 0.20  | 1.17                                               | ELHS451VSN221MP45S |                          | 330         | 30 × 45               | 0.20  | 1.63                                               | ELHS4H1VSN331MR45S |
|                          | 220         | 25.4 × 35             | 0.20  | 1.21                                               | ELHS451VSN221MQ35S |                          | 330         | 35 × 35               | 0.20  | 1.51                                               | ELHS4H1VSN331MA35S |
|                          | 220         | 30 × 25               | 0.20  | 1.15                                               | ELHS451VSN221MR25S |                          | 390         | 30 × 50               | 0.20  | 1.80                                               | ELHS4H1VSN391MR50S |
|                          | 270         | 22 × 50               | 0.20  | 1.33                                               | ELHS451VSN271MP50S |                          | 390         | 35 × 40               | 0.20  | 1.70                                               | ELHS4H1VSN391MA40S |
|                          | 270         | 25.4 × 40             | 0.20  | 1.36                                               | ELHS451VSN271MQ40S |                          | 470         | 30 × 60               | 0.20  | 2.05                                               | ELHS4H1VSN471MR60S |
|                          | 270         | 30 × 30               | 0.20  | 1.29                                               | ELHS451VSN271MR30S |                          | 470         | 35 × 45               | 0.20  | 1.91                                               | ELHS4H1VSN471MA45S |
|                          | 270         | 35 × 25               | 0.20  | 1.25                                               | ELHS451VSN271MA25S |                          | 470         | 35 × 50               | 0.20  | 1.95                                               | ELHS4H1VSN471MA50S |
|                          | 330         | 22 × 60               | 0.20  | 1.54                                               | ELHS451VSN331MP60S | 500                      | 560         | 35 × 60               | 0.20  | 2.21                                               | ELHS4H1VSN561MA60S |
|                          | 330         | 25.4 × 45             | 0.20  | 1.54                                               | ELHS451VSN331MQ45S |                          | 120         | 30 × 25               | 0.20  | 0.90                                               | ELHS501VSN121MR25S |
|                          | 330         | 25.4 × 50             | 0.20  | 1.56                                               | ELHS451VSN331MQ50S |                          | 150         | 30 × 30               | 0.20  | 1.02                                               | ELHS501VSN151MR30S |
|                          | 330         | 30 × 35               | 0.20  | 1.46                                               | ELHS451VSN331MR35S |                          | 150         | 35 × 25               | 0.20  | 0.99                                               | ELHS501VSN151MA25S |
|                          | 330         | 35 × 30               | 0.20  | 1.41                                               | ELHS451VSN331MA30S |                          | 180         | 30 × 35               | 0.20  | 1.14                                               | ELHS501VSN181MR35S |
|                          | 390         | 25.4 × 60             | 0.20  | 1.74                                               | ELHS451VSN391MQ60S |                          | 220         | 30 × 40               | 0.20  | 1.30                                               | ELHS501VSN221MR40S |
|                          | 390         | 30 × 40               | 0.20  | 1.63                                               | ELHS451VSN391MR40S |                          | 220         | 35 × 30               | 0.20  | 1.22                                               | ELHS501VSN221MA30S |
|                          | 470         | 30 × 45               | 0.20  | 1.84                                               | ELHS451VSN471MR45S |                          | 270         | 30 × 45               | 0.20  | 1.47                                               | ELHS501VSN271MR45S |
|                          | 470         | 30 × 50               | 0.20  | 1.87                                               | ELHS451VSN471MR50S |                          | 270         | 35 × 35               | 0.20  | 1.37                                               | ELHS501VSN271MA35S |
|                          | 470         | 35 × 35               | 0.20  | 1.71                                               | ELHS451VSN471MA35S |                          | 330         | 30 × 50               | 0.20  | 1.66                                               | ELHS501VSN331MR50S |
|                          | 560         | 35 × 40               | 0.20  | 1.95                                               | ELHS451VSN561MA40S |                          | 330         | 35 × 40               | 0.20  | 1.57                                               | ELHS501VSN331MA40S |
|                          | 560         | 35 × 45               | 0.20  | 1.99                                               | ELHS451VSN561MA45S |                          | 390         | 30 × 60               | 0.20  | 1.87                                               | ELHS501VSN391MR60S |
|                          | 680         | 30 × 60               | 0.20  | 2.33                                               | ELHS451VSN681MR60S |                          | 390         | 35 × 45               | 0.20  | 1.74                                               | ELHS501VSN391MA45S |
|                          | 680         | 35 × 50               | 0.20  | 2.22                                               | ELHS451VSN681MA50S |                          | 470         | 35 × 50               | 0.20  | 1.95                                               | ELHS501VSN471MA50S |
|                          | 820         | 35 × 60               | 0.20  | 2.52                                               | ELHS451VSN821MA60S |                          | 560         | 35 × 60               | 0.20  | 2.21                                               | ELHS501VSN561MA60S |

## ◆RATED RIPPLE CURRENT MULTIPLIERS

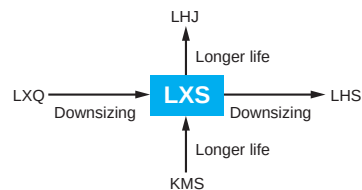
## ● Frequency Multipliers

| Frequency(Hz)           | 50   | 120  | 300  | 1k   | 10k  | 50k  |
|-------------------------|------|------|------|------|------|------|
| 450V <sub>dc</sub>      | 0.77 | 1.00 | 1.16 | 1.30 | 1.41 | 1.43 |
| 475, 500V <sub>dc</sub> | 0.70 | 1.00 | 1.16 | 1.30 | 1.41 | 1.43 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

# LXS Series

- For solar power generation
- Endurance with ripple current : 5,000 hours at 105°C
- Rated voltage range : 160 to 600V
- Downsized from LXQ series
- Non solvent resistant type
- RoHS2 Compliant

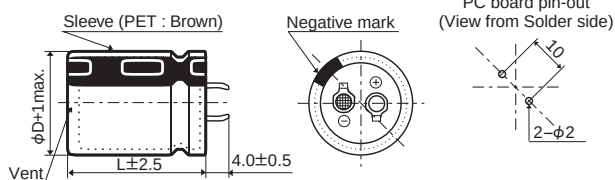


## SPECIFICATIONS

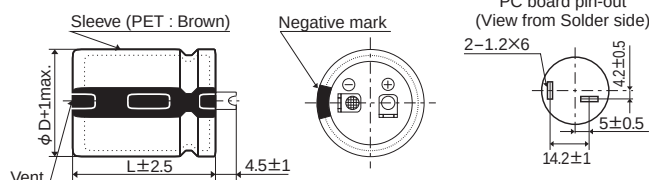
| Items                                                  | Characteristics                                                                                                                                                                                                                                                                         |                                                                                                       |             |                  |
|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|-------------|------------------|
| Category                                               | -25 to +105°C                                                                                                                                                                                                                                                                           |                                                                                                       |             |                  |
| Temperature Range                                      |                                                                                                                                                                                                                                                                                         |                                                                                                       |             |                  |
| Rated Voltage Range                                    | 160 to 600V <sub>dc</sub>                                                                                                                                                                                                                                                               |                                                                                                       |             |                  |
| Capacitance Tolerance                                  | ± 20% (M) (at 20°C, 120Hz)                                                                                                                                                                                                                                                              |                                                                                                       |             |                  |
| Leakage Current                                        | I ≤ 3√CV<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C after 5 minutes)                                                                                                                                                         |                                                                                                       |             |                  |
| Dissipation Factor (tan δ)                             | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                        | 160 to 400V                                                                                           | 420 to 600V | (at 20°C, 120Hz) |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                            | 0.15                                                                                                  | 0.20        |                  |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                        | 160 to 400V                                                                                           | 420 to 600V | (at 120Hz)       |
|                                                        | Z(-25°C)/Z(+20°C)                                                                                                                                                                                                                                                                       | 4                                                                                                     | 8           |                  |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 5,000 hours at 105°C.                                         |                                                                                                       |             |                  |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                      | ≤ ±20% of the initial value                                                                           |             |                  |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                            | ≤ 200% of the initial specified value (500V <sub>dc</sub> : ≤ 250%, 550, 600V <sub>dc</sub> : ≤ 300%) |             |                  |
|                                                        | Leakage current                                                                                                                                                                                                                                                                         | ≤ The initial specified value                                                                         |             |                  |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                                                                                       |             |                  |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                      | ≤ ±15% of the initial value                                                                           |             |                  |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                            | ≤ 150% of the initial specified value                                                                 |             |                  |
|                                                        | Leakage current                                                                                                                                                                                                                                                                         | ≤ The initial specified value                                                                         |             |                  |

## DIMENSIONS [mm]

● Terminal Code : VS (φ22 to φ35) : Standard

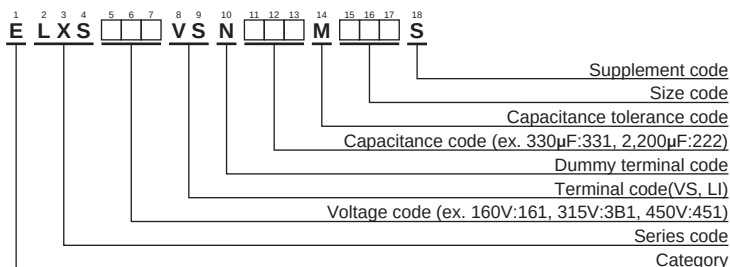


● Terminal Code : LI (φ30, φ35)



The standard design has no plastic disc.

## PART NUMBERING SYSTEM



Please refer to "Product code guide (snap-in type)"





LXS Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|
| 160                      | 470         | 22 × 25               | 0.15  | 1.47                                               | ELXS161VSN471MP25S | 200                      | 1,500       | 35 × 35               | 0.15  | 3.36                                               | ELXS201VSN152MA35S |
|                          | 680         | 22 × 30               | 0.15  | 1.86                                               | ELXS161VSN681MP30S |                          | 1,800       | 30 × 50               | 0.15  | 3.72                                               | ELXS201VSN182MR50S |
|                          | 680         | 25.4 × 25             | 0.15  | 1.84                                               | ELXS161VSN681MQ25S |                          | 1,800       | 35 × 40               | 0.15  | 3.81                                               | ELXS201VSN182MA40S |
|                          | 820         | 22 × 35               | 0.15  | 2.09                                               | ELXS161VSN821MP35S |                          | 2,200       | 35 × 45               | 0.15  | 4.32                                               | ELXS201VSN222MA45S |
|                          | 820         | 25.4 × 30             | 0.15  | 2.08                                               | ELXS161VSN821MQ30S |                          | 2,700       | 35 × 50               | 0.15  | 4.88                                               | ELXS201VSN272MA50S |
|                          | 1,000       | 22 × 40               | 0.15  | 2.35                                               | ELXS161VSN102MP40S | 250                      | 270         | 22 × 25               | 0.15  | 1.11                                               | ELXS251VSN271MP25S |
|                          | 1,000       | 22 × 45               | 0.15  | 2.40                                               | ELXS161VSN102MP45S |                          | 330         | 22 × 30               | 0.15  | 1.29                                               | ELXS251VSN331MP30S |
|                          | 1,000       | 25.4 × 35             | 0.15  | 2.40                                               | ELXS161VSN102MQ35S |                          | 390         | 22 × 35               | 0.15  | 1.44                                               | ELXS251VSN391MP35S |
|                          | 1,000       | 30 × 25               | 0.15  | 2.50                                               | ELXS161VSN102MR25S |                          | 390         | 25.4 × 25             | 0.15  | 1.40                                               | ELXS251VSN391MQ25S |
|                          | 1,200       | 22 × 50               | 0.15  | 2.69                                               | ELXS161VSN122MP50S |                          | 470         | 22 × 40               | 0.15  | 1.61                                               | ELXS251VSN471MP40S |
|                          | 1,200       | 25.4 × 40             | 0.15  | 2.68                                               | ELXS161VSN122MQ40S |                          | 470         | 25.4 × 30             | 0.15  | 1.57                                               | ELXS251VSN471MQ30S |
|                          | 1,200       | 30 × 30               | 0.15  | 2.77                                               | ELXS161VSN122MR30S |                          | 560         | 22 × 45               | 0.15  | 1.79                                               | ELXS251VSN561MP45S |
|                          | 1,200       | 35 × 25               | 0.15  | 2.91                                               | ELXS161VSN122MA25S |                          | 560         | 25.4 × 35             | 0.15  | 1.79                                               | ELXS251VSN561MQ35S |
|                          | 1,500       | 25.4 × 45             | 0.15  | 3.05                                               | ELXS161VSN152MQ45S |                          | 560         | 30 × 25               | 0.15  | 1.87                                               | ELXS251VSN561MR25S |
|                          | 1,500       | 30 × 35               | 0.15  | 3.17                                               | ELXS161VSN152MR35S |                          | 680         | 22 × 50               | 0.15  | 2.02                                               | ELXS251VSN681MP50S |
|                          | 1,800       | 25.4 × 50             | 0.15  | 3.40                                               | ELXS161VSN182MQ50S |                          | 680         | 25.4 × 40             | 0.15  | 2.02                                               | ELXS251VSN681MQ40S |
|                          | 1,800       | 30 × 40               | 0.15  | 3.57                                               | ELXS161VSN182MR40S |                          | 680         | 30 × 30               | 0.15  | 2.08                                               | ELXS251VSN681MR30S |
|                          | 1,800       | 35 × 30               | 0.15  | 3.62                                               | ELXS161VSN182MA30S |                          | 680         | 35 × 25               | 0.15  | 2.19                                               | ELXS251VSN681MA25S |
|                          | 2,200       | 30 × 45               | 0.15  | 4.05                                               | ELXS161VSN222MR45S |                          | 820         | 25.4 × 45             | 0.15  | 2.26                                               | ELXS251VSN821MQ45S |
|                          | 2,200       | 30 × 50               | 0.15  | 4.11                                               | ELXS161VSN222MR50S |                          | 820         | 25.4 × 50             | 0.15  | 2.29                                               | ELXS251VSN821MQ50S |
|                          | 2,200       | 35 × 35               | 0.15  | 4.07                                               | ELXS161VSN222MA35S |                          | 820         | 30 × 35               | 0.15  | 2.34                                               | ELXS251VSN821MR35S |
|                          | 2,700       | 35 × 40               | 0.15  | 4.67                                               | ELXS161VSN272MA40S |                          | 820         | 35 × 30               | 0.15  | 2.45                                               | ELXS251VSN821MA30S |
|                          | 2,700       | 35 × 45               | 0.15  | 4.78                                               | ELXS161VSN272MA45S |                          | 1,000       | 30 × 40               | 0.15  | 2.66                                               | ELXS251VSN102MR40S |
|                          | 3,300       | 35 × 50               | 0.15  | 5.40                                               | ELXS161VSN332MA50S |                          | 1,200       | 30 × 45               | 0.15  | 2.99                                               | ELXS251VSN122MR45S |
| 180                      | 390         | 22 × 25               | 0.15  | 1.34                                               | ELXS181VSN391MP25S |                          | 1,200       | 30 × 50               | 0.15  | 3.04                                               | ELXS251VSN122MR50S |
|                          | 560         | 22 × 30               | 0.15  | 1.68                                               | ELXS181VSN561MP30S |                          | 1,200       | 35 × 35               | 0.15  | 3.00                                               | ELXS251VSN122MA35S |
|                          | 560         | 25.4 × 25             | 0.15  | 1.67                                               | ELXS181VSN561MQ25S |                          | 1,200       | 35 × 40               | 0.15  | 3.11                                               | ELXS251VSN122MA40S |
|                          | 680         | 22 × 35               | 0.15  | 1.90                                               | ELXS181VSN681MP35S |                          | 1,500       | 35 × 45               | 0.15  | 3.56                                               | ELXS251VSN152MA45S |
|                          | 820         | 22 × 40               | 0.15  | 2.13                                               | ELXS181VSN821MP40S |                          | 1,800       | 35 × 50               | 0.15  | 3.98                                               | ELXS251VSN182MA50S |
|                          | 820         | 25.4 × 30             | 0.15  | 2.08                                               | ELXS181VSN821MQ30S | 315                      | 180         | 22 × 25               | 0.15  | 0.95                                               | ELXS3B1VSN181MP25S |
|                          | 820         | 25.4 × 35             | 0.15  | 2.17                                               | ELXS181VSN821MQ35S |                          | 220         | 22 × 30               | 0.15  | 1.10                                               | ELXS3B1VSN221MP30S |
|                          | 820         | 30 × 25               | 0.15  | 2.26                                               | ELXS181VSN821MR25S |                          | 220         | 25.4 × 25             | 0.15  | 1.10                                               | ELXS3B1VSN221MQ25S |
|                          | 1,000       | 22 × 45               | 0.15  | 2.40                                               | ELXS181VSN102MP45S |                          | 270         | 22 × 35               | 0.15  | 1.24                                               | ELXS3B1VSN271MP35S |
|                          | 1,000       | 22 × 50               | 0.15  | 2.45                                               | ELXS181VSN102MP50S |                          | 270         | 25.4 × 30             | 0.15  | 1.25                                               | ELXS3B1VSN271MQ30S |
|                          | 1,000       | 25.4 × 40             | 0.15  | 2.45                                               | ELXS181VSN102MQ40S |                          | 330         | 22 × 40               | 0.15  | 1.40                                               | ELXS3B1VSN331MP40S |
|                          | 1,000       | 30 × 30               | 0.15  | 2.52                                               | ELXS181VSN102MR30S |                          | 330         | 30 × 25               | 0.15  | 1.43                                               | ELXS3B1VSN331MR25S |
|                          | 1,000       | 35 × 25               | 0.15  | 2.66                                               | ELXS181VSN102MA25S |                          | 390         | 22 × 45               | 0.15  | 1.56                                               | ELXS3B1VSN391MP45S |
|                          | 1,200       | 25.4 × 45             | 0.15  | 2.73                                               | ELXS181VSN122MQ45S |                          | 390         | 22 × 50               | 0.15  | 1.59                                               | ELXS3B1VSN391MP50S |
|                          | 1,200       | 30 × 35               | 0.15  | 2.83                                               | ELXS181VSN122MR35S |                          | 390         | 25.4 × 35             | 0.15  | 1.57                                               | ELXS3B1VSN391MQ35S |
|                          | 1,500       | 25.4 × 50             | 0.15  | 3.10                                               | ELXS181VSN152MQ50S |                          | 470         | 25.4 × 40             | 0.15  | 1.76                                               | ELXS3B1VSN471MQ40S |
|                          | 1,500       | 30 × 40               | 0.15  | 3.26                                               | ELXS181VSN152MR40S |                          | 470         | 25.4 × 45             | 0.15  | 1.79                                               | ELXS3B1VSN471MQ45S |
|                          | 1,500       | 35 × 30               | 0.15  | 3.31                                               | ELXS181VSN152MA30S |                          | 470         | 30 × 30               | 0.15  | 1.73                                               | ELXS3B1VSN471MR30S |
|                          | 1,800       | 30 × 45               | 0.15  | 3.66                                               | ELXS181VSN182MR45S |                          | 470         | 35 × 25               | 0.15  | 1.82                                               | ELXS3B1VSN471MA25S |
|                          | 1,800       | 35 × 35               | 0.15  | 3.68                                               | ELXS181VSN182MA35S |                          | 560         | 25.4 × 50             | 0.15  | 1.99                                               | ELXS3B1VSN561MQ50S |
|                          | 2,200       | 30 × 50               | 0.15  | 4.11                                               | ELXS181VSN222MR50S |                          | 560         | 30 × 35               | 0.15  | 1.93                                               | ELXS3B1VSN561MR35S |
|                          | 2,200       | 35 × 40               | 0.15  | 4.22                                               | ELXS181VSN222MA40S |                          | 560         | 35 × 30               | 0.15  | 2.02                                               | ELXS3B1VSN561MA30S |
|                          | 2,200       | 35 × 45               | 0.15  | 4.32                                               | ELXS181VSN222MA45S |                          | 680         | 30 × 40               | 0.15  | 2.19                                               | ELXS3B1VSN681MR40S |
|                          | 2,700       | 35 × 50               | 0.15  | 4.88                                               | ELXS181VSN272MA50S |                          | 680         | 30 × 45               | 0.15  | 2.25                                               | ELXS3B1VSN681MR45S |
| 200                      | 390         | 22 × 25               | 0.15  | 1.34                                               | ELXS201VSN391MP25S |                          | 680         | 35 × 35               | 0.15  | 2.26                                               | ELXS3B1VSN681MA35S |
|                          | 470         | 22 × 30               | 0.15  | 1.54                                               | ELXS201VSN471MP30S | 400                      | 820         | 30 × 50               | 0.15  | 2.51                                               | ELXS3B1VSN821MR50S |
|                          | 560         | 22 × 35               | 0.15  | 1.72                                               | ELXS201VSN561MP35S |                          | 820         | 35 × 40               | 0.15  | 2.57                                               | ELXS3B1VSN821MA40S |
|                          | 560         | 25.4 × 25             | 0.15  | 1.67                                               | ELXS201VSN561MQ25S |                          | 1,000       | 35 × 45               | 0.15  | 2.91                                               | ELXS3B1VSN102MA45S |
|                          | 680         | 22 × 40               | 0.15  | 1.94                                               | ELXS201VSN681MP40S |                          | 1,200       | 35 × 50               | 0.15  | 3.25                                               | ELXS3B1VSN122MA50S |
|                          | 680         | 25.4 × 30             | 0.15  | 1.89                                               | ELXS201VSN681MQ30S |                          | 120         | 22 × 25               | 0.15  | 0.77                                               | ELXS401VSN121MP25S |
|                          | 680         | 30 × 25               | 0.15  | 2.06                                               | ELXS201VSN681MR25S |                          | 150         | 22 × 30               | 0.15  | 0.90                                               | ELXS401VSN151MP30S |
|                          | 820         | 22 × 45               | 0.15  | 2.17                                               | ELXS201VSN821MP45S |                          | 180         | 22 × 35               | 0.15  | 1.02                                               | ELXS401VSN181MP35S |
|                          | 820         | 25.4 × 35             | 0.15  | 2.17                                               | ELXS201VSN821MQ35S |                          | 180         | 25.4 × 25             | 0.15  | 0.99                                               | ELXS401VSN181MQ25S |
|                          | 1,000       | 22 × 50               | 0.15  | 2.45                                               | ELXS201VSN102MP50S |                          | 220         | 22 × 40               | 0.15  | 1.15                                               | ELXS401VSN221MP40S |
|                          | 1,000       | 25.4 × 40             | 0.15  | 2.45                                               | ELXS201VSN102MQ40S |                          | 220         | 25.4 × 30             | 0.15  | 1.13                                               | ELXS401VSN221MQ30S |
|                          | 1,000       | 30 × 30               | 0.15  | 2.52                                               | ELXS201VSN102MR30S |                          | 220         | 30 × 25               | 0.15  | 1.17                                               | ELXS401VSN221MR25S |
|                          | 1,000       | 35 × 25               | 0.15  | 2.66                                               | ELXS201VSN102MA25S |                          | 270         | 22 × 45               | 0.15  | 1.29                                               | ELXS401VSN271MP45S |
|                          | 1,200       | 25.4 × 45             | 0.15  | 2.73                                               | ELXS201VSN122MQ45S |                          | 270         | 22 × 50               | 0.15  | 1.32                                               | ELXS401VSN271MP50S |
|                          | 1,200       | 25.4 × 50             | 0.15  | 2.78                                               | ELXS201VSN122MQ50S |                          | 270         | 25.4 × 35             | 0.15  | 1.30                                               | ELXS401VSN271MQ35S |
|                          | 1,200       | 30 × 35               | 0.15  | 2.83                                               | ELXS201VSN122MR35S |                          | 330         | 25.4 × 40             | 0.15  | 1.47                                               | ELXS401VSN331MQ40S |
|                          | 1,200       | 35 × 30               | 0.15  | 2.96                                               | ELXS201VSN122MA30S |                          | 330         | 30 × 30               | 0.15  | 1.45                                               | ELXS401VSN331MR30S |
|                          | 1,500       | 30 × 40               | 0.15  | 3.26                                               | ELXS201VSN152MR40S |                          | 330         | 35 × 25               | 0.15  | 1.52                                               | ELXS401VSN331MA25S |
|                          | 1,500       | 30 × 45               | 0.15  | 3.34                                               | ELXS201VSN152MR45S |                          | 390         | 25.4 × 45             | 0.15  | 1.63                                               | ELXS401VSN391MQ45S |



## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|
| 400                      | 390         | 25.4 × 50             | 0.15  | 1.66                                               | ELXS401VSN391MQ50S | 450                      | 220         | 30 × 30               | 0.20  | 1.18                                               | ELXS451VSN221MR30S |
|                          | 390         | 30 × 35               | 0.15  | 1.61                                               | ELXS401VSN391MR35S |                          | 220         | 35 × 25               | 0.20  | 1.24                                               | ELXS451VSN221MA25S |
|                          | 390         | 35 × 30               | 0.15  | 1.68                                               | ELXS401VSN391MA30S |                          | 270         | 25.4 × 45             | 0.20  | 1.36                                               | ELXS451VSN271MQ45S |
|                          | 470         | 30 × 40               | 0.15  | 1.82                                               | ELXS401VSN471MR40S |                          | 270         | 25.4 × 50             | 0.20  | 1.38                                               | ELXS451VSN271MQ50S |
|                          | 470         | 35 × 35               | 0.15  | 1.88                                               | ELXS401VSN471MA35S |                          | 270         | 30 × 35               | 0.20  | 1.34                                               | ELXS451VSN271MR35S |
|                          | 560         | 30 × 45               | 0.15  | 2.04                                               | ELXS401VSN561MR45S |                          | 270         | 35 × 30               | 0.20  | 1.40                                               | ELXS451VSN271MA30S |
|                          | 560         | 30 × 50               | 0.15  | 2.07                                               | ELXS401VSN561MR50S |                          | 330         | 30 × 40               | 0.20  | 1.52                                               | ELXS451VSN331MR40S |
|                          | 560         | 35 × 40               | 0.15  | 2.13                                               | ELXS401VSN561MA40S |                          | 390         | 30 × 45               | 0.20  | 1.70                                               | ELXS451VSN391MR45S |
|                          | 680         | 35 × 45               | 0.15  | 2.40                                               | ELXS401VSN681MA45S |                          | 390         | 30 × 50               | 0.20  | 1.73                                               | ELXS451VSN391MR50S |
|                          | 820         | 35 × 50               | 0.15  | 2.69                                               | ELXS401VSN821MA50S |                          | 390         | 35 × 35               | 0.20  | 1.71                                               | ELXS451VSN391MA35S |
| 420                      | 100         | 22 × 25               | 0.20  | 0.70                                               | ELXS421VSN101MP25S | 500                      | 470         | 35 × 40               | 0.20  | 1.95                                               | ELXS451VSN471MA40S |
|                          | 120         | 22 × 30               | 0.20  | 0.81                                               | ELXS421VSN121MP30S |                          | 470         | 35 × 45               | 0.20  | 1.99                                               | ELXS451VSN471MA45S |
|                          | 120         | 25.4 × 25             | 0.20  | 0.81                                               | ELXS421VSN121MQ25S |                          | 560         | 35 × 50               | 0.20  | 2.22                                               | ELXS451VSN561MA50S |
|                          | 150         | 22 × 35               | 0.20  | 0.93                                               | ELXS421VSN151MP35S |                          | 100         | 30 × 25               | 0.20  | 0.82                                               | ELXS501VSN101MR25S |
|                          | 180         | 22 × 40               | 0.20  | 1.04                                               | ELXS421VSN181MP40S |                          | 120         | 30 × 30               | 0.20  | 0.91                                               | ELXS501VSN121MR30S |
|                          | 180         | 25.4 × 30             | 0.20  | 1.02                                               | ELXS421VSN181MQ30S |                          | 120         | 35 × 25               | 0.20  | 0.88                                               | ELXS501VSN121MA25S |
|                          | 180         | 30 × 25               | 0.20  | 1.06                                               | ELXS421VSN181MR25S |                          | 150         | 30 × 35               | 0.20  | 1.04                                               | ELXS501VSN151MR35S |
|                          | 220         | 22 × 45               | 0.20  | 1.17                                               | ELXS421VSN221MP45S |                          | 180         | 30 × 40               | 0.20  | 1.17                                               | ELXS501VSN181MR40S |
|                          | 220         | 22 × 50               | 0.20  | 1.20                                               | ELXS421VSN221MP50S |                          | 180         | 35 × 30               | 0.20  | 1.10                                               | ELXS501VSN181MA30S |
|                          | 220         | 25.4 × 35             | 0.20  | 1.18                                               | ELXS421VSN221MQ35S |                          | 220         | 30 × 45               | 0.20  | 1.33                                               | ELXS501VSN221MR45S |
|                          | 270         | 25.4 × 40             | 0.20  | 1.33                                               | ELXS421VSN271MQ40S | 550                      | 220         | 35 × 35               | 0.20  | 1.23                                               | ELXS501VSN221MA35S |
|                          | 270         | 25.4 × 45             | 0.20  | 1.36                                               | ELXS421VSN271MQ45S |                          | 270         | 30 × 50               | 0.20  | 1.50                                               | ELXS501VSN271MR50S |
|                          | 270         | 30 × 30               | 0.20  | 1.31                                               | ELXS421VSN271MR30S |                          | 270         | 35 × 40               | 0.20  | 1.42                                               | ELXS501VSN271MA40S |
|                          | 270         | 35 × 25               | 0.20  | 1.38                                               | ELXS421VSN271MA25S |                          | 330         | 35 × 45               | 0.20  | 1.60                                               | ELXS501VSN331MA45S |
|                          | 330         | 25.4 × 50             | 0.20  | 1.52                                               | ELXS421VSN331MQ50S |                          | 390         | 35 × 50               | 0.20  | 1.78                                               | ELXS501VSN391MA50S |
|                          | 330         | 30 × 35               | 0.20  | 1.48                                               | ELXS421VSN331MR35S |                          | 470         | 35 × 60               | 0.20  | 2.03                                               | ELXS501VSN471MA60S |
|                          | 330         | 35 × 30               | 0.20  | 1.55                                               | ELXS421VSN331MA30S |                          | 120         | 30 × 30               | 0.20  | 0.91                                               | ELXS551VSN121MR30S |
|                          | 390         | 30 × 40               | 0.20  | 1.66                                               | ELXS421VSN391MR40S |                          | 150         | 30 × 35               | 0.20  | 1.04                                               | ELXS551VSN151MR35S |
|                          | 390         | 30 × 45               | 0.20  | 1.70                                               | ELXS421VSN391MR45S |                          | 180         | 30 × 40               | 0.20  | 1.17                                               | ELXS551VSN181MR40S |
|                          | 390         | 35 × 35               | 0.20  | 1.71                                               | ELXS421VSN391MA35S |                          | 180         | 35 × 30               | 0.20  | 1.10                                               | ELXS551VSN181MA30S |
| 450                      | 470         | 30 × 50               | 0.20  | 1.90                                               | ELXS421VSN471MR50S |                          | 220         | 30 × 50               | 0.20  | 1.35                                               | ELXS551VSN221MR50S |
|                          | 470         | 35 × 40               | 0.20  | 1.95                                               | ELXS421VSN471MA40S |                          | 220         | 35 × 40               | 0.20  | 1.28                                               | ELXS551VSN221MA40S |
|                          | 560         | 35 × 45               | 0.20  | 2.17                                               | ELXS421VSN561MA45S |                          | 270         | 35 × 45               | 0.20  | 1.45                                               | ELXS551VSN271MA45S |
|                          | 680         | 35 × 50               | 0.20  | 2.45                                               | ELXS421VSN681MA50S |                          | 330         | 35 × 50               | 0.20  | 1.64                                               | ELXS551VSN331MA50S |
|                          | 82          | 22 × 25               | 0.20  | 0.64                                               | ELXS451VSN820MP25S | 600                      | 390         | 35 × 60               | 0.20  | 1.85                                               | ELXS551VSN391MA60S |
|                          | 120         | 22 × 30               | 0.20  | 0.81                                               | ELXS451VSN121MP30S |                          | 120         | 30 × 40               | 0.20  | 0.96                                               | ELXS601VSN121MR40S |
|                          | 120         | 22 × 35               | 0.20  | 0.83                                               | ELXS451VSN121MP35S |                          | 120         | 35 × 30               | 0.20  | 0.95                                               | ELXS601VSN121MA30S |
|                          | 120         | 25.4 × 25             | 0.20  | 0.81                                               | ELXS451VSN121MQ25S |                          | 150         | 30 × 45               | 0.20  | 1.10                                               | ELXS601VSN151MR45S |
|                          | 150         | 22 × 40               | 0.20  | 0.94                                               | ELXS451VSN151MP40S |                          | 150         | 35 × 35               | 0.20  | 1.07                                               | ELXS601VSN151MA35S |
|                          | 150         | 25.4 × 30             | 0.20  | 0.93                                               | ELXS451VSN151MQ30S |                          | 180         | 30 × 50               | 0.20  | 1.22                                               | ELXS601VSN181MR50S |
|                          | 180         | 22 × 45               | 0.20  | 1.06                                               | ELXS451VSN181MP45S |                          | 180         | 35 × 40               | 0.20  | 1.22                                               | ELXS601VSN181MA40S |
|                          | 180         | 25.4 × 35             | 0.20  | 1.06                                               | ELXS451VSN181MQ35S |                          | 220         | 30 × 60               | 0.20  | 1.40                                               | ELXS601VSN221MR60S |
|                          | 180         | 30 × 25               | 0.20  | 1.06                                               | ELXS451VSN181MR25S |                          | 220         | 35 × 45               | 0.20  | 1.38                                               | ELXS601VSN221MA45S |
|                          | 220         | 22 × 50               | 0.20  | 1.20                                               | ELXS451VSN221MP50S |                          | 270         | 35 × 50               | 0.20  | 1.56                                               | ELXS601VSN271MA50S |
|                          | 220         | 25.4 × 40             | 0.20  | 1.20                                               | ELXS451VSN221MQ40S |                          | 330         | 35 × 60               | 0.20  | 1.79                                               | ELXS601VSN331MA60S |

## ◆RATED RIPPLE CURRENT MULTIPLIERS

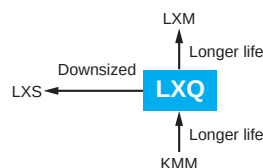
## ●Frequency Multipliers

| Frequency(Hz)             | 50   | 120  | 300  | 1k   | 10k  | 50k  |
|---------------------------|------|------|------|------|------|------|
| 160 to 250V <sub>dc</sub> | 0.81 | 1.00 | 1.17 | 1.32 | 1.45 | 1.50 |
| 315 to 450V <sub>dc</sub> | 0.77 | 1.00 | 1.16 | 1.30 | 1.41 | 1.43 |
| 500 to 600V <sub>dc</sub> | 0.70 | 1.00 | 1.16 | 1.30 | 1.41 | 1.43 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

# LXQ Series

- Endurance with ripple current : 5,000 hours at 105°C
- Downsized and higher ripple version of LXG series
- Non solvent resistant type
- RoHS2 Compliant

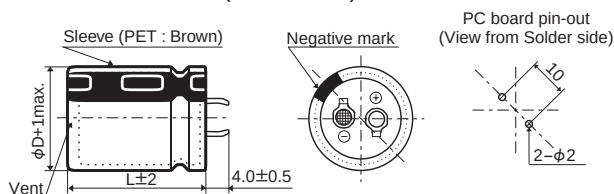


## SPECIFICATIONS

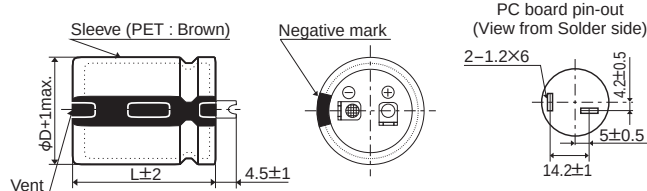
| Items                                                  | Characteristics                                                                                                                                                                                                                                                                       |                                      |            |                 |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------------|-----------------|
| Category                                               | -25 to +105℃                                                                                                                                                                                                                                                                          |                                      |            |                 |
| Temperature Range                                      |                                                                                                                                                                                                                                                                                       |                                      |            |                 |
| Rated Voltage Range                                    | 160 to 450V <sub>dc</sub>                                                                                                                                                                                                                                                             |                                      |            |                 |
| Capacitance Tolerance                                  | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                             |                                      |            |                 |
| Leakage Current                                        | I ≤ 3√CV<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 5 minutes)                                                                                                                                                        |                                      |            |                 |
| Dissipation Factor (tan δ )                            | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 160 to 400V                          | 420 & 450V | (at 20℃, 120Hz) |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.15                                 | 0.20       |                 |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 160 to 400V                          | 420 & 450V | (at 120Hz)      |
|                                                        | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 4                                    | 8          |                 |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 5,000 hours at 105℃.                                         |                                      |            |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±20% of the initial value          |            |                 |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤200% of the initial specified value |            |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value        |            |                 |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                      |            |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±15% of the initial value          |            |                 |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤150% of the initial specified value |            |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value        |            |                 |

## DIMENSIONS [mm]

- Terminal Code : VS (φ22 to φ35) : Standard

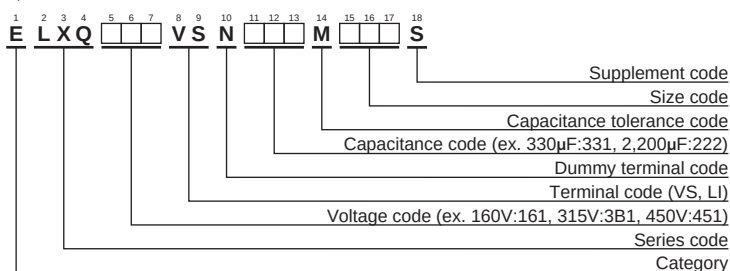


- Terminal Code : LI (φ30, φ35)



The standard design has no plastic disc.

## PART NUMBERING SYSTEM



Please refer to "Product code guide (snap-in type)"



LXQ Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|
| 160                      | 390         | 22 × 25               | 0.15  | 1.32                                               | ELXQ161VSN391MP25S | 200                      | 1,200       | 30 × 50               | 0.15  | 2.88                                               | ELXQ201VSN122MR50S |
|                          | 560         | 22 × 30               | 0.15  | 1.66                                               | ELXQ161VSN561MP30S |                          | 1,200       | 35 × 35               | 0.15  | 2.88                                               | ELXQ201VSN122MA35S |
|                          | 560         | 25.4 × 25             | 0.15  | 1.68                                               | ELXQ161VSN561MQ25S |                          | 1,500       | 35 × 40               | 0.15  | 3.34                                               | ELXQ201VSN152MA40S |
|                          | 680         | 22 × 35               | 0.15  | 1.87                                               | ELXQ161VSN681MP35S |                          | 1,800       | 35 × 45               | 0.15  | 3.74                                               | ELXQ201VSN182MA45S |
|                          | 680         | 25.4 × 30             | 0.15  | 1.88                                               | ELXQ161VSN681MQ30S |                          | 1,800       | 35 × 50               | 0.15  | 3.82                                               | ELXQ201VSN182MA50S |
|                          | 680         | 30 × 25               | 0.15  | 1.96                                               | ELXQ161VSN681MR25S | 220                      | 270         | 22 × 25               | 0.15  | 1.10                                               | ELXQ221VSN271MP25S |
|                          | 820         | 22 × 40               | 0.15  | 2.09                                               | ELXQ161VSN821MP40S |                          | 330         | 22 × 30               | 0.15  | 1.19                                               | ELXQ221VSN331MP30S |
|                          | 1,000       | 22 × 45               | 0.15  | 2.36                                               | ELXQ161VSN102MP45S |                          | 390         | 25.4 × 25             | 0.15  | 1.39                                               | ELXQ221VSN391MQ25S |
|                          | 1,000       | 22 × 50               | 0.15  | 2.41                                               | ELXQ161VSN102MP50S |                          | 470         | 22 × 35               | 0.15  | 1.55                                               | ELXQ221VSN471MP35S |
|                          | 1,000       | 25.4 × 35             | 0.15  | 2.38                                               | ELXQ161VSN102MQ35S |                          | 470         | 25.4 × 30             | 0.15  | 1.56                                               | ELXQ221VSN471MQ30S |
|                          | 1,000       | 30 × 30               | 0.15  | 2.40                                               | ELXQ161VSN102MR30S |                          | 470         | 30 × 25               | 0.15  | 1.63                                               | ELXQ221VSN471MR25S |
|                          | 1,000       | 35 × 25               | 0.15  | 2.55                                               | ELXQ161VSN102MA25S |                          | 560         | 22 × 40               | 0.15  | 1.73                                               | ELXQ221VSN561MP40S |
|                          | 1,200       | 25.4 × 40             | 0.15  | 2.66                                               | ELXQ161VSN122MQ40S |                          | 560         | 30 × 30               | 0.15  | 1.79                                               | ELXQ221VSN561MR30S |
|                          | 1,200       | 25.4 × 45             | 0.15  | 2.71                                               | ELXQ161VSN122MQ45S |                          | 680         | 22 × 45               | 0.15  | 1.94                                               | ELXQ221VSN681MP45S |
|                          | 1,200       | 30 × 35               | 0.15  | 2.69                                               | ELXQ161VSN122MR35S |                          | 680         | 22 × 50               | 0.15  | 1.99                                               | ELXQ221VSN681MR50S |
|                          | 1,200       | 30 × 40               | 0.15  | 2.77                                               | ELXQ161VSN122MR40S |                          | 680         | 25.4 × 35             | 0.15  | 1.96                                               | ELXQ221VSN681MQ35S |
|                          | 1,200       | 35 × 30               | 0.15  | 2.86                                               | ELXQ161VSN122MA30S |                          | 680         | 30 × 35               | 0.15  | 2.02                                               | ELXQ221VSN681MR35S |
|                          | 1,500       | 25.4 × 50             | 0.15  | 3.08                                               | ELXQ161VSN152MQ50S |                          | 680         | 35 × 25               | 0.15  | 2.10                                               | ELXQ221VSN681MA25S |
|                          | 1,500       | 30 × 45               | 0.15  | 3.17                                               | ELXQ161VSN152MR45S |                          | 820         | 25.4 × 40             | 0.15  | 2.20                                               | ELXQ221VSN821MQ40S |
|                          | 1,500       | 35 × 35               | 0.15  | 3.22                                               | ELXQ161VSN152MA35S |                          | 820         | 25.4 × 45             | 0.15  | 2.24                                               | ELXQ221VSN821MQ45S |
|                          | 1,800       | 30 × 50               | 0.15  | 3.53                                               | ELXQ161VSN182MR50S |                          | 820         | 30 × 40               | 0.15  | 2.29                                               | ELXQ221VSN821MR40S |
|                          | 1,800       | 35 × 40               | 0.15  | 3.66                                               | ELXQ161VSN182MA40S |                          | 820         | 35 × 30               | 0.15  | 2.36                                               | ELXQ221VSN821MA30S |
|                          | 2,200       | 35 × 45               | 0.15  | 4.14                                               | ELXQ161VSN222MA45S |                          | 1,000       | 25.4 × 50             | 0.15  | 2.51                                               | ELXQ221VSN102MQ50S |
|                          | 2,700       | 35 × 50               | 0.15  | 4.68                                               | ELXQ161VSN272MA50S |                          | 1,000       | 30 × 45               | 0.15  | 2.59                                               | ELXQ221VSN102MR45S |
| 180                      | 330         | 22 × 25               | 0.15  | 1.21                                               | ELXQ181VSN331MP25S |                          | 1,000       | 35 × 35               | 0.15  | 2.63                                               | ELXQ221VSN102MA35S |
|                          | 470         | 22 × 30               | 0.15  | 1.52                                               | ELXQ181VSN471MP30S | 250                      | 1,200       | 30 × 50               | 0.15  | 2.88                                               | ELXQ221VSN122MR50S |
|                          | 470         | 25.4 × 25             | 0.15  | 1.52                                               | ELXQ181VSN471MQ25S |                          | 1,200       | 35 × 40               | 0.15  | 2.98                                               | ELXQ221VSN122MA40S |
|                          | 560         | 22 × 35               | 0.15  | 1.70                                               | ELXQ181VSN561MP35S |                          | 1,500       | 35 × 45               | 0.15  | 3.41                                               | ELXQ221VSN152MA45S |
|                          | 560         | 30 × 25               | 0.15  | 1.78                                               | ELXQ181VSN561MR25S |                          | 1,800       | 35 × 50               | 0.15  | 3.82                                               | ELXQ221VSN182MA50S |
|                          | 680         | 22 × 40               | 0.15  | 1.91                                               | ELXQ181VSN681MP40S |                          | 220         | 22 × 25               | 0.15  | 1.01                                               | ELXQ251VSN221MP25S |
|                          | 680         | 25.4 × 30             | 0.15  | 1.88                                               | ELXQ181VSN681MQ30S |                          | 270         | 22 × 30               | 0.15  | 1.20                                               | ELXQ251VSN271MP30S |
|                          | 820         | 22 × 45               | 0.15  | 1.99                                               | ELXQ181VSN821MP45S |                          | 330         | 25.4 × 25             | 0.15  | 1.32                                               | ELXQ251VSN331MQ25S |
|                          | 820         | 25.4 × 35             | 0.15  | 2.16                                               | ELXQ181VSN821MQ35S |                          | 390         | 22 × 35               | 0.15  | 1.44                                               | ELXQ251VSN391MP35S |
|                          | 820         | 30 × 30               | 0.15  | 2.17                                               | ELXQ181VSN821MR30S |                          | 390         | 25.4 × 30             | 0.15  | 1.43                                               | ELXQ251VSN391MQ30S |
|                          | 820         | 35 × 25               | 0.15  | 2.31                                               | ELXQ181VSN821MA25S |                          | 390         | 30 × 25               | 0.15  | 1.51                                               | ELXQ251VSN391MR25S |
|                          | 1,000       | 22 × 50               | 0.15  | 2.25                                               | ELXQ181VSN102MP50S |                          | 470         | 22 × 40               | 0.15  | 1.62                                               | ELXQ251VSN471MP40S |
|                          | 1,000       | 25.4 × 40             | 0.15  | 2.43                                               | ELXQ181VSN102MQ40S |                          | 560         | 22 × 45               | 0.15  | 1.80                                               | ELXQ251VSN561MP45S |
|                          | 1,000       | 25.4 × 45             | 0.15  | 2.47                                               | ELXQ181VSN102MQ45S |                          | 560         | 22 × 50               | 0.15  | 1.84                                               | ELXQ251VSN561MP50S |
|                          | 1,000       | 30 × 35               | 0.15  | 2.46                                               | ELXQ181VSN102MR35S |                          | 560         | 25.4 × 35             | 0.15  | 1.78                                               | ELXQ251VSN561MQ35S |
|                          | 1,200       | 25.4 × 50             | 0.15  | 2.75                                               | ELXQ181VSN122MQ50S |                          | 560         | 30 × 30               | 0.15  | 1.83                                               | ELXQ251VSN561MR30S |
|                          | 1,200       | 30 × 40               | 0.15  | 2.77                                               | ELXQ181VSN122MR40S |                          | 560         | 35 × 25               | 0.15  | 1.91                                               | ELXQ251VSN561MA25S |
|                          | 1,200       | 35 × 30               | 0.15  | 2.86                                               | ELXQ181VSN122MA30S |                          | 680         | 25.4 × 40             | 0.15  | 2.00                                               | ELXQ251VSN681MQ40S |
|                          | 1,500       | 30 × 45               | 0.15  | 3.17                                               | ELXQ181VSN152MR45S |                          | 680         | 25.4 × 45             | 0.15  | 2.04                                               | ELXQ251VSN681MQ45S |
|                          | 1,500       | 30 × 50               | 0.15  | 3.22                                               | ELXQ181VSN152MR50S |                          | 680         | 30 × 35               | 0.15  | 2.06                                               | ELXQ251VSN681MR35S |
|                          | 1,500       | 35 × 35               | 0.15  | 3.22                                               | ELXQ181VSN152MA35S |                          | 680         | 35 × 30               | 0.15  | 2.15                                               | ELXQ251VSN681MA30S |
|                          | 1,800       | 35 × 40               | 0.15  | 3.66                                               | ELXQ181VSN182MA40S |                          | 820         | 25.4 × 50             | 0.15  | 2.28                                               | ELXQ251VSN821MQ50S |
|                          | 1,800       | 35 × 45               | 0.15  | 3.74                                               | ELXQ181VSN182MA45S |                          | 820         | 30 × 40               | 0.15  | 2.33                                               | ELXQ251VSN821MR40S |
|                          | 2,200       | 35 × 50               | 0.15  | 4.22                                               | ELXQ181VSN222MA50S |                          | 820         | 30 × 45               | 0.15  | 2.39                                               | ELXQ251VSN821MR45S |
| 200                      | 270         | 22 × 25               | 0.15  | 1.10                                               | ELXQ201VSN271MP25S |                          | 820         | 35 × 35               | 0.15  | 2.38                                               | ELXQ251VSN821MA35S |
|                          | 390         | 22 × 30               | 0.15  | 1.38                                               | ELXQ201VSN391MP30S | 315                      | 1,000       | 30 × 50               | 0.15  | 2.68                                               | ELXQ251VSN102MR50S |
|                          | 390         | 25.4 × 25             | 0.15  | 1.39                                               | ELXQ201VSN391MQ25S |                          | 1,000       | 35 × 40               | 0.15  | 2.72                                               | ELXQ251VSN102MA40S |
|                          | 470         | 22 × 35               | 0.15  | 1.55                                               | ELXQ201VSN471MP35S |                          | 1,200       | 35 × 45               | 0.15  | 3.05                                               | ELXQ251VSN122MA45S |
|                          | 560         | 22 × 40               | 0.15  | 1.73                                               | ELXQ201VSN561MP40S |                          | 1,500       | 35 × 50               | 0.15  | 3.49                                               | ELXQ251VSN152MA50S |
|                          | 560         | 25.4 × 30             | 0.15  | 1.71                                               | ELXQ201VSN561MQ30S |                          | 150         | 22 × 25               | 0.15  | 0.80                                               | ELXQ3B1VSN151MP25S |
|                          | 560         | 30 × 25               | 0.15  | 1.78                                               | ELXQ201VSN561MR25S |                          | 180         | 22 × 30               | 0.15  | 0.92                                               | ELXQ3B1VSN181MP30S |
|                          | 680         | 22 × 45               | 0.15  | 1.81                                               | ELXQ201VSN681MP45S |                          | 180         | 25.4 × 25             | 0.15  | 0.94                                               | ELXQ3B1VSN181MQ25S |
|                          | 680         | 25.4 × 35             | 0.15  | 1.87                                               | ELXQ201VSN681MQ35S |                          | 220         | 22 × 35               | 0.15  | 1.04                                               | ELXQ3B1VSN221MP35S |
|                          | 680         | 30 × 30               | 0.15  | 1.98                                               | ELXQ201VSN681MR30S |                          | 220         | 30 × 25               | 0.15  | 1.17                                               | ELXQ3B1VSN221MR25S |
|                          | 680         | 35 × 25               | 0.15  | 2.10                                               | ELXQ201VSN681MA25S |                          | 270         | 22 × 40               | 0.15  | 1.18                                               | ELXQ3B1VSN271MP40S |
|                          | 820         | 22 × 50               | 0.15  | 2.18                                               | ELXQ201VSN821MP50S |                          | 270         | 25.4 × 30             | 0.15  | 1.19                                               | ELXQ3B1VSN271MQ30S |
|                          | 820         | 25.4 × 40             | 0.15  | 2.09                                               | ELXQ201VSN821MQ40S |                          | 330         | 22 × 45               | 0.15  | 1.33                                               | ELXQ3B1VSN331MP45S |
|                          | 820         | 30 × 35               | 0.15  | 2.22                                               | ELXQ201VSN821MR35S |                          | 330         | 25.4 × 35             | 0.15  | 1.37                                               | ELXQ3B1VSN331MQ35S |
|                          | 1,000       | 25.4 × 45             | 0.15  | 2.35                                               | ELXQ201VSN102MQ45S |                          | 330         | 30 × 30               | 0.15  | 1.40                                               | ELXQ3B1VSN331MR30S |
|                          | 1,000       | 25.4 × 50             | 0.15  | 2.39                                               | ELXQ201VSN102MQ50S |                          | 330         | 35 × 25               | 0.15  | 1.49                                               | ELXQ3B1VSN331MA25S |
|                          | 1,000       | 30 × 40               | 0.15  | 2.53                                               | ELXQ201VSN102MR40S |                          | 390         | 22 × 50               | 0.15  | 1.48                                               | ELXQ3B1VSN391MP50S |
|                          | 1,000       | 35 × 30               | 0.15  | 2.61                                               | ELXQ201VSN102MA30S |                          | 390         | 25.4 × 40             | 0.15  | 1.52                                               | ELXQ3B1VSN391MQ40S |
|                          | 1,200       | 30 × 45               | 0.15  | 2.84                                               | ELXQ201VSN122MR45S |                          | 470         | 25.4 × 45             | 0.15  | 1.70                                               | ELXQ3B1VSN471MQ45S |





## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|
| 315                      | 470         | 30 × 35               | 0.15  | 1.71                                               | ELXQ3B1VSN471MR35S | 400                      | 470         | 30 × 45               | 0.15  | 1.81                                               | ELXQ401VSN471MR45S |
|                          | 470         | 35 × 30               | 0.15  | 1.82                                               | ELXQ3B1VSN471MA30S |                          | 470         | 30 × 50               | 0.15  | 1.84                                               | ELXQ401VSN471MR50S |
|                          | 560         | 25.4 × 50             | 0.15  | 1.88                                               | ELXQ3B1VSN561MQ50S |                          | 470         | 35 × 40               | 0.15  | 1.90                                               | ELXQ401VSN471MA40S |
|                          | 560         | 30 × 40               | 0.15  | 1.92                                               | ELXQ3B1VSN561MR40S |                          | 560         | 35 × 45               | 0.15  | 2.12                                               | ELXQ401VSN561MA45S |
|                          | 560         | 30 × 45               | 0.15  | 1.97                                               | ELXQ3B1VSN561MR45S |                          | 680         | 35 × 50               | 0.15  | 2.39                                               | ELXQ401VSN681MA50S |
|                          | 560         | 35 × 35               | 0.15  | 2.00                                               | ELXQ3B1VSN561MA35S | 420                      | 100         | 22 × 25               | 0.20  | 0.66                                               | ELXQ421VSN101MP25S |
|                          | 680         | 30 × 50               | 0.15  | 2.21                                               | ELXQ3B1VSN681MR50S |                          | 120         | 22 × 30               | 0.20  | 0.75                                               | ELXQ421VSN121MP30S |
|                          | 680         | 35 × 40               | 0.15  | 2.29                                               | ELXQ3B1VSN681MA40S |                          | 120         | 25.4 × 25             | 0.20  | 0.77                                               | ELXQ421VSN121MQ25S |
|                          | 820         | 35 × 45               | 0.15  | 2.57                                               | ELXQ3B1VSN821MA45S |                          | 150         | 22 × 35               | 0.20  | 0.86                                               | ELXQ421VSN151MP35S |
|                          | 1,000       | 35 × 50               | 0.15  | 2.89                                               | ELXQ3B1VSN102MA50S |                          | 180         | 22 × 40               | 0.20  | 0.96                                               | ELXQ421VSN181MP40S |
| 350                      | 120         | 22 × 25               | 0.15  | 0.72                                               | ELXQ351VSN121MP25S |                          | 180         | 22 × 45               | 0.20  | 0.98                                               | ELXQ421VSN181MP45S |
|                          | 150         | 22 × 30               | 0.15  | 0.84                                               | ELXQ351VSN151MP30S |                          | 180         | 25.4 × 30             | 0.20  | 0.97                                               | ELXQ421VSN181MQ30S |
|                          | 180         | 25.4 × 25             | 0.15  | 0.94                                               | ELXQ351VSN181MQ25S |                          | 180         | 25.4 × 35             | 0.20  | 1.01                                               | ELXQ421VSN181MQ35S |
|                          | 220         | 22 × 35               | 0.15  | 1.04                                               | ELXQ351VSN221MP35S |                          | 180         | 30 × 25               | 0.20  | 1.02                                               | ELXQ421VSN181MR25S |
|                          | 220         | 22 × 40               | 0.15  | 1.06                                               | ELXQ351VSN221MP40S |                          | 220         | 22 × 50               | 0.20  | 1.11                                               | ELXQ421VSN221MP50S |
|                          | 220         | 25.4 × 30             | 0.15  | 1.07                                               | ELXQ351VSN221MQ30S |                          | 220         | 25.4 × 40             | 0.20  | 1.14                                               | ELXQ421VSN221MQ40S |
|                          | 220         | 30 × 25               | 0.15  | 1.13                                               | ELXQ351VSN221MR25S |                          | 220         | 30 × 30               | 0.20  | 1.14                                               | ELXQ421VSN221MR30S |
|                          | 270         | 22 × 45               | 0.15  | 1.20                                               | ELXQ351VSN271MP45S |                          | 220         | 35 × 25               | 0.20  | 1.22                                               | ELXQ421VSN221MA25S |
|                          | 270         | 25.4 × 35             | 0.15  | 1.24                                               | ELXQ351VSN271MQ35S |                          | 270         | 25.4 × 45             | 0.20  | 1.29                                               | ELXQ421VSN271MQ45S |
|                          | 270         | 30 × 30               | 0.15  | 1.27                                               | ELXQ351VSN271MR30S |                          | 270         | 30 × 35               | 0.20  | 1.30                                               | ELXQ421VSN271MR35S |
|                          | 270         | 35 × 25               | 0.15  | 1.35                                               | ELXQ351VSN271MA25S |                          | 270         | 35 × 30               | 0.20  | 1.38                                               | ELXQ421VSN271MA30S |
|                          | 330         | 22 × 50               | 0.15  | 1.36                                               | ELXQ351VSN331MP50S |                          | 330         | 25.4 × 50             | 0.20  | 1.44                                               | ELXQ421VSN331MQ50S |
|                          | 330         | 25.4 × 40             | 0.15  | 1.39                                               | ELXQ351VSN331MQ40S |                          | 330         | 30 × 40               | 0.20  | 1.48                                               | ELXQ421VSN331MP40S |
|                          | 330         | 30 × 35               | 0.15  | 1.43                                               | ELXQ351VSN331MR35S |                          | 330         | 35 × 35               | 0.20  | 1.54                                               | ELXQ421VSN331MA35S |
|                          | 390         | 25.4 × 45             | 0.15  | 1.55                                               | ELXQ351VSN391MQ45S |                          | 390         | 30 × 45               | 0.20  | 1.64                                               | ELXQ421VSN391MR45S |
|                          | 390         | 30 × 40               | 0.15  | 1.60                                               | ELXQ351VSN391MR40S |                          | 390         | 35 × 40               | 0.20  | 1.73                                               | ELXQ421VSN391MA40S |
|                          | 390         | 35 × 30               | 0.15  | 1.66                                               | ELXQ351VSN391MA30S |                          | 470         | 30 × 50               | 0.20  | 1.84                                               | ELXQ421VSN471MQ50S |
|                          | 470         | 25.4 × 50             | 0.15  | 1.72                                               | ELXQ351VSN471MQ50S |                          | 470         | 35 × 45               | 0.20  | 1.94                                               | ELXQ421VSN471MA45S |
|                          | 470         | 30 × 45               | 0.15  | 1.81                                               | ELXQ351VSN471MR45S | 450                      | 560         | 35 × 50               | 0.20  | 2.17                                               | ELXQ421VSN561MA50S |
| 350                      | 470         | 35 × 35               | 0.15  | 1.83                                               | ELXQ351VSN471MA35S |                          | 82          | 22 × 25               | 0.20  | 0.59                                               | ELXQ451VSN820MP25S |
|                          | 560         | 30 × 50               | 0.15  | 2.00                                               | ELXQ351VSN561MR50S |                          | 100         | 22 × 30               | 0.20  | 0.69                                               | ELXQ451VSN101MP30S |
|                          | 560         | 35 × 40               | 0.15  | 2.07                                               | ELXQ351VSN561MA40S |                          | 100         | 25.4 × 25             | 0.20  | 0.70                                               | ELXQ451VSN101MQ25S |
|                          | 680         | 35 × 45               | 0.15  | 2.34                                               | ELXQ351VSN681MA45S |                          | 120         | 22 × 35               | 0.20  | 0.77                                               | ELXQ451VSN121MP35S |
|                          | 820         | 35 × 50               | 0.15  | 2.62                                               | ELXQ351VSN821MA50S |                          | 150         | 22 × 40               | 0.20  | 0.88                                               | ELXQ451VSN151MP40S |
| 400                      | 100         | 22 × 25               | 0.15  | 0.66                                               | ELXQ401VSN101MP25S |                          | 150         | 22 × 45               | 0.20  | 0.90                                               | ELXQ451VSN151MP45S |
|                          | 120         | 22 × 30               | 0.15  | 0.75                                               | ELXQ401VSN121MP30S |                          | 150         | 25.4 × 30             | 0.20  | 0.88                                               | ELXQ451VSN151MQ30S |
|                          | 150         | 22 × 35               | 0.15  | 0.86                                               | ELXQ401VSN151MP35S |                          | 150         | 25.4 × 35             | 0.20  | 0.92                                               | ELXQ451VSN151MQ35S |
|                          | 150         | 25.4 × 25             | 0.15  | 0.86                                               | ELXQ401VSN151MQ25S |                          | 150         | 30 × 25               | 0.20  | 0.93                                               | ELXQ451VSN151MR25S |
|                          | 180         | 22 × 40               | 0.15  | 0.96                                               | ELXQ401VSN181MP40S |                          | 180         | 22 × 50               | 0.20  | 1.01                                               | ELXQ451VSN181MP50S |
|                          | 180         | 25.4 × 30             | 0.15  | 0.97                                               | ELXQ401VSN181MQ30S |                          | 180         | 25.4 × 40             | 0.20  | 1.03                                               | ELXQ451VSN181MQ40S |
|                          | 180         | 30 × 25               | 0.15  | 1.02                                               | ELXQ401VSN181MR25S |                          | 180         | 30 × 30               | 0.20  | 1.03                                               | ELXQ451VSN181MR30S |
|                          | 220         | 22 × 45               | 0.15  | 1.09                                               | ELXQ401VSN221MP45S |                          | 180         | 35 × 25               | 0.20  | 1.10                                               | ELXQ451VSN181MA25S |
|                          | 220         | 25.4 × 35             | 0.15  | 1.12                                               | ELXQ401VSN221MQ35S |                          | 220         | 25.4 × 45             | 0.20  | 1.16                                               | ELXQ451VSN221MQ45S |
|                          | 220         | 35 × 25               | 0.15  | 1.22                                               | ELXQ401VSN221MA25S |                          | 220         | 30 × 35               | 0.20  | 1.17                                               | ELXQ451VSN221MR35S |
|                          | 270         | 22 × 50               | 0.15  | 1.23                                               | ELXQ401VSN271MP50S |                          | 220         | 35 × 30               | 0.20  | 1.24                                               | ELXQ451VSN221MA30S |
|                          | 270         | 25.4 × 40             | 0.15  | 1.26                                               | ELXQ401VSN271MQ40S |                          | 270         | 25.4 × 50             | 0.20  | 1.31                                               | ELXQ451VSN271MQ50S |
|                          | 270         | 25.4 × 45             | 0.15  | 1.29                                               | ELXQ401VSN271MQ45S |                          | 270         | 30 × 40               | 0.20  | 1.33                                               | ELXQ451VSN271MR40S |
|                          | 270         | 30 × 30               | 0.15  | 1.27                                               | ELXQ401VSN271MR30S |                          | 270         | 35 × 35               | 0.20  | 1.39                                               | ELXQ451VSN271MA35S |
|                          | 330         | 25.4 × 50             | 0.15  | 1.44                                               | ELXQ401VSN331MQ50S |                          | 330         | 30 × 45               | 0.20  | 1.51                                               | ELXQ451VSN331MR45S |
|                          | 330         | 30 × 35               | 0.15  | 1.43                                               | ELXQ401VSN331MR35S |                          | 390         | 30 × 50               | 0.20  | 1.67                                               | ELXQ451VSN391MR50S |
|                          | 330         | 35 × 30               | 0.15  | 1.52                                               | ELXQ401VSN331MA30S |                          | 390         | 35 × 40               | 0.20  | 1.73                                               | ELXQ451VSN391MA40S |
|                          | 390         | 30 × 40               | 0.15  | 1.60                                               | ELXQ401VSN391MR40S |                          | 390         | 35 × 45               | 0.20  | 1.77                                               | ELXQ451VSN391MA45S |
|                          | 390         | 35 × 35               | 0.15  | 1.67                                               | ELXQ401VSN391MA35S |                          | 470         | 35 × 50               | 0.20  | 1.98                                               | ELXQ451VSN471MA50S |

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

| Frequency(Hz)             | 50   | 120  | 300  | 1k   | 10k  | 50k  |
|---------------------------|------|------|------|------|------|------|
| 160 to 250V <sub>dc</sub> | 0.81 | 1.00 | 1.17 | 1.32 | 1.45 | 1.50 |
| 315 to 450V <sub>dc</sub> | 0.77 | 1.00 | 1.16 | 1.30 | 1.41 | 1.43 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.



## LXG Series

- Endurance with ripple current : 5,000 hours at 105°C
- Non solvent resistant type
- RoHS2 Compliant

LXG

Longer life

KMQ



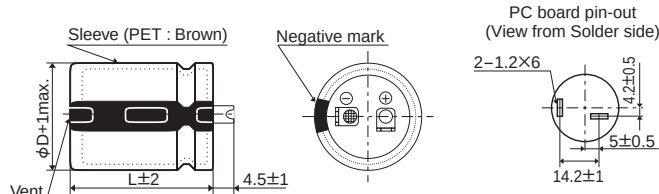
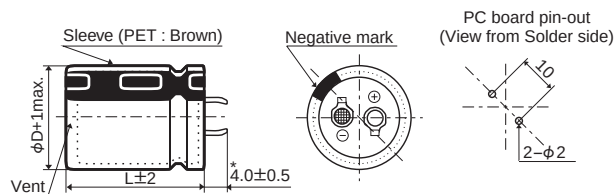
### SPECIFICATIONS

| Items                                                        | Characteristics                                                                                                                                                                                                                                                                     |                                      |      |      |      |      |      |           |                 |
|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------|------|------|------|------|-----------|-----------------|
| Category                                                     | -40 to +105℃                                                                                                                                                                                                                                                                        |                                      |      |      |      |      |      |           |                 |
| Temperature Range                                            |                                                                                                                                                                                                                                                                                     |                                      |      |      |      |      |      |           |                 |
| Rated Voltage Range                                          | 10 to 100V <sub>dc</sub>                                                                                                                                                                                                                                                            |                                      |      |      |      |      |      |           |                 |
| Capacitance Tolerance                                        | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                           |                                      |      |      |      |      |      |           |                 |
| Leakage Current                                              | I=0.02CV or 3mA, whichever is smaller.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 5 minutes)                                                                                                                        |                                      |      |      |      |      |      |           |                 |
| Dissipation Factor<br>(tan δ )                               | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                    | 10V                                  | 16V  | 25V  | 35V  | 50V  | 63V  | 80 & 100V | (at 20℃, 120Hz) |
|                                                              | tan δ (Max.)                                                                                                                                                                                                                                                                        | 0.60                                 | 0.45 | 0.30 | 0.25 | 0.20 | 0.15 | 0.15      |                 |
| Low Temperature<br>Characteristics<br>(Max. Impedance Ratio) | Capacitance change : Capacitance at the lowest operating temperature shall not be less than 70% of the 20℃ value.                                                                                                                                                                   |                                      |      |      |      |      |      |           |                 |
|                                                              | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                    | 10V                                  | 16V  | 25V  | 35V  | 50V  | 63V  | 80 & 100V | (at 120Hz)      |
|                                                              | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                     | 4                                    | 4    | 3    | 3    | 2    | 2    | 2         |                 |
|                                                              | Z(-40℃)/Z(+20℃)                                                                                                                                                                                                                                                                     | 15                                   | 15   | 10   | 8    | 6    | 6    | 5         |                 |
| Endurance                                                    | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 5,000 hours at 105℃.                                           |                                      |      |      |      |      |      |           |                 |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                  | ≤ ±25% of the initial value          |      |      |      |      |      |           |                 |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                       | ≤250% of the initial specified value |      |      |      |      |      |           |                 |
|                                                              | Leakage current                                                                                                                                                                                                                                                                     | ≤The initial specified value         |      |      |      |      |      |           |                 |
| Shelf Life                                                   | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 500 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                      |      |      |      |      |      |           |                 |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                  | ≤ ±20% of the initial value          |      |      |      |      |      |           |                 |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                       | ≤150% of the initial specified value |      |      |      |      |      |           |                 |
|                                                              | Leakage current                                                                                                                                                                                                                                                                     | ≤The initial specified value         |      |      |      |      |      |           |                 |

### DIMENSIONS [mm]

- Terminal Code : VS (φ22 to φ35) : Standard

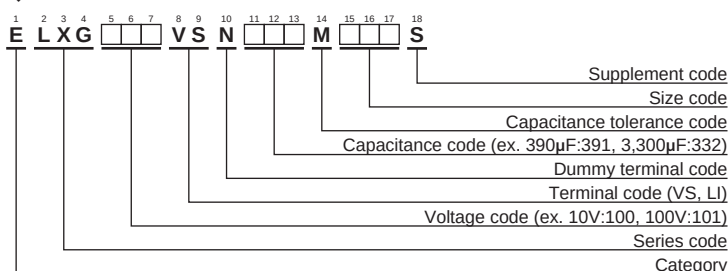
- Terminal Code : LI (φ35)



\*φD=35mm : 3.5±0.5mm

The standard design has no plastic disc.

### PART NUMBERING SYSTEM



Please refer to "Product code guide (snap-in type)"

### RATED RIPPLE CURRENT MULTIPLIERS

- Frequency Multipliers

| Frequency(Hz)            | 50   | 120  | 300  | 1k   | 10k  | 50k  |
|--------------------------|------|------|------|------|------|------|
| 10 to 50V <sub>dc</sub>  | 0.95 | 1.00 | 1.03 | 1.05 | 1.08 | 1.08 |
| 63 to 100V <sub>dc</sub> | 0.92 | 1.00 | 1.07 | 1.13 | 1.19 | 1.20 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.





LXG Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|
| 10                       | 6,800       | 22 × 25               | 0.60  | 1.30                                               | ELXG100VSN682MP25S | 35                       | 5,600       | 25.4 × 35             | 0.25  | 1.98                                               | ELXG350VSN562MQ35S |
|                          | 10,000      | 22 × 30               | 0.60  | 1.65                                               | ELXG100VSN103MP30S |                          | 5,600       | 30 × 30               | 0.25  | 1.98                                               | ELXG350VSN562MR30S |
|                          | 10,000      | 25.4 × 25             | 0.60  | 1.64                                               | ELXG100VSN103MQ25S |                          | 5,600       | 35 × 25               | 0.25  | 2.03                                               | ELXG350VSN562MA25S |
|                          | 12,000      | 22 × 35               | 0.60  | 1.85                                               | ELXG100VSN123MP35S |                          | 6,800       | 22 × 50               | 0.25  | 2.26                                               | ELXG350VSN682MP50S |
|                          | 12,000      | 25.4 × 30             | 0.60  | 1.85                                               | ELXG100VSN123MQ30S |                          | 6,800       | 25.4 × 40             | 0.25  | 2.24                                               | ELXG350VSN682MQ40S |
|                          | 12,000      | 30 × 25               | 0.60  | 1.89                                               | ELXG100VSN123MR25S |                          | 8,200       | 25.4 × 50             | 0.25  | 2.57                                               | ELXG350VSN822MQ50S |
|                          | 15,000      | 22 × 40               | 0.60  | 2.12                                               | ELXG100VSN153MP40S |                          | 8,200       | 30 × 35               | 0.25  | 2.50                                               | ELXG350VSN822MR35S |
|                          | 15,000      | 25.4 × 35             | 0.60  | 2.16                                               | ELXG100VSN153MQ35S |                          | 8,200       | 35 × 30               | 0.25  | 2.55                                               | ELXG350VSN822MA30S |
|                          | 18,000      | 22 × 50               | 0.60  | 2.45                                               | ELXG100VSN183MP50S |                          | 10,000      | 30 × 40               | 0.25  | 2.86                                               | ELXG350VSN103MR40S |
|                          | 18,000      | 25.4 × 40             | 0.60  | 2.43                                               | ELXG100VSN183MQ40S |                          | 10,000      | 35 × 35               | 0.25  | 2.88                                               | ELXG350VSN103MA35S |
|                          | 18,000      | 30 × 30               | 0.60  | 2.37                                               | ELXG100VSN183MR30S |                          | 12,000      | 30 × 50               | 0.25  | 3.32                                               | ELXG350VSN123MR50S |
|                          | 18,000      | 35 × 25               | 0.60  | 2.42                                               | ELXG100VSN183MA25S |                          | 12,000      | 35 × 40               | 0.25  | 3.30                                               | ELXG350VSN123MA40S |
|                          | 22,000      | 30 × 35               | 0.60  | 2.73                                               | ELXG100VSN223MR35S |                          | 18,000      | 35 × 50               | 0.25  | 4.29                                               | ELXG350VSN183MA50S |
|                          | 22,000      | 35 × 30               | 0.60  | 2.79                                               | ELXG100VSN223MA30S | 50                       | 1,500       | 22 × 25               | 0.20  | 1.02                                               | ELXG500VSN152MP25S |
|                          | 27,000      | 25.4 × 50             | 0.60  | 3.11                                               | ELXG100VSN273MQ50S |                          | 1,800       | 22 × 30               | 0.20  | 1.17                                               | ELXG500VSN182MR30S |
|                          | 27,000      | 30 × 40               | 0.60  | 3.13                                               | ELXG100VSN273MR40S |                          | 1,800       | 25.4 × 25             | 0.20  | 1.17                                               | ELXG500VSN182MQ25S |
|                          | 33,000      | 35 × 35               | 0.60  | 3.49                                               | ELXG100VSN333MA35S |                          | 2,200       | 22 × 35               | 0.20  | 1.33                                               | ELXG500VSN222MP35S |
|                          | 39,000      | 30 × 50               | 0.60  | 3.99                                               | ELXG100VSN393MR50S |                          | 2,700       | 22 × 40               | 0.20  | 1.51                                               | ELXG500VSN272MP40S |
|                          | 39,000      | 35 × 40               | 0.60  | 3.96                                               | ELXG100VSN393MA40S |                          | 2,700       | 25.4 × 30             | 0.20  | 1.47                                               | ELXG500VSN272MQ30S |
|                          | 47,000      | 35 × 50               | 0.60  | 4.62                                               | ELXG100VSN473MA50S |                          | 2,700       | 30 × 25               | 0.20  | 1.50                                               | ELXG500VSN272MR25S |
| 16                       | 5,600       | 22 × 25               | 0.45  | 1.44                                               | ELXG160VSN562MP25S |                          | 3,300       | 25.4 × 35             | 0.20  | 1.70                                               | ELXG500VSN332MQ35S |
|                          | 6,800       | 22 × 30               | 0.45  | 1.66                                               | ELXG160VSN682MP30S |                          | 3,300       | 30 × 30               | 0.20  | 1.70                                               | ELXG500VSN332MR30S |
|                          | 6,800       | 25.4 × 25             | 0.45  | 1.66                                               | ELXG160VSN682MQ25S |                          | 3,300       | 35 × 25               | 0.20  | 1.74                                               | ELXG500VSN332MA25S |
|                          | 8,200       | 22 × 35               | 0.45  | 1.87                                               | ELXG160VSN822MP35S |                          | 3,900       | 22 × 50               | 0.20  | 1.91                                               | ELXG500VSN392MP50S |
|                          | 10,000      | 22 × 40               | 0.45  | 2.12                                               | ELXG160VSN103MP40S |                          | 3,900       | 25.4 × 40             | 0.20  | 1.89                                               | ELXG500VSN392MQ40S |
|                          | 10,000      | 25.4 × 30             | 0.45  | 2.07                                               | ELXG160VSN103MQ30S |                          | 4,700       | 30 × 35               | 0.20  | 2.11                                               | ELXG500VSN472MR35S |
|                          | 10,000      | 30 × 25               | 0.45  | 2.11                                               | ELXG160VSN103MR25S |                          | 4,700       | 35 × 30               | 0.20  | 2.16                                               | ELXG500VSN472MA30S |
|                          | 12,000      | 25.4 × 35             | 0.45  | 2.37                                               | ELXG160VSN123MQ35S |                          | 5,600       | 25.4 × 50             | 0.20  | 2.38                                               | ELXG500VSN562MQ50S |
|                          | 12,000      | 30 × 30               | 0.45  | 2.37                                               | ELXG160VSN123MR30S |                          | 5,600       | 30 × 40               | 0.20  | 2.39                                               | ELXG500VSN562MR40S |
|                          | 12,000      | 35 × 25               | 0.45  | 2.42                                               | ELXG160VSN123MA25S |                          | 5,600       | 35 × 35               | 0.20  | 2.41                                               | ELXG500VSN562MA35S |
|                          | 15,000      | 22 × 50               | 0.45  | 2.74                                               | ELXG160VSN153MP50S |                          | 6,800       | 30 × 50               | 0.20  | 2.79                                               | ELXG500VSN682MR50S |
|                          | 15,000      | 25.4 × 40             | 0.45  | 2.71                                               | ELXG160VSN153MQ40S |                          | 6,800       | 35 × 40               | 0.20  | 2.78                                               | ELXG500VSN682MA40S |
|                          | 18,000      | 25.4 × 50             | 0.45  | 3.11                                               | ELXG160VSN183MQ50S |                          | 10,000      | 35 × 50               | 0.20  | 3.57                                               | ELXG500VSN103MA50S |
|                          | 18,000      | 30 × 35               | 0.45  | 3.02                                               | ELXG160VSN183MR35S | 63                       | 1,000       | 22 × 25               | 0.15  | 1.00                                               | ELXG630VSN102MP25S |
|                          | 18,000      | 35 × 30               | 0.45  | 3.09                                               | ELXG160VSN183MA30S |                          | 1,200       | 22 × 30               | 0.15  | 1.15                                               | ELXG630VSN122MP30S |
|                          | 22,000      | 30 × 40               | 0.45  | 3.46                                               | ELXG160VSN223MR40S |                          | 1,200       | 25.4 × 25             | 0.15  | 1.15                                               | ELXG630VSN122MQ25S |
|                          | 22,000      | 35 × 35               | 0.45  | 3.49                                               | ELXG160VSN223MA35S |                          | 1,500       | 22 × 35               | 0.15  | 1.32                                               | ELXG630VSN152MP35S |
|                          | 27,000      | 30 × 50               | 0.45  | 4.07                                               | ELXG160VSN273MR50S |                          | 1,800       | 22 × 40               | 0.15  | 1.49                                               | ELXG630VSN182MP40S |
|                          | 27,000      | 35 × 40               | 0.45  | 4.04                                               | ELXG160VSN273MA40S |                          | 1,800       | 25.4 × 30             | 0.15  | 1.45                                               | ELXG630VSN182MQ30S |
|                          | 39,000      | 35 × 50               | 0.45  | 5.16                                               | ELXG160VSN393MA50S |                          | 1,800       | 30 × 25               | 0.15  | 1.48                                               | ELXG630VSN182MR25S |
| 25                       | 3,900       | 22 × 25               | 0.30  | 1.31                                               | ELXG250VSN392MP25S |                          | 2,200       | 25.4 × 35             | 0.15  | 1.67                                               | ELXG630VSN222MQ35S |
|                          | 4,700       | 22 × 30               | 0.30  | 1.51                                               | ELXG250VSN472MP30S |                          | 2,200       | 30 × 30               | 0.15  | 1.68                                               | ELXG630VSN222MR30S |
|                          | 4,700       | 25.4 × 25             | 0.30  | 1.51                                               | ELXG250VSN472MQ25S |                          | 2,200       | 35 × 25               | 0.15  | 1.71                                               | ELXG630VSN222MA25S |
|                          | 5,600       | 22 × 35               | 0.30  | 1.70                                               | ELXG250VSN562MP35S |                          | 2,700       | 22 × 50               | 0.15  | 1.92                                               | ELXG630VSN272MP50S |
|                          | 6,800       | 22 × 40               | 0.30  | 1.92                                               | ELXG250VSN682MP40S |                          | 2,700       | 25.4 × 40             | 0.15  | 1.90                                               | ELXG630VSN272MQ40S |
|                          | 6,800       | 25.4 × 30             | 0.30  | 1.87                                               | ELXG250VSN682MQ30S |                          | 2,700       | 30 × 35               | 0.15  | 1.93                                               | ELXG630VSN272MR35S |
|                          | 6,800       | 30 × 25               | 0.30  | 1.90                                               | ELXG250VSN682MR25S |                          | 3,300       | 25.4 × 50             | 0.15  | 2.20                                               | ELXG630VSN332MQ50S |
|                          | 8,200       | 25.4 × 35             | 0.30  | 2.14                                               | ELXG250VSN822MQ35S |                          | 3,300       | 35 × 30               | 0.15  | 2.18                                               | ELXG630VSN332MA30S |
|                          | 8,200       | 30 × 30               | 0.30  | 2.15                                               | ELXG250VSN822MR30S |                          | 3,900       | 30 × 40               | 0.15  | 2.41                                               | ELXG630VSN392MR40S |
|                          | 8,200       | 35 × 25               | 0.30  | 2.19                                               | ELXG250VSN822MA25S |                          | 3,900       | 35 × 35               | 0.15  | 2.43                                               | ELXG630VSN392MA35S |
|                          | 10,000      | 22 × 50               | 0.30  | 2.45                                               | ELXG250VSN103MP50S |                          | 4,700       | 30 × 50               | 0.15  | 2.80                                               | ELXG630VSN472MR50S |
|                          | 10,000      | 25.4 × 40             | 0.30  | 2.43                                               | ELXG250VSN103MQ40S |                          | 4,700       | 35 × 40               | 0.15  | 2.78                                               | ELXG630VSN472MA40S |
|                          | 12,000      | 25.4 × 50             | 0.30  | 2.78                                               | ELXG250VSN123MQ50S |                          | 6,800       | 35 × 50               | 0.15  | 3.55                                               | ELXG630VSN682MA50S |
|                          | 12,000      | 30 × 35               | 0.30  | 2.70                                               | ELXG250VSN123MR35S | 80                       | 680         | 22 × 25               | 0.15  | 0.97                                               | ELXG800VSN681MP25S |
|                          | 12,000      | 35 × 30               | 0.30  | 2.76                                               | ELXG250VSN123MA30S |                          | 820         | 22 × 30               | 0.15  | 1.12                                               | ELXG800VSN821MP30S |
|                          | 15,000      | 30 × 40               | 0.30  | 3.13                                               | ELXG250VSN153MR40S |                          | 1,000       | 22 × 35               | 0.15  | 1.27                                               | ELXG800VSN102MP35S |
|                          | 15,000      | 35 × 35               | 0.30  | 3.16                                               | ELXG250VSN153MA35S |                          | 1,000       | 25.4 × 25             | 0.15  | 1.23                                               | ELXG800VSN102MQ25S |
|                          | 18,000      | 30 × 50               | 0.30  | 3.64                                               | ELXG250VSN183MR50S |                          | 1,200       | 22 × 40               | 0.15  | 1.42                                               | ELXG800VSN122MP40S |
|                          | 18,000      | 35 × 40               | 0.30  | 3.61                                               | ELXG250VSN183MA40S |                          | 1,200       | 25.4 × 30             | 0.15  | 1.39                                               | ELXG800VSN122MQ30S |
|                          | 27,000      | 35 × 50               | 0.30  | 4.70                                               | ELXG250VSN273MA50S |                          | 1,200       | 30 × 25               | 0.15  | 1.41                                               | ELXG800VSN122MR25S |
| 35                       | 2,200       | 22 × 25               | 0.25  | 1.10                                               | ELXG350VSN222MP25S |                          | 1,500       | 25.4 × 35             | 0.15  | 1.62                                               | ELXG800VSN152MQ35S |
|                          | 3,300       | 22 × 30               | 0.25  | 1.42                                               | ELXG350VSN332MP30S |                          | 1,800       | 22 × 50               | 0.15  | 1.84                                               | ELXG800VSN182MP50S |
|                          | 3,300       | 25.4 × 25             | 0.25  | 1.41                                               | ELXG350VSN332MQ25S |                          | 1,800       | 25.4 × 40             | 0.15  | 1.82                                               | ELXG800VSN182MQ40S |
|                          | 3,900       | 22 × 35               | 0.25  | 1.58                                               | ELXG350VSN392MP35S |                          | 1,800       | 30 × 30               | 0.15  | 1.78                                               | ELXG800VSN182MR30S |
|                          | 3,900       | 25.4 × 30             | 0.25  | 1.58                                               | ELXG350VSN392MQ30S |                          | 1,800       | 35 × 25               | 0.15  | 1.82                                               | ELXG800VSN182MA25S |
|                          | 4,700       | 22 × 40               | 0.25  | 1.78                                               | ELXG350VSN472MP40S |                          | 2,200       | 25.4 × 50             | 0.15  | 2.11                                               | ELXG800VSN222MQ50S |
|                          | 4,700       | 30 × 25               | 0.25  | 1.77                                               | ELXG350VSN472MR25S |                          | 2,200       | 30 × 35               | 0.15  | 2.05                                               | ELXG800VSN222MR35S |
|                          |             |                       |       |                                                    |                    |                          |             |                       |       |                                                    |                    |



## LXG Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|
| 80                       | 2,200       | 35 × 30               | 0.15  | 2.09                                               | ELXG800VSN222MA30S | 100                      | 1,000       | 25.4 × 35             | 0.15  | 1.41                                               | ELXG101VSN102MQ35S |
|                          | 2,700       | 30 × 40               | 0.15  | 2.35                                               | ELXG800VSN272MR40S |                          | 1,000       | 30 × 30               | 0.15  | 1.42                                               | ELXG101VSN102MR30S |
|                          | 2,700       | 35 × 35               | 0.15  | 2.37                                               | ELXG800VSN272MA35S |                          | 1,000       | 35 × 25               | 0.15  | 1.45                                               | ELXG101VSN102MA25S |
|                          | 3,300       | 30 × 50               | 0.15  | 2.75                                               | ELXG800VSN332MR50S |                          | 1,200       | 22 × 50               | 0.15  | 1.60                                               | ELXG101VSN122MP50S |
|                          | 3,300       | 35 × 40               | 0.15  | 2.73                                               | ELXG800VSN332MA40S |                          | 1,200       | 25.4 × 40             | 0.15  | 1.59                                               | ELXG101VSN122MQ40S |
|                          | 4,700       | 35 × 50               | 0.15  | 3.46                                               | ELXG800VSN472MA50S |                          | 1,200       | 30 × 35               | 0.15  | 1.61                                               | ELXG101VSN122MR35S |
| 100                      | 390         | 22 × 25               | 0.15  | 0.78                                               | ELXG101VSN391MP25S |                          | 1,500       | 25.4 × 50             | 0.15  | 1.86                                               | ELXG101VSN152MQ50S |
|                          | 560         | 22 × 30               | 0.15  | 0.99                                               | ELXG101VSN561MP30S |                          | 1,500       | 30 × 40               | 0.15  | 1.87                                               | ELXG101VSN152MR40S |
|                          | 560         | 25.4 × 25             | 0.15  | 0.98                                               | ELXG101VSN561MQ25S |                          | 1,500       | 35 × 30               | 0.15  | 1.85                                               | ELXG101VSN152MA30S |
|                          | 680         | 22 × 35               | 0.15  | 1.12                                               | ELXG101VSN681MP35S |                          | 1,800       | 35 × 35               | 0.15  | 2.07                                               | ELXG101VSN182MA35S |
|                          | 820         | 22 × 40               | 0.15  | 1.26                                               | ELXG101VSN821MP40S |                          | 2,200       | 30 × 50               | 0.15  | 2.40                                               | ELXG101VSN222MR50S |
|                          | 820         | 25.4 × 30             | 0.15  | 1.23                                               | ELXG101VSN821MQ30S |                          | 2,200       | 35 × 40               | 0.15  | 2.39                                               | ELXG101VSN222MA40S |
|                          | 820         | 30 × 25               | 0.15  | 1.25                                               | ELXG101VSN821MR25S |                          | 2,700       | 35 × 50               | 0.15  | 2.81                                               | ELXG101VSN272MA50S |

## ◆MAXIMUM IMPEDANCE [mΩ/20°C, 30kHz]

| V <sub>dc</sub><br>Case size<br>φD×L(mm) | 10 to 63 | 80  | 100 |
|------------------------------------------|----------|-----|-----|
| 22×25                                    | 120      | 150 |     |
| 22×30                                    | 100      | 120 |     |
| 22×35                                    | 80       | 95  |     |
| 22×40                                    | 70       | 80  |     |
| 22×50                                    | 50       | 60  |     |
| 25.4×25                                  | 90       | 110 |     |
| 25.4×30                                  | 70       | 85  |     |
| 25.4×35                                  | 60       | 70  |     |
| 25.4×40                                  | 50       | 60  |     |
| 25.4×50                                  | 40       | 45  |     |
| 30×25                                    | 70       | 80  |     |
| 30×30                                    | 50       | 60  |     |
| 30×35                                    | 40       | 50  |     |
| 30×40                                    | 35       | 40  |     |
| 30×50                                    | 25       | 30  |     |
| 35×25                                    | 65       | 70  |     |
| 35×30                                    | 45       | 50  |     |
| 35×35                                    | 38       | 40  |     |
| 35×40                                    | 30       | 30  |     |
| 35×50                                    | 23       | 25  |     |

## LVA Series

- Designed for automotive application (including On Board Charger) by high vibration resistance structure.
- Endurance with ripple current : 5,000 hours at 105°C
- Rated voltage range : 450V<sub>dc</sub>, Capacitance range : 150 to 890μF
- Non solvent resistant type
- RoHS2 Compliant
- AEC-Q200 compliant : Please contact Chemi-Con for more details, test data, information.



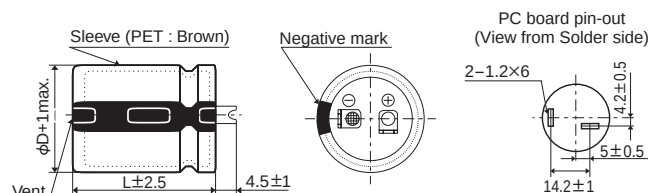
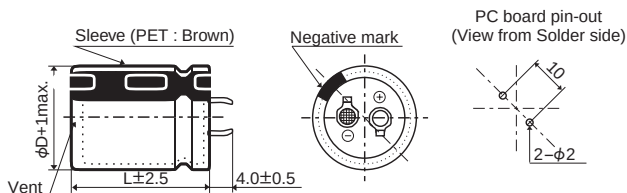
## ◆SPECIFICATIONS

| Items                                                        | Characteristics                                                                                                                                                                                                                                                                       |                                                                                   |                 |
|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------|
| Category                                                     | -40 to +105℃                                                                                                                                                                                                                                                                          |                                                                                   |                 |
| Temperature Range                                            |                                                                                                                                                                                                                                                                                       |                                                                                   |                 |
| Rated Voltage Range                                          | 450V <sub>dc</sub>                                                                                                                                                                                                                                                                    |                                                                                   |                 |
| Capacitance Tolerance                                        | ± 20% (M)                                                                                                                                                                                                                                                                             |                                                                                   | (at 20℃, 120Hz) |
| Leakage Current                                              | I ≤ 3√CV<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)<br>(at 20℃ after 5 minutes)                                                                                                                                                     |                                                                                   |                 |
| Dissipation Factor<br>(tan δ)                                | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 450V                                                                              | (at 20℃, 120Hz) |
|                                                              | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.20                                                                              |                 |
| Low Temperature<br>Characteristics<br>(Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 450V                                                                              | (at 120Hz)      |
|                                                              | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 8                                                                                 |                 |
| Endurance                                                    | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 5,000 hours at 105℃.                                         |                                                                                   |                 |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±20% of the initial value                                                       |                 |
|                                                              | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤ 200% of the initial specified value                                             |                 |
|                                                              | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value                                                     |                 |
| Shelf Life                                                   | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                                                                   |                 |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±15% of the initial value                                                       |                 |
|                                                              | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤ 150% of the initial specified value                                             |                 |
|                                                              | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value                                                     |                 |
| Vibration                                                    | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to vibration test (vibration profile shown below) at room temperature (15 to 35℃).                                                                                            |                                                                                   |                 |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±5% of the initial value                                                        |                 |
|                                                              | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤ The initial specified value                                                     |                 |
|                                                              | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value                                                     |                 |
|                                                              | Vibration profile                                                                                                                                                                                                                                                                     |                                                                                   |                 |
|                                                              | Vibration frequency range                                                                                                                                                                                                                                                             | 10 to 2,000Hz                                                                     |                 |
|                                                              | Acceleration                                                                                                                                                                                                                                                                          | 49m/s <sup>2</sup> (5G)                                                           |                 |
|                                                              | Sweep rate                                                                                                                                                                                                                                                                            | 10 to 2,000 to 10Hz 20 minutes                                                    |                 |
|                                                              | Direction and period of motion                                                                                                                                                                                                                                                        | 4 hours in each of 3 mutually perpendicular directions (total of 12 hours)        |                 |
|                                                              | Fixation                                                                                                                                                                                                                                                                              | Securely attach the main body using a fixing tool. Please contact us for details. |                 |

## ◆DIMENSIONS [mm]

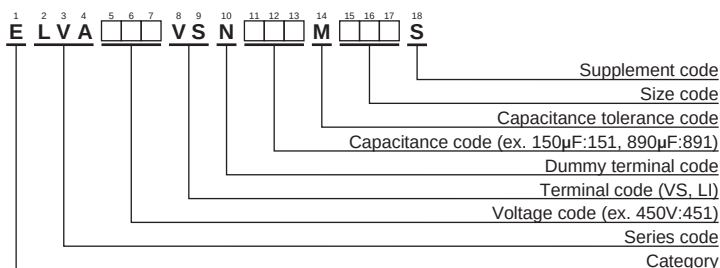
●Terminal Code : VS (φ25.4 to φ35) : Standard

●Terminal Code : LI (φ30, φ35)



The standard design has no plastic disc.

## ◆PART NUMBERING SYSTEM



Please refer to "Product code guide (snap-in type)"



## LVA Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|
| 450                      | 150         | 25.4 × 25             | 0.20  | 0.93                                               | ELVA451VSN151MQ25S | 450                      | 410         | 30 × 40               | 0.20  | 1.67                                               | ELVA451VSN411MR40S |
|                          | 190         | 25.4 × 30             | 0.20  | 1.07                                               | ELVA451VSN191MQ30S |                          | 440         | 35 × 35               | 0.20  | 1.64                                               | ELVA451VSN441MA35S |
|                          | 210         | 30 × 25               | 0.20  | 1.13                                               | ELVA451VSN211MR25S |                          | 450         | 25.4 × 60             | 0.20  | 1.91                                               | ELVA451VSN451MQ60S |
|                          | 230         | 25.4 × 35             | 0.20  | 1.23                                               | ELVA451VSN231MQ35S |                          | 470         | 30 × 45               | 0.20  | 1.84                                               | ELVA451VSN471MR45S |
|                          | 260         | 35 × 25               | 0.20  | 1.22                                               | ELVA451VSN261MA25S |                          | 530         | 35 × 40               | 0.20  | 1.86                                               | ELVA451VSN531MA40S |
|                          | 280         | 25.4 × 40             | 0.20  | 1.39                                               | ELVA451VSN281MQ40S |                          | 540         | 30 × 50               | 0.20  | 2.00                                               | ELVA451VSN541MR50S |
|                          | 280         | 30 × 30               | 0.20  | 1.31                                               | ELVA451VSN281MR30S |                          | 600         | 30 × 55               | 0.20  | 2.15                                               | ELVA451VSN601MR55S |
|                          | 320         | 25.4 × 45             | 0.20  | 1.51                                               | ELVA451VSN321MQ45S |                          | 620         | 35 × 45               | 0.20  | 2.06                                               | ELVA451VSN621MA45S |
|                          | 340         | 30 × 35               | 0.20  | 1.48                                               | ELVA451VSN341MR35S |                          | 660         | 30 × 60               | 0.20  | 2.30                                               | ELVA451VSN661MR60S |
|                          | 350         | 35 × 30               | 0.20  | 1.44                                               | ELVA451VSN351MA30S |                          | 710         | 35 × 50               | 0.20  | 2.25                                               | ELVA451VSN711MA50S |
|                          | 360         | 25.4 × 50             | 0.20  | 1.63                                               | ELVA451VSN361MQ50S |                          | 800         | 35 × 55               | 0.20  | 2.44                                               | ELVA451VSN801MA55S |
|                          | 410         | 25.4 × 55             | 0.20  | 1.79                                               | ELVA451VSN411MQ55S |                          | 890         | 35 × 60               | 0.20  | 2.62                                               | ELVA451VSN891MA60S |

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ⊙Frequency Multipliers

| Frequency(Hz) | 50   | 120  | 300  | 1k   | 10k  | 50k  |
|---------------|------|------|------|------|------|------|
| 450V          | 0.77 | 1.00 | 1.16 | 1.30 | 1.41 | 1.43 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.



## KVB Series

- Designed for automotive application (including On Board Charger) by high vibration resistance structure.
- Endurance with ripple current : 3,000 hours at 105°C
- Rated voltage range : 450V<sub>dc</sub>, Capacitance range : 150 to 920μF
- Non solvent resistant type
- RoHS2 Compliant
- AEC-Q200 compliant : Please contact Chemi-Con for more details, test data, information.



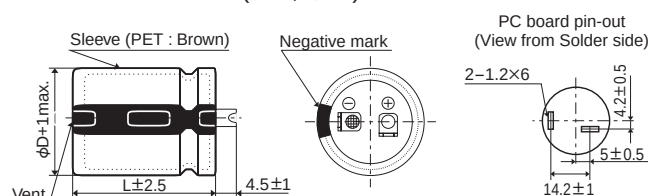
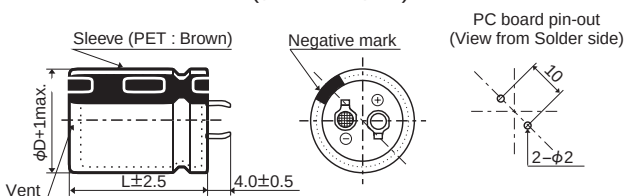
### SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                       |                                                                                   |                 |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------|
| Category                                               | -40 to +105℃                                                                                                                                                                                                                                                                          |                                                                                   |                 |
| Temperature Range                                      |                                                                                                                                                                                                                                                                                       |                                                                                   |                 |
| Rated Voltage Range                                    | 450V <sub>dc</sub>                                                                                                                                                                                                                                                                    |                                                                                   |                 |
| Capacitance Tolerance                                  | ± 20% (M)                                                                                                                                                                                                                                                                             |                                                                                   | (at 20℃, 120Hz) |
| Leakage Current                                        | I ≤ 3√CV<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)<br>(at 20℃ after 5 minutes)                                                                                                                                                     |                                                                                   |                 |
| Dissipation Factor (tan δ)                             | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 450V                                                                              | (at 20℃, 120Hz) |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.20                                                                              |                 |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 450V                                                                              | (at 120Hz)      |
|                                                        | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 8                                                                                 |                 |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 3,000 hours at 105℃.                                         |                                                                                   |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ± 20% of the initial value                                                      |                 |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤ 200% of the initial specified value                                             |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value                                                     |                 |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                                                                   |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ± 15% of the initial value                                                      |                 |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤ 150% of the initial specified value                                             |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value                                                     |                 |
| Vibration                                              | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to vibration test (vibration profile shown below) at room temperature (15 to 35℃).                                                                                            |                                                                                   |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ± 5% of the initial value                                                       |                 |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤ The initial specified value                                                     |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value                                                     |                 |
|                                                        | Vibration profile                                                                                                                                                                                                                                                                     |                                                                                   |                 |
|                                                        | Vibration frequency range                                                                                                                                                                                                                                                             | 10 to 2,000Hz                                                                     |                 |
|                                                        | Acceleration                                                                                                                                                                                                                                                                          | 49m/s <sup>2</sup> (5G)                                                           |                 |
|                                                        | Sweep rate                                                                                                                                                                                                                                                                            | 10 to 2,000 to 10Hz 20 minutes                                                    |                 |
|                                                        | Direction and period of motion                                                                                                                                                                                                                                                        | 4 hours in each of 3 mutually perpendicular directions (total of 12 hours)        |                 |
|                                                        | Fixation                                                                                                                                                                                                                                                                              | Securely attach the main body using a fixing tool. Please contact us for details. |                 |

### DIMENSIONS [mm]

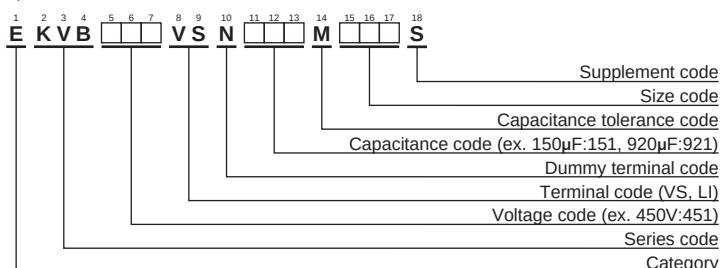
●Terminal Code : VS (φ25.4 to φ35) : Standard

●Terminal Code : LI (φ30, φ35)



The standard design has no plastic disc.

### PART NUMBERING SYSTEM



Please refer to "Product code guide (snap-in type)"



## KVB Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|
| 450                      | 150         | 25.4 × 25             | 0.20  | 0.93                                               | EKVB451VSN151MQ25S | 450                      | 420         | 30 × 40               | 0.20  | 1.69                                               | EKVB451VSN421MR40S |
|                          | 200         | 25.4 × 30             | 0.20  | 1.10                                               | EKVB451VSN201MQ30S |                          | 460         | 35 × 35               | 0.20  | 1.67                                               | EKVB451VSN461MA35S |
|                          | 220         | 30 × 25               | 0.20  | 1.15                                               | EKVB451VSN221MR25S |                          | 470         | 25.4 × 60             | 0.20  | 1.96                                               | EKVB451VSN471MQ60S |
|                          | 240         | 25.4 × 35             | 0.20  | 1.26                                               | EKVB451VSN241MQ35S |                          | 490         | 30 × 45               | 0.20  | 1.88                                               | EKVB451VSN491MR45S |
|                          | 270         | 35 × 25               | 0.20  | 1.24                                               | EKVB451VSN271MA25S |                          | 550         | 35 × 40               | 0.20  | 1.90                                               | EKVB451VSN551MA40S |
|                          | 290         | 25.4 × 40             | 0.20  | 1.41                                               | EKVB451VSN291MQ40S |                          | 560         | 30 × 50               | 0.20  | 2.04                                               | EKVB451VSN561MR50S |
|                          | 290         | 30 × 30               | 0.20  | 1.34                                               | EKVB451VSN291MR30S |                          | 620         | 30 × 55               | 0.20  | 2.19                                               | EKVB451VSN621MR55S |
|                          | 330         | 25.4 × 45             | 0.20  | 1.54                                               | EKVB451VSN331MQ45S |                          | 650         | 35 × 45               | 0.20  | 2.11                                               | EKVB451VSN651MA45S |
|                          | 350         | 30 × 35               | 0.20  | 1.50                                               | EKVB451VSN351MR35S |                          | 690         | 30 × 60               | 0.20  | 2.35                                               | EKVB451VSN691MR60S |
|                          | 370         | 35 × 30               | 0.20  | 1.48                                               | EKVB451VSN371MA30S |                          | 740         | 35 × 50               | 0.20  | 2.30                                               | EKVB451VSN741MA50S |
|                          | 380         | 25.4 × 50             | 0.20  | 1.67                                               | EKVB451VSN381MQ50S |                          | 830         | 35 × 55               | 0.20  | 2.48                                               | EKVB451VSN831MA55S |
|                          | 420         | 25.4 × 55             | 0.20  | 1.81                                               | EKVB451VSN421MQ55S |                          | 920         | 35 × 60               | 0.20  | 2.66                                               | EKVB451VSN921MA60S |

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

| Frequency(Hz) | 50   | 120  | 300  | 1k   | 10k  | 50k  |
|---------------|------|------|------|------|------|------|
| 450V          | 0.77 | 1.00 | 1.16 | 1.30 | 1.41 | 1.43 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.



# KVA Series

- Designed for automotive application (including On Board Charger) by high vibration resistance structure.
- Endurance with ripple current : 2,000 hours at 105°C
- Rated voltage range : 450V<sub>dc</sub>, Capacitance range : 160 to 970μF
- Non solvent resistant type
- RoHS2 Compliant
- AEC-Q200 compliant : Please contact Chemi-Con for more details, test data, information.



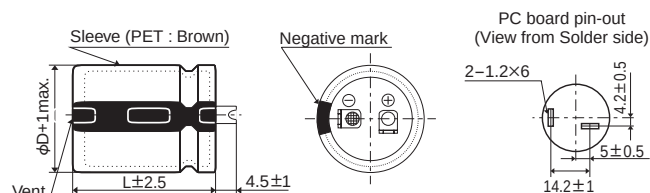
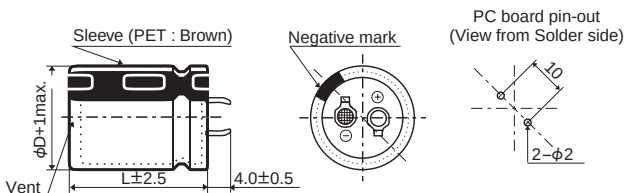
## SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                       |                                                                                   |                 |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------|
| Category                                               | -40 to +105℃                                                                                                                                                                                                                                                                          |                                                                                   |                 |
| Temperature Range                                      |                                                                                                                                                                                                                                                                                       |                                                                                   |                 |
| Rated Voltage Range                                    | 450V <sub>dc</sub>                                                                                                                                                                                                                                                                    |                                                                                   |                 |
| Capacitance Tolerance                                  | ± 20% (M)                                                                                                                                                                                                                                                                             |                                                                                   | (at 20℃, 120Hz) |
| Leakage Current                                        | I ≤ 3√CV<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)<br>(at 20℃ after 5 minutes)                                                                                                                                                     |                                                                                   |                 |
| Dissipation Factor (tan δ)                             | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 450V                                                                              | (at 20℃, 120Hz) |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.20                                                                              |                 |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 450V                                                                              | (at 120Hz)      |
|                                                        | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 8                                                                                 |                 |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 2,000 hours at 105℃.                                         |                                                                                   |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ± 20% of the initial value                                                      |                 |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤ 200% of the initial specified value                                             |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value                                                     |                 |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                                                                   |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ± 15% of the initial value                                                      |                 |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤ 150% of the initial specified value                                             |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value                                                     |                 |
| Vibration                                              | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to vibration test (vibration profile shown below) at room temperature (15 to 35℃).                                                                                            |                                                                                   |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ± 5% of the initial value                                                       |                 |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤ The initial specified value                                                     |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value                                                     |                 |
|                                                        | Vibration profile                                                                                                                                                                                                                                                                     |                                                                                   |                 |
|                                                        | Vibration frequency range                                                                                                                                                                                                                                                             | 10 to 2,000Hz                                                                     |                 |
|                                                        | Acceleration                                                                                                                                                                                                                                                                          | 49m/s <sup>2</sup> (5G)                                                           |                 |
|                                                        | Sweep rate                                                                                                                                                                                                                                                                            | 10 to 2,000 to 10Hz 20 minutes                                                    |                 |
|                                                        | Direction and period of motion                                                                                                                                                                                                                                                        | 4 hours in each of 3 mutually perpendicular directions (total of 12 hours)        |                 |
|                                                        | Fixation                                                                                                                                                                                                                                                                              | Securely attach the main body using a fixing tool. Please contact us for details. |                 |

## DIMENSIONS [mm]

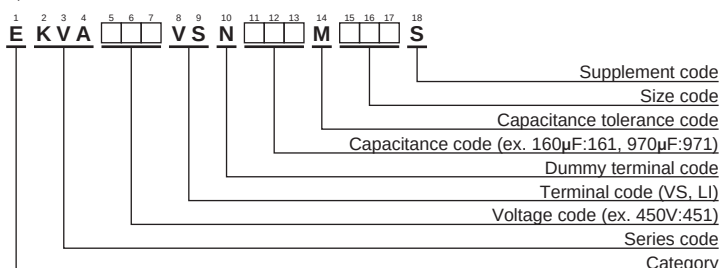
●Terminal Code : VS (φ25.4 to φ35) : Standard

●Terminal Code : LI (φ30, φ35)



The standard design has no plastic disc.

## PART NUMBERING SYSTEM



Please refer to "Product code guide (snap-in type)"



## KVA Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|
| 450                      | 160         | 25.4 × 25             | 0.20  | 0.96                                               | EKVA451VSN161MQ25S | 450                      | 450         | 25.4 × 55             | 0.20  | 1.87                                               | EKVA451VSN451MQ55S |
|                          | 210         | 25.4 × 30             | 0.20  | 1.13                                               | EKVA451VSN211MQ30S |                          | 480         | 35 × 35               | 0.20  | 1.71                                               | EKVA451VSN481MA35S |
|                          | 230         | 30 × 25               | 0.20  | 1.18                                               | EKVA451VSN231MR25S |                          | 490         | 25.4 × 60             | 0.20  | 2.00                                               | EKVA451VSN491MQ60S |
|                          | 250         | 25.4 × 35             | 0.20  | 1.29                                               | EKVA451VSN251MQ35S |                          | 510         | 30 × 45               | 0.20  | 1.91                                               | EKVA451VSN511MR45S |
|                          | 290         | 35 × 25               | 0.20  | 1.29                                               | EKVA451VSN291MA25S |                          | 580         | 30 × 50               | 0.20  | 2.08                                               | EKVA451VSN581MR50S |
|                          | 300         | 25.4 × 40             | 0.20  | 1.44                                               | EKVA451VSN301MQ40S |                          | 580         | 35 × 40               | 0.20  | 1.95                                               | EKVA451VSN581MA40S |
|                          | 300         | 30 × 30               | 0.20  | 1.36                                               | EKVA451VSN301MR30S |                          | 650         | 30 × 55               | 0.20  | 2.24                                               | EKVA451VSN651MR55S |
|                          | 350         | 25.4 × 45             | 0.20  | 1.58                                               | EKVA451VSN351MQ45S |                          | 680         | 35 × 45               | 0.20  | 2.16                                               | EKVA451VSN681MA45S |
|                          | 370         | 30 × 35               | 0.20  | 1.55                                               | EKVA451VSN371MR35S |                          | 730         | 30 × 60               | 0.20  | 2.42                                               | EKVA451VSN731MR60S |
|                          | 390         | 35 × 30               | 0.20  | 1.52                                               | EKVA451VSN391MA30S |                          | 780         | 35 × 50               | 0.20  | 2.36                                               | EKVA451VSN781MA50S |
|                          | 400         | 25.4 × 50             | 0.20  | 1.72                                               | EKVA451VSN401MQ50S |                          | 880         | 35 × 55               | 0.20  | 2.56                                               | EKVA451VSN881MA55S |
|                          | 440         | 30 × 40               | 0.20  | 1.73                                               | EKVA451VSN441MR40S |                          | 970         | 35 × 60               | 0.20  | 2.73                                               | EKVA451VSN971MA60S |

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

| Frequency(Hz) | 50   | 120  | 300  | 1k   | 10k  | 50k  |
|---------------|------|------|------|------|------|------|
| 450V          | 0.77 | 1.00 | 1.16 | 1.30 | 1.41 | 1.43 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

# GXA<sub>Series</sub>

- Endurance with ripple current : 3,000 hours at 125°C
- Rated voltage range : 400 & 450V<sub>dc</sub>, Capacitance range : 220 to 820μF
- Suitable for the communication infrastructure power supply and other high temperature applications.
- Non solvent resistant type
- RoHS2 Compliant

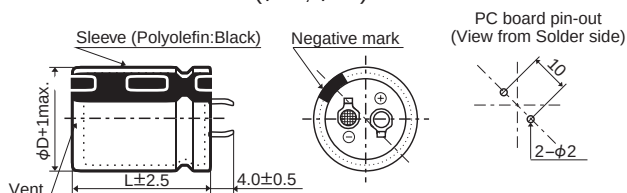


## SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                         |                                       |                  |
|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|------------------|
| Category                                               | -40 to +125°C                                                                                                                                                                                                                                                                           |                                       |                  |
| Temperature Range                                      |                                                                                                                                                                                                                                                                                         |                                       |                  |
| Rated Voltage Range                                    | 400 & 450V <sub>dc</sub>                                                                                                                                                                                                                                                                |                                       |                  |
| Capacitance Tolerance                                  | ±20% (M)                                                                                                                                                                                                                                                                                |                                       |                  |
| Leakage Current                                        | I ≤ 3/CV<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)                                                                                                                                                                                   |                                       |                  |
|                                                        | (at 20°C, 120Hz)                                                                                                                                                                                                                                                                        |                                       |                  |
| Dissipation Factor (tan δ)                             | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                        | 400 & 450V                            |                  |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                            | 0.20                                  | (at 20°C, 120Hz) |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                        | 400 & 450V                            |                  |
|                                                        | Z(-25°C)/Z(+20°C)                                                                                                                                                                                                                                                                       | 8                                     | (at 120Hz)       |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 3,000 hours at 125°C.                                         |                                       |                  |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                      | ≤ ±20% of the initial value           |                  |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                            | ≤ 200% of the initial specified value |                  |
|                                                        | Leakage current                                                                                                                                                                                                                                                                         | ≤ The initial specified value         |                  |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 125°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                       |                  |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                      | ≤ ±15% of the initial value           |                  |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                            | ≤ 150% of the initial specified value |                  |
|                                                        | Leakage current                                                                                                                                                                                                                                                                         | ≤ The initial specified value         |                  |

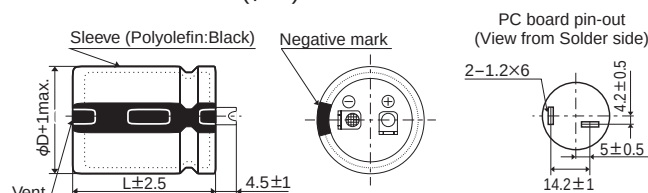
## DIMENSIONS [mm]

- Terminal Code : VS (φ30, φ35) : Standard

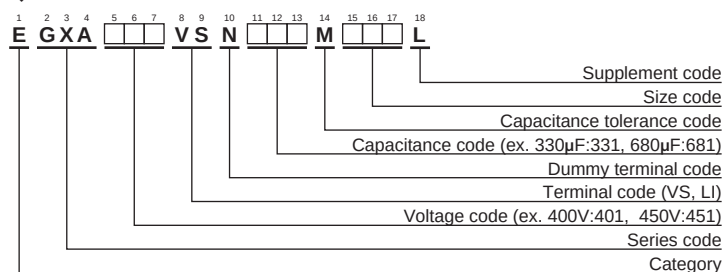


The standard design has no plastic disc.

- Terminal Code : LI (φ35)



## PART NUMBERING SYSTEM



Please refer to "Product code guide (snap-in type)"



## GXA Series

### ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>125°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>125°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|
| 400                      | 270         | 30 × 30               | 0.20  | 1.24                                               | EGXA401VSN271MR30L | 450                      | 220         | 30 × 30               | 0.20  | 1.12                                               | EGXA451VSN221MR30L |
|                          | 330         | 30 × 35               | 0.20  | 1.41                                               | EGXA401VSN331MR35L |                          | 270         | 30 × 35               | 0.20  | 1.27                                               | EGXA451VSN271MR35L |
|                          | 330         | 35 × 30               | 0.20  | 1.48                                               | EGXA401VSN331MA30L |                          | 270         | 30 × 40               | 0.20  | 1.31                                               | EGXA451VSN271MR40L |
|                          | 390         | 30 × 40               | 0.20  | 1.57                                               | EGXA401VSN391MR40L |                          | 270         | 35 × 30               | 0.20  | 1.34                                               | EGXA451VSN271MA30L |
|                          | 390         | 30 × 45               | 0.20  | 1.61                                               | EGXA401VSN391MR45L |                          | 330         | 30 × 45               | 0.20  | 1.48                                               | EGXA451VSN331MR45L |
|                          | 390         | 35 × 35               | 0.20  | 1.64                                               | EGXA401VSN391MA35L |                          | 330         | 35 × 35               | 0.20  | 1.51                                               | EGXA451VSN331MA35L |
|                          | 470         | 30 × 50               | 0.20  | 1.80                                               | EGXA401VSN471MR50L |                          | 390         | 30 × 50               | 0.20  | 1.64                                               | EGXA451VSN391MR50L |
|                          | 470         | 35 × 40               | 0.20  | 1.86                                               | EGXA401VSN471MA40L |                          | 390         | 35 × 40               | 0.20  | 1.70                                               | EGXA451VSN391MA40L |
|                          | 560         | 30 × 55               | 0.20  | 2.01                                               | EGXA401VSN561MR55L |                          | 470         | 30 × 55               | 0.20  | 1.84                                               | EGXA451VSN471MR55L |
|                          | 560         | 30 × 60               | 0.20  | 2.04                                               | EGXA401VSN561MR60L |                          | 470         | 30 × 60               | 0.20  | 1.87                                               | EGXA451VSN471MR60L |
|                          | 560         | 35 × 45               | 0.20  | 2.08                                               | EGXA401VSN561MA45L |                          | 470         | 35 × 45               | 0.20  | 1.91                                               | EGXA451VSN471MA45L |
|                          | 680         | 35 × 50               | 0.20  | 2.34                                               | EGXA401VSN681MA50L |                          | 560         | 35 × 50               | 0.20  | 2.13                                               | EGXA451VSN561MA50L |
|                          | 680         | 35 × 55               | 0.20  | 2.39                                               | EGXA401VSN681MA55L |                          | 560         | 35 × 55               | 0.20  | 2.17                                               | EGXA451VSN561MA55L |
|                          | 820         | 35 × 60               | 0.20  | 2.67                                               | EGXA401VSN821MA60L |                          | 680         | 35 × 60               | 0.20  | 2.43                                               | EGXA451VSN681MA60L |

### ◆RATED RIPPLE CURRENT MULTIPLIERS

#### ●Frequency Multipliers

| Frequency(Hz)            | 50   | 120  | 300  | 1k   | 10k  | 50k  |
|--------------------------|------|------|------|------|------|------|
| 400 & 450V <sub>dc</sub> | 0.77 | 1.00 | 1.16 | 1.30 | 1.41 | 1.43 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.



## CHA Series

- Doesn't spark with DC over voltage
- Downsized from current KLG series
- Endurance with ripple current : 2,000 hours at 105°C
- Non solvent resistant type
- RoHS2 Compliant

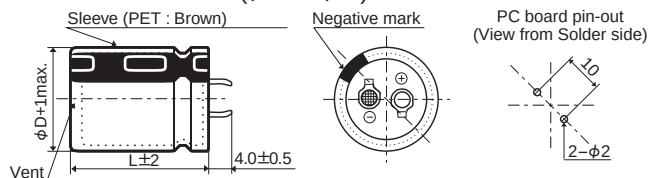


### SPECIFICATIONS

| Items                                                 | Characteristics                                                                                                                                                                                                                                                                       |                                       |                 |
|-------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-----------------|
| Category                                              |                                                                                                                                                                                                                                                                                       |                                       |                 |
| Temperature Range                                     | -25 to +105℃                                                                                                                                                                                                                                                                          |                                       |                 |
| Rated Voltage Range                                   | 200 to 450V <sub>dc</sub>                                                                                                                                                                                                                                                             |                                       |                 |
| Capacitance Tolerance                                 | ± 20% (M)                                                                                                                                                                                                                                                                             |                                       | (at 20℃, 120Hz) |
| Leakage Current                                       | I≤3√CV<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V <sub>dc</sub> ) (at 20℃ after 5 minutes)                                                                                                                                           |                                       |                 |
| Dissipation Factor (tan δ )                           | 200V <sub>dc</sub> : 0.15 max. (0.20 max. for φ D=35mm)<br>400V <sub>dc</sub> : 0.15 max.                                                                                                                                                                                             |                                       | (at 20℃, 120Hz) |
| Low Temperature Characteristics (Max.Impedance Ratio) | Rated Voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 200 to 450V                           | (at 120Hz)      |
|                                                       | Z(-25℃) / Z(+20℃)                                                                                                                                                                                                                                                                     | 4                                     |                 |
| ESL                                                   | 50nH max.                                                                                                                                                                                                                                                                             |                                       | (at 20℃, 1MHz)  |
| Endurance                                             | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 2,000 hours at 105℃.                                         |                                       |                 |
|                                                       | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ± 20% of the initial value          |                 |
|                                                       | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤ 200% of the initial specified value |                 |
|                                                       | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value         |                 |
| Shelf Life                                            | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                       |                 |
|                                                       | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ± 15% of the initial value          |                 |
|                                                       | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤ 150% of the initial specified value |                 |
|                                                       | Leakage current                                                                                                                                                                                                                                                                       | ≤ The initial specified value         |                 |

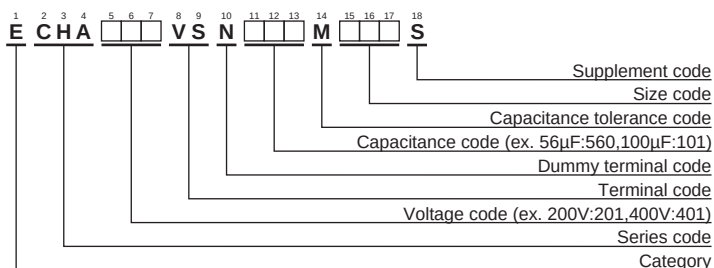
### DIMENSIONS [mm]

- Terminal Code : VS (φ22 to φ35)



The standard design has no plastic disc.

### PART NUMBERING SYSTEM



Please refer to "Product code guide (snap-in type)"

### RATED RIPPLE CURRENT MULTIPLIERS

- Frequency Multipliers

| Rated Voltage(V <sub>dc</sub> ) | 50   | 120  | 300  | 1k   | 10k  | 50k  |
|---------------------------------|------|------|------|------|------|------|
| 200, 250                        | 0.81 | 1.00 | 1.17 | 1.32 | 1.45 | 1.50 |
| 400, 450                        | 0.77 | 1.00 | 1.16 | 1.30 | 1.41 | 1.43 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.



## CHA Series

### ◆STANDARD RATINGS

| WV (V <sub>dc</sub> ) | Cap (μF) | Case size φD×L(mm) | tan δ | Rated ripple current (Arms/ 105°C, 120Hz) | Part No.           | WV (V <sub>dc</sub> ) | Cap (μF) | Case size φD×L(mm) | tan δ | Rated ripple current (Arms/ 105°C, 120Hz) | Part No.           |
|-----------------------|----------|--------------------|-------|-------------------------------------------|--------------------|-----------------------|----------|--------------------|-------|-------------------------------------------|--------------------|
| 200                   | 180      | 22 × 20            | 0.15  | 0.82                                      | ECHA201VSN181MP20S | 250                   | 680      | 35 × 30            | 0.20  | 2.19                                      | ECHA251VSN681MA30S |
|                       | 220      | 22 × 20            | 0.15  | 0.90                                      | ECHA201VSN221MP20S |                       | 820      | 30 × 45            | 0.15  | 2.39                                      | ECHA251VSN821MR45S |
|                       | 270      | 22 × 25            | 0.15  | 1.02                                      | ECHA201VSN271MP25S |                       | 820      | 35 × 35            | 0.20  | 2.42                                      | ECHA251VSN821MA35S |
|                       | 330      | 22 × 30            | 0.15  | 1.20                                      | ECHA201VSN331MP30S | 400                   | 56       | 22 × 20            | 0.15  | 0.45                                      | ECHA401VSN560MP20S |
|                       | 330      | 25.4 × 25          | 0.15  | 1.20                                      | ECHA201VSN331MQ25S |                       | 68       | 22 × 20            | 0.15  | 0.51                                      | ECHA401VSN680MP20S |
|                       | 390      | 22 × 30            | 0.15  | 1.35                                      | ECHA201VSN391MP30S |                       | 82       | 22 × 25            | 0.15  | 0.58                                      | ECHA401VSN820MP25S |
|                       | 390      | 25.4 × 25          | 0.15  | 1.35                                      | ECHA201VSN391MQ25S |                       | 100      | 22 × 25            | 0.15  | 0.66                                      | ECHA401VSN101MP25S |
|                       | 470      | 22 × 35            | 0.15  | 1.45                                      | ECHA201VSN471MP35S |                       | 100      | 25.4 × 25          | 0.15  | 0.66                                      | ECHA401VSN101MQ25S |
|                       | 470      | 25.4 × 30          | 0.15  | 1.45                                      | ECHA201VSN471MQ30S |                       | 120      | 22 × 30            | 0.15  | 0.76                                      | ECHA401VSN121MP30S |
|                       | 470      | 30 × 25            | 0.15  | 1.47                                      | ECHA201VSN471MR25S |                       | 120      | 25.4 × 25          | 0.15  | 0.76                                      | ECHA401VSN121MQ25S |
|                       | 560      | 22 × 40            | 0.15  | 1.62                                      | ECHA201VSN561MP40S |                       | 150      | 22 × 35            | 0.15  | 0.85                                      | ECHA401VSN151MP35S |
|                       | 560      | 25.4 × 30          | 0.15  | 1.60                                      | ECHA201VSN561MQ30S |                       | 150      | 25.4 × 30          | 0.15  | 0.85                                      | ECHA401VSN151MQ30S |
|                       | 560      | 30 × 25            | 0.15  | 1.60                                      | ECHA201VSN561MR25S |                       | 150      | 30 × 25            | 0.15  | 0.85                                      | ECHA401VSN151MR25S |
|                       | 680      | 25.4 × 35          | 0.15  | 1.82                                      | ECHA201VSN681MQ35S |                       | 180      | 22 × 40            | 0.15  | 0.94                                      | ECHA401VSN181MP40S |
|                       | 680      | 30 × 30            | 0.15  | 1.81                                      | ECHA201VSN681MR30S |                       | 180      | 25.4 × 35          | 0.15  | 0.95                                      | ECHA401VSN181MQ35S |
|                       | 680      | 35 × 25            | 0.20  | 1.86                                      | ECHA201VSN681MA25S |                       | 180      | 30 × 25            | 0.15  | 0.95                                      | ECHA401VSN181MR25S |
|                       | 820      | 25.4 × 45          | 0.15  | 2.11                                      | ECHA201VSN821MQ45S |                       | 220      | 25.4 × 35          | 0.15  | 1.24                                      | ECHA401VSN221MQ35S |
|                       | 820      | 30 × 35            | 0.15  | 2.11                                      | ECHA201VSN821MR35S |                       | 220      | 30 × 30            | 0.15  | 1.24                                      | ECHA401VSN221MR30S |
|                       | 820      | 35 × 25            | 0.20  | 2.11                                      | ECHA201VSN821MA25S |                       | 220      | 35 × 25            | 0.15  | 1.24                                      | ECHA401VSN221MA25S |
|                       | 1,000    | 30 × 35            | 0.15  | 2.40                                      | ECHA201VSN102MR35S |                       | 270      | 25.4 × 45          | 0.15  | 1.30                                      | ECHA401VSN271MQ45S |
|                       | 1,000    | 35 × 30            | 0.20  | 2.40                                      | ECHA201VSN102MA30S |                       | 270      | 30 × 35            | 0.15  | 1.30                                      | ECHA401VSN271MR35S |
|                       | 1,200    | 30 × 45            | 0.15  | 2.69                                      | ECHA201VSN122MR45S | 450                   | 270      | 35 × 25            | 0.15  | 1.30                                      | ECHA401VSN271MA25S |
| 250                   | 1,200    | 35 × 35            | 0.20  | 2.65                                      | ECHA201VSN122MA35S |                       | 330      | 30 × 35            | 0.15  | 1.45                                      | ECHA401VSN331MR35S |
|                       | 1,500    | 35 × 45            | 0.20  | 2.96                                      | ECHA201VSN152MA45S |                       | 330      | 30 × 40            | 0.15  | 1.47                                      | ECHA401VSN331MR40S |
|                       | 120      | 22 × 20            | 0.15  | 0.68                                      | ECHA251VSN121MP20S |                       | 330      | 35 × 30            | 0.15  | 1.47                                      | ECHA401VSN331MA30S |
|                       | 180      | 22 × 25            | 0.15  | 0.87                                      | ECHA251VSN181MP25S |                       | 390      | 30 × 40            | 0.15  | 1.60                                      | ECHA401VSN391MR40S |
|                       | 180      | 25.4 × 20          | 0.15  | 0.93                                      | ECHA251VSN181MQ20S |                       | 390      | 35 × 35            | 0.15  | 1.61                                      | ECHA401VSN391MA35S |
|                       | 220      | 22 × 30            | 0.15  | 1.00                                      | ECHA251VSN221MP30S |                       | 470      | 35 × 40            | 0.15  | 1.84                                      | ECHA401VSN471MA40S |
|                       | 270      | 22 × 35            | 0.15  | 1.14                                      | ECHA251VSN271MP35S |                       | 82       | 25.4 × 25          | 0.20  | 0.61                                      | ECHA451VSN820MQ25S |
|                       | 270      | 25.4 × 25          | 0.15  | 1.13                                      | ECHA251VSN271MQ25S |                       | 120      | 25.4 × 30          | 0.20  | 0.76                                      | ECHA451VSN121MQ30S |
|                       | 270      | 30 × 20            | 0.15  | 1.25                                      | ECHA251VSN271MR20S |                       | 120      | 30 × 25            | 0.20  | 0.77                                      | ECHA451VSN121MR25S |
|                       | 330      | 22 × 40            | 0.15  | 1.28                                      | ECHA251VSN331MP40S |                       | 150      | 25.4 × 35          | 0.20  | 0.88                                      | ECHA451VSN151MQ35S |
|                       | 330      | 25.4 × 30          | 0.15  | 1.29                                      | ECHA251VSN331MQ30S |                       | 180      | 25.4 × 40          | 0.20  | 0.99                                      | ECHA451VSN181MQ40S |
|                       | 390      | 22 × 45            | 0.15  | 1.42                                      | ECHA251VSN391MP45S |                       | 180      | 30 × 30            | 0.20  | 0.97                                      | ECHA451VSN181MR30S |
|                       | 390      | 25.4 × 35          | 0.15  | 1.46                                      | ECHA251VSN391MQ35S |                       | 180      | 30 × 35            | 0.20  | 1.00                                      | ECHA451VSN181MR35S |
|                       | 390      | 30 × 25            | 0.15  | 1.52                                      | ECHA251VSN391MR25S |                       | 220      | 30 × 35            | 0.20  | 1.30                                      | ECHA451VSN221MR35S |
|                       | 390      | 35 × 20            | 0.20  | 1.62                                      | ECHA251VSN391MA20S |                       | 220      | 35 × 25            | 0.20  | 1.20                                      | ECHA451VSN221MA25S |
|                       | 470      | 25.4 × 40          | 0.15  | 1.64                                      | ECHA251VSN471MQ40S |                       | 270      | 30 × 35            | 0.20  | 1.22                                      | ECHA451VSN271MR35S |
|                       | 470      | 30 × 30            | 0.15  | 1.67                                      | ECHA251VSN471MR30S |                       | 270      | 30 × 40            | 0.20  | 1.28                                      | ECHA451VSN271MR40S |
|                       | 560      | 25.4 × 45          | 0.15  | 1.82                                      | ECHA251VSN561MQ45S |                       | 270      | 35 × 30            | 0.20  | 1.30                                      | ECHA451VSN271MA30S |
|                       | 560      | 30 × 35            | 0.15  | 1.87                                      | ECHA251VSN561MR35S |                       | 330      | 35 × 35            | 0.20  | 1.40                                      | ECHA451VSN331MA35S |
|                       | 560      | 35 × 25            | 0.20  | 1.99                                      | ECHA251VSN561MA25S |                       | 390      | 35 × 40            | 0.20  | 1.60                                      | ECHA451VSN391MA40S |
|                       | 680      | 30 × 40            | 0.15  | 2.12                                      | ECHA251VSN681MR40S |                       | 420      | 35 × 50            | 0.20  | 1.56                                      | ECHA451VSN421MA50S |

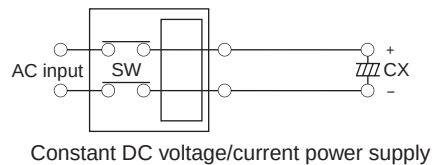
### ◆DC OVERVOLTAGE TEST CONDITIONS

The vent will operate and the capacitor shall become an open circuit without burning materials when the following test DC voltage is applied.

#### ●Test DC voltage

| Rated Voltage      | Nominal Capacitance | Current Limit | Test Voltage           |
|--------------------|---------------------|---------------|------------------------|
| 200V <sub>dc</sub> | <330μF              | 4A            | 300/375V <sub>dc</sub> |
|                    | 330μF ≤ C < 470μF   | 5A            |                        |
|                    | ≥ 470μF             | 7A            |                        |
| 250V <sub>dc</sub> | <330μF              | 4A            | 350/450V <sub>dc</sub> |
|                    | 330μF ≤ C < 470μF   | 5A            |                        |
|                    | ≥ 470μF             | 7A            |                        |
| 400V <sub>dc</sub> | <100μF              | 2A            | 500/600V <sub>dc</sub> |
|                    | 100μF ≤ C < 220μF   | 4A            |                        |
|                    | ≥ 220μF             | 7A            |                        |
| 450V <sub>dc</sub> | <100μF              | 2A            | 550/675V <sub>dc</sub> |
|                    | 100μF ≤ C < 220μF   | 4A            |                        |
|                    | ≥ 220μF             | 7A            |                        |

#### ●Test Circuit



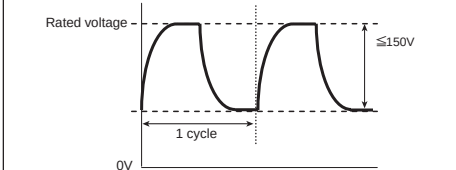


# KMV Series

- For frequently change of regenerative voltage from AC servo amplifier and inverter control
- Ideal use to power supply, specially power source with turn on and off frequently and highly voltage fluctuation
- Improved the resistance for charge and discharge from same dimension of KMQ series
- Endurance with ripple current : 3,000 hours at 105°C
- Rated voltage range : 350 to 450V<sub>dc</sub>, Capacitance 82 to 1,200μF
- Non solvent resistant type
- RoHS2 Compliant



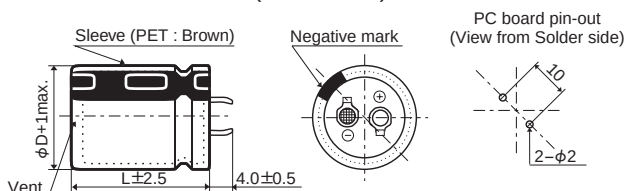
## SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                       |                                                                                      |            |                 |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|------------|-----------------|
| Category                                               | -25 to +105℃                                                                                                                                                                                                                                                                          |                                                                                      |            |                 |
| Temperature Range                                      |                                                                                                                                                                                                                                                                                       |                                                                                      |            |                 |
| Rated Voltage Range                                    | 350 to 450V <sub>dc</sub>                                                                                                                                                                                                                                                             |                                                                                      |            |                 |
| Capacitance Tolerance                                  | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                             |                                                                                      |            |                 |
| Leakage Current                                        | I ≤ 3√CV<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 5 minutes)                                                                                                                                                        |                                                                                      |            |                 |
| Dissipation Factor (tan δ)                             | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 350 & 400V                                                                           | 420 & 450V | (at 20℃, 120Hz) |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.15                                                                                 | 0.20       |                 |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 350 to 450V                                                                          |            | (at 120Hz)      |
|                                                        | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 8                                                                                    |            |                 |
| Charge and Discharge                                   | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to charge and discharge test with the voltage waveform shown below at room temperature (15 to 35℃).                                                                           |                                                                                      |            |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±20% of the initial value                                                          |            |                 |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤200% of the initial specified value                                                 |            |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value                                                         |            |                 |
|                                                        | Frequency                                                                                                                                                                                                                                                                             | 6Hz                                                                                  |            |                 |
|                                                        | Number of cycles                                                                                                                                                                                                                                                                      | 50 million times                                                                     |            |                 |
|                                                        | Voltage waveform                                                                                                                                                                                                                                                                      |  |            |                 |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 3,000 hours at 105℃.                                         |                                                                                      |            |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±20% of the initial value                                                          |            |                 |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤200% of the initial specified value                                                 |            |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value                                                         |            |                 |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                                                                      |            |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±15% of the initial value                                                          |            |                 |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                          | ≤150% of the initial specified value                                                 |            |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value                                                         |            |                 |

\*Please consult with us about charge and discharge conditions.

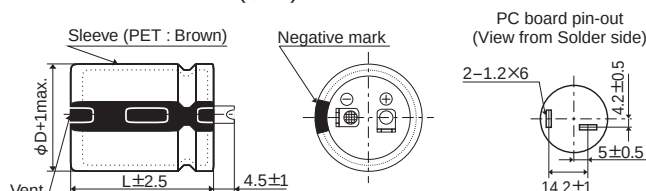
## DIMENSIONS [mm]

- Terminal Code : VS (φ22 to φ35) : Standard



No plastic disk is the standard design.

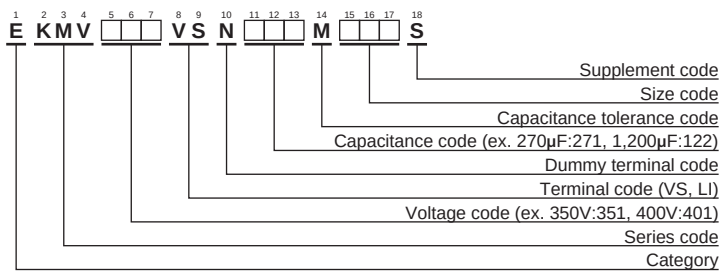
- Terminal Code : LI (φ35)





## KMV Series

## ◆PART NUMBERING SYSTEM



Please refer to "Product code guide (snap-in type)"

## ◆STANDARD RATINGS

| WV (V <sub>dc</sub> ) | Cap (μF) | Case size φD×L(mm) | Rated ripple current (Arms/ 105°C, 120Hz) | Effective value of charge and discharge current (Arms/ 6Hz) | Part No.           |
|-----------------------|----------|--------------------|-------------------------------------------|-------------------------------------------------------------|--------------------|
| 350                   | 120      | 22 × 25            | 0.74                                      | 0.42                                                        | EKMV351VSN121MP25S |
|                       | 150      | 22 × 30            | 0.87                                      | 0.49                                                        | EKMV351VSN151MP30S |
|                       | 180      | 25.4 × 25          | 0.92                                      | 0.54                                                        | EKMV351VSN181MQ25S |
|                       | 220      | 22 × 35            | 1.08                                      | 0.60                                                        | EKMV351VSN221MP35S |
|                       | 220      | 22 × 40            | 1.10                                      | 0.62                                                        | EKMV351VSN221MP40S |
|                       | 220      | 25.4 × 30          | 1.05                                      | 0.61                                                        | EKMV351VSN221MQ30S |
|                       | 270      | 22 × 45            | 1.24                                      | 0.71                                                        | EKMV351VSN271MP45S |
|                       | 270      | 25.4 × 35          | 1.21                                      | 0.70                                                        | EKMV351VSN271MQ35S |
|                       | 270      | 30 × 25            | 1.15                                      | 0.68                                                        | EKMV351VSN271MR25S |
|                       | 330      | 22 × 50            | 1.41                                      | 0.80                                                        | EKMV351VSN331MP50S |
|                       | 330      | 25.4 × 40          | 1.37                                      | 0.80                                                        | EKMV351VSN331MQ40S |
|                       | 330      | 30 × 30            | 1.29                                      | 0.77                                                        | EKMV351VSN331MR30S |
|                       | 330      | 35 × 25            | 1.31                                      | 0.78                                                        | EKMV351VSN331MA25S |
|                       | 390      | 25.4 × 45          | 1.51                                      | 0.89                                                        | EKMV351VSN391MQ45S |
|                       | 390      | 30 × 35            | 1.44                                      | 0.88                                                        | EKMV351VSN391MR35S |
|                       | 470      | 25.4 × 50          | 1.69                                      | 0.99                                                        | EKMV351VSN471MQ50S |
|                       | 470      | 30 × 40            | 1.62                                      | 1.00                                                        | EKMV351VSN471MR40S |
|                       | 470      | 35 × 30            | 1.61                                      | 0.97                                                        | EKMV351VSN471MA30S |
|                       | 560      | 30 × 45            | 1.82                                      | 1.12                                                        | EKMV351VSN561MR45S |
|                       | 560      | 35 × 35            | 1.77                                      | 1.08                                                        | EKMV351VSN561MA35S |
| 400                   | 680      | 30 × 50            | 2.04                                      | 1.27                                                        | EKMV351VSN681MR50S |
|                       | 680      | 35 × 40            | 2.02                                      | 1.25                                                        | EKMV351VSN681MA40S |
|                       | 820      | 35 × 45            | 2.27                                      | 1.41                                                        | EKMV351VSN821MA45S |
|                       | 820      | 35 × 50            | 2.32                                      | 1.46                                                        | EKMV351VSN821MA50S |
|                       | 1,200    | 35 × 60            | 2.88                                      | 1.84                                                        | EKMV351VSN122MA60S |
|                       | 100      | 22 × 25            | 0.69                                      | 0.38                                                        | EKMV401VSN101MP25S |
|                       | 120      | 22 × 30            | 0.79                                      | 0.44                                                        | EKMV401VSN121MP30S |
|                       | 150      | 25.4 × 25          | 0.87                                      | 0.49                                                        | EKMV401VSN151MQ25S |
|                       | 180      | 22 × 35            | 0.99                                      | 0.55                                                        | EKMV401VSN181MP35S |
|                       | 180      | 22 × 40            | 1.01                                      | 0.56                                                        | EKMV401VSN181MP40S |
|                       | 180      | 25.4 × 30          | 0.98                                      | 0.55                                                        | EKMV401VSN181MQ30S |
|                       | 220      | 22 × 45            | 1.14                                      | 0.64                                                        | EKMV401VSN221MP45S |
|                       | 220      | 25.4 × 35          | 1.13                                      | 0.63                                                        | EKMV401VSN221MQ35S |
|                       | 220      | 30 × 25            | 1.10                                      | 0.61                                                        | EKMV401VSN221MR25S |
|                       | 270      | 22 × 50            | 1.30                                      | 0.73                                                        | EKMV401VSN271MP50S |
|                       | 270      | 25.4 × 40          | 1.28                                      | 0.72                                                        | EKMV401VSN271MQ40S |
|                       | 270      | 30 × 30            | 1.22                                      | 0.70                                                        | EKMV401VSN271MR30S |
|                       | 270      | 35 × 25            | 1.26                                      | 0.71                                                        | EKMV401VSN271MA25S |
|                       | 330      | 25.4 × 45          | 1.44                                      | 0.82                                                        | EKMV401VSN331MQ45S |
|                       | 330      | 30 × 35            | 1.38                                      | 0.81                                                        | EKMV401VSN331MR35S |
| 450                   | 390      | 25.4 × 50          | 1.59                                      | 0.91                                                        | EKMV401VSN391MQ50S |
|                       | 390      | 30 × 40            | 1.55                                      | 0.91                                                        | EKMV401VSN391MR40S |
|                       | 390      | 35 × 30            | 1.55                                      | 0.89                                                        | EKMV401VSN391MA30S |
|                       | 470      | 30 × 45            | 1.74                                      | 1.03                                                        | EKMV401VSN471MR45S |
|                       | 470      | 35 × 35            | 1.71                                      | 1.00                                                        | EKMV401VSN471MA35S |
|                       | 560      | 30 × 50            | 1.93                                      | 1.15                                                        | EKMV401VSN561MR50S |
|                       | 560      | 35 × 40            | 1.94                                      | 1.14                                                        | EKMV401VSN561MA40S |
|                       | 680      | 35 × 45            | 2.19                                      | 1.29                                                        | EKMV401VSN681MA45S |
|                       | 820      | 35 × 50            | 2.45                                      | 1.44                                                        | EKMV401VSN821MA50S |
|                       | 1,000    | 35 × 60            | 2.79                                      | 1.70                                                        | EKMV401VSN102MA60S |
|                       | 82       | 22 × 25            | 0.64                                      | 0.34                                                        | EKMV421VSN820MP25S |
|                       | 120      | 22 × 30            | 0.81                                      | 0.44                                                        | EKMV421VSN121MP30S |
|                       | 120      | 25.4 × 25          | 0.81                                      | 0.44                                                        | EKMV421VSN121MQ25S |
|                       | 150      | 22 × 35            | 0.93                                      | 0.50                                                        | EKMV421VSN151MP35S |
|                       | 150      | 25.4 × 30          | 0.93                                      | 0.50                                                        | EKMV421VSN151MQ30S |
|                       | 180      | 22 × 40            | 1.04                                      | 0.56                                                        | EKMV421VSN181MP40S |
|                       | 180      | 22 × 45            | 1.06                                      | 0.58                                                        | EKMV421VSN181MP45S |
|                       | 180      | 25.4 × 35          | 1.06                                      | 0.58                                                        | EKMV421VSN181MQ35S |
|                       | 180      | 30 × 25            | 1.02                                      | 0.56                                                        | EKMV421VSN181MR25S |
|                       | 220      | 22 × 50            | 1.20                                      | 0.66                                                        | EKMV421VSN221MP50S |
|                       | 220      | 25.4 × 40          | 1.20                                      | 0.65                                                        | EKMV421VSN221MQ40S |
| 420                   | 220      | 30 × 30            | 1.14                                      | 0.63                                                        | EKMV421VSN221MR30S |
|                       | 270      | 25.4 × 45          | 1.36                                      | 0.74                                                        | EKMV421VSN271MQ45S |
|                       | 270      | 30 × 35            | 1.29                                      | 0.73                                                        | EKMV421VSN271MR35S |
|                       | 270      | 35 × 25            | 1.26                                      | 0.71                                                        | EKMV421VSN271MA25S |
|                       | 330      | 25.4 × 50          | 1.52                                      | 0.83                                                        | EKMV421VSN331MQ50S |
|                       | 330      | 30 × 40            | 1.47                                      | 0.84                                                        | EKMV421VSN331MR40S |
|                       | 330      | 35 × 30            | 1.42                                      | 0.82                                                        | EKMV421VSN331MA30S |
|                       | 390      | 30 × 45            | 1.64                                      | 0.94                                                        | EKMV421VSN391MR45S |
|                       | 390      | 35 × 35            | 1.56                                      | 0.91                                                        | EKMV421VSN391MA35S |
|                       | 470      | 30 × 50            | 1.83                                      | 1.06                                                        | EKMV421VSN471MR50S |
|                       | 470      | 35 × 40            | 1.78                                      | 1.05                                                        | EKMV421VSN471MA40S |
|                       | 560      | 35 × 45            | 1.98                                      | 1.18                                                        | EKMV421VSN561MA45S |
|                       | 680      | 35 × 50            | 2.23                                      | 1.34                                                        | EKMV421VSN681MA50S |
|                       | 820      | 35 × 60            | 2.52                                      | 1.55                                                        | EKMV421VSN821MA60S |
|                       | 82       | 22 × 25            | 0.64                                      | 0.34                                                        | EKMV451VSN820MP25S |
|                       | 100      | 22 × 30            | 0.72                                      | 0.40                                                        | EKMV451VSN101MP30S |
|                       | 100      | 25.4 × 25          | 0.72                                      | 0.40                                                        | EKMV451VSN101MQ25S |
|                       | 120      | 22 × 35            | 0.81                                      | 0.45                                                        | EKMV451VSN121MP35S |
|                       | 150      | 22 × 40            | 0.93                                      | 0.51                                                        | EKMV451VSN151MP40S |
|                       | 150      | 25.4 × 30          | 0.91                                      | 0.50                                                        | EKMV451VSN151MQ30S |
| 440                   | 150      | 30 × 25            | 0.90                                      | 0.51                                                        | EKMV451VSN151MR25S |
|                       | 180      | 22 × 45            | 1.03                                      | 0.58                                                        | EKMV451VSN181MP45S |
|                       | 180      | 22 × 50            | 1.06                                      | 0.59                                                        | EKMV451VSN181MP50S |
|                       | 180      | 25.4 × 35          | 1.04                                      | 0.57                                                        | EKMV451VSN181MQ35S |
|                       | 220      | 25.4 × 40          | 1.18                                      | 0.65                                                        | EKMV451VSN221MQ40S |
|                       | 220      | 25.4 × 45          | 1.20                                      | 0.67                                                        | EKMV451VSN221MQ45S |
|                       | 220      | 30 × 30            | 1.10                                      | 0.63                                                        | EKMV451VSN221MR30S |
|                       | 220      | 35 × 25            | 1.12                                      | 0.64                                                        | EKMV451VSN221MA25S |
|                       | 270      | 25.4 × 50          | 1.35                                      | 0.75                                                        | EKMV451VSN271MQ50S |
|                       | 270      | 30 × 35            | 1.25                                      | 0.73                                                        | EKMV451VSN271MR35S |
|                       | 270      | 35 × 30            | 1.27                                      | 0.74                                                        | EKMV451VSN271MA30S |
|                       | 330      | 30 × 40            | 1.42                                      | 0.84                                                        | EKMV451VSN331MR40S |
|                       | 330      | 30 × 45            | 1.46                                      | 0.87                                                        | EKMV451VSN331MR45S |
|                       | 330      | 35 × 35            | 1.41                                      | 0.84                                                        | EKMV451VSN331MA35S |
|                       | 390      | 30 × 50            | 1.61                                      | 0.97                                                        | EKMV451VSN391MR50S |
|                       | 390      | 35 × 40            | 1.59                                      | 0.96                                                        | EKMV451VSN391MA40S |
|                       | 470      | 35 × 45            | 1.79                                      | 1.08                                                        | EKMV451VSN471MA45S |
|                       | 560      | 35 × 50            | 2.00                                      | 1.22                                                        | EKMV451VSN561MA50S |
|                       | 680      | 35 × 60            | 2.26                                      | 1.42                                                        | EKMV451VSN681MA60S |



## KMV Series

### ◆RATED RIPPLE CURRENT MULTIPLIERS

#### ● Frequency Multipliers

| Frequency(Hz) | 50   | 120  | 300  | 1k   | 10k  | 50k  |
|---------------|------|------|------|------|------|------|
| Coefficient   | 0.77 | 1.00 | 1.16 | 1.30 | 1.41 | 1.43 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

## Product code guide (Screw mount terminal type)

(Example : KMH series, 400V-3,300μF, φ 63.5×120L, Without mounting clamp)

Please refer to the following table



| Contents | Code | Series | Code | Type           | Code | Tol.(%) | Code | Sleeve Material | Plastic disk | Code |
|----------|------|--------|------|----------------|------|---------|------|-----------------|--------------|------|
| Polar    | E    | KMH    | KMH  | Screw terminal | LG   | ±20     | M    | PVC             | Provided     | U    |

|          |             |   |   |              |   |   |               |                     |    |                  |    |    |                       |           |    |                 |    |
|----------|-------------|---|---|--------------|---|---|---------------|---------------------|----|------------------|----|----|-----------------------|-----------|----|-----------------|----|
| 1        | 2           | 3 | 4 | 5            | 6 | 7 | 8             | 9                   | 10 | 11               | 12 | 13 | 14                    | 15        | 16 | 17              | 18 |
| E        | K           | M | H | 4            | 0 | 1 | L             | G                   | N  | 3                | 3  | 2  | M                     | D         | C  | 0               | U  |
| Category | Series code |   |   | Voltage code |   |   | Terminal code | Mounting clamp code |    | Capacitance code |    |    | Capacitance tolerance | Size code |    | Supplement code |    |

| Voltage(V) | Code |
|------------|------|
| 10         | 100  |
| 25         | 250  |
| 100        | 101  |
| 250        | 251  |
| 315        | 3B1  |
| 525        | 5C1  |
| ⋮          | ⋮    |

| Type          | Code |
|---------------|------|
|               | B    |
|               | C    |
| Without clamp | N    |

| Cap.(μF) | Code |
|----------|------|
| 100      | 101  |
| 470      | 471  |
| 1,000    | 102  |
| 4,700    | 472  |
| 10,000   | 103  |
| 47,000   | 473  |
| 100,000  | 104  |
| ⋮        | ⋮    |

| φD(mm) | Code |
|--------|------|
| 35     | A    |
| 50     | C    |
| 63.5   | D    |
| 76.2   | E    |
| 89     | F    |
| 100    | G    |

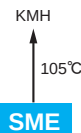
| L(mm) | Code |
|-------|------|
| 50    | 50   |
| 55    | 55   |
| 60    | 60   |
| 65    | 65   |
| 75    | 75   |
| 80    | 80   |
| 85    | 85   |
| 90    | 90   |
| 95    | 95   |
| 96    | 96   |
| 100   | A0   |
| 105   | A5   |
| 110   | B0   |
| 115   | B5   |
| 120   | C0   |
| 125   | C5   |
| 130   | D0   |
| 140   | E0   |
| 145   | E5   |
| 155   | F5   |
| 170   | H0   |
| 190   | K0   |
| 210   | M0   |
| 220   | N0   |
| 250   | R0   |
| 270   | T0   |

\*Refer to the appendix (Part number) for codes not listed here.



## SME Series

- Endurance with ripple current : 2,000 hours at 85°C
- RoHS2 Compliant

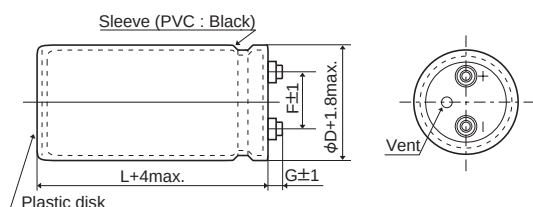


### SPECIFICATIONS

| Items                           | Characteristics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |                             |              |                                      |                 |                               |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|--------------|--------------------------------------|-----------------|-------------------------------|
| Category                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |                             |              |                                      |                 |                               |
| Temperature Range               | -40 to +85°C (10 to 100V <sub>dc</sub> )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |                             |              |                                      |                 |                               |
| Rated Voltage Range             | 10 to 100V <sub>dc</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |                             |              |                                      |                 |                               |
| Capacitance Tolerance           | ±20% (M) (at 20°C, 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                    |                             |              |                                      |                 |                               |
| Leakage Current                 | I=0.02CV or 5mA, whichever is smaller.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C after 5 minutes)                                                                                                                                                                                                                                                                                                                                                                                       |                    |                             |              |                                      |                 |                               |
| Dissipation Factor (tan δ)      | Shall not exceed the values shown in the STANDARD RATINGS (at 20°C, 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                    |                             |              |                                      |                 |                               |
| Low Temperature Characteristics | Capacitance change C(-25°C)/C(+20°C)≥0.7 (at 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                    |                             |              |                                      |                 |                               |
| Insulation Resistance           | When measured between the terminals that are connected to each other and to the mounting clamp on the insulating sleeve covering the case by using an insulation resistance meter of 500V <sub>dc</sub> , the insulation resistance shall not be less than 100MΩ.                                                                                                                                                                                                                                                                                   |                    |                             |              |                                      |                 |                               |
| Insulation Withstanding Voltage | When a voltage of 2,000V <sub>ac</sub> is applied for 1 minute between the terminals that are connected to each other and to the mounting clamp on the insulating sleeve covering the case, there shall not be electrical damage.                                                                                                                                                                                                                                                                                                                   |                    |                             |              |                                      |                 |                               |
| Endurance                       | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 2,000 hours at 85°C.<br><table border="1"> <tr> <td>Capacitance change</td><td>≤ ±20% of the initial value</td></tr> <tr> <td>D.F. (tan δ)</td><td>≤200% of the initial specified value</td></tr> <tr> <td>Leakage current</td><td>≤ The initial specified value</td></tr> </table>                                       | Capacitance change | ≤ ±20% of the initial value | D.F. (tan δ) | ≤200% of the initial specified value | Leakage current | ≤ The initial specified value |
| Capacitance change              | ≤ ±20% of the initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                             |              |                                      |                 |                               |
| D.F. (tan δ)                    | ≤200% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    |                             |              |                                      |                 |                               |
| Leakage current                 | ≤ The initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |                             |              |                                      |                 |                               |
| Shelf Life                      | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 500 hours at 85°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4.<br><table border="1"> <tr> <td>Capacitance change</td><td>≤ ±20% of the initial value</td></tr> <tr> <td>D.F. (tan δ)</td><td>≤150% of the initial specified value</td></tr> <tr> <td>Leakage current</td><td>≤ The initial specified value</td></tr> </table> | Capacitance change | ≤ ±20% of the initial value | D.F. (tan δ) | ≤150% of the initial specified value | Leakage current | ≤ The initial specified value |
| Capacitance change              | ≤ ±20% of the initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                             |              |                                      |                 |                               |
| D.F. (tan δ)                    | ≤150% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    |                             |              |                                      |                 |                               |
| Leakage current                 | ≤ The initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |                             |              |                                      |                 |                               |

### DIMENSIONS (Screw-Mount) [mm]

#### Terminal Code : LG



φ35 to φ63.5 : G=6  
φ76.2 & φ89 : G=5

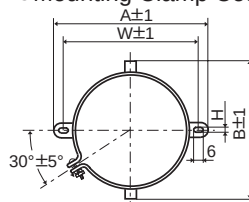
<Screw specifications>

Plus hexagon-headed screw :M5×0.8×10

Maximum screw tightening torque :3.23Nm

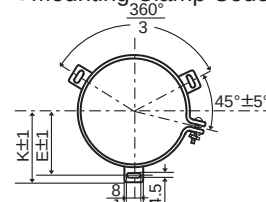
\* The screw and the mounting clamp are separately supplied and not attached to the product.

#### Mounting Clamp Code : B



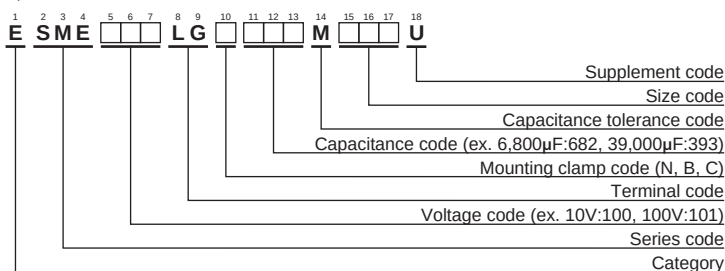
| φD   | A     | B    | W    | H   | F    |
|------|-------|------|------|-----|------|
| 35   | 58.0  | 44.0 | 48.0 | 3.5 | 12.7 |
| 50   | 78.0  | 64.0 | 68.0 | 4.5 | 22.4 |
| 63.5 | 90.0  | 76.0 | 80.0 | 4.5 | 28.0 |
| 76.2 | 104.5 | 90.0 | 93.5 | 4.5 | 31.5 |

#### Mounting Clamp Code : C



| φD   | E    | K    | J    | F    |
|------|------|------|------|------|
| 50   | 32.5 | 37.0 | 14.0 | 22.4 |
| 63.5 | 38.1 | 43.5 | 14.0 | 28.0 |
| 76.2 | 44.5 | 50.0 | 14.0 | 31.5 |
| 89   | 50.8 | 56.5 | 16.0 | 31.5 |

### PART NUMBERING SYSTEM



Please refer to "Product code guide (screw-mount terminal type)"



## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>85°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>85°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|---------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|---------------------------------------------------|--------------------|
| 10                       | 39,000      | 35 × 50               | 0.60  | 4.70                                              | ESME100LGB393MA50U | 50                       | 10,000      | 35 × 50               | 0.25  | 4.10                                              | ESME500LGB103MA50U |
|                          | 82,000      | 35 × 80               | 0.60  | 7.40                                              | ESME100LGB823MA80U |                          | 18,000      | 35 × 80               | 0.25  | 5.20                                              | ESME500LGB183MA80U |
|                          | 100,000     | 35 × 100              | 0.70  | 8.00                                              | ESME100LGB104MAA0U |                          | 22,000      | 35 × 100              | 0.30  | 5.90                                              | ESME500LGB223MAA0U |
|                          | 120,000     | 35 × 120              | 0.70  | 9.40                                              | ESME100LGB124MAC0U |                          | 27,000      | 35 × 120              | 0.35  | 6.60                                              | ESME500LGB273MAC0U |
|                          | 150,000     | 50 × 80               | 0.90  | 9.80                                              | ESME100LGC154MC80U |                          | 39,000      | 50 × 80               | 0.40  | 7.40                                              | ESME500LGC393MC80U |
|                          | 220,000     | 50 × 100              | 1.00  | 12.1                                              | ESME100LGC224MCA0U |                          | 56,000      | 50 × 100              | 0.40  | 9.80                                              | ESME500LGC563MCA0U |
|                          | 270,000     | 50 × 120              | 1.20  | 13.6                                              | ESME100LGC274MCC0U |                          | 68,000      | 50 × 120              | 0.45  | 11.1                                              | ESME500LGC683MCC0U |
|                          | 390,000     | 63.5 × 100            | 1.50  | 15.3                                              | ESME100LGC394MDA0U |                          | 82,000      | 63.5 × 100            | 0.50  | 12.2                                              | ESME500LGC823MDA0U |
|                          | 470,000     | 63.5 × 120            | 2.00  | 16.0                                              | ESME100LGC474MDC0U |                          | 120,000     | 63.5 × 120            | 0.50  | 16.0                                              | ESME500LGC124MDC0U |
|                          | 560,000     | 76.2 × 100            | 2.50  | 17.3                                              | ESME100LGC564MEA0U |                          | 150,000     | 76.2 × 120            | 0.60  | 18.1                                              | ESME500LGC154MEC0U |
| 16                       | 680,000     | 76.2 × 120            | 3.00  | 18.7                                              | ESME100LGC684MEC0U |                          | 180,000     | 76.2 × 140            | 0.70  | 19.5                                              | ESME500LGC184MEE0U |
|                          | 27,000      | 35 × 50               | 0.45  | 4.20                                              | ESME160LGB273MA50U | 63                       | 270,000     | 89 × 140              | 0.80  | 24.6                                              | ESME500LGC274MFE0U |
|                          | 56,000      | 35 × 80               | 0.60  | 6.50                                              | ESME160LGB563MA80U |                          | 5,600       | 35 × 50               | 0.20  | 3.00                                              | ESME630LGB562MA50U |
|                          | 82,000      | 35 × 100              | 0.70  | 8.00                                              | ESME160LGB823MAA0U |                          | 10,000      | 35 × 80               | 0.25  | 4.00                                              | ESME630LGB103MA80U |
|                          | 100,000     | 35 × 120              | 0.70  | 9.60                                              | ESME160LGB104MAC0U |                          | 15,000      | 35 × 100              | 0.25  | 5.30                                              | ESME630LGB153MAA0U |
|                          | 120,000     | 50 × 80               | 0.80  | 9.60                                              | ESME160LGC124MC80U |                          | 18,000      | 35 × 120              | 0.25  | 6.20                                              | ESME630LGB183MAC0U |
|                          | 150,000     | 50 × 100              | 0.90  | 11.2                                              | ESME160LGC154MCA0U |                          | 22,000      | 50 × 80               | 0.30  | 6.50                                              | ESME630LGC223MC80U |
|                          | 220,000     | 50 × 120              | 1.00  | 14.2                                              | ESME160LGC224MCC0U |                          | 33,000      | 50 × 100              | 0.35  | 8.10                                              | ESME630LGC333MCA0U |
|                          | 270,000     | 63.5 × 100            | 1.20  | 15.3                                              | ESME160LGC274MDA0U |                          | 39,000      | 50 × 120              | 0.35  | 9.60                                              | ESME630LGC393MCC0U |
|                          | 330,000     | 63.5 × 120            | 1.30  | 17.1                                              | ESME160LGC334MDC0U |                          | 47,000      | 63.5 × 100            | 0.40  | 10.2                                              | ESME630LGC473MDA0U |
|                          | 390,000     | 76.2 × 100            | 1.60  | 18.0                                              | ESME160LGC394MEA0U |                          | 68,000      | 63.5 × 120            | 0.40  | 13.3                                              | ESME630LGC683MDC0U |
| 25                       | 470,000     | 76.2 × 120            | 1.80  | 19.3                                              | ESME160LGC474MEC0U |                          | 100,000     | 76.2 × 120            | 0.45  | 17.1                                              | ESME630LGC104MEC0U |
|                          | 560,000     | 76.2 × 140            | 2.00  | 20.7                                              | ESME160LGC564MEE0U |                          | 120,000     | 76.2 × 140            | 0.50  | 19.0                                              | ESME630LGC124MEE0U |
|                          | 18,000      | 35 × 50               | 0.35  | 4.00                                              | ESME250LGB183MA50U | 80                       | 150,000     | 89 × 140              | 0.55  | 22.0                                              | ESME630LGC154MFE0U |
|                          | 39,000      | 35 × 80               | 0.40  | 6.20                                              | ESME250LGB393MA80U |                          | 3,300       | 35 × 50               | 0.15  | 2.50                                              | ESME800LGB332MA50U |
|                          | 47,000      | 35 × 100              | 0.40  | 7.40                                              | ESME250LGB473MAA0U |                          | 6,800       | 35 × 80               | 0.20  | 3.70                                              | ESME800LGB682MA80U |
|                          | 56,000      | 35 × 120              | 0.45  | 8.30                                              | ESME250LGB563MAC0U |                          | 10,000      | 35 × 100              | 0.20  | 4.90                                              | ESME800LGB103MAA0U |
|                          | 82,000      | 50 × 80               | 0.50  | 9.70                                              | ESME250LGC823MC80U |                          | 12,000      | 35 × 120              | 0.20  | 5.40                                              | ESME800LGB123MAC0U |
|                          | 100,000     | 50 × 100              | 0.60  | 10.8                                              | ESME250LGC104MCA0U |                          | 15,000      | 50 × 80               | 0.25  | 6.00                                              | ESME800LGC153MC80U |
|                          | 120,000     | 50 × 120              | 0.60  | 12.8                                              | ESME250LGC124MCC0U |                          | 22,000      | 50 × 100              | 0.30  | 7.10                                              | ESME800LGC223MCA0U |
|                          | 180,000     | 63.5 × 100            | 0.75  | 14.7                                              | ESME250LGC184MDA0U |                          | 27,000      | 50 × 120              | 0.30  | 8.60                                              | ESME800LGC273MCC0U |
|                          | 220,000     | 63.5 × 120            | 0.80  | 16.8                                              | ESME250LGC224MDC0U |                          | 33,000      | 63.5 × 100            | 0.35  | 9.30                                              | ESME800LGC333MDA0U |
|                          | 270,000     | 76.2 × 100            | 0.90  | 18.3                                              | ESME250LGC274MEA0U |                          | 47,000      | 63.5 × 120            | 0.35  | 12.0                                              | ESME800LGC473MDC0U |
| 35                       | 330,000     | 76.2 × 120            | 1.00  | 20.7                                              | ESME250LGC334MEC0U |                          | 68,000      | 76.2 × 120            | 0.35  | 15.4                                              | ESME800LGC683MEC0U |
|                          | 390,000     | 76.2 × 140            | 1.20  | 22.1                                              | ESME250LGC394MEE0U | 100                      | 82,000      | 76.2 × 140            | 0.35  | 18.1                                              | ESME800LGC823MEE0U |
|                          | 560,000     | 89 × 140              | 1.50  | 25.8                                              | ESME250LGC564MFE0U |                          | 100,000     | 89 × 140              | 0.40  | 21.0                                              | ESME800LGC104MFE0U |
|                          | 15,000      | 35 × 50               | 0.30  | 3.90                                              | ESME350LGB153MA50U |                          | 2,200       | 35 × 50               | 0.10  | 2.50                                              | ESME101LGB222MA50U |
|                          | 33,000      | 35 × 80               | 0.40  | 6.00                                              | ESME350LGB333MA80U |                          | 4,700       | 35 × 80               | 0.15  | 3.40                                              | ESME101LGB472MA80U |
|                          | 39,000      | 35 × 100              | 0.40  | 7.00                                              | ESME350LGB393MAA0U |                          | 6,800       | 35 × 100              | 0.15  | 4.20                                              | ESME101LGB682MAA0U |
|                          | 47,000      | 35 × 120              | 0.45  | 8.00                                              | ESME350LGB473MAC0U |                          | 8,200       | 35 × 120              | 0.15  | 5.00                                              | ESME101LGB822MAC0U |
|                          | 68,000      | 50 × 80               | 0.50  | 9.00                                              | ESME350LGC683MC80U |                          | 10,000      | 50 × 80               | 0.20  | 5.20                                              | ESME101LGC103MC80U |
|                          | 82,000      | 50 × 100              | 0.55  | 10.3                                              | ESME350LGC823MCA0U |                          | 18,000      | 50 × 120              | 0.20  | 8.10                                              | ESME101LGC183MCC0U |
|                          | 120,000     | 50 × 120              | 0.60  | 12.8                                              | ESME350LGC124MCC0U |                          | 22,000      | 63.5 × 100            | 0.25  | 8.60                                              | ESME101LGC223MDA0U |
|                          | 150,000     | 63.5 × 100            | 0.70  | 14.0                                              | ESME350LGC154MDA0U |                          | 27,000      | 63.5 × 120            | 0.25  | 10.3                                              | ESME101LGC273MDC0U |
| 100                      | 180,000     | 63.5 × 120            | 0.70  | 16.6                                              | ESME350LGC184MDC0U |                          | 33,000      | 76.2 × 100            | 0.25  | 11.1                                              | ESME101LGC333MEA0U |
|                          | 220,000     | 76.2 × 100            | 0.75  | 17.3                                              | ESME350LGC224MEA0U |                          | 39,000      | 76.2 × 120            | 0.25  | 12.4                                              | ESME101LGC393MEC0U |
|                          | 270,000     | 76.2 × 120            | 0.80  | 19.8                                              | ESME350LGC274MEC0U |                          | 47,000      | 76.2 × 140            | 0.25  | 14.3                                              | ESME101LGC473MEE0U |
|                          | 330,000     | 76.2 × 140            | 0.90  | 22.5                                              | ESME350LGC334MEE0U |                          | 68,000      | 89 × 140              | 0.30  | 18.0                                              | ESME101LGC683MFE0U |
|                          | 470,000     | 89 × 140              | 1.00  | 28.3                                              | ESME350LGC474MFE0U |                          |             |                       |       |                                                   |                    |
|                          |             |                       |       |                                                   |                    |                          |             |                       |       |                                                   |                    |
|                          |             |                       |       |                                                   |                    |                          |             |                       |       |                                                   |                    |
|                          |             |                       |       |                                                   |                    |                          |             |                       |       |                                                   |                    |

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ● Frequency Multipliers

| Rated voltage<br>(V <sub>dc</sub> ) | Case diameter<br>(mm) | Frequency (Hz) |      |      |      |      |      |
|-------------------------------------|-----------------------|----------------|------|------|------|------|------|
|                                     |                       | 50             | 120  | 300  | 1k   | 10k  | 50k  |
| 10 to 50                            | φ35 to φ89            | 0.95           | 1.00 | 1.03 | 1.05 | 1.09 | 1.12 |
| 63 & 80                             | φ35                   | 0.90           | 1.00 | 1.06 | 1.10 | 1.18 | 1.22 |
|                                     | φ50 to φ89            | 0.95           | 1.00 | 1.03 | 1.05 | 1.09 | 1.12 |
| 100                                 | φ35                   | 0.82           | 1.00 | 1.12 | 1.22 | 1.30 | 1.33 |
|                                     | φ50                   | 0.90           | 1.00 | 1.06 | 1.10 | 1.18 | 1.22 |
|                                     | φ63.5 to φ89          | 0.95           | 1.00 | 1.03 | 1.05 | 1.09 | 1.12 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.





# LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS Standard screw terminals, 105°C

## KMQ Series

- Endurance with ripple current : 2,000 hours at 105°C
- Downsized and high ripple current from KMH series
- RoHS2 Compliant

KMQ

Downsized  
Higher ripple  
KMH

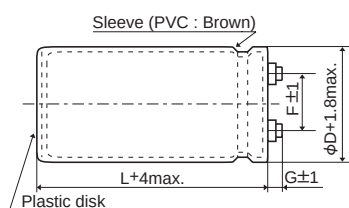


### SPECIFICATIONS

| Items                           | Characteristics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |                             |              |                                       |                 |                               |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|--------------|---------------------------------------|-----------------|-------------------------------|
| Category                        | -25 to +105°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                             |              |                                       |                 |                               |
| Temperature Range               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |                             |              |                                       |                 |                               |
| Rated Voltage Range             | 315 to 450V <sub>dc</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                    |                             |              |                                       |                 |                               |
| Capacitance Tolerance           | ±20% (M) (at 20°C, 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                    |                             |              |                                       |                 |                               |
| Leakage Current                 | I=0.02CV or 5mA, whichever is smaller.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C after 5 minutes)                                                                                                                                                                                                                                                                                                                                                                                         |                    |                             |              |                                       |                 |                               |
| Dissipation Factor (tan δ)      | Shall not exceed the values shown in the STANDARD RATINGS (at 20°C, 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |                             |              |                                       |                 |                               |
| Low Temperature Characteristics | Capacitance change $C(-25^{\circ}\text{C})/C(+20^{\circ}\text{C}) \geq 0.7$ (at 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    |                             |              |                                       |                 |                               |
| Insulation Resistance           | When measured between the terminals that are connected to each other and to the mounting clamp on the insulating sleeve covering the case by using an insulation resistance meter of 500V <sub>dc</sub> , the insulation resistance shall not be less than 100MΩ.                                                                                                                                                                                                                                                                                     |                    |                             |              |                                       |                 |                               |
| Insulation Withstanding Voltage | When a voltage of 2,000V <sub>ac</sub> is applied for 1 minute between the terminals that are connected to each other and to the mounting clamp on the insulating sleeve covering the case, there shall not be electrical damage.                                                                                                                                                                                                                                                                                                                     |                    |                             |              |                                       |                 |                               |
| Endurance                       | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 2,000 hours at 105°C.<br><table border="1"> <tr> <td>Capacitance change</td><td>≤ ±20% of the initial value</td></tr> <tr> <td>D.F. (tan δ)</td><td>≤ 200% of the initial specified value</td></tr> <tr> <td>Leakage current</td><td>≤ The initial specified value</td></tr> </table>                                       | Capacitance change | ≤ ±20% of the initial value | D.F. (tan δ) | ≤ 200% of the initial specified value | Leakage current | ≤ The initial specified value |
| Capacitance change              | ≤ ±20% of the initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                    |                             |              |                                       |                 |                               |
| D.F. (tan δ)                    | ≤ 200% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                    |                             |              |                                       |                 |                               |
| Leakage current                 | ≤ The initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                             |              |                                       |                 |                               |
| Shelf Life                      | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 500 hours at 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4.<br><table border="1"> <tr> <td>Capacitance change</td><td>≤ ±20% of the initial value</td></tr> <tr> <td>D.F. (tan δ)</td><td>≤ 200% of the initial specified value</td></tr> <tr> <td>Leakage current</td><td>≤ The initial specified value</td></tr> </table> | Capacitance change | ≤ ±20% of the initial value | D.F. (tan δ) | ≤ 200% of the initial specified value | Leakage current | ≤ The initial specified value |
| Capacitance change              | ≤ ±20% of the initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                    |                             |              |                                       |                 |                               |
| D.F. (tan δ)                    | ≤ 200% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                    |                             |              |                                       |                 |                               |
| Leakage current                 | ≤ The initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                             |              |                                       |                 |                               |

### DIMENSIONS (Screw-Mount) [mm]

Terminal Code : LG



φ35 to φ63.5 : G=6  
φ76.2 & φ89 : G=5

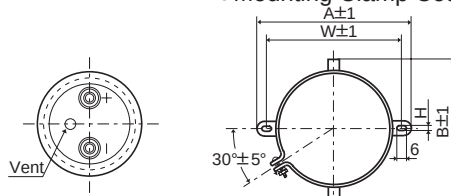
<Screw specifications>

Plus hexagon-headed screw : M5×0.8×10

Maximum screw tightening torque : 3.23Nm

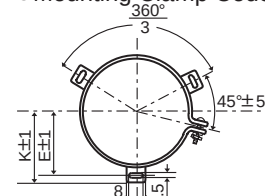
\* The screw and the mounting clamp are separately supplied and not attached to the product.

Mounting Clamp Code : B



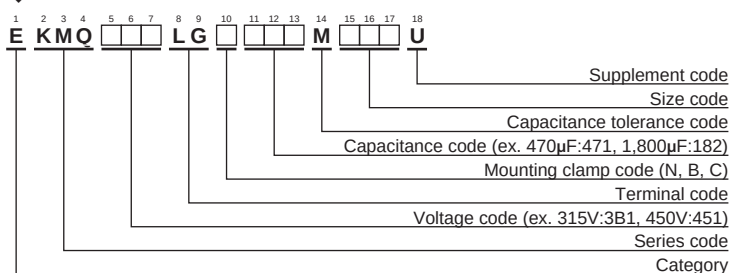
| φD   | A     | B    | W    | H   | F    |
|------|-------|------|------|-----|------|
| 35   | 58.0  | 44.0 | 48.0 | 3.5 | 12.7 |
| 50   | 78.0  | 64.0 | 68.0 | 4.5 | 22.4 |
| 63.5 | 90.0  | 76.0 | 80.0 | 4.5 | 28.0 |
| 76.2 | 104.5 | 90.0 | 93.5 | 4.5 | 31.5 |

Mounting Clamp Code : C



| φD   | E    | K    | J    | F    |
|------|------|------|------|------|
| 50   | 32.5 | 37.0 | 14.0 | 22.4 |
| 63.5 | 38.1 | 43.5 | 14.0 | 28.0 |
| 76.2 | 44.5 | 50.0 | 14.0 | 31.5 |
| 89   | 50.8 | 56.5 | 16.0 | 31.5 |

### PART NUMBERING SYSTEM



Please refer to "Product code guide (screw-mount terminal type)"



## KMQ Series

### ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|
| 315                      | 560         | 35 × 55               | 0.10  | 2.4                                                | EKMQ3B1LGB561MA55U | 400                      | 390         | 35 × 55               | 0.10  | 2.0                                                | EKMQ401LGB391MA55U |
|                          | 680         | 35 × 65               | 0.15  | 2.9                                                | EKMQ3B1LGB681MA65U |                          | 470         | 35 × 60               | 0.10  | 2.3                                                | EKMQ401LGB471MA60U |
|                          | 820         | 35 × 75               | 0.15  | 3.3                                                | EKMQ3B1LGB821MA75U |                          | 560         | 35 × 70               | 0.15  | 2.7                                                | EKMQ401LGB561MA70U |
|                          | 1,000       | 35 × 80               | 0.15  | 3.8                                                | EKMQ3B1LGB102MA80U |                          | 680         | 35 × 80               | 0.15  | 3.1                                                | EKMQ401LGB681MA80U |
|                          | 1,200       | 35 × 100              | 0.15  | 4.5                                                | EKMQ3B1LGB122MAA0U |                          | 820         | 35 × 90               | 0.15  | 3.6                                                | EKMQ401LGB821MA90U |
|                          | 1,500       | 50 × 70               | 0.15  | 5.4                                                | EKMQ3B1LGC152MC70U |                          | 1,000       | 50 × 65               | 0.15  | 4.2                                                | EKMQ401LGC102MC65U |
|                          | 1,800       | 50 × 75               | 0.15  | 6.0                                                | EKMQ3B1LGC182MC75U |                          | 1,200       | 50 × 75               | 0.15  | 4.9                                                | EKMQ401LGC122MC75U |
|                          | 2,200       | 50 × 90               | 0.15  | 7.2                                                | EKMQ3B1LGC222MC90U |                          | 1,500       | 50 × 85               | 0.15  | 5.8                                                | EKMQ401LGC152MC85U |
|                          | 2,700       | 50 × 100              | 0.15  | 8.4                                                | EKMQ3B1LGC272MCA0U |                          | 2,200       | 63.5 × 85             | 0.15  | 8.1                                                | EKMQ401LGC222MD85U |
|                          | 3,300       | 63.5 × 85             | 0.15  | 9.9                                                | EKMQ3B1LGC332MD85U |                          | 3,300       | 63.5 × 105            | 0.15  | 10.8                                               | EKMQ401LGC332MDA5U |
|                          | 3,900       | 63.5 × 96             | 0.15  | 11.3                                               | EKMQ3B1LGC392MD96U |                          | 4,700       | 76.2 × 105            | 0.15  | 14.3                                               | EKMQ401LGC472MEA5U |
|                          | 4,700       | 76.2 × 85             | 0.15  | 13.1                                               | EKMQ3B1LGC472ME85U |                          | 5,600       | 89 × 96               | 0.15  | 13.9                                               | EKMQ401LGC562MF96U |
|                          | 5,600       | 76.2 × 96             | 0.15  | 15.0                                               | EKMQ3B1LGC562ME96U |                          | 6,800       | 89 × 115              | 0.15  | 16.6                                               | EKMQ401LGC682MFB5U |
|                          | 6,800       | 76.2 × 110            | 0.15  | 17.6                                               | EKMQ3B1LGC682MEB0U |                          | 8,200       | 89 × 130              | 0.15  | 19.2                                               | EKMQ401LGC822MFD0U |
|                          | 8,200       | 89 × 100              | 0.15  | 17.2                                               | EKMQ3B1LGC822MFA0U | 450                      | 330         | 35 × 55               | 0.10  | 1.8                                                | EKMQ451LGB331MA55U |
|                          | 10,000      | 89 × 115              | 0.15  | 20.1                                               | EKMQ3B1LGC103MFB5U |                          | 390         | 35 × 65               | 0.10  | 2.2                                                | EKMQ451LGB391MA65U |
| 350                      | 470         | 35 × 55               | 0.10  | 2.2                                                | EKMQ351LGB471MA55U |                          | 470         | 35 × 75               | 0.10  | 2.5                                                | EKMQ451LGB471MA75U |
|                          | 560         | 35 × 60               | 0.10  | 2.5                                                | EKMQ351LGB561MA60U |                          | 560         | 35 × 80               | 0.15  | 2.8                                                | EKMQ451LGB561MA80U |
|                          | 680         | 35 × 70               | 0.15  | 2.9                                                | EKMQ351LGB681MA70U |                          | 680         | 35 × 100              | 0.15  | 3.5                                                | EKMQ451LGB681MAA0U |
|                          | 820         | 35 × 80               | 0.15  | 3.4                                                | EKMQ351LGB821MA80U |                          | 820         | 35 × 110              | 0.15  | 4.1                                                | EKMQ451LGB821MAB0U |
|                          | 1,000       | 35 × 90               | 0.15  | 4.0                                                | EKMQ351LGB102MA90U |                          | 1,000       | 50 × 80               | 0.15  | 4.6                                                | EKMQ451LGC102MC80U |
|                          | 1,200       | 50 × 65               | 0.15  | 4.6                                                | EKMQ351LGC122MC65U |                          | 1,200       | 50 × 90               | 0.15  | 5.3                                                | EKMQ451LGC122MC90U |
|                          | 1,500       | 50 × 75               | 0.15  | 5.5                                                | EKMQ351LGC152MC75U |                          | 1,500       | 50 × 105              | 0.15  | 6.4                                                | EKMQ451LGC152MCA5U |
|                          | 1,800       | 50 × 85               | 0.15  | 6.4                                                | EKMQ351LGC182MC85U |                          | 2,200       | 63.5 × 96             | 0.15  | 8.5                                                | EKMQ451LGC222MD96U |
|                          | 2,200       | 50 × 100              | 0.15  | 7.6                                                | EKMQ351LGC222MCA0U |                          | 3,300       | 63.5 × 130            | 0.15  | 11.9                                               | EKMQ451LGC332MDD0U |
|                          | 2,700       | 63.5 × 85             | 0.15  | 9.0                                                | EKMQ351LGC272MD85U |                          | 4,700       | 76.2 × 130            | 0.15  | 15.7                                               | EKMQ451LGC472MED0U |
|                          | 3,900       | 76.2 × 80             | 0.15  | 11.7                                               | EKMQ351LGC392ME80U |                          | 5,600       | 76.2 × 155            | 0.15  | 18.5                                               | EKMQ451LGC562MEF5U |
|                          | 5,600       | 76.2 × 105            | 0.15  | 15.6                                               | EKMQ351LGC562MEA5U |                          | 5,600       | 89 × 120              | 0.15  | 15.3                                               | EKMQ451LGC562MFC0U |
|                          | 6,800       | 76.2 × 125            | 0.15  | 18.6                                               | EKMQ351LGC682MEC5U |                          | 6,800       | 89 × 140              | 0.15  | 18.0                                               | EKMQ451LGC682MFE0U |
|                          | 8,200       | 89 × 115              | 0.15  | 18.2                                               | EKMQ351LGC822MFB5U |                          | 8,200       | 89 × 170              | 0.15  | 21.6                                               | EKMQ451LGC822MFH0U |

### ◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multipliers

| Frequency (Hz) | 50   | 120  | 300  | 1k   | 3k   |
|----------------|------|------|------|------|------|
| φ 35, 50       | 0.70 | 1.00 | 1.30 | 1.70 | 1.80 |
| φ 63.5 to 89   | 0.80 | 1.00 | 1.10 | 1.15 | 1.15 |

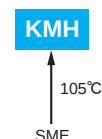
The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.



# LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS Standard screw terminals, 105°C

## KMH Series

- Endurance with ripple current : 2,000 hours at 105°C
- RoHS2 Compliant

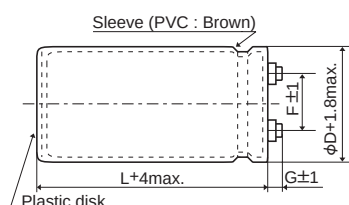


### SPECIFICATIONS

| Items                           | Characteristics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                    |                             |              |                                       |                 |                               |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|--------------|---------------------------------------|-----------------|-------------------------------|
| Category                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                    |                             |              |                                       |                 |                               |
| Temperature Range               | -40 to +105°C (10 to 100V <sub>dc</sub> ) -25 to +105°C (160 to 400V <sub>dc</sub> )                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                    |                             |              |                                       |                 |                               |
| Rated Voltage Range             | 10 to 400V <sub>dc</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                    |                             |              |                                       |                 |                               |
| Capacitance Tolerance           | ±20% (M) (at 20°C, 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                    |                             |              |                                       |                 |                               |
| Leakage Current                 | I=0.02CV or 5mA, whichever is smaller.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C after 5 minutes)                                                                                                                                                                                                                                                                                                                                                                                      |                    |                             |              |                                       |                 |                               |
| Dissipation Factor (tan δ)      | Shall not exceed the values shown in the STANDARD RATINGS (at 20°C, 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                             |              |                                       |                 |                               |
| Low Temperature Characteristics | Capacitance change 10 to 100V <sub>dc</sub> : C(-40°C)/C(+20°C) ≥ 0.6<br>160 to 400V <sub>dc</sub> : C(-25°C)/C(+20°C) ≥ 0.7 (at 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                            |                    |                             |              |                                       |                 |                               |
| Insulation Resistance           | When measured between the terminals that are connected to each other and to the mounting clamp on the insulating sleeve covering the case by using an insulation resistance meter of 500V <sub>dc</sub> , the insulation resistance shall not be less than 100MΩ.                                                                                                                                                                                                                                                                                  |                    |                             |              |                                       |                 |                               |
| Insulation Withstanding Voltage | When a voltage of 2,000V <sub>ac</sub> is applied for 1 minute between the terminals that are connected to each other and to the mounting clamp on the insulating sleeve covering the case, there shall not be electrical damage.                                                                                                                                                                                                                                                                                                                  |                    |                             |              |                                       |                 |                               |
| Endurance                       | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 2,000 hours at 105°C. <table border="1"> <tr> <td>Capacitance change</td><td>≤ ±20% of the initial value</td></tr> <tr> <td>D.F. (tan δ)</td><td>≤ 200% of the initial specified value</td></tr> <tr> <td>Leakage current</td><td>≤ The initial specified value</td></tr> </table>                                       | Capacitance change | ≤ ±20% of the initial value | D.F. (tan δ) | ≤ 200% of the initial specified value | Leakage current | ≤ The initial specified value |
| Capacitance change              | ≤ ±20% of the initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |                             |              |                                       |                 |                               |
| D.F. (tan δ)                    | ≤ 200% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                    |                             |              |                                       |                 |                               |
| Leakage current                 | ≤ The initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                    |                             |              |                                       |                 |                               |
| Shelf Life                      | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 500 hours at 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. <table border="1"> <tr> <td>Capacitance change</td><td>≤ ±20% of the initial value</td></tr> <tr> <td>D.F. (tan δ)</td><td>≤ 200% of the initial specified value</td></tr> <tr> <td>Leakage current</td><td>≤ The initial specified value</td></tr> </table> | Capacitance change | ≤ ±20% of the initial value | D.F. (tan δ) | ≤ 200% of the initial specified value | Leakage current | ≤ The initial specified value |
| Capacitance change              | ≤ ±20% of the initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |                             |              |                                       |                 |                               |
| D.F. (tan δ)                    | ≤ 200% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                    |                             |              |                                       |                 |                               |
| Leakage current                 | ≤ The initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                    |                             |              |                                       |                 |                               |

### DIMENSIONS (Screw-Mount) [mm]

●Terminal Code : LG



φ35 to φ63.5 : G=6  
φ76.2 & φ89 : G=5

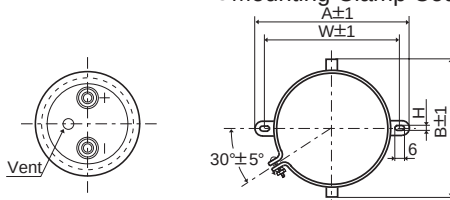
<Screw specifications>

Plus hexagon-headed screw : M5×0.8×10

Maximum screw tightening torque : 3.23Nm

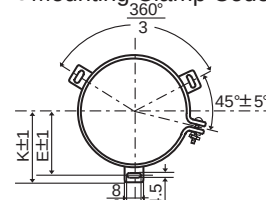
\* The screw and the mounting clamp are separately supplied and not attached to the product.

●Mounting Clamp Code : B



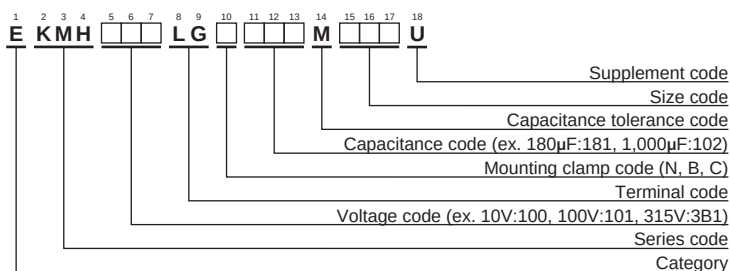
| φD   | A     | B    | W    | H   | F    |
|------|-------|------|------|-----|------|
| 35   | 58.0  | 44.0 | 48.0 | 3.5 | 12.7 |
| 50   | 78.0  | 64.0 | 68.0 | 4.5 | 22.4 |
| 63.5 | 90.0  | 76.0 | 80.0 | 4.5 | 28.0 |
| 76.2 | 104.5 | 90.0 | 93.5 | 4.5 | 31.5 |

●Mounting Clamp Code : C



| φD   | E    | K    | J    | F    |
|------|------|------|------|------|
| 50   | 32.5 | 37.0 | 14.0 | 22.4 |
| 63.5 | 38.1 | 43.5 | 14.0 | 28.0 |
| 76.2 | 44.5 | 50.0 | 14.0 | 31.5 |
| 89   | 50.8 | 56.5 | 16.0 | 31.5 |

### PART NUMBERING SYSTEM



Please refer to "Product code guide (screw-mount terminal type)"



## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.          |
|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|-------------------|
| 10                       | 27,000      | 35 × 50               | 0.45  | 4.90                                               | EKM100LGB273MA50U |
|                          | 33,000      | 35 × 50               | 0.50  | 5.10                                               | EKM100LGB333MA50U |
|                          | 39,000      | 35 × 60               | 0.50  | 5.90                                               | EKM100LGB393MA60U |
|                          | 47,000      | 35 × 80               | 0.50  | 7.10                                               | EKM100LGB473MA80U |
|                          | 56,000      | 35 × 80               | 0.60  | 7.10                                               | EKM100LGB563MA80U |
|                          | 68,000      | 35 × 100              | 0.60  | 8.50                                               | EKM100LGB683MAA0U |
|                          | 82,000      | 35 × 100              | 0.65  | 8.90                                               | EKM100LGB823MAA0U |
|                          | 100,000     | 35 × 120              | 0.65  | 10.7                                               | EKM100LGB104MAC0U |
|                          | 120,000     | 50 × 80               | 0.75  | 11.0                                               | EKM100LGC124MC80U |
|                          | 150,000     | 50 × 100              | 0.80  | 13.2                                               | EKM100LGC154MCA0U |
|                          | 180,000     | 50 × 120              | 0.80  | 15.7                                               | EKM100LGC184MCC0U |
|                          | 220,000     | 50 × 120              | 0.85  | 16.8                                               | EKM100LGC224MCC0U |
|                          | 270,000     | 63.5 × 120            | 1.00  | 19.6                                               | EKM100LGC274MDC0U |
|                          | 330,000     | 63.5 × 120            | 1.20  | 19.7                                               | EKM100LGC334MDC0U |
|                          | 390,000     | 76.2 × 120            | 1.50  | 21.3                                               | EKM100LGC394MCC0U |
|                          | 470,000     | 76.2 × 120            | 1.80  | 21.4                                               | EKM100LGC474MEC0U |
| 16                       | 560,000     | 76.2 × 140            | 2.00  | 23.6                                               | EKM100LGC564MEE0U |
|                          | 680,000     | 89 × 140              | 2.40  | 26.0                                               | EKM100LGC684MFE0U |
|                          | 18,000      | 35 × 50               | 0.40  | 4.20                                               | EKM160LGB183MA50U |
|                          | 22,000      | 35 × 50               | 0.40  | 4.70                                               | EKM160LGB223MA50U |
|                          | 27,000      | 35 × 60               | 0.40  | 5.50                                               | EKM160LGB273MA60U |
|                          | 33,000      | 35 × 60               | 0.45  | 5.70                                               | EKM160LGB333MA60U |
|                          | 39,000      | 35 × 80               | 0.45  | 6.80                                               | EKM160LGB393MA80U |
|                          | 47,000      | 35 × 80               | 0.50  | 7.10                                               | EKM160LGB473MA80U |
|                          | 56,000      | 35 × 100              | 0.50  | 8.40                                               | EKM160LGB563MAA0U |
|                          | 68,000      | 35 × 100              | 0.55  | 8.80                                               | EKM160LGB683MAA0U |
|                          | 82,000      | 50 × 80               | 0.55  | 10.7                                               | EKM160LGB823MC80U |
|                          | 100,000     | 50 × 80               | 0.65  | 10.8                                               | EKM160LGC104MC80U |
|                          | 120,000     | 50 × 100              | 0.65  | 13.1                                               | EKM160LGC124MCA0U |
|                          | 150,000     | 50 × 120              | 0.70  | 15.3                                               | EKM160LGC154MCC0U |
|                          | 180,000     | 50 × 120              | 0.80  | 15.7                                               | EKM160LGC184MCC0U |
|                          | 220,000     | 63.5 × 120            | 0.85  | 19.2                                               | EKM160LGC224MDC0U |
| 25                       | 270,000     | 63.5 × 120            | 1.00  | 19.6                                               | EKM160LGC274MDC0U |
|                          | 330,000     | 76.2 × 120            | 1.30  | 21.1                                               | EKM160LGC334MEC0U |
|                          | 390,000     | 76.2 × 120            | 1.50  | 21.3                                               | EKM160LGC394MCC0U |
|                          | 470,000     | 76.2 × 140            | 1.60  | 24.2                                               | EKM160LGC474MEE0U |
|                          | 560,000     | 89 × 140              | 2.00  | 28.1                                               | EKM160LGC564MFE0U |
|                          | 680,000     | 89 × 140              | 2.40  | 28.5                                               | EKM160LGC684MFE0U |
|                          | 12,000      | 35 × 50               | 0.35  | 3.70                                               | EKM250LGB123MA50U |
|                          | 15,000      | 35 × 50               | 0.35  | 4.10                                               | EKM250LGB153MA50U |
|                          | 18,000      | 35 × 60               | 0.35  | 4.80                                               | EKM250LGB183MA60U |
|                          | 22,000      | 35 × 60               | 0.35  | 5.30                                               | EKM250LGB223MA60U |
|                          | 27,000      | 35 × 80               | 0.35  | 6.40                                               | EKM250LGB273MA80U |
|                          | 33,000      | 35 × 80               | 0.40  | 6.70                                               | EKM250LGB333MA80U |
|                          | 39,000      | 35 × 100              | 0.40  | 7.80                                               | EKM250LGB393MAA0U |
|                          | 47,000      | 35 × 120              | 0.40  | 9.30                                               | EKM250LGB473MAC0U |
|                          | 56,000      | 50 × 80               | 0.45  | 9.70                                               | EKM250LGB563MC80U |
|                          | 68,000      | 50 × 100              | 0.45  | 11.2                                               | EKM250LGB683MCA0U |
| 35                       | 82,000      | 50 × 100              | 0.50  | 11.2                                               | EKM250LGB823MCA0U |
|                          | 100,000     | 50 × 120              | 0.50  | 14.8                                               | EKM250LGC104MCC0U |
|                          | 120,000     | 63.5 × 100            | 0.65  | 14.9                                               | EKM250LGC124MDA0U |
|                          | 150,000     | 63.5 × 120            | 0.65  | 17.9                                               | EKM250LGC154MDC0U |
|                          | 180,000     | 63.5 × 120            | 0.80  | 17.9                                               | EKM250LGC184MDC0U |
|                          | 220,000     | 76.2 × 120            | 0.85  | 21.3                                               | EKM250LGC224MEC0U |
|                          | 270,000     | 76.2 × 120            | 1.00  | 21.7                                               | EKM250LGC274MEC0U |
|                          | 330,000     | 76.2 × 140            | 1.20  | 23.4                                               | EKM250LGC334MEE0U |
|                          | 390,000     | 89 × 140              | 1.50  | 24.9                                               | EKM250LGC394MFE0U |
|                          | 8,200       | 35 × 50               | 0.30  | 3.30                                               | EKM350LGB822MA50U |
|                          | 10,000      | 35 × 50               | 0.30  | 3.60                                               | EKM350LGB103MA50U |
|                          | 12,000      | 35 × 60               | 0.30  | 4.20                                               | EKM350LGB123MA60U |
|                          | 15,000      | 35 × 60               | 0.30  | 4.70                                               | EKM350LGB153MA60U |
|                          | 18,000      | 35 × 80               | 0.30  | 5.70                                               | EKM350LGB183MA80U |
|                          | 22,000      | 35 × 80               | 0.30  | 6.30                                               | EKM350LGB223MA80U |
|                          | 27,000      | 35 × 100              | 0.30  | 7.50                                               | EKM350LGB273MAA0U |
| 50                       | 33,000      | 35 × 120              | 0.30  | 9.00                                               | EKM350LGB333MAC0U |
|                          | 39,000      | 50 × 80               | 0.35  | 9.20                                               | EKM350LGC393MC80U |
|                          | 47,000      | 50 × 100              | 0.35  | 11.2                                               | EKM350LGC473MCA0U |
|                          | 56,000      | 50 × 100              | 0.40  | 11.4                                               | EKM350LGC563MCA0U |
|                          | 68,000      | 50 × 120              | 0.40  | 13.6                                               | EKM350LGC683MCC0U |
|                          | 82,000      | 63.5 × 100            | 0.45  | 14.8                                               | EKM350LGC823MDA0U |
|                          | 100,000     | 63.5 × 120            | 0.45  | 17.6                                               | EKM350LGC104MDC0U |
|                          | 120,000     | 63.5 × 120            | 0.55  | 17.6                                               | EKM350LGC124MDC0U |
|                          | 150,000     | 76.2 × 120            | 0.65  | 19.8                                               | EKM350LGC154MEC0U |
|                          | 180,000     | 76.2 × 120            | 0.80  | 19.8                                               | EKM350LGC184MEC0U |
|                          | 220,000     | 76.2 × 140            | 0.80  | 23.4                                               | EKM350LGC224MEE0U |
|                          | 270,000     | 89 × 140              | 1.00  | 25.5                                               | EKM350LGC274MFE0U |
|                          | 3,900       | 35 × 50               | 0.20  | 2.80                                               | EKM500LGB392MA50U |
|                          | 4,700       | 35 × 50               | 0.20  | 3.10                                               | EKM500LGB472MA50U |
|                          | 5,600       | 35 × 50               | 0.20  | 3.30                                               | EKM500LGB562MA50U |
|                          | 6,800       | 35 × 50               | 0.25  | 3.30                                               | EKM500LGB682MA50U |
| 63                       | 8,200       | 35 × 60               | 0.25  | 3.80                                               | EKM500LGB822MA60U |
|                          | 10,000      | 35 × 80               | 0.25  | 4.60                                               | EKM500LGB823MA80U |
|                          | 12,000      | 35 × 80               | 0.25  | 5.10                                               | EKM500LGB123MA80U |
|                          | 15,000      | 35 × 80               | 0.25  | 5.70                                               | EKM500LGB153MA80U |
|                          | 18,000      | 35 × 100              | 0.25  | 6.70                                               | EKM500LGB183MAA0U |
|                          | 22,000      | 35 × 120              | 0.25  | 8.10                                               | EKM500LGB223MAC0U |
|                          | 27,000      | 50 × 80               | 0.25  | 9.10                                               | EKM500LGC273MC80U |
|                          | 33,000      | 50 × 100              | 0.25  | 11.1                                               | EKM500LGC333MCA0U |
|                          | 39,000      | 50 × 120              | 0.25  | 13.1                                               | EKM500LGC393MCC0U |
|                          | 47,000      | 50 × 120              | 0.30  | 13.9                                               | EKM500LGC473MCC0U |
|                          | 56,000      | 63.5 × 100            | 0.35  | 13.9                                               | EKM500LGC563MDA0U |
|                          | 68,000      | 63.5 × 120            | 0.35  | 16.6                                               | EKM500LGC683MDC0U |
|                          | 82,000      | 76.2 × 120            | 0.40  | 18.9                                               | EKM500LGC823MEC0U |
|                          | 100,000     | 76.2 × 120            | 0.45  | 19.5                                               | EKM500LGC104MEC0U |
|                          | 120,000     | 76.2 × 120            | 0.55  | 19.5                                               | EKM500LGC124MEC0U |
| 80                       | 150,000     | 89 × 140              | 0.60  | 23.9                                               | EKM500LGC154MFE0U |
|                          | 180,000     | 89 × 140              | 0.75  | 23.9                                               | EKM500LGC184MFE0U |
|                          | 2,700       | 35 × 50               | 0.20  | 2.30                                               | EKM630LGB272MA50U |
|                          | 3,300       | 35 × 50               | 0.20  | 2.50                                               | EKM630LGB332MA50U |
|                          | 3,900       | 35 × 50               | 0.20  | 2.80                                               | EKM630LGB392MA50U |
|                          | 4,700       | 35 × 50               | 0.20  | 3.10                                               | EKM630LGB472MA50U |
|                          | 5,600       | 35 × 60               | 0.20  | 3.50                                               | EKM630LGB562MA60U |
|                          | 6,800       | 35 × 60               | 0.20  | 3.90                                               | EKM630LGB682MA60U |
|                          | 8,200       | 35 × 80               | 0.20  | 4.70                                               | EKM630LGB822MA80U |
|                          | 10,000      | 35 × 80               | 0.25  | 4.70                                               | EKM630LGB103MA80U |
|                          | 12,000      | 35 × 100              | 0.25  | 5.50                                               | EKM630LGB123MAA0U |
|                          | 15,000      | 35 × 120              | 0.25  | 6.60                                               | EKM630LGB153MAC0U |
|                          | 18,000      | 50 × 80               | 0.25  | 7.40                                               | EKM630LGC183MC80U |
|                          | 22,000      | 50 × 100              | 0.25  | 9.00                                               | EKM630LGC223MCA0U |
|                          | 27,000      | 50 × 120              | 0.25  | 10.9                                               | EKM630LGC273MCC0U |
|                          | 33,000      | 50 × 120              | 0.25  | 12.0                                               | EKM630LGC333MCC0U |
| 100                      | 39,000      | 63.5 × 100            | 0.30  | 12.5                                               | EKM630LGC393MDA0U |
|                          | 47,000      | 63.5 × 120            | 0.30  | 14.9                                               | EKM630LGC473MDC0U |
|                          | 56,000      | 63.5 × 120            | 0.30  | 16.3                                               | EKM630LGC563MDC0U |
|                          | 68,000      | 76.2 × 120            | 0.35  | 18.4                                               | EKM630LGC683MEC0U |
|                          | 82,000      | 76.2 × 140            | 0.40  | 20.0                                               | EKM630LGC823MEE0U |
|                          | 100,000     | 76.2 × 140            | 0.50  | 20.0                                               | EKM630LGC104MEE0U |
|                          | 120,000     | 89 × 140              | 0.60  | 21.8                                               | EKM630LGC124MFE0U |
|                          | 2,200       | 35 × 50               | 0.15  | 2.40                                               | EKM800LGB272MA50U |
|                          | 2,700       | 35 × 50               | 0.15  | 2.70                                               | EKM800LGB272MA50U |
|                          | 3,300       | 35 × 50               | 0.15  | 3.00                                               | EKM800LGB332MA50U |
|                          | 3,900       | 35 × 60               | 0.15  | 3.40                                               | EKM800LGB392MA60U |
|                          | 4,700       | 35 × 60               | 0.15  | 3.70                                               | EKM800LGB472MA60U |
|                          | 5,600       | 35 × 80               | 0.15  | 4.50                                               | EKM800LGB562MA80U |
|                          | 6,800       | 35 × 80               | 0.15  | 4.90                                               | EKM800LGB682MA80U |
|                          | 8,200       | 35 × 100              | 0.20  | 5.10                                               | EKM800LGB822MAA0U |
|                          | 10,000      | 35 × 120              | 0.20  | 6.10                                               | EKM800LGB103MAC0U |
|                          | 12,000      | 50 × 80               | 0.20  | 6.70                                               | EKM800LGC123MC80U |
|                          | 15,000      | 50 × 100              | 0.20  | 8.30                                               | EKM800LGC153MCA0U |
|                          | 18,000      | 50 × 120              | 0.20  | 9.90                                               | EKM800LGC183MCC0U |
|                          | 22,000      | 50 × 120              | 0.20  | 11.0                                               | EKM800LGC223MCC0U |
|                          | 27,000      | 63.5 × 100            | 0.25  | 11.4                                               | EKM800LGC273MDA0U |
|                          | 33,000      | 76.2 × 100            | 0.25  | 13.9                                               | EKM800LGC333MEA0U |
|                          | 39,000      | 76.2 × 100            | 0.30  | 13.9                                               | EKM800LGC393MEA0U |



## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.          | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.          |
|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|-------------------|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|-------------------|
| 80                       | 47,000      | 76.2 × 120            | 0.30  | 16.5                                               | EKM800LGC473MEC0U | 250                      | 330         | 35 × 50               | 0.15  | 0.90                                               | EKM251LGB331MA50U |
|                          | 56,000      | 76.2 × 120            | 0.30  | 18.1                                               | EKM800LGC563MEC0U |                          | 390         | 35 × 50               | 0.15  | 1.00                                               | EKM251LGB391MA50U |
|                          | 68,000      | 76.2 × 140            | 0.35  | 19.7                                               | EKM800LGC683MEE0U |                          | 470         | 35 × 50               | 0.15  | 1.10                                               | EKM251LGB471MA50U |
|                          | 82,000      | 89 × 140              | 0.40  | 22.1                                               | EKM800LGC823MFE0U |                          | 560         | 35 × 50               | 0.15  | 1.20                                               | EKM251LGB561MA50U |
| 100                      | 1,800       | 35 × 50               | 0.10  | 2.70                                               | EKM101LGB182MA50U |                          | 680         | 35 × 60               | 0.15  | 1.40                                               | EKM251LGB681MA60U |
|                          | 2,200       | 35 × 50               | 0.10  | 3.00                                               | EKM101LGB222MA50U |                          | 820         | 35 × 80               | 0.15  | 1.60                                               | EKM251LGB821MA80U |
|                          | 2,700       | 35 × 60               | 0.10  | 3.50                                               | EKM101LGB272MA60U |                          | 1,000       | 35 × 80               | 0.20  | 1.60                                               | EKM251LGB102MA80U |
|                          | 3,300       | 35 × 80               | 0.10  | 4.20                                               | EKM101LGB332MA80U |                          | 1,200       | 35 × 80               | 0.20  | 1.80                                               | EKM251LGB122MA80U |
|                          | 3,900       | 35 × 80               | 0.12  | 4.20                                               | EKM101LGB392MA80U |                          | 1,500       | 35 × 100              | 0.20  | 2.10                                               | EKM251LGB152MAA0U |
|                          | 4,700       | 35 × 100              | 0.12  | 5.00                                               | EKM101LGB472MAA0U |                          | 1,800       | 35 × 120              | 0.20  | 2.50                                               | EKM251LGB182MAC0U |
|                          | 5,600       | 35 × 100              | 0.12  | 5.40                                               | EKM101LGB562MAA0U |                          | 2,200       | 50 × 80               | 0.20  | 2.90                                               | EKM251LGB102MA80U |
|                          | 6,800       | 35 × 120              | 0.15  | 5.80                                               | EKM101LGB682MAC0U |                          | 2,700       | 50 × 100              | 0.20  | 3.50                                               | EKM251LGC272MCA0U |
|                          | 8,200       | 50 × 80               | 0.15  | 6.40                                               | EKM101LGC822MC80U |                          | 3,300       | 50 × 120              | 0.20  | 4.20                                               | EKM251LGC332MCC0U |
|                          | 10,000      | 50 × 100              | 0.15  | 7.80                                               | EKM101LGC103MCA0U |                          | 3,900       | 50 × 120              | 0.20  | 4.60                                               | EKM251LGC392MCC0U |
|                          | 12,000      | 50 × 120              | 0.15  | 9.30                                               | EKM101LGC123MCC0U |                          | 4,700       | 63.5 × 120            | 0.20  | 5.70                                               | EKM251LGC472MDC0U |
|                          | 15,000      | 50 × 120              | 0.15  | 10.4                                               | EKM101LGC153MCC0U |                          | 5,600       | 63.5 × 120            | 0.20  | 6.30                                               | EKM251LGC562MDC0U |
|                          | 18,000      | 63.5 × 100            | 0.20  | 10.4                                               | EKM101LGC183MDA0U |                          | 6,800       | 76.2 × 120            | 0.20  | 7.70                                               | EKM251LGC682MEC0U |
|                          | 22,000      | 63.5 × 120            | 0.20  | 12.5                                               | EKM101LGC223MDC0U |                          | 8,200       | 76.2 × 120            | 0.20  | 8.40                                               | EKM251LGC822MEC0U |
|                          | 27,000      | 76.2 × 120            | 0.25  | 13.7                                               | EKM101LGC273MEC0U |                          | 10,000      | 76.2 × 140            | 0.20  | 10.0                                               | EKM251LGC103MEE0U |
| 160                      | 33,000      | 76.2 × 120            | 0.25  | 15.2                                               | EKM101LGC333MEC0U | 315                      | 12,000      | 89 × 140              | 0.20  | 11.9                                               | EKM251LGC123MFE0U |
|                          | 39,000      | 76.2 × 140            | 0.30  | 16.1                                               | EKM101LGC393MEE0U |                          | 180         | 35 × 50               | 0.10  | 0.80                                               | EKM315LGB181MA50U |
|                          | 47,000      | 89 × 140              | 0.30  | 19.3                                               | EKM101LGC473MFE0U |                          | 220         | 35 × 50               | 0.10  | 0.90                                               | EKM315LGB221MA50U |
|                          | 56,000      | 89 × 140              | 0.30  | 21.1                                               | EKM101LGC563MFE0U |                          | 270         | 35 × 50               | 0.10  | 1.00                                               | EKM315LGB271MA50U |
|                          | 560         | 35 × 50               | 0.15  | 1.20                                               | EKM161LGB561MA50U |                          | 330         | 35 × 50               | 0.10  | 1.10                                               | EKM315LGB331MA50U |
|                          | 680         | 35 × 50               | 0.15  | 1.30                                               | EKM161LGB681MA50U |                          | 390         | 35 × 50               | 0.10  | 1.20                                               | EKM315LGB391MA50U |
|                          | 820         | 35 × 50               | 0.15  | 1.40                                               | EKM161LGB821MA50U |                          | 470         | 35 × 60               | 0.10  | 1.40                                               | EKM315LGB471MA60U |
|                          | 1,000       | 35 × 50               | 0.15  | 1.60                                               | EKM161LGB102MA50U |                          | 560         | 35 × 60               | 0.10  | 1.50                                               | EKM315LGB561MA60U |
|                          | 1,200       | 35 × 60               | 0.15  | 1.90                                               | EKM161LGB122MA60U |                          | 680         | 35 × 80               | 0.10  | 1.70                                               | EKM315LGB681MA80U |
|                          | 1,500       | 35 × 60               | 0.15  | 2.10                                               | EKM161LGB152MA60U |                          | 820         | 35 × 80               | 0.15  | 1.70                                               | EKM315LGB821MA80U |
|                          | 1,800       | 35 × 80               | 0.15  | 2.50                                               | EKM161LGB182MA80U |                          | 1,000       | 35 × 100              | 0.15  | 2.00                                               | EKM315LGB102MAA0U |
|                          | 2,200       | 35 × 80               | 0.15  | 2.80                                               | EKM161LGB222MA80U |                          | 1,200       | 35 × 120              | 0.15  | 2.40                                               | EKM315LGB122MAC0U |
|                          | 2,700       | 35 × 100              | 0.15  | 3.30                                               | EKM161LGB272MAA0U |                          | 1,500       | 50 × 80               | 0.15  | 2.70                                               | EKM315LGC152MC80U |
|                          | 3,300       | 35 × 120              | 0.15  | 3.80                                               | EKM161LGB332MAC0U |                          | 1,800       | 50 × 100              | 0.15  | 3.30                                               | EKM315LGC182MCA0U |
|                          | 3,900       | 50 × 80               | 0.20  | 3.80                                               | EKM161LGC392MC80U |                          | 2,200       | 50 × 120              | 0.15  | 4.00                                               | EKM315LGC222MCC0U |
|                          | 4,700       | 50 × 100              | 0.20  | 4.60                                               | EKM161LGC472MCA0U |                          | 2,700       | 50 × 120              | 0.15  | 4.40                                               | EKM315LGC272MCC0U |
| 200                      | 5,600       | 50 × 100              | 0.20  | 5.10                                               | EKM161LGC562MCA0U | 350                      | 3,300       | 63.5 × 100            | 0.15  | 5.10                                               | EKM315LGC332MDA0U |
|                          | 6,800       | 50 × 120              | 0.20  | 6.10                                               | EKM161LGC682MCC0U |                          | 3,900       | 63.5 × 120            | 0.15  | 6.00                                               | EKM315LGC392MDC0U |
|                          | 8,200       | 63.5 × 100            | 0.20  | 7.00                                               | EKM161LGC822MDA0U |                          | 4,700       | 76.2 × 100            | 0.15  | 6.80                                               | EKM315LGC472MEA0U |
|                          | 10,000      | 63.5 × 120            | 0.20  | 8.40                                               | EKM161LGC103MDC0U |                          | 5,600       | 76.2 × 120            | 0.15  | 8.00                                               | EKM315LGC562MED0U |
|                          | 12,000      | 76.2 × 100            | 0.20  | 9.40                                               | EKM161LGC123MEA0U |                          | 6,800       | 76.2 × 130            | 0.15  | 9.20                                               | EKM315LGC682MED0U |
|                          | 15,000      | 76.2 × 120            | 0.20  | 11.4                                               | EKM161LGC153MEC0U |                          | 8,200       | 89 × 140              | 0.15  | 11.4                                               | EKM315LGC822MFE0U |
|                          | 18,000      | 76.2 × 140            | 0.20  | 13.4                                               | EKM161LGC183MEE0U |                          | 10,000      | 89 × 140              | 0.15  | 12.6                                               | EKM315LGC103MFE0U |
|                          | 22,000      | 89 × 140              | 0.25  | 14.5                                               | EKM161LGC233MFE0U | 400                      | 180         | 35 × 50               | 0.10  | 0.80                                               | EKM401LGB181MA50U |
|                          | 27,000      | 89 × 140              | 0.25  | 16.0                                               | EKM161LGC273MFE0U |                          | 220         | 35 × 50               | 0.10  | 0.90                                               | EKM401LGB221MA50U |
|                          | 330         | 35 × 50               | 0.15  | 0.90                                               | EKM201LGB331MA50U |                          | 270         | 35 × 50               | 0.10  | 1.00                                               | EKM401LGB271MA50U |
|                          | 390         | 35 × 50               | 0.15  | 1.00                                               | EKM201LGB391MA50U |                          | 330         | 35 × 50               | 0.10  | 1.10                                               | EKM401LGB331MA50U |
|                          | 470         | 35 × 50               | 0.15  | 1.10                                               | EKM201LGB471MA50U |                          | 390         | 35 × 60               | 0.10  | 1.30                                               | EKM401LGB391MA60U |
|                          | 560         | 35 × 50               | 0.15  | 1.20                                               | EKM201LGB561MA50U |                          | 470         | 35 × 60               | 0.10  | 1.40                                               | EKM401LGB471MA60U |
|                          | 680         | 35 × 50               | 0.15  | 1.30                                               | EKM201LGB681MA50U |                          | 560         | 35 × 80               | 0.10  | 1.60                                               | EKM401LGB561MA80U |
|                          | 820         | 35 × 50               | 0.15  | 1.40                                               | EKM201LGB821MA50U |                          | 680         | 35 × 80               | 0.15  | 1.60                                               | EKM401LGB681MA80U |
|                          | 1,000       | 35 × 60               | 0.15  | 1.70                                               | EKM201LGB102MA60U |                          | 820         | 35 × 100              | 0.15  | 1.80                                               | EKM401LGB821MAA0U |
|                          | 1,200       | 35 × 60               | 0.15  | 1.90                                               | EKM201LGB122MA60U |                          | 1,000       | 35 × 120              | 0.15  | 2.20                                               | EKM401LGB102MAC0U |
|                          | 1,500       | 35 × 80               | 0.15  | 2.30                                               | EKM201LGB152MA80U |                          | 1,200       | 50 × 80               | 0.15  | 2.40                                               | EKM401LGC122MC80U |
|                          | 1,800       | 35 × 80               | 0.15  | 2.50                                               | EKM201LGB182MA80U |                          | 1,500       | 50 × 100              | 0.15  | 3.00                                               | EKM401LGC152MCA0U |
|                          | 2,200       | 35 × 100              | 0.15  | 3.00                                               | EKM201LGB222MAA0U |                          | 1,800       | 50 × 120              | 0.15  | 3.60                                               | EKM401LGC182MCC0U |
|                          | 2,700       | 35 × 120              | 0.15  | 3.60                                               | EKM201LGB272MAC0U |                          | 2,200       | 50 × 120              | 0.15  | 4.00                                               | EKM401LGC222MCC0U |
| 250                      | 3,300       | 50 × 80               | 0.15  | 4.10                                               | EKM201LGC332MC80U |                          | 2,700       | 63.5 × 100            | 0.15  | 4.60                                               | EKM401LGC272MDA0U |
|                          | 3,900       | 50 × 100              | 0.15  | 4.90                                               | EKM201LGC392MCA0U |                          | 3,900       | 76.2 × 120            | 0.15  | 6.70                                               | EKM401LGC392MEC0U |
|                          | 4,700       | 63.5 × 100            | 0.20  | 5.30                                               | EKM201LGC472MDA0U |                          | 5,600       | 76.2 × 130            | 0.15  | 8.30                                               | EKM401LGC562MED0U |
|                          | 5,600       | 63.5 × 100            | 0.20  | 5.80                                               | EKM201LGC562MDA0U |                          | 6,800       | 76.2 × 140            | 0.15  | 9.50                                               | EKM401LGC682MEE0U |
|                          | 6,800       | 63.5 × 120            | 0.20  | 6.90                                               | EKM201LGC682MDC0U |                          | 8,200       | 89 × 140              | 0.15  | 11.4                                               | EKM401LGC822MFE0U |
|                          | 8,200       | 63.5 × 120            | 0.20  | 7.60                                               | EKM201LGC822MDC0U |                          | 180         | 35 × 50               | 0.10  | 0.80                                               | EKM401LGB181MA50U |
|                          | 10,000      | 76.2 × 120            | 0.20  | 9.30                                               | EKM201LGC103MEC0U |                          | 220         | 35 × 50               | 0.10  | 0.90                                               | EKM401LGB221MA50U |
|                          | 12,000      | 76.2 × 120            | 0.20  | 10.2                                               | EKM201LGC123MEC0U |                          | 270         | 35 × 50               | 0.10  | 1.00                                               | EKM401LGB271MA50U |
|                          | 15,000      | 76.2 × 140            | 0.20  | 12.2                                               | EKM201LGC153MEE0U |                          | 330         | 35 × 60               | 0.10  | 1.20                                               | EKM401LGB331MA60U |
|                          | 18,000      | 89 × 140              | 0.25  | 13.1                                               | EKM201LGC183MFE0U |                          | 390         | 35 × 60               | 0.10  | 1.30                                               | EKM401LGB391MA60U |
|                          | 270         | 35 × 50               | 0.15  | 0.80                                               | EKM251LGB271MA50U |                          | 470         | 35 × 80               | 0.10  | 1.40                                               | EKM401LGB471MA80U |



## KMH Series

### ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.          |
|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|-------------------|
| 400                      | 560         | 35 × 80               | 0.15  | 1.40                                               | EKM401LGB561MA80U |
|                          | 680         | 35 × 100              | 0.15  | 1.70                                               | EKM401LGB681MAA0U |
|                          | 820         | 35 × 120              | 0.15  | 2.00                                               | EKM401LGB821MAC0U |
|                          | 1,000       | 50 × 80               | 0.15  | 2.20                                               | EKM401LGC102MC80U |
|                          | 1,200       | 50 × 100              | 0.15  | 2.70                                               | EKM401LGC122MCA0U |
|                          | 1,500       | 50 × 120              | 0.15  | 3.30                                               | EKM401LGC152MCC0U |
| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.          |
| 400                      | 2,200       | 63.5 × 100            | 0.15  | 4.20                                               | EKM401LGC222MDA0U |
|                          | 3,300       | 63.5 × 120            | 0.15  | 5.50                                               | EKM401LGC332MDC0U |
|                          | 4,700       | 76.2 × 130            | 0.15  | 7.60                                               | EKM401LGC472MED0U |
|                          | 5,600       | 89 × 140              | 0.15  | 9.40                                               | EKM401LGC562MFE0U |
|                          | 6,800       | 89 × 140              | 0.15  | 10.4                                               | EKM401LGC682MFE0U |

### ◆RATED RIPPLE CURRENT MULTIPLIERS

#### ●Frequency Multipliers

| Rated voltage<br>(V <sub>dc</sub> ) | Case diameter<br>(mm) | Frequency (Hz) |      |      |      |      |      |
|-------------------------------------|-----------------------|----------------|------|------|------|------|------|
|                                     |                       | 50             | 120  | 300  | 1k   | 10k  | 50k  |
| 10 to 50                            | φ35 to φ89            | 0.95           | 1.00 | 1.03 | 1.05 | 1.09 | 1.12 |
| 63 & 80                             | φ35                   | 0.90           | 1.00 | 1.06 | 1.10 | 1.18 | 1.22 |
|                                     | φ50 to φ89            | 0.95           | 1.00 | 1.03 | 1.05 | 1.09 | 1.12 |
| 100                                 | φ35                   | 0.82           | 1.00 | 1.12 | 1.22 | 1.30 | 1.33 |
|                                     | φ50                   | 0.90           | 1.00 | 1.06 | 1.10 | 1.18 | 1.22 |
|                                     | φ63.5 to φ89          | 0.95           | 1.00 | 1.03 | 1.05 | 1.09 | 1.12 |
| 160 to 250                          | φ35                   | 0.80           | 1.00 | 1.19 | 1.34 | 1.46 | 1.52 |
|                                     | φ50 & φ63.5           | 0.81           | 1.00 | 1.14 | 1.26 | 1.36 | 1.41 |
|                                     | φ76.2 & φ89           | 0.82           | 1.00 | 1.12 | 1.22 | 1.30 | 1.33 |
| 315 to 400                          | φ35 to φ89            | 0.80           | 1.00 | 1.19 | 1.34 | 1.46 | 1.52 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.



# RWX Series

- Higher capacitance than RWF series.
- Endurance with ripple current : 5,000 hours at 85°C
- Suitable for UPS devices and servo press machines where higher capacitance is required.
- RoHS2 compliant

RWX

Higher capacitance

RWF



## SPECIFICATIONS

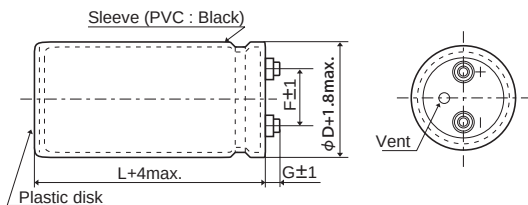
| Items                           | Characteristics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |                             |              |                                       |                 |                               |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|--------------|---------------------------------------|-----------------|-------------------------------|
| Category                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |                             |              |                                       |                 |                               |
| Temperature Range               | -40 to +85°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                    |                             |              |                                       |                 |                               |
| Rated Voltage Range             | 400 & 450V <sub>dc</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                    |                             |              |                                       |                 |                               |
| Capacitance Tolerance           | ±20% (M) (at 20°C, 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                             |              |                                       |                 |                               |
| Leakage Current                 | I=0.01CV or 7mA, whichever is smaller.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C after 5 minutes)                                                                                                                                                                                                                                                                                                                                                                                     |                    |                             |              |                                       |                 |                               |
| Dissipation Factor (tan δ)      | 0.25 max. (at 20°C, 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |                             |              |                                       |                 |                               |
| Low Temperature Characteristics | Capacitance change $C(-25^{\circ}\text{C})/C(+20^{\circ}\text{C}) \geq 0.7$ (at 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |                             |              |                                       |                 |                               |
| Insulation Resistance           | When measured between the terminals that are connected to each other and to the mounting clamp on the insulating sleeve covering the case by using an insulation resistance meter of 500V <sub>dc</sub> , the insulation resistance shall not be less than 100MΩ.                                                                                                                                                                                                                                                                                 |                    |                             |              |                                       |                 |                               |
| Insulation Withstanding Voltage | When a voltage of 2,000V <sub>ac</sub> is applied for 1 minute between the terminals that are connected to each other and to the mounting clamp on the insulating sleeve covering the case, there shall not be electrical damage.                                                                                                                                                                                                                                                                                                                 |                    |                             |              |                                       |                 |                               |
| Endurance                       | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 5,000 hours at 85°C. <table border="1"> <tr> <td>Capacitance change</td><td>≤ ±20% of the initial value</td></tr> <tr> <td>D.F. (tan δ)</td><td>≤ 200% of the initial specified value</td></tr> <tr> <td>Leakage current</td><td>≤ The initial specified value</td></tr> </table>                                       | Capacitance change | ≤ ±20% of the initial value | D.F. (tan δ) | ≤ 200% of the initial specified value | Leakage current | ≤ The initial specified value |
| Capacitance change              | ≤ ±20% of the initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |                             |              |                                       |                 |                               |
| D.F. (tan δ)                    | ≤ 200% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                    |                             |              |                                       |                 |                               |
| Leakage current                 | ≤ The initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |                             |              |                                       |                 |                               |
| Shelf Life                      | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 500 hours at 85°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. <table border="1"> <tr> <td>Capacitance change</td><td>≤ ±20% of the initial value</td></tr> <tr> <td>D.F. (tan δ)</td><td>≤ 200% of the initial specified value</td></tr> <tr> <td>Leakage current</td><td>≤ The initial specified value</td></tr> </table> | Capacitance change | ≤ ±20% of the initial value | D.F. (tan δ) | ≤ 200% of the initial specified value | Leakage current | ≤ The initial specified value |
| Capacitance change              | ≤ ±20% of the initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |                             |              |                                       |                 |                               |
| D.F. (tan δ)                    | ≤ 200% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                    |                             |              |                                       |                 |                               |
| Leakage current                 | ≤ The initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |                             |              |                                       |                 |                               |

## DIMENSIONS (Screw-Mount) [mm]

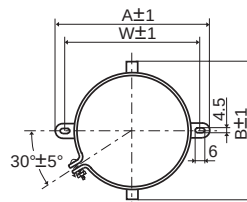
● Terminal Code : LG

● Mounting Clamp Code : B

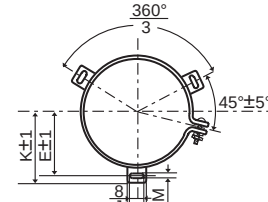
● Mounting Clamp Code : C : Standard



φ 63.5 : G=6  
 φ 76.2 & φ 89 : G=5  
 φ 100 : G=10



| φD   | A     | B    | W    | F    |
|------|-------|------|------|------|
| 63.5 | 90.0  | 76.0 | 80.0 | 28.0 |
| 76.2 | 104.5 | 90.0 | 93.5 | 31.5 |



| φD   | E    | K    | M   | F    | J    |
|------|------|------|-----|------|------|
| 63.5 | 38.1 | 43.5 | 4.5 | 28.0 | 14.0 |
| 76.2 | 44.5 | 50.0 | 4.5 | 31.5 | 14.0 |
| 89   | 50.8 | 56.5 | 4.5 | 31.5 | 16.0 |
| 100  | 56.5 | 63.4 | 5.5 | 41.5 | 18.0 |

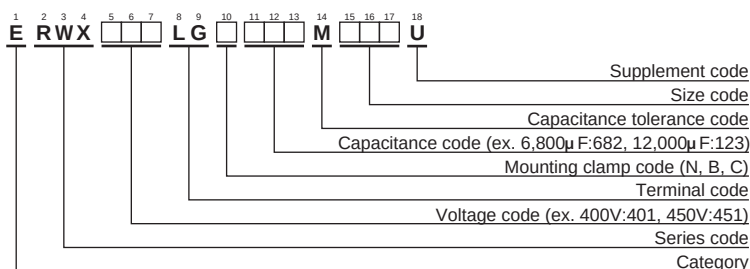
&lt;Screw specifications&gt;

to φ89 Plus hexagon-headed screw : M5×0.8×10  
 Maximum screw tightening torque : 3.23Nm

φ100 Cross-recessed head (Phillips) screw : M8×1.25×16  
 Spring washer, Washer  
 Maximum screw tightening torque : 6.31Nm

\* The screw and the mounting clamp are separately supplied and not attached to the product.

## PART NUMBERING SYSTEM



Please refer to "Product code guide (screw-mount terminal type)"



## RWX Series

### ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>85°C,120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>85°C,120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|--------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|--------------------------------------------------|--------------------|
| 400                      | 2,200       | 63.5×60               | 0.25  | 5.2                                              | ERWX401LGC222MD60U | 450                      | 2,200       | 63.5×70               | 0.25  | 5.3                                              | ERWX451LGC222MD70U |
|                          | 2,700       | 63.5×70               | 0.25  | 6.1                                              | ERWX401LGC272MD70U |                          | 2,700       | 63.5×80               | 0.25  | 6.2                                              | ERWX451LGC272MD80U |
|                          | 3,300       | 63.5×80               | 0.25  | 7.2                                              | ERWX401LGC332MD80U |                          | 3,300       | 63.5×90               | 0.25  | 7.3                                              | ERWX451LGC332MD90U |
|                          | 3,900       | 63.5×90               | 0.25  | 8.2                                              | ERWX401LGC392MD90U |                          | 3,900       | 63.5×100              | 0.25  | 8.3                                              | ERWX451LGC392MDA0U |
|                          | 4,700       | 63.5×100              | 0.25  | 9.4                                              | ERWX401LGC472MDA0U |                          | 4,700       | 63.5×115              | 0.25  | 9.6                                              | ERWX451LGC472MDB5U |
|                          | 5,600       | 63.5×115              | 0.25  | 10.0                                             | ERWX401LGC562MDB5U |                          | 5,600       | 63.5×130              | 0.25  | 10.3                                             | ERWX451LGC562MDD0U |
|                          | 6,800       | 63.5×135              | 0.25  | 11.9                                             | ERWX401LGC682MDD5U |                          | 6,800       | 63.5×155              | 0.25  | 12.3                                             | ERWX451LGC682MDF5U |
|                          | 8,200       | 63.5×155              | 0.25  | 13.1                                             | ERWX401LGC822MDF5U |                          | 6,800       | 76.2×115              | 0.25  | 11.9                                             | ERWX451LGC682MEB5U |
|                          | 8,200       | 76.2×115              | 0.25  | 12.7                                             | ERWX401LGC822MEB5U |                          | 8,200       | 76.2×130              | 0.25  | 12.9                                             | ERWX451LGC822MED0U |
|                          | 10,000      | 76.2×135              | 0.25  | 15.0                                             | ERWX401LGC103MED5U |                          | 10,000      | 76.2×155              | 0.25  | 15.4                                             | ERWX451LGC103MEF5U |
|                          | 12,000      | 76.2×155              | 0.25  | 16.8                                             | ERWX401LGC123MEF5U |                          | 10,000      | 89×120                | 0.25  | 12.7                                             | ERWX451LGC103MFC0U |
|                          | 15,000      | 89×145                | 0.25  | 16.9                                             | ERWX401LGC153MFE5U |                          | 12,000      | 89×135                | 0.25  | 14.1                                             | ERWX451LGC123MFD5U |
|                          | 18,000      | 89×165                | 0.25  | 19.1                                             | ERWX401LGC183MFG5U |                          | 15,000      | 89×165                | 0.25  | 17.2                                             | ERWX451LGC153MFG5U |
|                          | 20,000      | 89×205                | 0.25  | 22.1                                             | ERWX401LGC203MFL5U |                          | 18,000      | 89×200                | 0.25  | 20.1                                             | ERWX451LGC183MFL0U |
|                          | 20,000      | 100×165               | 0.25  | 21.5                                             | ERWX401LGC203MGG5U |                          | 20,000      | 100×200               | 0.25  | 22.6                                             | ERWX451LGC203MGL0U |
|                          | 25,000      | 100×205               | 0.25  | 25.8                                             | ERWX401LGC253MGL5U |                          | 25,000      | 100×240               | 0.25  | 26.8                                             | ERWX451LGC253MGQ0U |
|                          | 30,000      | 100×240               | 0.25  | 30.0                                             | ERWX401LGC303MGQ0U |                          | 29,000      | 100×270               | 0.25  | 29.9                                             | ERWX451LGC293MGT0U |
|                          | 34,000      | 100×270               | 0.25  | 33.1                                             | ERWX401LGC343MGT0U |                          |             |                       |       |                                                  |                    |

### ◆RATED RIPPLE CURRENT MULTIPLIERS

● Frequency Multipliers

| Frequency (Hz) | 50  | 120 | 300 | 1k  | 3k  |
|----------------|-----|-----|-----|-----|-----|
| Coefficient    | 0.8 | 1.0 | 1.1 | 1.2 | 1.2 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

Also, for the RWX series capacitors, using them at operating voltage less than their rated voltage can extend their lifetime. For details, please contact a representative of Nippon Chemi-Con.

# RWK Series

- Downsized and high ripple current from RWH series
- Endurance with ripple current : 5,000 hours at 85°C
- RoHS2 Compliant

RWK

Downsized

RWH

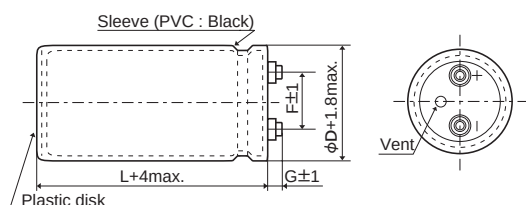


## SPECIFICATIONS

| Items                           | Characteristics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                    |                             |              |                                       |                 |                               |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|--------------|---------------------------------------|-----------------|-------------------------------|
| Category                        | -40 to +85°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                             |              |                                       |                 |                               |
| Temperature Range               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                    |                             |              |                                       |                 |                               |
| Rated Voltage Range             | 350 to 450V <sub>dc</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |                             |              |                                       |                 |                               |
| Capacitance Tolerance           | ±20% (M) (at 20°C, 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |                             |              |                                       |                 |                               |
| Leakage Current                 | I=0.02CV or 5mA, whichever is smaller.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C after 5 minutes)                                                                                                                                                                                                                                                                                                                                                                                        |                    |                             |              |                                       |                 |                               |
| Dissipation Factor (tan δ)      | 0.15 max. (at 20°C, 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                    |                             |              |                                       |                 |                               |
| Low Temperature Characteristics | Capacitance change $C(-25^{\circ}\text{C})/C(+20^{\circ}\text{C}) \geq 0.7$ (at 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                    |                             |              |                                       |                 |                               |
| Insulation Resistance           | When measured between the terminals that are connected to each other and to the mounting clamp on the insulating sleeve covering the case by using an insulation resistance meter of 500V <sub>dc</sub> , the insulation resistance shall not be less than 100MΩ.                                                                                                                                                                                                                                                                                    |                    |                             |              |                                       |                 |                               |
| Insulation Withstanding Voltage | When a voltage of 2,000V <sub>ac</sub> is applied for 1 minute between the terminals that are connected to each other and to the mounting clamp on the insulating sleeve covering the case, there shall not be electrical damage.                                                                                                                                                                                                                                                                                                                    |                    |                             |              |                                       |                 |                               |
| Endurance                       | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 5,000 hours at 85°C.<br><table border="1"> <tr> <td>Capacitance change</td><td>≤ ±20% of the initial value</td></tr> <tr> <td>D.F. (tan δ)</td><td>≤ 200% of the initial specified value</td></tr> <tr> <td>Leakage current</td><td>≤ The initial specified value</td></tr> </table>                                       | Capacitance change | ≤ ±20% of the initial value | D.F. (tan δ) | ≤ 200% of the initial specified value | Leakage current | ≤ The initial specified value |
| Capacitance change              | ≤ ±20% of the initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                    |                             |              |                                       |                 |                               |
| D.F. (tan δ)                    | ≤ 200% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    |                             |              |                                       |                 |                               |
| Leakage current                 | ≤ The initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |                             |              |                                       |                 |                               |
| Shelf Life                      | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 500 hours at 85°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4.<br><table border="1"> <tr> <td>Capacitance change</td><td>≤ ±20% of the initial value</td></tr> <tr> <td>D.F. (tan δ)</td><td>≤ 200% of the initial specified value</td></tr> <tr> <td>Leakage current</td><td>≤ The initial specified value</td></tr> </table> | Capacitance change | ≤ ±20% of the initial value | D.F. (tan δ) | ≤ 200% of the initial specified value | Leakage current | ≤ The initial specified value |
| Capacitance change              | ≤ ±20% of the initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                    |                             |              |                                       |                 |                               |
| D.F. (tan δ)                    | ≤ 200% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    |                             |              |                                       |                 |                               |
| Leakage current                 | ≤ The initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |                             |              |                                       |                 |                               |

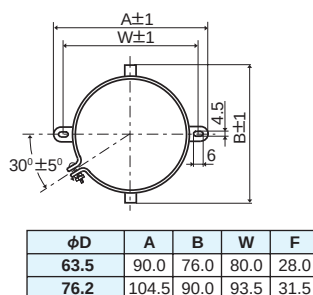
## DIMENSIONS (Screw-Mount) [mm]

●Terminal Code : LG

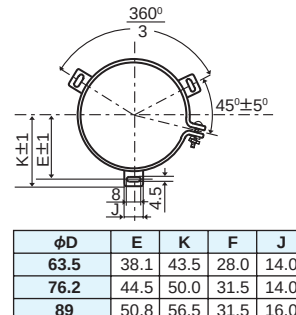


φ63.5, φ76.2 : G=6  
φ89 : G=4

●Mounting Clamp Code : B



●Mounting Clamp Code : C



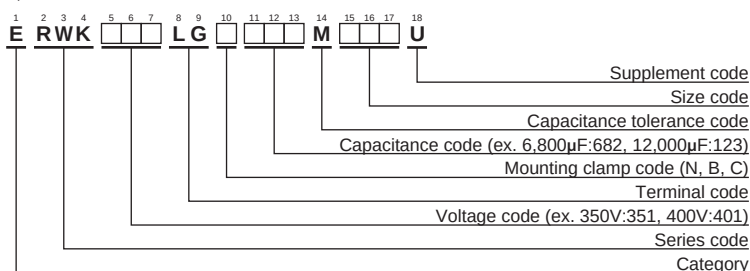
<Screw specifications>

Plus hexagon-headed screw : M5×0.8×10

Maximum screw tightening torque : 3.23Nm

\* The screw and the mounting clamp are separately supplied and not attached to the product.

## PART NUMBERING SYSTEM



Please refer to "Product code guide (screw-mount terminal type)"



## RWK Series

### ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>85°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>85°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|---------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|---------------------------------------------------|--------------------|
| 350                      | 3,900       | 63.5 × 105            | 0.15  | 18.1                                              | ERWK351LGC392MDA5U | 400                      | 3,300       | 63.5 × 105            | 0.15  | 16.6                                              | ERWK401LGC332MDA5U |
|                          | 4,700       | 63.5 × 125            | 0.15  | 21.5                                              | ERWK351LGC472MDC5U |                          | 3,900       | 63.5 × 125            | 0.15  | 19.4                                              | ERWK401LGC392MDC5U |
|                          | 5,600       | 63.5 × 145            | 0.15  | 25.0                                              | ERWK351LGC562MDE5U |                          | 4,700       | 63.5 × 145            | 0.15  | 22.8                                              | ERWK401LGC472MDE5U |
|                          | 5,600       | 76.2 × 105            | 0.15  | 23.5                                              | ERWK351LGC562MEA5U |                          | 4,700       | 76.2 × 105            | 0.15  | 21.4                                              | ERWK401LGC472MEA5U |
|                          | 6,800       | 63.5 × 185            | 0.15  | 30.8                                              | ERWK351LGC682MDJ5U |                          | 5,600       | 76.2 × 125            | 0.15  | 25.2                                              | ERWK401LGC562MEC5U |
|                          | 6,800       | 76.2 × 125            | 0.15  | 27.9                                              | ERWK351LGC682MEC5U |                          | 6,800       | 76.2 × 145            | 0.15  | 29.6                                              | ERWK401LGC682MEE5U |
|                          | 8,200       | 76.2 × 145            | 0.15  | 32.7                                              | ERWK351LGC822MEE5U |                          | 8,200       | 89 × 130              | 0.15  | 31.0                                              | ERWK401LGC822MFD0U |
|                          | 10,000      | 76.2 × 185            | 0.15  | 40.3                                              | ERWK351LGC103MEJ5U |                          | 10,000      | 89 × 150              | 0.15  | 36.9                                              | ERWK401LGC103MFF0U |
|                          | 10,000      | 89 × 130              | 0.15  | 34.4                                              | ERWK351LGC103MFD0U |                          | 12,000      | 89 × 190              | 0.15  | 44.3                                              | ERWK401LGC123MFK0U |
| 375                      | 12,000      | 89 × 150              | 0.15  | 40.1                                              | ERWK351LGC123MFF0U | 450                      | 2,700       | 63.5 × 105            | 0.15  | 15.0                                              | ERWK451LGC272MDA5U |
|                          | 3,300       | 63.5 × 105            | 0.15  | 16.6                                              | ERWK3H1LGC332MDA5U |                          | 3,300       | 63.5 × 125            | 0.15  | 18.0                                              | ERWK451LGC332MDC5U |
|                          | 3,900       | 63.5 × 125            | 0.15  | 19.4                                              | ERWK3H1LGC392MDC5U |                          | 3,900       | 63.5 × 145            | 0.15  | 20.9                                              | ERWK451LGC392MDE5U |
|                          | 4,700       | 63.5 × 145            | 0.15  | 22.8                                              | ERWK3H1LGC472MDE5U |                          | 3,900       | 76.2 × 105            | 0.15  | 19.6                                              | ERWK451LGC392MEA5U |
|                          | 4,700       | 76.2 × 105            | 0.15  | 21.4                                              | ERWK3H1LGC472MEA5U |                          | 4,700       | 63.5 × 185            | 0.15  | 25.6                                              | ERWK451LGC472MDJ5U |
|                          | 5,600       | 76.2 × 125            | 0.15  | 25.2                                              | ERWK3H1LGC562MEC5U |                          | 4,700       | 76.2 × 125            | 0.15  | 23.2                                              | ERWK451LGC472MEC5U |
|                          | 6,800       | 63.5 × 185            | 0.15  | 30.7                                              | ERWK3H1LGC682MDJ5U |                          | 5,600       | 76.2 × 145            | 0.15  | 27.0                                              | ERWK451LGC562MEE5U |
|                          | 6,800       | 76.2 × 145            | 0.15  | 29.6                                              | ERWK3H1LGC682MEE5U |                          | 6,800       | 89 × 130              | 0.15  | 28.3                                              | ERWK451LGC682MFD0U |
|                          | 6,800       | 89 × 110              | 0.15  | 26.3                                              | ERWK3H1LGC682MFB0U |                          | 8,200       | 89 × 150              | 0.15  | 33.1                                              | ERWK451LGC822MFF0U |
|                          | 8,200       | 89 × 130              | 0.15  | 31.0                                              | ERWK3H1LGC822MFD0U |                          | 10,000      | 89 × 190              | 0.15  | 40.6                                              | ERWK451LGC103MFK0U |
|                          | 10,000      | 76.2 × 185            | 0.15  | 40.0                                              | ERWK3H1LGC103MEJ5U |                          |             |                       |       |                                                   |                    |
|                          | 10,000      | 89 × 150              | 0.15  | 36.4                                              | ERWK3H1LGC103MFF0U |                          |             |                       |       |                                                   |                    |
|                          | 12,000      | 89 × 190              | 0.15  | 44.3                                              | ERWK3H1LGC123MFK0U |                          |             |                       |       |                                                   |                    |

### ◆RATED RIPPLE CURRENT MULTIPLIERS

● Frequency Multipliers

| Frequency (Hz) | 50  | 120 | 300 | 1k  | 3k  |
|----------------|-----|-----|-----|-----|-----|
| Coefficient    | 0.8 | 1.0 | 1.1 | 1.3 | 1.4 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

Also, for the RWK series capacitors, using them at operating voltage less than their rated voltage can extend their lifetime. For details, please contact a representative of Nippon Chemi-Con.

# RWH Series

- Downsized and high ripple current from RWF series
- Endurance with ripple current : 5,000 hours at 85°C
- RoHS2 Compliant

RWK  
Higher ripple  
**RWH**  
Downsized  
Higher ripple  
RWF

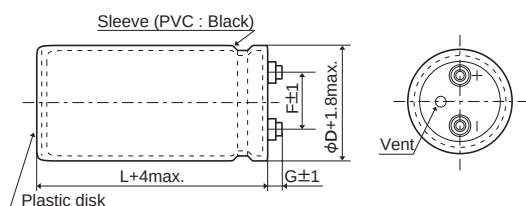


## SPECIFICATIONS

| Items                           | Characteristics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                    |                             |              |                                       |                 |                               |              |      |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|--------------|---------------------------------------|-----------------|-------------------------------|--------------|------|
| Category                        | -25 to +85°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    |                             |              |                                       |                 |                               |              |      |
| Temperature Range               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                    |                             |              |                                       |                 |                               |              |      |
| Rated Voltage Range             | 350 to 450V <sub>dc</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |                             |              |                                       |                 |                               |              |      |
| Capacitance Tolerance           | ±20% (M) (at 20°C, 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |                             |              |                                       |                 |                               |              |      |
| Leakage Current                 | I=0.02CV or 5mA, whichever is smaller.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C after 5 minutes)                                                                                                                                                                                                                                                                                                                                                                                               |                    |                             |              |                                       |                 |                               |              |      |
| Dissipation Factor (tan δ)      | 0.25 max. (at 20°C, 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                    |                             |              |                                       |                 |                               |              |      |
| Low Temperature Characteristics | Capacitance change $C(-25^{\circ}\text{C})/C(+20^{\circ}\text{C}) \geq 0.7$ (at 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                    |                             |              |                                       |                 |                               |              |      |
| Insulation Resistance           | When measured between the terminals that are connected to each other and to the mounting clamp on the insulating sleeve covering the case by using an insulation resistance meter of 500V <sub>dc</sub> , the insulation resistance shall not be less than 100MΩ.                                                                                                                                                                                                                                                                                           |                    |                             |              |                                       |                 |                               |              |      |
| Insulation Withstanding Voltage | When a voltage of 2,000V <sub>ac</sub> is applied for 1 minute between the terminals that are connected to each other and to the mounting clamp on the insulating sleeve covering the case, there shall not be electrical damage.                                                                                                                                                                                                                                                                                                                           |                    |                             |              |                                       |                 |                               |              |      |
| Endurance                       | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 5,000 hours at 85°C.<br><table border="1"> <tr> <td>Capacitance change</td><td>≤ ±20% of the initial value</td></tr> <tr> <td>D.F. (tan δ)</td><td>≤ 200% of the initial specified value</td></tr> <tr> <td>Leakage current</td><td>≤ The initial specified value</td></tr> </table>                                              | Capacitance change | ≤ ±20% of the initial value | D.F. (tan δ) | ≤ 200% of the initial specified value | Leakage current | ≤ The initial specified value |              |      |
| Capacitance change              | ≤ ±20% of the initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                    |                             |              |                                       |                 |                               |              |      |
| D.F. (tan δ)                    | ≤ 200% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |                             |              |                                       |                 |                               |              |      |
| Leakage current                 | ≤ The initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                    |                             |              |                                       |                 |                               |              |      |
| Useful life                     | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 8,000 hours at 85°C.<br><table border="1"> <tr> <td>Capacitance change</td><td>≤ ±30% of the initial value</td></tr> <tr> <td>D.F. (tan δ)</td><td>≤ 300% of the initial specified value</td></tr> <tr> <td>Leakage current</td><td>≤ The initial specified value</td></tr> <tr> <td>Failure rate</td><td>≤ 1%</td></tr> </table> | Capacitance change | ≤ ±30% of the initial value | D.F. (tan δ) | ≤ 300% of the initial specified value | Leakage current | ≤ The initial specified value | Failure rate | ≤ 1% |
| Capacitance change              | ≤ ±30% of the initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                    |                             |              |                                       |                 |                               |              |      |
| D.F. (tan δ)                    | ≤ 300% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |                             |              |                                       |                 |                               |              |      |
| Leakage current                 | ≤ The initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                    |                             |              |                                       |                 |                               |              |      |
| Failure rate                    | ≤ 1%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |                             |              |                                       |                 |                               |              |      |
| Shelf Life                      | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 500 hours at 85°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4.<br><table border="1"> <tr> <td>Capacitance change</td><td>≤ ±20% of the initial value</td></tr> <tr> <td>D.F. (tan δ)</td><td>≤ 200% of the initial specified value</td></tr> <tr> <td>Leakage current</td><td>≤ The initial specified value</td></tr> </table>        | Capacitance change | ≤ ±20% of the initial value | D.F. (tan δ) | ≤ 200% of the initial specified value | Leakage current | ≤ The initial specified value |              |      |
| Capacitance change              | ≤ ±20% of the initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                    |                             |              |                                       |                 |                               |              |      |
| D.F. (tan δ)                    | ≤ 200% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |                             |              |                                       |                 |                               |              |      |
| Leakage current                 | ≤ The initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                    |                             |              |                                       |                 |                               |              |      |

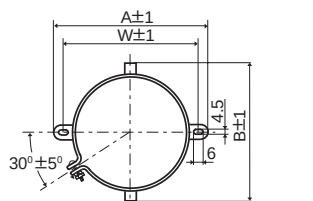
## DIMENSIONS (Screw-Mount) [mm]

●Terminal Code : LG



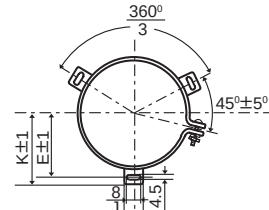
φ63.5, φ76.2 : G=6  
φ89 : G=4

●Mounting Clamp Code : B



| φD   | A     | B    | W    | F    |
|------|-------|------|------|------|
| 63.5 | 90.0  | 76.0 | 80.0 | 28.0 |
| 76.2 | 104.5 | 90.0 | 93.5 | 31.5 |

●Mounting Clamp Code : C



| φD   | E    | K    | F    | J    |
|------|------|------|------|------|
| 63.5 | 38.1 | 43.5 | 28.0 | 14.0 |
| 76.2 | 44.5 | 50.0 | 31.5 | 14.0 |
| 89   | 50.8 | 56.5 | 31.5 | 16.0 |

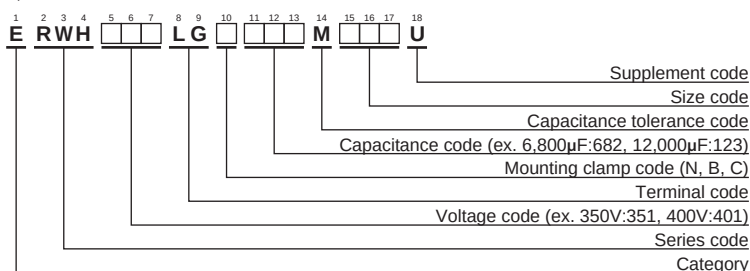
<Screw specifications>

Plus hexagon-headed screw : M5×0.8×10

Maximum screw tightening torque : 3.23Nm

\* The screw and the mounting clamp are separately supplied and not attached to the product.

## PART NUMBERING SYSTEM



Please refer to "Product code guide (screw-mount terminal type)"

## ◆STANDARD RATINGS

| WV (V <sub>dc</sub> ) | Cap (μF) | Case size φD×L(mm) | tan δ | Rated ripple current (Arms/85°C, 120Hz) | Part No.           | WV (V <sub>dc</sub> ) | Cap (μF) | Case size φD×L(mm) | tan δ | Rated ripple current (Arms/85°C, 120Hz) | Part No.           |
|-----------------------|----------|--------------------|-------|-----------------------------------------|--------------------|-----------------------|----------|--------------------|-------|-----------------------------------------|--------------------|
| 350                   | 4,700    | 63.5 × 105         | 0.25  | 16.3                                    | ERWH351LGC472MDA5U | 400                   | 8,200    | 76.2 × 135         | 0.25  | 26.5                                    | ERWH401LGC822MED5U |
|                       | 5,600    | 63.5 × 125         | 0.25  | 19.2                                    | ERWH351LGC562MDC5U |                       | 10,000   | 76.2 × 160         | 0.25  | 31.6                                    | ERWH401LGC103MEG0U |
|                       | 6,800    | 63.5 × 145         | 0.25  | 22.6                                    | ERWH351LGC682MDE5U |                       | 10,000   | 89 × 130           | 0.25  | 28.3                                    | ERWH401LGC103MFD0U |
|                       | 6,800    | 76.2 × 105         | 0.25  | 21.7                                    | ERWH351LGC682MEA5U |                       | 12,000   | 89 × 150           | 0.25  | 33.0                                    | ERWH401LGC123MFF0U |
|                       | 8,200    | 63.5 × 165         | 0.25  | 26.3                                    | ERWH351LGC822MDG5U |                       | 15,000   | 89 × 180           | 0.25  | 39.9                                    | ERWH401LGC153MFJ0U |
|                       | 8,200    | 76.2 × 120         | 0.25  | 25.2                                    | ERWH351LGC822MEC0U | 450                   | 3,300    | 63.5 × 105         | 0.25  | 13.6                                    | ERWH451LGC332MDA5U |
|                       | 10,000   | 76.2 × 140         | 0.25  | 29.8                                    | ERWH351LGC103MEE0U |                       | 3,900    | 63.5 × 125         | 0.25  | 16.0                                    | ERWH451LGC392MDC5U |
|                       | 12,000   | 76.2 × 165         | 0.25  | 35.1                                    | ERWH351LGC123MEG5U |                       | 4,700    | 63.5 × 145         | 0.25  | 18.7                                    | ERWH451LGC472MDE5U |
|                       | 15,000   | 89 × 155           | 0.25  | 37.5                                    | ERWH351LGC153MFF5U |                       | 4,700    | 76.2 × 105         | 0.25  | 18.0                                    | ERWH451LGC472MEA5U |
|                       | 18,000   | 89 × 180           | 0.25  | 43.8                                    | ERWH351LGC183MFJ0U |                       | 5,600    | 63.5 × 165         | 0.25  | 21.7                                    | ERWH451LGC562MDG5U |
| 400                   | 3,900    | 63.5 × 100         | 0.25  | 14.5                                    | ERWH401LGC392MDA0U |                       | 5,600    | 76.2 × 120         | 0.25  | 20.8                                    | ERWH451LGC562MEC0U |
|                       | 4,700    | 63.5 × 120         | 0.25  | 17.2                                    | ERWH401LGC472MDC0U |                       | 6,800    | 76.2 × 140         | 0.25  | 24.5                                    | ERWH451LGC682MEE0U |
|                       | 5,600    | 63.5 × 135         | 0.25  | 19.8                                    | ERWH401LGC562MDD5U |                       | 8,200    | 76.2 × 165         | 0.25  | 29.0                                    | ERWH451LGC822MEG5U |
|                       | 5,600    | 76.2 × 105         | 0.25  | 19.7                                    | ERWH401LGC562MEA5U |                       | 8,200    | 89 × 135           | 0.25  | 26.1                                    | ERWH451LGC822MFD5U |
|                       | 6,800    | 63.5 × 160         | 0.25  | 23.5                                    | ERWH401LGC682MDG0U |                       | 10,000   | 89 × 155           | 0.25  | 30.5                                    | ERWH451LGC103MFF5U |
|                       | 6,800    | 76.2 × 115         | 0.25  | 22.5                                    | ERWH401LGC682MEB5U |                       | 12,000   | 89 × 190           | 0.25  | 36.6                                    | ERWH451LGC123MFK0U |

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

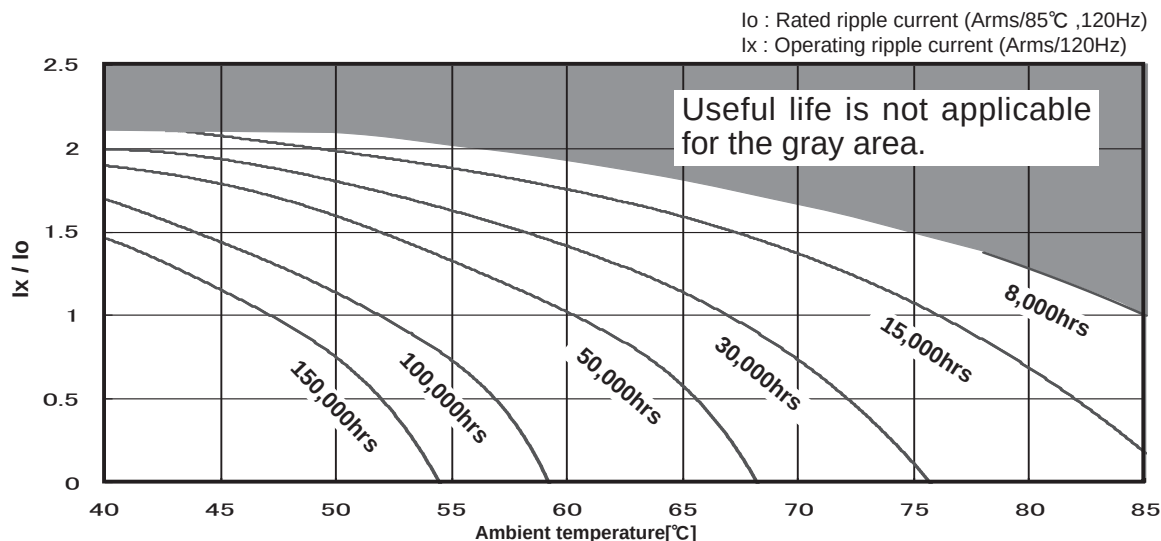
| Frequency (Hz) | 50  | 120 | 300 | 1k  | 3k  |
|----------------|-----|-----|-----|-----|-----|
| Coefficient    | 0.8 | 1.0 | 1.1 | 1.3 | 1.4 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

Also, for the RWH series capacitors, using them at operating voltage less than their rated voltage can extend their lifetime. For details, please contact a representative of Nippon Chemi-Con.

## ◆USEFUL LIFE

Useful life depending on the ambient temperature  $T_x$  under ripple current operating conditions



## ◆Warning !

Useful life shall indicate the end of the life time without exceeding the specified failure rate. It's generally known that Aluminum Electrolytic Capacitors have wear-out failure mode with gradual deterioration of the electrical parameters and should have large number of the failure rate at the end of life. The useful life time is specified by a certain failure rate. It's not a guaranteed specification.

Generally the maximum life time is 15 years (131,000hours) considering sealing material deteriorate. When a longer life time is required for your application, please consult us.



## RWF Series

- High ripple capability
- Endurance with ripple current : 5,000 hours at 85°C
- Wide range of case sizes from  $\phi 50$  to  $\phi 100$
- RoHS2 Compliant

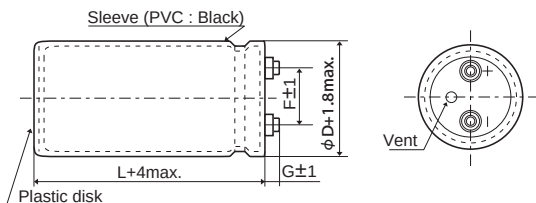


## ◆ SPECIFICATIONS

| Items                           | Characteristics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |                             |              |                                       |                 |                               |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|--------------|---------------------------------------|-----------------|-------------------------------|
| Category                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |                             |              |                                       |                 |                               |
| Temperature Range               | -25 to +85°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                    |                             |              |                                       |                 |                               |
| Rated Voltage Range             | 350 to 450V <sub>dc</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                             |              |                                       |                 |                               |
| Capacitance Tolerance           | ±20% (M) (at 20°C, 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                             |              |                                       |                 |                               |
| Leakage Current                 | I=0.02CV or 5mA, whichever is smaller.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C after 5 minutes)                                                                                                                                                                                                                                                                                                                                                                                     |                    |                             |              |                                       |                 |                               |
| Dissipation Factor (tan δ)      | 0.25 max. (at 20°C, 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |                             |              |                                       |                 |                               |
| Low Temperature Characteristics | Capacitance change $C(-25^{\circ}\text{C})/C(+20^{\circ}\text{C}) \geq 0.7$ (at 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |                             |              |                                       |                 |                               |
| Insulation Resistance           | When measured between the terminals that are connected to each other and to the mounting clamp on the insulating sleeve covering the case by using an insulation resistance meter of 500V <sub>dc</sub> , the insulation resistance shall not be less than 100MΩ.                                                                                                                                                                                                                                                                                 |                    |                             |              |                                       |                 |                               |
| Insulation Withstanding Voltage | When a voltage of 2,000V <sub>ac</sub> is applied for 1 minute between the terminals that are connected to each other and to the mounting clamp on the insulating sleeve covering the case, there shall not be electrical damage.                                                                                                                                                                                                                                                                                                                 |                    |                             |              |                                       |                 |                               |
| Endurance                       | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 5,000 hours at 85°C. <table border="1"> <tr> <td>Capacitance change</td><td>≤ ±20% of the initial value</td></tr> <tr> <td>D.F. (tan δ)</td><td>≤ 200% of the initial specified value</td></tr> <tr> <td>Leakage current</td><td>≤ The initial specified value</td></tr> </table>                                       | Capacitance change | ≤ ±20% of the initial value | D.F. (tan δ) | ≤ 200% of the initial specified value | Leakage current | ≤ The initial specified value |
| Capacitance change              | ≤ ±20% of the initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |                             |              |                                       |                 |                               |
| D.F. (tan δ)                    | ≤ 200% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                    |                             |              |                                       |                 |                               |
| Leakage current                 | ≤ The initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |                             |              |                                       |                 |                               |
| Shelf Life                      | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 500 hours at 85°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. <table border="1"> <tr> <td>Capacitance change</td><td>≤ ±20% of the initial value</td></tr> <tr> <td>D.F. (tan δ)</td><td>≤ 200% of the initial specified value</td></tr> <tr> <td>Leakage current</td><td>≤ The initial specified value</td></tr> </table> | Capacitance change | ≤ ±20% of the initial value | D.F. (tan δ) | ≤ 200% of the initial specified value | Leakage current | ≤ The initial specified value |
| Capacitance change              | ≤ ±20% of the initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |                             |              |                                       |                 |                               |
| D.F. (tan δ)                    | ≤ 200% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                    |                             |              |                                       |                 |                               |
| Leakage current                 | ≤ The initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |                             |              |                                       |                 |                               |

## ◆ DIMENSIONS (Screw-Mount) [mm]

- Terminal Code : LG

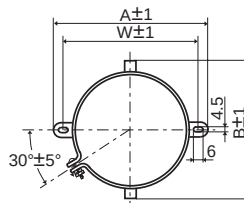


φ50 & φ63.5 : G=6  
φ76.2 & φ89 : G=5  
φ100 : G=10

<Screw specifications>

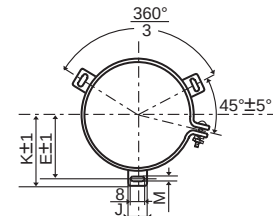
to φ89 Plus hexagon-headed screw : M5×0.8×10  
Maximum screw tightening torque : 3.23Nm

- Mounting Clamp Code : B



| φD   | A     | B    | W    | F    |
|------|-------|------|------|------|
| 50   | 78.0  | 64.0 | 68.0 | 22.4 |
| 63.5 | 90.0  | 76.0 | 80.0 | 28.0 |
| 76.2 | 104.5 | 90.0 | 93.5 | 31.5 |

- Mounting Clamp Code : C

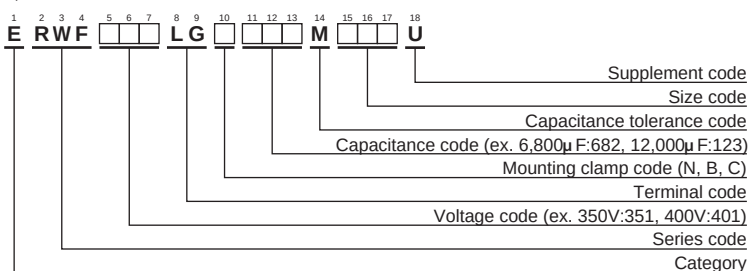


| φD   | E    | K    | M   | F    | J    |
|------|------|------|-----|------|------|
| 50   | 32.5 | 37.0 | 4.5 | 22.4 | 14.0 |
| 63.5 | 38.1 | 43.5 | 4.5 | 28.0 | 14.0 |
| 76.2 | 44.5 | 50.0 | 4.5 | 31.5 | 14.0 |
| 89   | 50.8 | 56.5 | 4.5 | 31.5 | 16.0 |
| 100  | 56.5 | 63.4 | 5.5 | 41.5 | 18.0 |

φ100 Cross-recessed head (Phillips) screw : M8×1.25×16  
Spring washer, Washer  
Maximum screw tightening torque : 6.31Nm

\* The screw and the mounting clamp are separately supplied and not attached to the product.

## ◆ PART NUMBERING SYSTEM



Please refer to "Product code guide (screw-mount terminal type)"

## ◆ STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>85°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>85°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|---------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|---------------------------------------------------|--------------------|
| 350                      | 1,200       | 50 × 60               | 0.25  | 4.90                                              | ERWF351LGC122MC60U | 400                      | 5,600       | 63.5 × 190            | 0.25  | 18.2                                              | ERWF401LGC562MDK0U |
|                          | 1,800       | 50 × 75               | 0.25  | 6.50                                              | ERWF351LGC182MC75U |                          | 5,600       | 76.2 × 130            | 0.25  | 16.9                                              | ERWF401LGC562MED0U |
|                          | 2,200       | 50 × 85               | 0.25  | 7.50                                              | ERWF351LGC222MC85U |                          | 6,800       | 76.2 × 155            | 0.25  | 20.2                                              | ERWF401LGC682MEF5U |
|                          | 2,200       | 50 × 96               | 0.25  | 7.70                                              | ERWF351LGC222MC96U |                          | 8,200       | 76.2 × 170            | 0.25  | 22.8                                              | ERWF401LGC822MEH0U |
|                          | 2,700       | 50 × 115              | 0.25  | 9.30                                              | ERWF351LGC272MCB5U |                          | 10,000      | 89 × 155              | 0.25  | 26.6                                              | ERWF401LGC103MFF5U |
|                          | 3,300       | 50 × 130              | 0.25  | 10.8                                              | ERWF351LGC332MCD0U |                          | 12,000      | 89 × 170              | 0.25  | 30.0                                              | ERWF401LGC123MFH0U |
|                          | 3,900       | 63.5 × 115            | 0.25  | 12.1                                              | ERWF351LGC392MDB5U |                          | 15,000      | 100 × 190             | 0.25  | 33.7                                              | ERWF401LGC153MGK0U |
|                          | 4,700       | 63.5 × 130            | 0.25  | 14.0                                              | ERWF351LGC472MDD0U |                          | 18,000      | 100 × 220             | 0.25  | 37.4                                              | ERWF401LGC183MGN0U |
|                          | 5,600       | 63.5 × 155            | 0.25  | 16.6                                              | ERWF351LGC562MDF5U | 450                      | 820         | 50 × 60               | 0.25  | 4.00                                              | ERWF451LGC821MC60U |
|                          | 5,600       | 76.2 × 115            | 0.25  | 16.1                                              | ERWF351LGC562MEB5U |                          | 1,000       | 50 × 75               | 0.25  | 4.80                                              | ERWF451LGC102MC75U |
|                          | 6,800       | 63.5 × 190            | 0.25  | 20.0                                              | ERWF351LGC682MDK0U |                          | 1,200       | 50 × 85               | 0.25  | 5.60                                              | ERWF451LGC122MC85U |
|                          | 6,800       | 76.2 × 130            | 0.25  | 18.6                                              | ERWF351LGC682MED0U |                          | 1,200       | 50 × 96               | 0.25  | 5.70                                              | ERWF451LGC122MC96U |
|                          | 8,200       | 76.2 × 155            | 0.25  | 22.2                                              | ERWF351LGC822MEF5U |                          | 1,500       | 50 × 96               | 0.25  | 6.30                                              | ERWF451LGC152MC96U |
|                          | 10,000      | 76.2 × 170            | 0.25  | 25.2                                              | ERWF351LGC103MEH0U |                          | 1,800       | 50 × 115              | 0.25  | 7.60                                              | ERWF451LGC182MCB5U |
|                          | 12,000      | 89 × 155              | 0.25  | 29.1                                              | ERWF351LGC123MFF5U |                          | 2,200       | 50 × 130              | 0.25  | 8.80                                              | ERWF451LGC222MCD0U |
|                          | 15,000      | 89 × 190              | 0.25  | 35.7                                              | ERWF351LGC153MFK0U |                          | 2,700       | 63.5 × 115            | 0.25  | 10.1                                              | ERWF451LGC272MDB5U |
|                          | 18,000      | 100 × 190             | 0.25  | 36.9                                              | ERWF351LGC183MGK0U |                          | 3,300       | 63.5 × 130            | 0.25  | 11.7                                              | ERWF451LGC332MDD0U |
|                          | 22,000      | 100 × 250             | 0.25  | 46.1                                              | ERWF351LGC223MGR0U |                          | 3,900       | 63.5 × 155            | 0.25  | 13.8                                              | ERWF451LGC392MDF5U |
| 400                      | 1,000       | 50 × 60               | 0.25  | 4.40                                              | ERWF401LGC102MC60U |                          | 3,900       | 76.2 × 115            | 0.25  | 13.4                                              | ERWF451LGC392MEB5U |
|                          | 1,500       | 50 × 75               | 0.25  | 5.90                                              | ERWF401LGC152MC75U |                          | 4,700       | 63.5 × 190            | 0.25  | 16.7                                              | ERWF451LGC472MDK0U |
|                          | 1,800       | 50 × 85               | 0.25  | 6.80                                              | ERWF401LGC182MC85U |                          | 4,700       | 76.2 × 130            | 0.25  | 15.5                                              | ERWF451LGC472MED0U |
|                          | 1,800       | 50 × 96               | 0.25  | 7.00                                              | ERWF401LGC182MC96U |                          | 5,600       | 76.2 × 155            | 0.25  | 18.3                                              | ERWF451LGC562MEF5U |
|                          | 2,200       | 50 × 105              | 0.25  | 8.00                                              | ERWF401LGC222MCA5U |                          | 6,800       | 76.2 × 170            | 0.25  | 20.7                                              | ERWF451LGC682MEH0U |
|                          | 2,700       | 50 × 130              | 0.25  | 9.80                                              | ERWF401LGC272MCD0U |                          | 8,200       | 89 × 155              | 0.25  | 24.1                                              | ERWF451LGC822MFF5U |
|                          | 3,300       | 63.5 × 115            | 0.25  | 11.1                                              | ERWF401LGC332MDB5U |                          | 10,000      | 89 × 170              | 0.25  | 27.8                                              | ERWF451LGC103MFH0U |
|                          | 3,900       | 63.5 × 130            | 0.25  | 12.7                                              | ERWF401LGC392MDD0U |                          | 12,000      | 100 × 190             | 0.25  | 29.3                                              | ERWF451LGC123MGK0U |
|                          | 4,700       | 63.5 × 155            | 0.25  | 15.2                                              | ERWF401LGC472MDF5U |                          | 15,000      | 100 × 250             | 0.25  | 37.0                                              | ERWF451LGC153MGR0U |
|                          | 4,700       | 76.2 × 115            | 0.25  | 14.7                                              | ERWF401LGC472MEB5U |                          |             |                       |       |                                                   |                    |

## ◆ RATED RIPPLE CURRENT MULTIPLIERS

## ● Frequency Multipliers

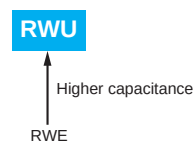
| Frequency (Hz) | 50  | 120 | 300 | 1k  | 3k  |
|----------------|-----|-----|-----|-----|-----|
| Coefficient    | 0.8 | 1.0 | 1.1 | 1.3 | 1.4 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

Also, for the RWF series capacitors, using them at operating voltage less than their rated voltage can extend their lifetime. For details, please contact a representative of Nippon Chemi-Con.

## RWU Series

- Higher capacitance than RWE series.
- Endurance with ripple current: 2,000 hours at 85°C
- Suitable for UPS devices and servo press machines where higher capacitance is required.
- RoHS2 compliant



## ◆ SPECIFICATIONS

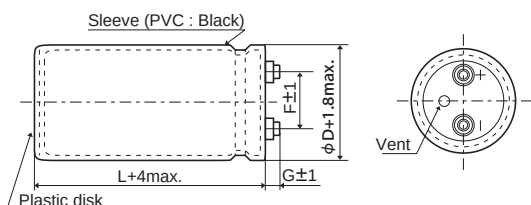
| Items                           | Characteristics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |                             |              |                                       |                 |                               |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|--------------|---------------------------------------|-----------------|-------------------------------|
| Category                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |                             |              |                                       |                 |                               |
| Temperature Range               | -40 to +85°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                    |                             |              |                                       |                 |                               |
| Rated Voltage Range             | 400 & 450V <sub>dc</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                    |                             |              |                                       |                 |                               |
| Capacitance Tolerance           | ±20% (M) (at 20°C, 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                             |              |                                       |                 |                               |
| Leakage Current                 | I=0.01CV or 7mA, whichever is smaller.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C after 5 minutes)                                                                                                                                                                                                                                                                                                                                                                                     |                    |                             |              |                                       |                 |                               |
| Dissipation Factor (tan δ)      | 0.25 max. (at 20°C, 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |                             |              |                                       |                 |                               |
| Low Temperature Characteristics | Capacitance change $C(-25^{\circ}\text{C})/C(+20^{\circ}\text{C}) \geq 0.7$ (at 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |                             |              |                                       |                 |                               |
| Insulation Resistance           | When measured between the terminals that are connected to each other and to the mounting clamp on the insulating sleeve covering the case by using an insulation resistance meter of 500V <sub>dc</sub> , the insulation resistance shall not be less than 100MΩ.                                                                                                                                                                                                                                                                                 |                    |                             |              |                                       |                 |                               |
| Insulation Withstanding Voltage | When a voltage of 2,000V <sub>ac</sub> is applied for 1 minute between the terminals that are connected to each other and to the mounting clamp on the insulating sleeve covering the case, there shall not be electrical damage.                                                                                                                                                                                                                                                                                                                 |                    |                             |              |                                       |                 |                               |
| Endurance                       | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 2,000 hours at 85°C. <table border="1"> <tr> <td>Capacitance change</td><td>≤ ±20% of the initial value</td></tr> <tr> <td>D.F. (tan δ)</td><td>≤ 200% of the initial specified value</td></tr> <tr> <td>Leakage current</td><td>≤ The initial specified value</td></tr> </table>                                       | Capacitance change | ≤ ±20% of the initial value | D.F. (tan δ) | ≤ 200% of the initial specified value | Leakage current | ≤ The initial specified value |
| Capacitance change              | ≤ ±20% of the initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |                             |              |                                       |                 |                               |
| D.F. (tan δ)                    | ≤ 200% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                    |                             |              |                                       |                 |                               |
| Leakage current                 | ≤ The initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |                             |              |                                       |                 |                               |
| Shelf Life                      | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 500 hours at 85°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. <table border="1"> <tr> <td>Capacitance change</td><td>≤ ±20% of the initial value</td></tr> <tr> <td>D.F. (tan δ)</td><td>≤ 200% of the initial specified value</td></tr> <tr> <td>Leakage current</td><td>≤ The initial specified value</td></tr> </table> | Capacitance change | ≤ ±20% of the initial value | D.F. (tan δ) | ≤ 200% of the initial specified value | Leakage current | ≤ The initial specified value |
| Capacitance change              | ≤ ±20% of the initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |                             |              |                                       |                 |                               |
| D.F. (tan δ)                    | ≤ 200% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                    |                             |              |                                       |                 |                               |
| Leakage current                 | ≤ The initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |                             |              |                                       |                 |                               |

## ◆ DIMENSIONS (Screw-Mount) [mm]

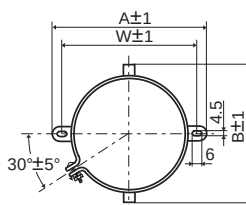
● Terminal Code : LG

● Mounting Clamp Code : B

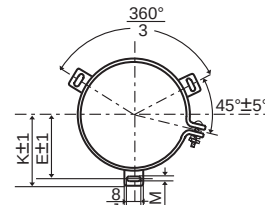
● Mounting Clamp Code : C : Standard



φ 63.5 : G=6  
 φ 76.2 & φ 89 : G=5  
 φ 100 : G=10



| φD   | A     | B    | W    | F    |
|------|-------|------|------|------|
| 63.5 | 90.0  | 76.0 | 80.0 | 28.0 |
| 76.2 | 104.5 | 90.0 | 93.5 | 31.5 |



| φD   | E    | K    | M   | F    | J    |
|------|------|------|-----|------|------|
| 63.5 | 38.1 | 43.5 | 4.5 | 28.0 | 14.0 |
| 76.2 | 44.5 | 50.0 | 4.5 | 31.5 | 14.0 |
| 89   | 50.8 | 56.5 | 4.5 | 31.5 | 16.0 |
| 100  | 56.5 | 63.4 | 5.5 | 41.5 | 18.0 |

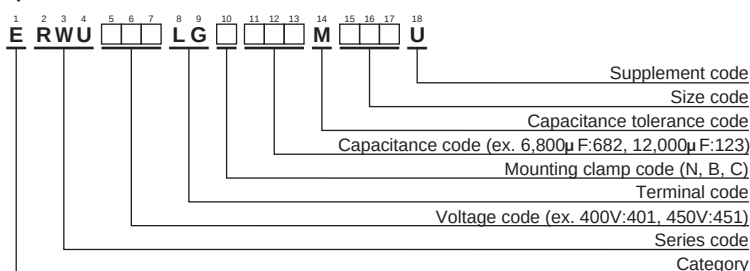
&lt;Screw specifications&gt;

to φ89 Plus hexagon-headed screw : M5×0.8×10  
 Maximum screw tightening torque : 3.23Nm

φ100 Cross-recessed head (Phillips) screw : M8×1.25×16  
 Spring washer, Washer  
 Maximum screw tightening torque : 6.31Nm

\* The screw and the mounting clamp are separately supplied and not attached to the product.

## ◆ PART NUMBERING SYSTEM



Please refer to "Product code guide (screw-mount terminal type)"



### ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>85°C,120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>85°C,120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|--------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|--------------------------------------------------|--------------------|
| 400                      | 2,200       | 63.5×60               | 0.25  | 5.2                                              | ERWU401LGC222MD60U | 450                      | 2,200       | 63.5×70               | 0.25  | 5.3                                              | ERWU451LGC222MD70U |
|                          | 2,700       | 63.5×70               | 0.25  | 6.1                                              | ERWU401LGC272MD70U |                          | 2,700       | 63.5×75               | 0.25  | 6.1                                              | ERWU451LGC272MD75U |
|                          | 3,300       | 63.5×80               | 0.25  | 7.2                                              | ERWU401LGC332MD80U |                          | 3,300       | 63.5×90               | 0.25  | 7.3                                              | ERWU451LGC332MD90U |
|                          | 3,900       | 63.5×85               | 0.25  | 8.0                                              | ERWU401LGC392MD85U |                          | 3,900       | 63.5×100              | 0.25  | 8.3                                              | ERWU451LGC392MDA0U |
|                          | 4,700       | 63.5×100              | 0.25  | 9.4                                              | ERWU401LGC472MDA0U |                          | 4,700       | 63.5×115              | 0.25  | 9.6                                              | ERWU451LGC472MDB5U |
|                          | 5,600       | 63.5×115              | 0.25  | 10.0                                             | ERWU401LGC562MDB5U |                          | 5,600       | 63.5×130              | 0.25  | 10.3                                             | ERWU451LGC562MDD0U |
|                          | 6,800       | 63.5×130              | 0.25  | 11.7                                             | ERWU401LGC682MDD0U |                          | 6,800       | 63.5×150              | 0.25  | 12.1                                             | ERWU451LGC682MDF0U |
|                          | 8,200       | 63.5×155              | 0.25  | 13.1                                             | ERWU401LGC822MDF5U |                          | 8,200       | 76.2×130              | 0.25  | 12.9                                             | ERWU451LGC822MED0U |
|                          | 8,200       | 76.2×110              | 0.25  | 12.5                                             | ERWU401LGC822MEB0U |                          | 10,000      | 76.2×150              | 0.25  | 15.1                                             | ERWU451LGC103MEF0U |
|                          | 10,000      | 76.2×130              | 0.25  | 14.8                                             | ERWU401LGC103MED0U |                          | 12,000      | 76.2×175              | 0.25  | 17.1                                             | ERWU451LGC123MEH5U |
|                          | 12,000      | 76.2×150              | 0.25  | 16.6                                             | ERWU401LGC123MEF0U |                          | 12,000      | 89×135                | 0.25  | 14.1                                             | ERWU451LGC123MFD5U |
|                          | 15,000      | 89×140                | 0.25  | 16.6                                             | ERWU401LGC153MFE0U |                          | 15,000      | 89×160                | 0.25  | 17.0                                             | ERWU451LGC153MFG0U |
|                          | 18,000      | 89×165                | 0.25  | 19.1                                             | ERWU401LGC183MFG5U |                          | 18,000      | 89×205                | 0.25  | 20.3                                             | ERWU451LGC183MFL5U |
|                          | 20,000      | 89×200                | 0.25  | 21.9                                             | ERWU401LGC203MFL0U |                          | 20,000      | 89×230                | 0.25  | 22.5                                             | ERWU451LGC203MFP0U |
|                          | 20,000      | 100×160               | 0.25  | 21.2                                             | ERWU401LGC203MGG0U |                          | 25,000      | 100×230               | 0.25  | 26.1                                             | ERWU451LGC253MGP0U |
|                          | 25,000      | 100×210               | 0.25  | 26.1                                             | ERWU401LGC253MGM0U |                          | 30,000      | 100×270               | 0.25  | 30.5                                             | ERWU451LGC303MGT0U |
|                          | 30,000      | 100×235               | 0.25  | 29.7                                             | ERWU401LGC303MGP5U |                          |             |                       |       |                                                  |                    |
|                          | 35,000      | 100×270               | 0.25  | 33.8                                             | ERWU401LGC353MGT0U |                          |             |                       |       |                                                  |                    |

### ◆RATED RIPPLE CURRENT MULTIPLIERS

● Frequency Multipliers

| Frequency (Hz) | 50  | 120 | 300 | 1k  | 3k  |
|----------------|-----|-----|-----|-----|-----|
| Coefficient    | 0.8 | 1.0 | 1.1 | 1.2 | 1.2 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

Also, for the RWU series capacitors, using them at operating voltage less than their rated voltage can extend their lifetime. For details, please contact a representative of Nippon Chemi-Con.

## RWJ Series

- Downsized and high ripple current from RWR series
- Endurance with ripple current : 2,000 hours at 85°C
- RoHS2 Compliant

RWJ

Downsized

RWR

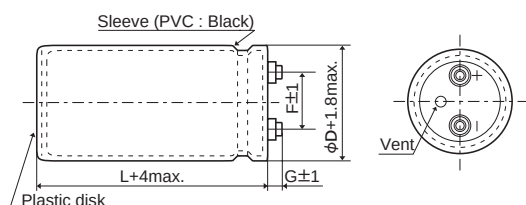


## ◆SPECIFICATIONS

| Items                           | Characteristics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                    |                             |              |                                       |                 |                               |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|--------------|---------------------------------------|-----------------|-------------------------------|
| Category                        | -40 to +85°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                             |              |                                       |                 |                               |
| Temperature Range               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                    |                             |              |                                       |                 |                               |
| Rated Voltage Range             | 350 to 450V <sub>dc</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |                             |              |                                       |                 |                               |
| Capacitance Tolerance           | ±20% (M) (at 20°C, 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |                             |              |                                       |                 |                               |
| Leakage Current                 | I=0.02CV or 5mA, whichever is smaller.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C after 5 minutes)                                                                                                                                                                                                                                                                                                                                                                                        |                    |                             |              |                                       |                 |                               |
| Dissipation Factor (tan δ)      | 0.15 max. (at 20°C, 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                    |                             |              |                                       |                 |                               |
| Low Temperature Characteristics | Capacitance change $C(-25^{\circ}\text{C})/C(+20^{\circ}\text{C}) \geq 0.7$ (at 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                    |                             |              |                                       |                 |                               |
| Insulation Resistance           | When measured between the terminals that are connected to each other and to the mounting clamp on the insulating sleeve covering the case by using an insulation resistance meter of 500V <sub>dc</sub> , the insulation resistance shall not be less than 100MΩ.                                                                                                                                                                                                                                                                                    |                    |                             |              |                                       |                 |                               |
| Insulation Withstanding Voltage | When a voltage of 2,000V <sub>ac</sub> is applied for 1 minute between the terminals that are connected to each other and to the mounting clamp on the insulating sleeve covering the case, there shall not be electrical damage.                                                                                                                                                                                                                                                                                                                    |                    |                             |              |                                       |                 |                               |
| Endurance                       | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 2,000 hours at 85°C.<br><table border="1"> <tr> <td>Capacitance change</td><td>≤ ±20% of the initial value</td></tr> <tr> <td>D.F. (tan δ)</td><td>≤ 200% of the initial specified value</td></tr> <tr> <td>Leakage current</td><td>≤ The initial specified value</td></tr> </table>                                       | Capacitance change | ≤ ±20% of the initial value | D.F. (tan δ) | ≤ 200% of the initial specified value | Leakage current | ≤ The initial specified value |
| Capacitance change              | ≤ ±20% of the initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                    |                             |              |                                       |                 |                               |
| D.F. (tan δ)                    | ≤ 200% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    |                             |              |                                       |                 |                               |
| Leakage current                 | ≤ The initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |                             |              |                                       |                 |                               |
| Shelf Life                      | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 500 hours at 85°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4.<br><table border="1"> <tr> <td>Capacitance change</td><td>≤ ±20% of the initial value</td></tr> <tr> <td>D.F. (tan δ)</td><td>≤ 200% of the initial specified value</td></tr> <tr> <td>Leakage current</td><td>≤ The initial specified value</td></tr> </table> | Capacitance change | ≤ ±20% of the initial value | D.F. (tan δ) | ≤ 200% of the initial specified value | Leakage current | ≤ The initial specified value |
| Capacitance change              | ≤ ±20% of the initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                    |                             |              |                                       |                 |                               |
| D.F. (tan δ)                    | ≤ 200% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    |                             |              |                                       |                 |                               |
| Leakage current                 | ≤ The initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |                             |              |                                       |                 |                               |

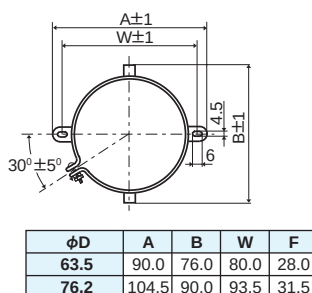
## ◆DIMENSIONS (Screw-Mount) [mm]

●Terminal Code : LG

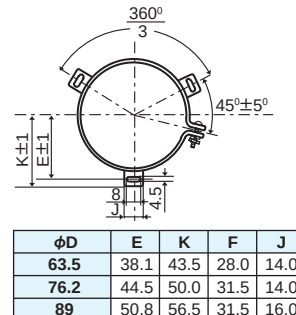


φ63.5, φ76.2 : G=6  
φ89 : G=4

●Mounting Clamp Code : B



●Mounting Clamp Code : C



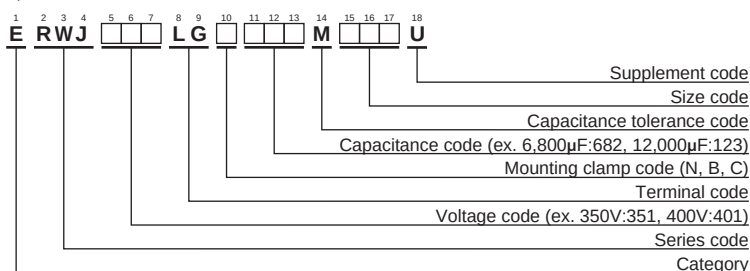
&lt;Screw specifications&gt;

Plus hexagon-headed screw : M5×0.8×10

Maximum screw tightening torque : 3.23Nm

\* The screw and the mounting clamp are separately supplied and not attached to the product.

## ◆PART NUMBERING SYSTEM



Please refer to "Product code guide (screw-mount terminal type)"



## RWJ Series

### ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>85°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>85°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|---------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|---------------------------------------------------|--------------------|
| 350                      | 3,900       | 63.5 × 105            | 0.15  | 18.1                                              | ERWJ351LGC392MDA5U | 400                      | 3,300       | 63.5 × 105            | 0.15  | 16.6                                              | ERWJ401LGC332MDA5U |
|                          | 4,700       | 63.5 × 125            | 0.15  | 21.5                                              | ERWJ351LGC472MDC5U |                          | 3,900       | 63.5 × 125            | 0.15  | 19.4                                              | ERWJ401LGC392MDC5U |
|                          | 5,600       | 63.5 × 145            | 0.15  | 25.0                                              | ERWJ351LGC562MDE5U |                          | 4,700       | 63.5 × 145            | 0.15  | 22.8                                              | ERWJ401LGC472MDE5U |
|                          | 5,600       | 76.2 × 105            | 0.15  | 23.5                                              | ERWJ351LGC562MEA5U |                          | 4,700       | 76.2 × 105            | 0.15  | 21.4                                              | ERWJ401LGC472MEA5U |
|                          | 6,800       | 63.5 × 185            | 0.15  | 30.8                                              | ERWJ351LGC682MDJ5U |                          | 5,600       | 76.2 × 125            | 0.15  | 25.2                                              | ERWJ401LGC562MEC5U |
|                          | 6,800       | 76.2 × 125            | 0.15  | 27.9                                              | ERWJ351LGC682MEC5U |                          | 6,800       | 76.2 × 145            | 0.15  | 29.6                                              | ERWJ401LGC682MEE5U |
|                          | 8,200       | 76.2 × 145            | 0.15  | 32.7                                              | ERWJ351LGC822MEE5U |                          | 6,800       | 89 × 110              | 0.15  | 26.3                                              | ERWJ401LGC682MFB0U |
|                          | 10,000      | 76.2 × 185            | 0.15  | 40.3                                              | ERWJ351LGC103MEJ5U |                          | 8,200       | 89 × 130              | 0.15  | 31.0                                              | ERWJ401LGC822MFD0U |
|                          | 10,000      | 89 × 130              | 0.15  | 34.4                                              | ERWJ351LGC103MFD0U |                          | 10,000      | 89 × 150              | 0.15  | 36.5                                              | ERWJ401LGC103MFF0U |
| 375                      | 12,000      | 89 × 150              | 0.15  | 40.1                                              | ERWJ351LGC123MFF0U |                          | 12,000      | 89 × 190              | 0.15  | 44.3                                              | ERWJ401LGC123MFK0U |
|                          | 3,300       | 63.5 × 105            | 0.15  | 16.6                                              | ERWJ3H1LGC332MDA5U | 450                      | 2,700       | 63.5 × 105            | 0.15  | 15.0                                              | ERWJ451LGC272MDA5U |
|                          | 4,700       | 63.5 × 145            | 0.15  | 22.8                                              | ERWJ3H1LGC472MDE5U |                          | 3,300       | 63.5 × 125            | 0.15  | 18.0                                              | ERWJ451LGC332MDC5U |
|                          | 4,700       | 76.2 × 105            | 0.15  | 21.4                                              | ERWJ3H1LGC472MEA5U |                          | 3,900       | 63.5 × 145            | 0.15  | 20.9                                              | ERWJ451LGC392MDE5U |
|                          | 6,800       | 63.5 × 185            | 0.15  | 30.7                                              | ERWJ3H1LGC682MDJ5U |                          | 3,900       | 76.2 × 105            | 0.15  | 19.6                                              | ERWJ451LGC392MEA5U |
|                          | 6,800       | 89 × 110              | 0.15  | 26.3                                              | ERWJ3H1LGC682MFB0U |                          | 4,700       | 63.5 × 185            | 0.15  | 25.6                                              | ERWJ451LGC472MDJ5U |
|                          | 8,200       | 89 × 130              | 0.15  | 31.0                                              | ERWJ3H1LGC822MFD0U |                          | 4,700       | 76.2 × 125            | 0.15  | 23.2                                              | ERWJ451LGC472MEC5U |
|                          | 10,000      | 76.2 × 185            | 0.15  | 40.0                                              | ERWJ3H1LGC103MEJ5U |                          | 5,600       | 76.2 × 145            | 0.15  | 27.0                                              | ERWJ451LGC562MEE5U |
|                          | 10,000      | 89 × 150              | 0.15  | 36.4                                              | ERWJ3H1LGC103MFF0U |                          | 5,600       | 89 × 110              | 0.15  | 24.0                                              | ERWJ451LGC562MFB0U |
|                          | 12,000      | 89 × 190              | 0.15  | 44.3                                              | ERWJ3H1LGC123MFK0U |                          | 6,800       | 89 × 130              | 0.15  | 28.3                                              | ERWJ451LGC682MFD0U |
|                          |             |                       |       |                                                   |                    |                          | 8,200       | 89 × 150              | 0.15  | 33.1                                              | ERWJ451LGC822MFF0U |
|                          |             |                       |       |                                                   |                    |                          | 10,000      | 89 × 190              | 0.15  | 40.6                                              | ERWJ451LGC103MFK0U |

### ◆RATED RIPPLE CURRENT MULTIPLIERS

#### ●Frequency Multipliers

| Frequency (Hz) | 50  | 120 | 300 | 1k  | 3k  |
|----------------|-----|-----|-----|-----|-----|
| Coefficient    | 0.8 | 1.0 | 1.1 | 1.3 | 1.4 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

Also, for the RWJ series capacitors, using them at operating voltage less than their rated voltage can extend their lifetime. For details, please contact a representative of Nippon Chemi-Con.

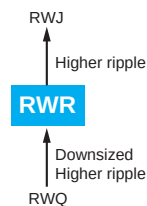




# LARGE CAPACITANCE ALUMINUM ELECTROLYTIC CAPACITORS Inverter-use screw terminal, 85°C

## RWR Series

- Downsized and high ripple current from RWQ series
- Endurance with ripple current : 2,000 hours at 85°C
- RoHS2 Compliant

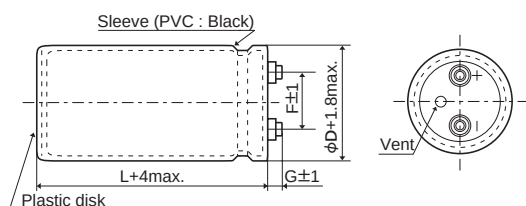


### SPECIFICATIONS

| Items                           | Characteristics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |                             |              |                                       |                 |                               |              |      |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|--------------|---------------------------------------|-----------------|-------------------------------|--------------|------|
| Category                        | -25 to +85°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |                             |              |                                       |                 |                               |              |      |
| Temperature Range               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |                             |              |                                       |                 |                               |              |      |
| Rated Voltage Range             | 350 to 450V <sub>dc</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                    |                             |              |                                       |                 |                               |              |      |
| Capacitance Tolerance           | ±20% (M) (at 20°C, 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                    |                             |              |                                       |                 |                               |              |      |
| Leakage Current                 | I=0.02CV or 5mA, whichever is smaller.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C after 5 minutes)                                                                                                                                                                                                                                                                                                                                                                                                       |                    |                             |              |                                       |                 |                               |              |      |
| Dissipation Factor (tan δ)      | 0.25 max. (at 20°C, 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                    |                             |              |                                       |                 |                               |              |      |
| Low Temperature Characteristics | Capacitance change $C(-25^{\circ}\text{C})/C(+20^{\circ}\text{C}) \geq 0.7$ (at 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                    |                             |              |                                       |                 |                               |              |      |
| Insulation Resistance           | When measured between the terminals that are connected to each other and to the mounting clamp on the insulating sleeve covering the case by using an insulation resistance meter of 500V <sub>dc</sub> , the insulation resistance shall not be less than 100MΩ.                                                                                                                                                                                                                                                                                                   |                    |                             |              |                                       |                 |                               |              |      |
| Insulation Withstanding Voltage | When a voltage of 2,000V <sub>ac</sub> is applied for 1 minute between the terminals that are connected to each other and to the mounting clamp on the insulating sleeve covering the case, there shall not be electrical damage.                                                                                                                                                                                                                                                                                                                                   |                    |                             |              |                                       |                 |                               |              |      |
| Endurance                       | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 2,000 hours at 85°C.<br><table border="1"> <tr> <td>Capacitance change</td> <td>≤ ±20% of the initial value</td> </tr> <tr> <td>D.F. (tan δ)</td> <td>≤ 300% of the initial specified value</td> </tr> <tr> <td>Leakage current</td> <td>≤ The initial specified value</td> </tr> </table>                                                | Capacitance change | ≤ ±20% of the initial value | D.F. (tan δ) | ≤ 300% of the initial specified value | Leakage current | ≤ The initial specified value |              |      |
| Capacitance change              | ≤ ±20% of the initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                             |              |                                       |                 |                               |              |      |
| D.F. (tan δ)                    | ≤ 300% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                    |                             |              |                                       |                 |                               |              |      |
| Leakage current                 | ≤ The initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |                             |              |                                       |                 |                               |              |      |
| Useful life                     | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 5,000 hours at 85°C.<br><table border="1"> <tr> <td>Capacitance change</td> <td>≤ ±30% of the initial value</td> </tr> <tr> <td>D.F. (tan δ)</td> <td>≤ 300% of the initial specified value</td> </tr> <tr> <td>Leakage current</td> <td>≤ The initial specified value</td> </tr> <tr> <td>Failure rate</td> <td>≤ 1%</td> </tr> </table> | Capacitance change | ≤ ±30% of the initial value | D.F. (tan δ) | ≤ 300% of the initial specified value | Leakage current | ≤ The initial specified value | Failure rate | ≤ 1% |
| Capacitance change              | ≤ ±30% of the initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                             |              |                                       |                 |                               |              |      |
| D.F. (tan δ)                    | ≤ 300% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                    |                             |              |                                       |                 |                               |              |      |
| Leakage current                 | ≤ The initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |                             |              |                                       |                 |                               |              |      |
| Failure rate                    | ≤ 1%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    |                             |              |                                       |                 |                               |              |      |
| Shelf Life                      | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 500 hours at 85°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4.<br><table border="1"> <tr> <td>Capacitance change</td> <td>≤ ±20% of the initial value</td> </tr> <tr> <td>D.F. (tan δ)</td> <td>≤ 300% of the initial specified value</td> </tr> <tr> <td>Leakage current</td> <td>≤ The initial specified value</td> </tr> </table>          | Capacitance change | ≤ ±20% of the initial value | D.F. (tan δ) | ≤ 300% of the initial specified value | Leakage current | ≤ The initial specified value |              |      |
| Capacitance change              | ≤ ±20% of the initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                             |              |                                       |                 |                               |              |      |
| D.F. (tan δ)                    | ≤ 300% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                    |                             |              |                                       |                 |                               |              |      |
| Leakage current                 | ≤ The initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |                             |              |                                       |                 |                               |              |      |

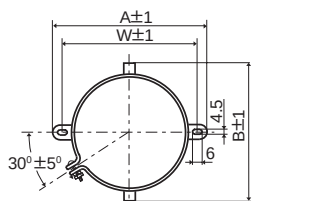
### DIMENSIONS (Screw-Mount) [mm]

#### ●Terminal Code : LG



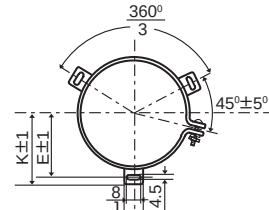
φ63.5, φ76.2 : G=6  
φ89 : G=4

#### ●Mounting Clamp Code : B



| φD   | A     | B    | W    | F    |
|------|-------|------|------|------|
| 63.5 | 90.0  | 76.0 | 80.0 | 28.0 |
| 76.2 | 104.5 | 90.0 | 93.5 | 31.5 |

#### ●Mounting Clamp Code : C



| φD   | E    | K    | F    | J    |
|------|------|------|------|------|
| 63.5 | 38.1 | 43.5 | 28.0 | 14.0 |
| 76.2 | 44.5 | 50.0 | 31.5 | 14.0 |
| 89   | 50.8 | 56.5 | 31.5 | 16.0 |

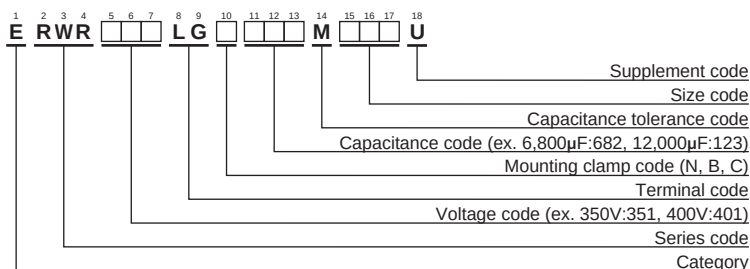
<Screw specifications>

Plus hexagon-headed screw : M5×0.8×10

Maximum screw tightening torque : 3.23Nm

\* The screw and the mounting clamp are separately supplied and not attached to the product.

### PART NUMBERING SYSTEM



Please refer to "Product code guide (screw-mount terminal type)"

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>85°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>85°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|---------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|---------------------------------------------------|--------------------|
| 350                      | 3,900       | 63.5 × 100            | 0.25  | 13.7                                              | ERWR351LGC392MDA0U | 400                      | 6,800       | 76.2 × 110            | 0.25  | 20.9                                              | ERWR401LGC682MEB0U |
|                          | 4,700       | 63.5 × 100            | 0.25  | 15.1                                              | ERWR351LGC472MDA0U |                          | 8,200       | 76.2 × 130            | 0.25  | 24.7                                              | ERWR401LGC822MED0U |
|                          | 5,600       | 63.5 × 115            | 0.25  | 17.5                                              | ERWR351LGC562MDB5U |                          | 10,000      | 89 × 125              | 0.25  | 26.4                                              | ERWR401LGC103MFC5U |
|                          | 5,600       | 76.2 × 100            | 0.25  | 18.2                                              | ERWR351LGC562MEA0U |                          | 12,000      | 89 × 145              | 0.25  | 30.8                                              | ERWR401LGC123MFE5U |
|                          | 6,800       | 76.2 × 100            | 0.25  | 20.1                                              | ERWR351LGC682MEA0U | 450                      | 2,700       | 63.5 × 100            | 0.25  | 11.4                                              | ERWR451LGC272MDA0U |
|                          | 8,200       | 76.2 × 115            | 0.25  | 23.4                                              | ERWR351LGC822MEB5U |                          | 3,300       | 63.5 × 105            | 0.25  | 12.9                                              | ERWR451LGC332MDA5U |
|                          | 10,000      | 76.2 × 135            | 0.25  | 27.7                                              | ERWR351LGC103MED5U |                          | 3,900       | 63.5 × 115            | 0.25  | 14.6                                              | ERWR451LGC392MDB5U |
|                          | 12,000      | 89 × 125              | 0.25  | 28.9                                              | ERWR351LGC123MFC5U |                          | 3,900       | 76.2 × 100            | 0.25  | 15.2                                              | ERWR451LGC392MEA0U |
| 400                      | 15,000      | 89 × 150              | 0.25  | 34.9                                              | ERWR351LGC153MFF0U |                          | 4,700       | 63.5 × 135            | 0.25  | 17.2                                              | ERWR451LGC472MDD5U |
|                          | 3,900       | 63.5 × 100            | 0.25  | 12.6                                              | ERWR401LGC332MDA0U |                          | 4,700       | 76.2 × 105            | 0.25  | 17.0                                              | ERWR451LGC472MEA5U |
|                          | 3,900       | 63.5 × 100            | 0.25  | 13.7                                              | ERWR401LGC392MDA0U |                          | 5,600       | 76.2 × 115            | 0.25  | 19.3                                              | ERWR451LGC562MEB5U |
|                          | 4,700       | 63.5 × 115            | 0.25  | 16.0                                              | ERWR401LGC472MDB5U |                          | 6,800       | 76.2 × 135            | 0.25  | 22.8                                              | ERWR451LGC682MED5U |
|                          | 4,700       | 76.2 × 100            | 0.25  | 16.7                                              | ERWR401LGC472MEA0U |                          | 8,200       | 89 × 125              | 0.25  | 23.9                                              | ERWR451LGC822MFC5U |
|                          | 5,600       | 63.5 × 130            | 0.25  | 18.4                                              | ERWR401LGC562MDD0U |                          | 10,000      | 89 × 150              | 0.25  | 28.5                                              | ERWR451LGC103MFF0U |

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

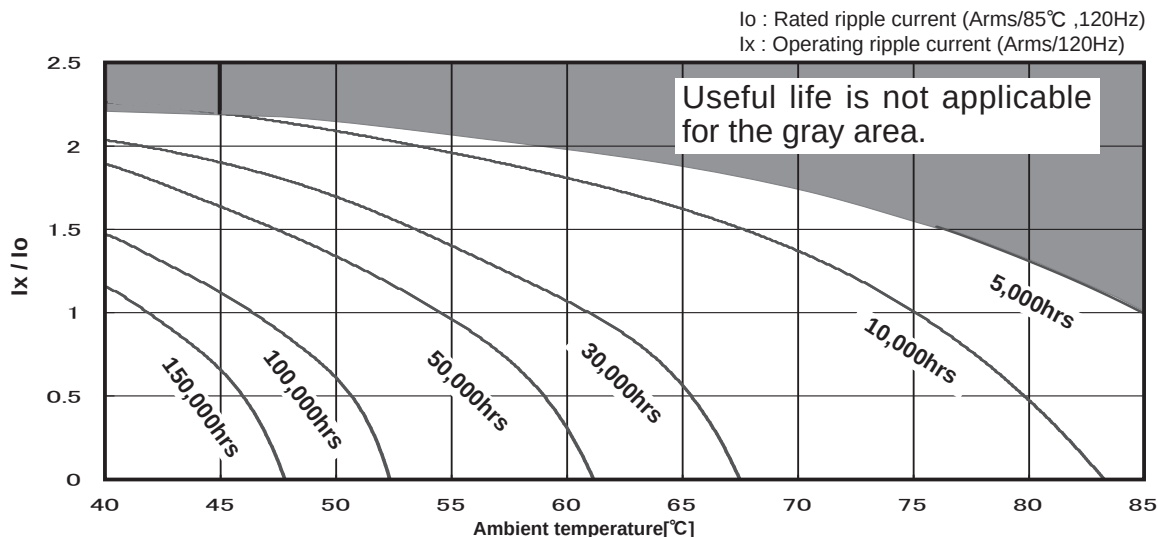
| Frequency (Hz) | 50  | 120 | 300 | 1k  | 3k  |
|----------------|-----|-----|-----|-----|-----|
| Coefficient    | 0.8 | 1.0 | 1.1 | 1.3 | 1.4 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

Also, for the RWR series capacitors, using them at operating voltage less than their rated voltage can extend their lifetime. For details, please contact a representative of Nippon Chemi-Con.

## ◆USEFUL LIFE

Useful life depending on the ambient temperature  $T_x$  under ripple current operating conditions



## ◆Warning !

Useful life shall indicate the end of the life time without exceeding the specified failure rate. It's generally known that Aluminum Electrolytic Capacitors have wear-out failure mode with gradual deterioration of the electrical parameters and should have large number of the failure rate at the end of life. The useful life time is specified by a certain failure rate.  
 It's not a guaranteed specification.

Generally the maximum life time is 15 years (131,000hours) considering sealing material deteriorate. When a longer life time is required for your application, please consult us.

## RWQ Series

- Downsized and high ripple current from RWE series
- Endurance with ripple current : 2,000 hours at 85°C
- RoHS2 Compliant

RWQ

Downsized

RWE

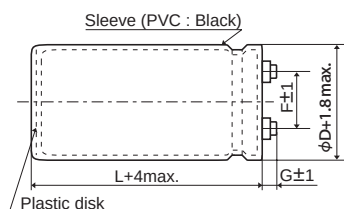


## ◆ SPECIFICATIONS

| Items                           | Characteristics                                                                                                                                                                                                                                                                  |                                      |             |                 |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------|-----------------|
| Category                        | -25 to +85℃                                                                                                                                                                                                                                                                      |                                      |             |                 |
| Temperature Range               |                                                                                                                                                                                                                                                                                  |                                      |             |                 |
| Rated Voltage Range             | 350 to 550V <sub>dc</sub>                                                                                                                                                                                                                                                        |                                      |             |                 |
| Capacitance Tolerance           | ± 20% (M)                                                                                                                                                                                                                                                                        |                                      |             | (at 20℃, 120Hz) |
| Leakage Current                 | I=0.02CV or 5mA, whichever is smaller.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V <sub>dc</sub> ) (at 20℃ after 5 minutes)                                                                                                      |                                      |             |                 |
| Dissipation Factor (tan δ )     | 0.25 max.                                                                                                                                                                                                                                                                        |                                      |             | (at 20℃, 120Hz) |
| Low Temperature Characteristics | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                 | 350 to 450V                          | 500 to 550V | (at 120Hz)      |
|                                 | C(-25℃) / C(+20℃)                                                                                                                                                                                                                                                                | ≥0.7                                 | ≥0.6        |                 |
| Insulation Resistance           | When measured between the terminals shorted each other and the mounting clamp on the insulating sleeve covering the case by using an insulation resistance meter of 500V <sub>dc</sub> , the insulation resistance shall not be less than 100MΩ.                                 |                                      |             |                 |
| Insulation Withstanding Voltage | When a voltage of 2,000V <sub>ac</sub> is applied for 1 minute between the terminals shorted each other and the mounting clamp on the insulating sleeve covering the case, there shall not be electrical damage.                                                                 |                                      |             |                 |
| Endurance                       | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 2,000 hours at 85℃.                                     |                                      |             |                 |
|                                 | Capacitance change                                                                                                                                                                                                                                                               | ≤ ±20% of the initial value          |             |                 |
|                                 | D.F. (tan δ )                                                                                                                                                                                                                                                                    | ≤300% of the initial specified value |             |                 |
|                                 | Leakage current                                                                                                                                                                                                                                                                  | ≤The initial specified value         |             |                 |
| Shelf Life                      | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 500 hours at 85℃ without voltage applied.Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JISC 5101-4. |                                      |             |                 |
|                                 | Capacitance change                                                                                                                                                                                                                                                               | ≤ ±20% of the initial value          |             |                 |
|                                 | D.F. (tan δ )                                                                                                                                                                                                                                                                    | ≤300% of the initial specified value |             |                 |
|                                 | Leakage current                                                                                                                                                                                                                                                                  | ≤The initial specified value         |             |                 |

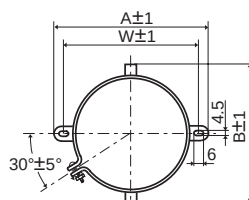
## ◆ DIMENSIONS (Screw-Mount) [mm]

- Terminal Code : LG



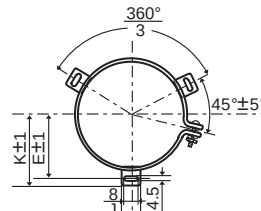
φ50 & φ63.5 : G=6  
φ76.2 & φ89 : G=5

- Mounting Clamp Code : B



| φD   | A     | B    | W    | F    |
|------|-------|------|------|------|
| 50   | 78.0  | 64.0 | 68.0 | 22.4 |
| 63.5 | 90.0  | 76.0 | 80.0 | 28.0 |
| 76.2 | 104.5 | 90.0 | 93.5 | 31.5 |

- Mounting Clamp Code : C



| φD   | E    | K    | F    | J    |
|------|------|------|------|------|
| 50   | 32.5 | 37.0 | 22.4 | 14.0 |
| 63.5 | 38.1 | 43.5 | 28.0 | 14.0 |
| 76.2 | 44.5 | 50.0 | 31.5 | 14.0 |
| 89   | 50.8 | 56.5 | 31.5 | 16.0 |

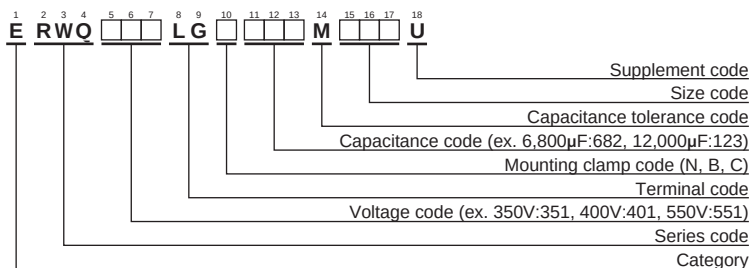
<Screw specifications>

Plus hexagon-headed screw : M5×0.8×10

Maximum screw tightening torque : 3.23Nm

\* The screw and the mounting clamp are separately supplied and not attached to the product.

## ◆ PART NUMBERING SYSTEM



Please refer to "Product code guide (screw-mount terminal type)"



## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>85°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>85°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|---------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|---------------------------------------------------|--------------------|
| 350                      | 1,500       | 50 × 65               | 0.25  | 5.09                                              | ERWQ351LGC152MC65U | 500                      | 470         | 50 × 60               | 0.25  | 2.17                                              | ERWQ501LGC471MC60U |
|                          | 1,800       | 50 × 75               | 0.25  | 5.93                                              | ERWQ351LGC182MC75U |                          | 680         | 50 × 65               | 0.25  | 2.70                                              | ERWQ501LGC681MC65U |
|                          | 2,200       | 50 × 96               | 0.25  | 7.30                                              | ERWQ351LGC222MC96U |                          | 820         | 50 × 75               | 0.25  | 3.15                                              | ERWQ501LGC821MC75U |
|                          | 2,700       | 50 × 115              | 0.25  | 8.76                                              | ERWQ351LGC272MCB5U |                          | 1,000       | 50 × 85               | 0.25  | 3.67                                              | ERWQ501LGC102MC85U |
|                          | 3,300       | 63.5 × 85             | 0.25  | 9.71                                              | ERWQ351LGC332MD85U |                          | 1,200       | 50 × 96               | 0.25  | 4.22                                              | ERWQ501LGC122MC96U |
|                          | 3,900       | 50 × 130              | 0.25  | 11.1                                              | ERWQ351LGC392MCD0U |                          | 1,500       | 50 × 115              | 0.25  | 5.14                                              | ERWQ501LGC152MCB5U |
|                          | 3,900       | 63.5 × 96             | 0.25  | 11.1                                              | ERWQ351LGC392MD96U |                          | 1,500       | 63.5 × 96             | 0.25  | 5.42                                              | ERWQ501LGC152MD96U |
|                          | 4,700       | 63.5 × 115            | 0.25  | 13.2                                              | ERWQ351LGC472MDB5U |                          | 1,800       | 50 × 130              | 0.25  | 5.95                                              | ERWQ501LGC182MCD0U |
|                          | 5,600       | 63.5 × 130            | 0.25  | 15.2                                              | ERWQ351LGC562MDD0U |                          | 1,800       | 63.5 × 96             | 0.25  | 5.94                                              | ERWQ501LGC182MD96U |
|                          | 5,600       | 76.2 × 96             | 0.25  | 14.3                                              | ERWQ351LGC562ME96U |                          | 2,200       | 63.5 × 115            | 0.25  | 7.10                                              | ERWQ501LGC222MDB5U |
|                          | 6,800       | 76.2 × 115            | 0.25  | 17.0                                              | ERWQ351LGC682MEB5U |                          | 2,200       | 76.2 × 96             | 0.25  | 7.30                                              | ERWQ501LGC222ME96U |
|                          | 8,200       | 76.2 × 130            | 0.25  | 19.6                                              | ERWQ351LGC822MED0U |                          | 2,700       | 63.5 × 130            | 0.25  | 8.31                                              | ERWQ501LGC272MDD0U |
|                          | 10,000      | 76.2 × 155            | 0.25  | 23.4                                              | ERWQ351LGC103MEF5U |                          | 3,300       | 76.2 × 115            | 0.25  | 9.65                                              | ERWQ501LGC332MEB5U |
|                          | 12,000      | 89 × 130              | 0.25  | 24.1                                              | ERWQ351LGC123MFD0U |                          | 3,900       | 76.2 × 130            | 0.25  | 11.1                                              | ERWQ501LGC392MED0U |
|                          | 15,000      | 89 × 155              | 0.25  | 29.1                                              | ERWQ351LGC153MFF5U |                          | 4,700       | 76.2 × 155            | 0.25  | 13.1                                              | ERWQ501LGC472MEF5U |
| 400                      | 1,200       | 50 × 65               | 0.25  | 4.55                                              | ERWQ401LGC122MC65U | 550                      | 6,800       | 89 × 155              | 0.25  | 15.9                                              | ERWQ501LGC682MFF5U |
|                          | 1,500       | 50 × 75               | 0.25  | 5.41                                              | ERWQ401LGC152MC75U |                          | 390         | 50 × 60               | 0.25  | 1.98                                              | ERWQ551LGC391MC60U |
|                          | 1,800       | 50 × 85               | 0.25  | 6.26                                              | ERWQ401LGC182MC85U |                          | 560         | 50 × 65               | 0.25  | 2.45                                              | ERWQ551LGC561MC65U |
|                          | 2,200       | 50 × 96               | 0.25  | 7.30                                              | ERWQ401LGC222MC96U |                          | 680         | 50 × 75               | 0.25  | 2.87                                              | ERWQ551LGC681MC75U |
|                          | 2,700       | 50 × 115              | 0.25  | 8.76                                              | ERWQ401LGC272MCB5U |                          | 820         | 50 × 85               | 0.25  | 3.32                                              | ERWQ551LGC821MC85U |
|                          | 3,300       | 63.5 × 96             | 0.25  | 10.2                                              | ERWQ401LGC332MD96U |                          | 1,200       | 50 × 115              | 0.25  | 4.60                                              | ERWQ551LGC122MCB5U |
|                          | 3,900       | 63.5 × 115            | 0.25  | 12.0                                              | ERWQ401LGC392MDB5U |                          | 1,500       | 63.5 × 96             | 0.25  | 5.42                                              | ERWQ551LGC152MD96U |
|                          | 4,700       | 63.5 × 130            | 0.25  | 13.9                                              | ERWQ401LGC472MDD0U |                          | 1,800       | 76.2 × 80             | 0.25  | 6.12                                              | ERWQ551LGC182ME80U |
|                          | 4,700       | 76.2 × 96             | 0.25  | 13.1                                              | ERWQ401LGC472ME96U |                          | 2,200       | 76.2 × 96             | 0.25  | 7.30                                              | ERWQ551LGC222ME96U |
|                          | 5,600       | 63.5 × 155            | 0.25  | 16.5                                              | ERWQ401LGC562MDF5U |                          | 2,700       | 76.2 × 115            | 0.25  | 8.73                                              | ERWQ551LGC272MEB5U |
|                          | 6,800       | 76.2 × 115            | 0.25  | 17.0                                              | ERWQ401LGC682MEB5U |                          | 3,300       | 76.2 × 130            | 0.25  | 10.2                                              | ERWQ551LGC332MED0U |
|                          | 8,200       | 76.2 × 155            | 0.25  | 21.2                                              | ERWQ401LGC822MEF5U |                          | 5,600       | 89 × 155              | 0.25  | 14.5                                              | ERWQ551LGC562MFF5U |
|                          | 10,000      | 89 × 130              | 0.25  | 22.0                                              | ERWQ401LGC103MFD0U |                          |             |                       |       |                                                   |                    |
|                          | 12,000      | 89 × 155              | 0.25  | 26.0                                              | ERWQ401LGC123MFF5U |                          |             |                       |       |                                                   |                    |
| 450                      | 1,000       | 50 × 70               | 0.25  | 3.87                                              | ERWQ451LGC102MC70U |                          |             |                       |       |                                                   |                    |
|                          | 1,200       | 50 × 75               | 0.25  | 4.36                                              | ERWQ451LGC122MC75U |                          |             |                       |       |                                                   |                    |
|                          | 1,500       | 50 × 90               | 0.25  | 5.28                                              | ERWQ451LGC152MC90U |                          |             |                       |       |                                                   |                    |
|                          | 1,800       | 50 × 96               | 0.25  | 5.95                                              | ERWQ451LGC182MC96U |                          |             |                       |       |                                                   |                    |
|                          | 2,200       | 50 × 130              | 0.25  | 7.54                                              | ERWQ451LGC222MCD0U |                          |             |                       |       |                                                   |                    |
|                          | 2,700       | 63.5 × 96             | 0.25  | 8.34                                              | ERWQ451LGC272MD96U |                          |             |                       |       |                                                   |                    |
|                          | 3,300       | 63.5 × 115            | 0.25  | 9.97                                              | ERWQ451LGC332MDB5U |                          |             |                       |       |                                                   |                    |
|                          | 3,900       | 63.5 × 130            | 0.25  | 11.4                                              | ERWQ451LGC392MDD0U |                          |             |                       |       |                                                   |                    |
|                          | 3,900       | 76.2 × 96             | 0.25  | 11.1                                              | ERWQ451LGC392ME96U |                          |             |                       |       |                                                   |                    |
|                          | 4,700       | 63.5 × 155            | 0.25  | 13.6                                              | ERWQ451LGC472MDF5U |                          |             |                       |       |                                                   |                    |
|                          | 4,700       | 76.2 × 115            | 0.25  | 13.2                                              | ERWQ451LGC472MEB5U |                          |             |                       |       |                                                   |                    |
|                          | 5,600       | 76.2 × 130            | 0.25  | 15.2                                              | ERWQ451LGC562MED0U |                          |             |                       |       |                                                   |                    |
|                          | 6,800       | 76.2 × 155            | 0.25  | 18.1                                              | ERWQ451LGC682MEF5U |                          |             |                       |       |                                                   |                    |
|                          | 8,200       | 89 × 130              | 0.25  | 19.2                                              | ERWQ451LGC822MFD0U |                          |             |                       |       |                                                   |                    |

## ◆RATED RIPPLE CURRENT MULTIPLIERS

### ●Frequency Multipliers

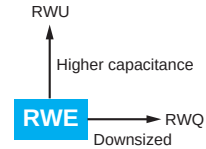
| Frequency (Hz) | 50  | 120 | 300 | 1k  | 3k  |
|----------------|-----|-----|-----|-----|-----|
| Coefficient    | 0.8 | 1.0 | 1.1 | 1.3 | 1.4 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

Also, for the RWQ series capacitors, using them at operating voltage less than their rated voltage can extend their lifetime. For the details, please contact a representative of Nippon Chemi-Con.

# RWE Series

- Endurance with ripple current : 85°C 2,000 hours
- RoHS2 Compliant

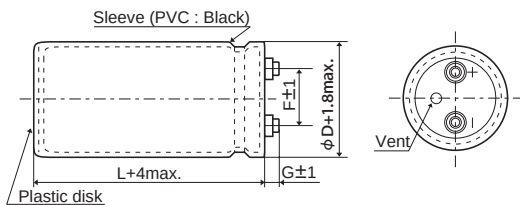


## SPECIFICATIONS

| Items                           | Characteristics                                                                                                                                                                                                                                                                    |                                      |             |            |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------|------------|
| Category                        | -25 to +85℃                                                                                                                                                                                                                                                                        |                                      |             |            |
| Temperature Range               |                                                                                                                                                                                                                                                                                    |                                      |             |            |
| Rated Voltage Range             | 350 to 450V <sub>dc</sub>                                                                                                                                                                                                                                                          |                                      |             |            |
| Capacitance Tolerance           | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                          |                                      |             |            |
| Leakage Current                 | I=0.02CV or 5mA, whichever is smaller.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 5 minutes)                                                                                                                       |                                      |             |            |
| Dissipation Factor (tan δ)      | 0.25 max. (at 20℃, 120Hz)                                                                                                                                                                                                                                                          |                                      |             |            |
| Low Temperature Characteristics | Capacitance change                                                                                                                                                                                                                                                                 | Rated Voltage (V <sub>dc</sub> )     | 350 to 450V | (at 120Hz) |
|                                 |                                                                                                                                                                                                                                                                                    | C(-25℃)/C(+20℃)                      | ≥0.7        |            |
| Insulation Resistance           | When measured between the terminals that are connected to each other and to the mounting clamp on the insulating sleeve covering the case by using an insulation resistance meter of 500V <sub>dc</sub> , the insulation resistance shall not be less than 100MΩ .                 |                                      |             |            |
| Insulation Withstanding Voltage | When a voltage of 2,000V <sub>ac</sub> is applied for 1 minute between the terminals that are connected to each other and to the mounting clamp on the insulating sleeve covering the case, there shall not be electrical damage.                                                  |                                      |             |            |
| Endurance                       | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 2,000 hours at 85℃.                                       |                                      |             |            |
|                                 | Capacitance change                                                                                                                                                                                                                                                                 | ≤ ± 20% of the initial value         |             |            |
|                                 | D.F. (tan δ)                                                                                                                                                                                                                                                                       | ≤300% of the initial specified value |             |            |
|                                 | Leakage current                                                                                                                                                                                                                                                                    | ≤The initial specified value         |             |            |
| Shelf Life                      | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 500 hours at 85℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                      |             |            |
|                                 | Capacitance change                                                                                                                                                                                                                                                                 | ≤ ± 20% of the initial value         |             |            |
|                                 | D.F. (tan δ)                                                                                                                                                                                                                                                                       | ≤300% of the initial specified value |             |            |
|                                 | Leakage current                                                                                                                                                                                                                                                                    | ≤The initial specified value         |             |            |

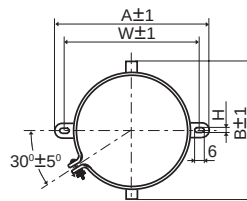
## DIMENSIONS (Screw-Mount) [mm]

●Terminal Code : LG



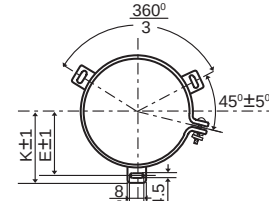
φ35 to φ63.5 : G=6  
φ76.2 & φ89 : G=5

●Mounting Clamp Code : B



| φD   | A     | B    | W    | H   | F    |
|------|-------|------|------|-----|------|
| 35   | 58.0  | 44.0 | 48.0 | 3.5 | 12.7 |
| 50   | 78.0  | 64.0 | 68.0 | 4.5 | 22.4 |
| 63.5 | 90.0  | 76.0 | 80.0 | 4.5 | 28.0 |
| 76.2 | 104.5 | 90.0 | 93.5 | 4.5 | 31.5 |

●Mounting Clamp Code : C



| φD   | E    | K    | F    | J    |
|------|------|------|------|------|
| 50   | 32.5 | 37.0 | 22.4 | 14.0 |
| 63.5 | 38.1 | 43.5 | 28.0 | 14.0 |
| 76.2 | 44.5 | 50.0 | 31.5 | 14.0 |
| 89   | 50.8 | 56.5 | 31.5 | 16.0 |

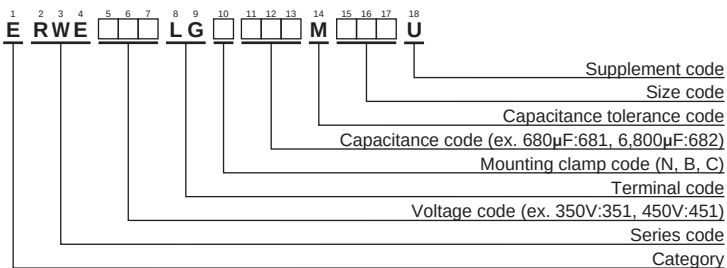
<Screw specifications>

Plus hexagon-headed screw :M5×0.8×10

Maximum screw tightening torque :3.23Nm

\* The screw and the mounting clamp are separately supplied and not attached to the product.

## PART NUMBERING SYSTEM



Please refer to "Product code guide (screw-mount terminal type)"

# RWE Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>85°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|---------------------------------------------------|--------------------|
| 350                      | 390         | 35 × 50               | 0.25  | 1.90                                              | ERWE351LGB391MA50U |
|                          | 680         | 35 × 80               | 0.25  | 2.90                                              | ERWE351LGB681MA80U |
|                          | 1,000       | 35 × 100              | 0.25  | 3.80                                              | ERWE351LGB102MAA0U |
|                          | 1,200       | 35 × 120              | 0.25  | 4.20                                              | ERWE351LGB122MAC0U |
|                          | 1,500       | 50 × 75               | 0.25  | 4.70                                              | ERWE351LGC152MC75U |
|                          | 2,200       | 50 × 96               | 0.25  | 6.30                                              | ERWE351LGC222MC96U |
|                          | 3,300       | 50 × 130              | 0.25  | 8.80                                              | ERWE351LGC332MCD0U |
|                          | 3,300       | 63.5 × 96             | 0.25  | 8.80                                              | ERWE351LGC332MD96U |
|                          | 3,900       | 63.5 × 115            | 0.25  | 10.3                                              | ERWE351LGC392MDB5U |
|                          | 4,700       | 63.5 × 130            | 0.25  | 12.0                                              | ERWE351LGC472MDD0U |
|                          | 4,700       | 76.2 × 96             | 0.25  | 11.7                                              | ERWE351LGC472ME96U |
|                          | 5,600       | 76.2 × 115            | 0.25  | 12.6                                              | ERWE351LGC562MEB5U |
|                          | 6,800       | 76.2 × 130            | 0.25  | 15.9                                              | ERWE351LGC682MED0U |
|                          | 8,200       | 76.2 × 155            | 0.25  | 19.0                                              | ERWE351LGC822MEF5U |
| 400                      | 12,000      | 89 × 155              | 0.25  | 22.5                                              | ERWE351LGC123MFF5U |
|                          | 330         | 35 × 50               | 0.25  | 1.70                                              | ERWE401LGB331MA50U |
|                          | 560         | 35 × 80               | 0.25  | 2.70                                              | ERWE401LGB561MA80U |
|                          | 820         | 35 × 100              | 0.25  | 3.40                                              | ERWE401LGB821MAA0U |
|                          | 1,000       | 35 × 120              | 0.25  | 3.90                                              | ERWE401LGB102MAC0U |
|                          | 1,200       | 50 × 75               | 0.25  | 4.20                                              | ERWE401LGC122MC75U |
|                          | 1,800       | 50 × 96               | 0.25  | 5.70                                              | ERWE401LGC182MC96U |
|                          | 2,200       | 50 × 130              | 0.25  | 7.20                                              | ERWE401LGC222MCD0U |
|                          | 2,700       | 63.5 × 96             | 0.25  | 7.90                                              | ERWE401LGC272MD96U |
|                          | 3,300       | 63.5 × 115            | 0.25  | 9.50                                              | ERWE401LGC332MDB5U |
|                          | 3,900       | 63.5 × 130            | 0.25  | 10.9                                              | ERWE401LGC392MDD0U |
|                          | 3,900       | 76.2 × 96             | 0.25  | 10.6                                              | ERWE401LGC392ME96U |
|                          | 4,700       | 76.2 × 115            | 0.25  | 12.6                                              | ERWE401LGC472MEB5U |
|                          | 5,600       | 76.2 × 130            | 0.25  | 14.5                                              | ERWE401LGC562MED0U |
|                          | 6,800       | 76.2 × 155            | 0.25  | 17.3                                              | ERWE401LGC682MEF5U |
|                          | 10,000      | 89 × 155              | 0.25  | 20.5                                              | ERWE401LGC103MFF5U |

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>85°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|---------------------------------------------------|--------------------|
| 450                      | 270         | 35 × 50               | 0.25  | 1.60                                              | ERWE451LGB271MA50U |
|                          | 470         | 35 × 80               | 0.25  | 2.40                                              | ERWE451LGB471MA80U |
|                          | 680         | 35 × 100              | 0.25  | 3.10                                              | ERWE451LGB681MAA0U |
|                          | 820         | 35 × 120              | 0.25  | 3.50                                              | ERWE451LGB821MAC0U |
|                          | 1,000       | 50 × 75               | 0.25  | 3.90                                              | ERWE451LGC102MC75U |
|                          | 1,200       | 50 × 96               | 0.25  | 4.70                                              | ERWE451LGC122MC96U |
|                          | 1,500       | 50 × 115              | 0.25  | 5.60                                              | ERWE451LGC152MCB5U |
|                          | 1,800       | 50 × 130              | 0.25  | 6.50                                              | ERWE451LGC182MCD0U |
|                          | 2,200       | 63.5 × 96             | 0.25  | 7.20                                              | ERWE451LGC222MD96U |
|                          | 2,700       | 63.5 × 115            | 0.25  | 8.60                                              | ERWE451LGC272MDB5U |
|                          | 3,300       | 63.5 × 130            | 0.25  | 10.0                                              | ERWE451LGC332MDD0U |
|                          | 3,300       | 76.2 × 96             | 0.25  | 9.80                                              | ERWE451LGC332ME96U |
|                          | 3,900       | 76.2 × 115            | 0.25  | 11.5                                              | ERWE451LGC392MEB5U |
|                          | 4,700       | 76.2 × 130            | 0.25  | 13.3                                              | ERWE451LGC472MED0U |
|                          | 5,600       | 76.2 × 155            | 0.25  | 15.7                                              | ERWE451LGC562MEF5U |
|                          | 8,200       | 89 × 155              | 0.25  | 18.6                                              | ERWE451LGC822MFF5U |

## ◆RATED RIPPLE CURRENT MULTIPLIERS

### ● Frequency Multipliers

| Frequency (Hz) | 50  | 120 | 300 | 1k  | 3k  |
|----------------|-----|-----|-----|-----|-----|
| Coefficient    | 0.8 | 1.0 | 1.1 | 1.3 | 1.4 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

Also, for the RWE series capacitors, using them at operating voltage less than their rated voltage can extend their lifetime. For details, please contact a representative of Nippon Chemi-Con.



## RWL Series

- High ripple capability
- For train systems and high power consuming inverter circuits
- Endurance with ripple current : 20,000 hours at 85°C
- RoHS2 Compliant

RWL

Longer life

RWF

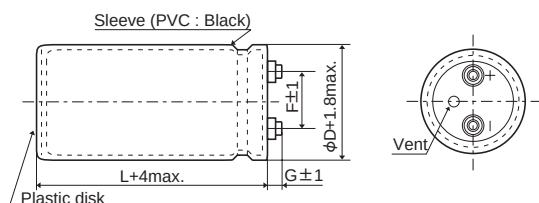


## ◆ SPECIFICATIONS

| Items                           | Characteristics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |                             |              |                                       |                 |                               |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|--------------|---------------------------------------|-----------------|-------------------------------|
| Category                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |                             |              |                                       |                 |                               |
| Temperature Range               | -25 to +85°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                    |                             |              |                                       |                 |                               |
| Rated Voltage Range             | 350 to 450V <sub>dc</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                             |              |                                       |                 |                               |
| Capacitance Tolerance           | ±20% (M) (at 20°C, 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                             |              |                                       |                 |                               |
| Leakage Current                 | I=0.02CV or 5mA, whichever is smaller.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C after 5 minutes)                                                                                                                                                                                                                                                                                                                                                                                     |                    |                             |              |                                       |                 |                               |
| Dissipation Factor (tan δ)      | 0.25 max. (at 20°C, 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |                             |              |                                       |                 |                               |
| Low Temperature Characteristics | Capacitance change $C(-25^{\circ}\text{C})/C(+20^{\circ}\text{C}) \geq 0.7$ (at 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |                             |              |                                       |                 |                               |
| Insulation Resistance           | When measured between the terminals that are connected to each other and to the mounting clamp on the insulating sleeve covering the case by using an insulation resistance meter of 500V <sub>dc</sub> , the insulation resistance shall not be less than 100MΩ.                                                                                                                                                                                                                                                                                 |                    |                             |              |                                       |                 |                               |
| Insulation Withstanding Voltage | When a voltage of 2,000V <sub>ac</sub> is applied for 1 minute between the terminals that are connected to each other and to the mounting clamp on the insulating sleeve covering the case, there shall not be electrical damage.                                                                                                                                                                                                                                                                                                                 |                    |                             |              |                                       |                 |                               |
| Endurance                       | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 20,000 hours at 85°C. <table border="1"> <tr> <td>Capacitance change</td><td>≤ ±30% of the initial value</td></tr> <tr> <td>D.F. (tan δ)</td><td>≤ 300% of the initial specified value</td></tr> <tr> <td>Leakage current</td><td>≤ The initial specified value</td></tr> </table>                                      | Capacitance change | ≤ ±30% of the initial value | D.F. (tan δ) | ≤ 300% of the initial specified value | Leakage current | ≤ The initial specified value |
| Capacitance change              | ≤ ±30% of the initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |                             |              |                                       |                 |                               |
| D.F. (tan δ)                    | ≤ 300% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                    |                             |              |                                       |                 |                               |
| Leakage current                 | ≤ The initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |                             |              |                                       |                 |                               |
| Shelf Life                      | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 500 hours at 85°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. <table border="1"> <tr> <td>Capacitance change</td><td>≤ ±20% of the initial value</td></tr> <tr> <td>D.F. (tan δ)</td><td>≤ 300% of the initial specified value</td></tr> <tr> <td>Leakage current</td><td>≤ The initial specified value</td></tr> </table> | Capacitance change | ≤ ±20% of the initial value | D.F. (tan δ) | ≤ 300% of the initial specified value | Leakage current | ≤ The initial specified value |
| Capacitance change              | ≤ ±20% of the initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |                             |              |                                       |                 |                               |
| D.F. (tan δ)                    | ≤ 300% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                    |                             |              |                                       |                 |                               |
| Leakage current                 | ≤ The initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |                             |              |                                       |                 |                               |

## ◆ DIMENSIONS (Screw-Mount) [mm]

● Terminal Code : LG



φ63.5 : G=6

φ76.2 &amp; φ89 : G=5

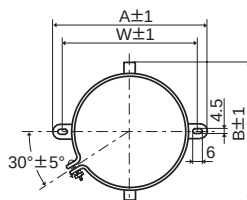
&lt;Screw specifications&gt;

Plus hexagon-headed screw : M5×0.8×10

Maximum screw tightening torque : 3.23Nm

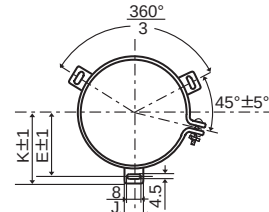
\* The screw and the mounting clamp are separately supplied and not attached to the product.

● Mounting Clamp Code : B



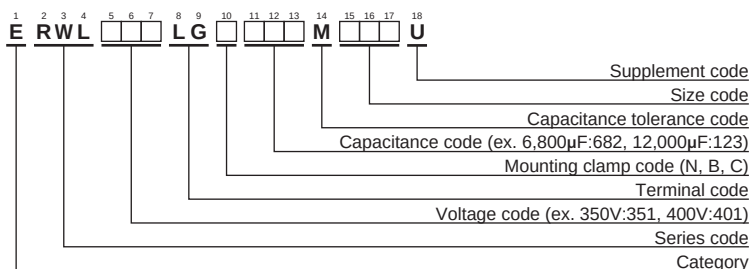
| φD   | A     | B    | W    | F    |
|------|-------|------|------|------|
| 63.5 | 90.0  | 76.0 | 80.0 | 28.0 |
| 76.2 | 104.5 | 90.0 | 93.5 | 31.5 |

● Mounting Clamp Code : C



| φD   | E    | K    | F    | J    |
|------|------|------|------|------|
| 63.5 | 38.1 | 43.5 | 28.0 | 14.0 |
| 76.2 | 44.5 | 50.0 | 31.5 | 14.0 |
| 89   | 50.8 | 56.5 | 31.5 | 16.0 |

## ◆ PART NUMBERING SYSTEM



Please refer to "Product code guide (screw-mount terminal type)"

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>85°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>85°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|---------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|---------------------------------------------------|--------------------|
| 350                      | 3,300       | 63.5 × 115            | 0.25  | 11.1                                              | ERWL351LGC332MDB5U | 400                      | 5,600       | 63.5 × 190            | 0.25  | 18.2                                              | ERWL401LGC562MDK0U |
|                          | 3,900       | 63.5 × 130            | 0.25  | 12.8                                              | ERWL351LGC392MDD0U |                          | 5,600       | 76.2 × 155            | 0.25  | 18.3                                              | ERWL401LGC562MEF5U |
|                          | 4,700       | 63.5 × 155            | 0.25  | 15.2                                              | ERWL351LGC472MDF5U |                          | 6,800       | 76.2 × 170            | 0.25  | 21.0                                              | ERWL401LGC682MEH0U |
|                          | 4,700       | 76.2 × 115            | 0.25  | 14.7                                              | ERWL351LGC472MEB5U |                          | 8,200       | 89 × 155              | 0.25  | 24.1                                              | ERWL401LGC822MFF5U |
|                          | 5,600       | 63.5 × 170            | 0.25  | 17.3                                              | ERWL351LGC562MDH0U |                          | 10,000      | 89 × 190              | 0.25  | 29.1                                              | ERWL401LGC103MFK0U |
|                          | 5,600       | 76.2 × 130            | 0.25  | 16.9                                              | ERWL351LGC562MED0U | 450                      | 2,200       | 63.5 × 115            | 0.25  | 9.10                                              | ERWL451LGC222MDB5U |
|                          | 6,800       | 63.5 × 190            | 0.25  | 20.0                                              | ERWL351LGC682MDK0U |                          | 2,700       | 63.5 × 130            | 0.25  | 10.6                                              | ERWL451LGC272MDD0U |
|                          | 6,800       | 76.2 × 155            | 0.25  | 20.2                                              | ERWL351LGC682MEF5U |                          | 2,700       | 76.2 × 115            | 0.25  | 11.2                                              | ERWL451LGC272MEB5U |
|                          | 8,200       | 76.2 × 170            | 0.25  | 23.1                                              | ERWL351LGC822MEH0U |                          | 3,300       | 63.5 × 155            | 0.25  | 12.7                                              | ERWL451LGC332MDF5U |
|                          | 10,000      | 89 × 155              | 0.25  | 26.6                                              | ERWL351LGC103MFF5U |                          | 3,300       | 76.2 × 130            | 0.25  | 13.0                                              | ERWL451LGC332MED0U |
| 400                      | 12,000      | 89 × 190              | 0.25  | 32.0                                              | ERWL351LGC123MFK0U |                          | 3,900       | 63.5 × 170            | 0.25  | 14.4                                              | ERWL451LGC392MDH0U |
|                          | 2,700       | 63.5 × 115            | 0.25  | 10.1                                              | ERWL401LGC272MDB5U |                          | 4,700       | 76.2 × 155            | 0.25  | 16.7                                              | ERWL451LGC472MEF5U |
|                          | 3,300       | 63.5 × 130            | 0.25  | 11.7                                              | ERWL401LGC332MDD0U |                          | 5,600       | 76.2 × 190            | 0.25  | 20.1                                              | ERWL451LGC562MEK0U |
|                          | 3,900       | 63.5 × 155            | 0.25  | 13.8                                              | ERWL401LGC392MDF5U |                          | 5,600       | 89 × 155              | 0.25  | 19.9                                              | ERWL451LGC562MFF5U |
|                          | 3,900       | 76.2 × 115            | 0.25  | 14.7                                              | ERWL401LGC392MEB5U |                          | 6,800       | 89 × 170              | 0.25  | 23.0                                              | ERWL451LGC682MFH0U |
|                          | 4,700       | 63.5 × 170            | 0.25  | 15.8                                              | ERWL401LGC472MDH0U |                          | 8,200       | 89 × 190              | 0.25  | 26.4                                              | ERWL451LGC822MFK0U |
|                          | 4,700       | 76.2 × 130            | 0.25  | 15.5                                              | ERWL401LGC472MED0U |                          |             |                       |       |                                                   |                    |

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

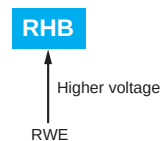
| Frequency (Hz) | 50  | 120 | 300 | 1k  | 3k  |
|----------------|-----|-----|-----|-----|-----|
| Coefficient    | 0.8 | 1.0 | 1.1 | 1.3 | 1.4 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

Also, for RWL series capacitors, using them at operating voltage less than their rated voltage can extend their lifetime. For details, please contact a representative of Nippon Chemi-Con.

# RHB Series

- Realized higher voltage than RWE series. (575 to 700V<sub>dc</sub>)
- Endurance with ripple current : 2,000 hours at 85°C
- Suitable for X-ray and welder power supply where high energy is required
- RoHS2 Compliant

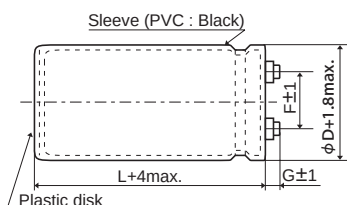


## SPECIFICATIONS

| Items                           | Characteristics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |                             |              |                                       |                 |                               |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|--------------|---------------------------------------|-----------------|-------------------------------|
| Category                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |                             |              |                                       |                 |                               |
| Temperature Range               | -25 to +85°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                    |                             |              |                                       |                 |                               |
| Rated Voltage Range             | 575 to 700V <sub>dc</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                             |              |                                       |                 |                               |
| Capacitance Tolerance           | ±20% (M) (at 20°C, 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                             |              |                                       |                 |                               |
| Leakage Current                 | I=0.02CV or 5mA, whichever is smaller.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C after 5 minutes)                                                                                                                                                                                                                                                                                                                                                                                     |                    |                             |              |                                       |                 |                               |
| Dissipation Factor (tan δ)      | 0.25 max. (at 20°C, 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |                             |              |                                       |                 |                               |
| Low Temperature Characteristics | Capacitance change $C(-25^{\circ}\text{C})/C(+20^{\circ}\text{C}) \geq 0.6$ (at 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |                             |              |                                       |                 |                               |
| Insulation Resistance           | When measured between the terminals that are connected to each other and to the mounting clamp on the insulating sleeve covering the case by using an insulation resistance meter of 500V <sub>dc</sub> , the insulation resistance shall not be less than 100MΩ.                                                                                                                                                                                                                                                                                 |                    |                             |              |                                       |                 |                               |
| Insulation Withstanding Voltage | When a voltage of 2,000V <sub>ac</sub> is applied for 1 minute between the terminals that are connected to each other and to the mounting clamp on the insulating sleeve covering the case, there shall not be electrical damage.                                                                                                                                                                                                                                                                                                                 |                    |                             |              |                                       |                 |                               |
| Endurance                       | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 2,000 hours at 85°C. <table border="1"> <tr> <td>Capacitance change</td><td>≤ ±20% of the initial value</td></tr> <tr> <td>D.F. (tan δ)</td><td>≤ 200% of the initial specified value</td></tr> <tr> <td>Leakage current</td><td>≤ The initial specified value</td></tr> </table>                                       | Capacitance change | ≤ ±20% of the initial value | D.F. (tan δ) | ≤ 200% of the initial specified value | Leakage current | ≤ The initial specified value |
| Capacitance change              | ≤ ±20% of the initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |                             |              |                                       |                 |                               |
| D.F. (tan δ)                    | ≤ 200% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                    |                             |              |                                       |                 |                               |
| Leakage current                 | ≤ The initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |                             |              |                                       |                 |                               |
| Shelf Life                      | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 500 hours at 85°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. <table border="1"> <tr> <td>Capacitance change</td><td>≤ ±20% of the initial value</td></tr> <tr> <td>D.F. (tan δ)</td><td>≤ 200% of the initial specified value</td></tr> <tr> <td>Leakage current</td><td>≤ The initial specified value</td></tr> </table> | Capacitance change | ≤ ±20% of the initial value | D.F. (tan δ) | ≤ 200% of the initial specified value | Leakage current | ≤ The initial specified value |
| Capacitance change              | ≤ ±20% of the initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |                             |              |                                       |                 |                               |
| D.F. (tan δ)                    | ≤ 200% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                    |                             |              |                                       |                 |                               |
| Leakage current                 | ≤ The initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |                             |              |                                       |                 |                               |

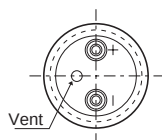
## DIMENSIONS (Screw-Mount) [mm]

● Terminal Code : LG

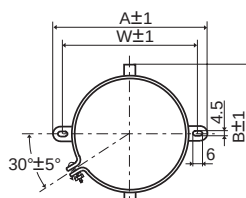


φ 63.5 : G=6

φ 76.2 & φ 89 : G=5

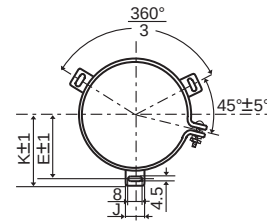


● Mounting Clamp Code : B



| φD   | A     | B    | W    | F    |
|------|-------|------|------|------|
| 63.5 | 90.0  | 76.0 | 80.0 | 28.0 |
| 76.2 | 104.5 | 90.0 | 93.5 | 31.5 |

● Mounting Clamp Code : C



| φD   | E    | K    | F    | J    |
|------|------|------|------|------|
| 63.5 | 38.1 | 43.5 | 28.0 | 14.0 |
| 76.2 | 44.5 | 50.0 | 31.5 | 14.0 |
| 89   | 50.8 | 56.5 | 31.5 | 16.0 |

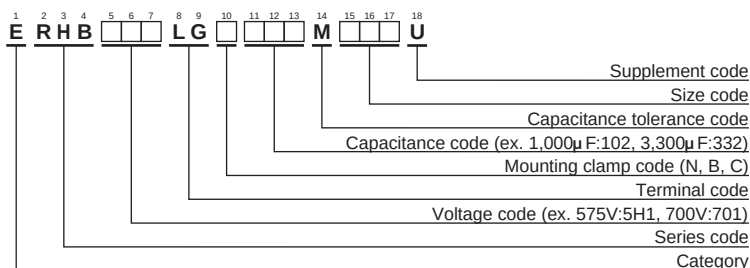
<Screw specifications>

to φ89 Plus hexagon-headed screw : M5×0.8×10

Maximum screw tightening torque : 3.23Nm

\* The screw and the mounting clamp are separately supplied and not attached to the product.

## PART NUMBERING SYSTEM



Please refer to "Product code guide (screw-mount terminal type)"



## RHB Series

### ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>85°C,120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>85°C,120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|--------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|--------------------------------------------------|--------------------|
| 575                      | 1,000       | 63.5×70               | 0.25  | 3.80                                             | ERHB5H1LGC102MD70U | 630                      | 1,500       | 76.2×85               | 0.25  | 5.60                                             | ERHB631LGC152ME85U |
|                          | 1,200       | 63.5×80               | 0.25  | 4.40                                             | ERHB5H1LGC122MD80U |                          | 1,800       | 63.5×125              | 0.25  | 6.60                                             | ERHB631LGC182MDC5U |
|                          | 1,500       | 63.5×95               | 0.25  | 5.30                                             | ERHB5H1LGC152MD95U |                          | 1,800       | 76.2×95               | 0.25  | 6.40                                             | ERHB631LGC182ME95U |
|                          | 1,500       | 76.2×70               | 0.25  | 5.20                                             | ERHB5H1LGC152ME70U |                          | 1,800       | 89×85                 | 0.25  | 5.70                                             | ERHB631LGC182MF85U |
|                          | 1,800       | 63.5×100              | 0.25  | 5.90                                             | ERHB5H1LGC182MDA0U |                          | 2,200       | 76.2×115              | 0.25  | 7.80                                             | ERHB631LGC222MEB5U |
|                          | 1,800       | 76.2×80               | 0.25  | 6.00                                             | ERHB5H1LGC182ME80U |                          | 2,200       | 89×90                 | 0.25  | 6.50                                             | ERHB631LGC222MF90U |
|                          | 2,200       | 63.5×120              | 0.25  | 7.10                                             | ERHB5H1LGC222MDC0U |                          | 2,700       | 76.2×130              | 0.25  | 9.10                                             | ERHB631LGC272MED0U |
|                          | 2,200       | 76.2×95               | 0.25  | 7.20                                             | ERHB5H1LGC222ME95U |                          | 2,700       | 89×100                | 0.25  | 7.40                                             | ERHB631LGC272MFA0U |
|                          | 2,700       | 76.2×105              | 0.25  | 8.30                                             | ERHB5H1LGC272MEA5U |                          | 3,300       | 89×120                | 0.25  | 9.00                                             | ERHB631LGC332MFC0U |
|                          | 2,700       | 89×85                 | 0.25  | 7.00                                             | ERHB5H1LGC272MF85U | 700                      | 1,000       | 63.5×115              | 0.25  | 4.70                                             | ERHB701LGC102MDB5U |
|                          | 3,300       | 76.2×120              | 0.25  | 9.70                                             | ERHB5H1LGC332MEC0U |                          | 1,200       | 63.5×125              | 0.25  | 5.40                                             | ERHB701LGC122MDC5U |
|                          | 3,300       | 89×100                | 0.25  | 8.30                                             | ERHB5H1LGC332MFA0U |                          | 1,500       | 76.2×115              | 0.25  | 6.40                                             | ERHB701LGC152MEB5U |
|                          | 3,900       | 89×105                | 0.25  | 9.10                                             | ERHB5H1LGC392MFA5U |                          | 1,800       | 76.2×125              | 0.25  | 7.20                                             | ERHB701LGC182MEC5U |
|                          | 4,700       | 89×130                | 0.25  | 11.1                                             | ERHB5H1LGC472MFD0U |                          | 1,800       | 89×105                | 0.25  | 6.20                                             | ERHB701LGC182MFA5U |
|                          | 5,600       | 89×145                | 0.25  | 12.7                                             | ERHB5H1LGC562MFE5U |                          | 2,200       | 76.2×155              | 0.25  | 8.80                                             | ERHB701LGC222MEF5U |
| 630                      | 1,000       | 63.5×85               | 0.25  | 4.10                                             | ERHB631LGC102MD85U |                          | 2,200       | 89×115                | 0.25  | 7.10                                             | ERHB701LGC222MFB5U |
|                          | 1,200       | 63.5×95               | 0.25  | 4.80                                             | ERHB631LGC122MD95U |                          | 2,700       | 89×135                | 0.25  | 8.50                                             | ERHB701LGC272MFD5U |
|                          | 1,500       | 63.5×115              | 0.25  | 5.80                                             | ERHB631LGC152MDB5U |                          | 3,300       | 89×155                | 0.25  | 9.90                                             | ERHB701LGC332MFF5U |

### ◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multipliers

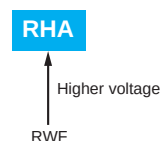
| Frequency (Hz) | 50  | 120 | 300 | 1k  | 3k  |
|----------------|-----|-----|-----|-----|-----|
| Coefficient    | 0.8 | 1.0 | 1.2 | 1.3 | 1.4 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

Also, for the RHB series capacitors, using them at operating voltage less than their rated voltage can extend their lifetime. For details, please contact a representative of Nippon Chemi-Con.

# RHASeries

- Realized higher voltage than RWF series (500 to 650V<sub>dc</sub>)
- Endurance with ripple current : 5,000 hours at 85°C
- Suitable for high voltage inverter
- RoHS2 compliant

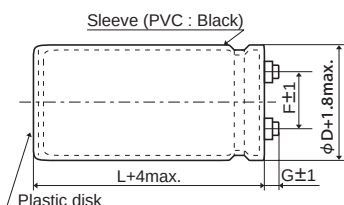


## SPECIFICATIONS

| Items                           | Characteristics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |                             |              |                                       |                 |                               |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|--------------|---------------------------------------|-----------------|-------------------------------|
| Category                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |                             |              |                                       |                 |                               |
| Temperature Range               | -25 to +85°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                    |                             |              |                                       |                 |                               |
| Rated Voltage Range             | 500 to 650V <sub>dc</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                             |              |                                       |                 |                               |
| Capacitance Tolerance           | ±20% (M) (at 20°C, 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                             |              |                                       |                 |                               |
| Leakage Current                 | I=0.02CV or 5mA, whichever is smaller.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C after 5 minutes)                                                                                                                                                                                                                                                                                                                                                                                     |                    |                             |              |                                       |                 |                               |
| Dissipation Factor (tan δ)      | 0.25 max. (at 20°C, 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |                             |              |                                       |                 |                               |
| Low Temperature Characteristics | Capacitance change $C(-25^{\circ}\text{C})/C(+20^{\circ}\text{C}) \geq 0.6$ (at 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |                             |              |                                       |                 |                               |
| Insulation Resistance           | When measured between the terminals that are connected to each other and to the mounting clamp on the insulating sleeve covering the case by using an insulation resistance meter of 500V <sub>dc</sub> , the insulation resistance shall not be less than 100MΩ.                                                                                                                                                                                                                                                                                 |                    |                             |              |                                       |                 |                               |
| Insulation Withstanding Voltage | When a voltage of 2,000V <sub>ac</sub> is applied for 1 minute between the terminals that are connected to each other and to the mounting clamp on the insulating sleeve covering the case, there shall not be electrical damage.                                                                                                                                                                                                                                                                                                                 |                    |                             |              |                                       |                 |                               |
| Endurance                       | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 5,000 hours at 85°C. <table border="1"> <tr> <td>Capacitance change</td><td>≤ ±20% of the initial value</td></tr> <tr> <td>D.F. (tan δ)</td><td>≤ 200% of the initial specified value</td></tr> <tr> <td>Leakage current</td><td>≤ The initial specified value</td></tr> </table>                                       | Capacitance change | ≤ ±20% of the initial value | D.F. (tan δ) | ≤ 200% of the initial specified value | Leakage current | ≤ The initial specified value |
| Capacitance change              | ≤ ±20% of the initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |                             |              |                                       |                 |                               |
| D.F. (tan δ)                    | ≤ 200% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                    |                             |              |                                       |                 |                               |
| Leakage current                 | ≤ The initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |                             |              |                                       |                 |                               |
| Shelf Life                      | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 500 hours at 85°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. <table border="1"> <tr> <td>Capacitance change</td><td>≤ ±20% of the initial value</td></tr> <tr> <td>D.F. (tan δ)</td><td>≤ 200% of the initial specified value</td></tr> <tr> <td>Leakage current</td><td>≤ The initial specified value</td></tr> </table> | Capacitance change | ≤ ±20% of the initial value | D.F. (tan δ) | ≤ 200% of the initial specified value | Leakage current | ≤ The initial specified value |
| Capacitance change              | ≤ ±20% of the initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |                             |              |                                       |                 |                               |
| D.F. (tan δ)                    | ≤ 200% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                    |                             |              |                                       |                 |                               |
| Leakage current                 | ≤ The initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |                             |              |                                       |                 |                               |

## DIMENSIONS (Screw-Mount) [mm]

● Terminal Code : LG

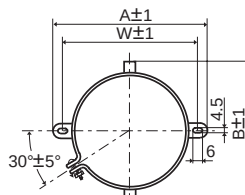


φ50 & φ63.5 : G=6  
φ76.2 & φ89 : G=5  
φ100 : G=10

<Screw specifications>

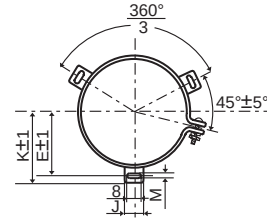
to φ89 Plus hexagon-headed screw : M5×0.8×10  
Maximum screw tightening torque : 3.23Nm

● Mounting Clamp Code : B



| φD   | A     | B    | W    | F    |
|------|-------|------|------|------|
| 50   | 78.0  | 64.0 | 68.0 | 22.4 |
| 63.5 | 90.0  | 76.0 | 80.0 | 28.0 |
| 76.2 | 104.5 | 90.0 | 93.5 | 31.5 |

● Mounting Clamp Code : C

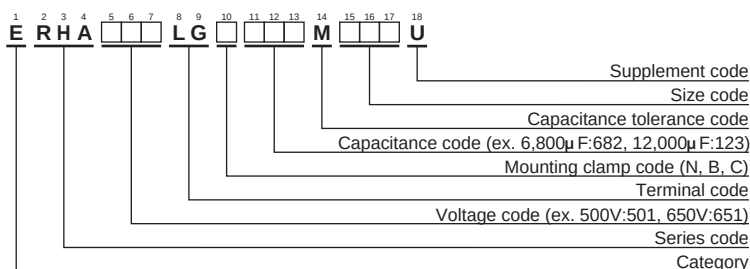


| φD   | E    | K    | M   | F    | J    |
|------|------|------|-----|------|------|
| 50   | 32.5 | 37.0 | 4.5 | 22.4 | 14.0 |
| 63.5 | 38.1 | 43.5 | 4.5 | 28.0 | 14.0 |
| 76.2 | 44.5 | 50.0 | 4.5 | 31.5 | 14.0 |
| 89   | 50.8 | 56.5 | 4.5 | 31.5 | 16.0 |
| 100  | 56.5 | 63.4 | 5.5 | 41.5 | 18.0 |

φ100 Cross-recessed head (Phillips) screw : M8×1.25×16  
Spring washer, Washer  
Maximum screw tightening torque : 6.31Nm

\* The screw and the mounting clamp are separately supplied and not attached to the product.

## PART NUMBERING SYSTEM



Please refer to "Product code guide (screw-mount terminal type)"



## RHA Series

### ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>85°C,120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>85°C,120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|--------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|--------------------------------------------------|--------------------|
| 500                      | 1,200       | 50×95                 | 0.25  | 5.90                                             | ERHA501LGC122MC95U | 550                      | 5,600       | 89×150                | 0.25  | 18.2                                             | ERHA551LGC562MFF0U |
|                          | 1,500       | 50×115                | 0.25  | 7.20                                             | ERHA501LGC152MCB5U |                          | 6,800       | 89×170                | 0.25  | 21.1                                             | ERHA551LGC682MFH0U |
|                          | 1,800       | 50×130                | 0.25  | 8.30                                             | ERHA501LGC182MCD0U |                          | 8,200       | 100×170               | 0.25  | 24.8                                             | ERHA551LGC822MGH0U |
|                          | 2,200       | 50×150                | 0.25  | 9.80                                             | ERHA501LGC222MCF0U |                          | 10,000      | 100×200               | 0.25  | 29.4                                             | ERHA551LGC103MGL0U |
|                          | 2,700       | 63.5×120              | 0.25  | 11.2                                             | ERHA501LGC272MDC0U | 600                      | 1,200       | 63.5×95               | 0.25  | 6.70                                             | ERHA601LGC122MD95U |
|                          | 3,300       | 63.5×140              | 0.25  | 13.3                                             | ERHA501LGC332MDE0U |                          | 1,500       | 63.5×110              | 0.25  | 8.00                                             | ERHA601LGC152MDB0U |
|                          | 3,900       | 63.5×170              | 0.25  | 15.7                                             | ERHA501LGC392MDH0U |                          | 1,800       | 63.5×125              | 0.25  | 9.30                                             | ERHA601LGC182MDC5U |
|                          | 3,900       | 76.2×130              | 0.25  | 15.4                                             | ERHA501LGC392MED0U |                          | 1,800       | 76.2×95               | 0.25  | 9.10                                             | ERHA601LGC182ME95U |
|                          | 4,700       | 76.2×150              | 0.25  | 18.1                                             | ERHA501LGC472MEF0U |                          | 2,200       | 63.5×145              | 0.25  | 11.0                                             | ERHA601LGC222MDE5U |
|                          | 5,600       | 76.2×170              | 0.25  | 20.8                                             | ERHA501LGC562MEH0U |                          | 2,200       | 76.2×110              | 0.25  | 10.8                                             | ERHA601LGC222MEB0U |
|                          | 5,600       | 89×130                | 0.25  | 17.1                                             | ERHA501LGC562MFD0U |                          | 2,700       | 63.5×170              | 0.25  | 13.1                                             | ERHA601LGC272MDH0U |
|                          | 6,800       | 89×150                | 0.25  | 20.0                                             | ERHA501LGC682MFF0U |                          | 2,700       | 76.2×125              | 0.25  | 12.6                                             | ERHA601LGC272MEC5U |
|                          | 8,200       | 89×190                | 0.25  | 24.4                                             | ERHA501LGC822MFK0U |                          | 3,300       | 76.2×145              | 0.25  | 14.9                                             | ERHA601LGC332MEE5U |
|                          | 10,000      | 89×210                | 0.25  | 28.2                                             | ERHA501LGC103MFM0U |                          | 3,900       | 76.2×170              | 0.25  | 17.3                                             | ERHA601LGC392MEH0U |
|                          | 12,000      | 100×210               | 0.25  | 32.9                                             | ERHA501LGC123MGM0U |                          | 3,900       | 89×130                | 0.25  | 14.2                                             | ERHA601LGC392MFD0U |
|                          | 15,000      | 100×250               | 0.25  | 39.8                                             | ERHA501LGC153MGR0U |                          | 4,700       | 76.2×190              | 0.25  | 20.0                                             | ERHA601LGC472MEK0U |
|                          |             |                       |       |                                                  |                    |                          | 4,700       | 89×150                | 0.25  | 16.6                                             | ERHA601LGC472MFF0U |
| 550                      | 1,000       | 50×95                 | 0.25  | 5.40                                             | ERHA551LGC102MC95U |                          | 5,600       | 89×170                | 0.25  | 19.1                                             | ERHA601LGC562MFH0U |
|                          | 1,200       | 50×110                | 0.25  | 6.30                                             | ERHA551LGC122MCB0U | 650                      | 1,000       | 63.5×100              | 0.25  | 6.30                                             | ERHA651LGC102MDA0U |
|                          | 1,500       | 50×130                | 0.25  | 7.60                                             | ERHA551LGC152MCD0U |                          | 1,200       | 63.5×110              | 0.25  | 7.20                                             | ERHA651LGC122MDB0U |
|                          | 1,800       | 63.5×105              | 0.25  | 8.60                                             | ERHA551LGC182MDA5U |                          | 1,500       | 63.5×130              | 0.25  | 8.60                                             | ERHA651LGC152MDD0U |
|                          | 2,200       | 63.5×120              | 0.25  | 10.1                                             | ERHA551LGC222MDC0U |                          | 1,800       | 63.5×150              | 0.25  | 10.1                                             | ERHA651LGC182MDF0U |
|                          | 2,700       | 63.5×150              | 0.25  | 12.4                                             | ERHA551LGC272MDF0U |                          | 2,200       | 63.5×170              | 0.25  | 11.7                                             | ERHA651LGC222MDH0U |
|                          | 2,700       | 76.2×105              | 0.25  | 11.7                                             | ERHA551LGC272MEA5U |                          | 2,700       | 76.2×150              | 0.25  | 13.6                                             | ERHA651LGC272MEF0U |
|                          | 3,300       | 63.5×170              | 0.25  | 14.5                                             | ERHA551LGC332MDH0U |                          | 3,300       | 76.2×170              | 0.25  | 15.8                                             | ERHA651LGC332MEH0U |
|                          | 3,300       | 76.2×130              | 0.25  | 14.2                                             | ERHA551LGC332MED0U |                          | 3,900       | 89×155                | 0.25  | 15.3                                             | ERHA651LGC392MFF5U |
|                          | 3,900       | 76.2×140              | 0.25  | 15.9                                             | ERHA551LGC392MEE0U |                          | 4,700       | 89×190                | 0.25  | 18.4                                             | ERHA651LGC472MFK0U |
|                          | 4,700       | 76.2×170              | 0.25  | 19.1                                             | ERHA551LGC472MEH0U |                          |             |                       |       |                                                  |                    |
|                          | 4,700       | 89×130                | 0.25  | 15.6                                             | ERHA551LGC472MFD0U |                          |             |                       |       |                                                  |                    |
|                          |             |                       |       |                                                  |                    |                          |             |                       |       |                                                  |                    |
|                          |             |                       |       |                                                  |                    |                          |             |                       |       |                                                  |                    |
|                          |             |                       |       |                                                  |                    |                          |             |                       |       |                                                  |                    |

### ◆RATED RIPPLE CURRENT MULTIPLIERS

#### ● Frequency Multipliers

| Frequency (Hz) | 50  | 120 | 300 | 1k  | 3k  |
|----------------|-----|-----|-----|-----|-----|
| Coefficient    | 0.8 | 1.0 | 1.2 | 1.3 | 1.4 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

Also, for the RHA series capacitors, using them at operating voltage less than their rated voltage can extend their lifetime. For details, please contact a representative of Nippon Chemi-Con.



## LXA Series

- Rated voltage range up to 525V<sub>dc</sub>
- Endurance with ripple current : 5,000 hours at 105°C (2,000 hours for 500V<sub>dc</sub> & 525V<sub>dc</sub>)
- RoHS2 Compliant

LXA

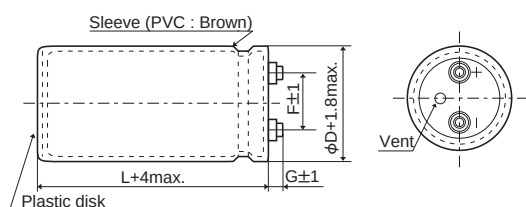
Long life  
KMH

## ◆SPECIFICATIONS

| Items                           | Characteristics                                                                                                                                                                                                                                                                                   |                                      |                                      |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|--------------------------------------|
| Category                        | -40 to +105℃ (10 to 100V <sub>dc</sub> )   -25 to +105℃ (160 to 525V <sub>dc</sub> )                                                                                                                                                                                                              |                                      |                                      |
| Temperature Range               |                                                                                                                                                                                                                                                                                                   |                                      |                                      |
| Rated Voltage Range             | 10 to 525V <sub>dc</sub>                                                                                                                                                                                                                                                                          |                                      |                                      |
| Capacitance Tolerance           | -10 to +50% (T) (10 to 250V <sub>dc</sub> )   ±20% (M) (350 to 525V <sub>dc</sub> ) (at 20℃, 120Hz)                                                                                                                                                                                               |                                      |                                      |
| Leakage Current                 | I=0.02CV or 5mA, whichever is smaller.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 5 minutes)                                                                                                                                      |                                      |                                      |
| Dissipation Factor (tan δ)      | See STANDARD RATINGS (10 to 250V <sub>dc</sub> )   0.20max. (350 to 525V <sub>dc</sub> ) (at 20℃, 120Hz)                                                                                                                                                                                          |                                      |                                      |
| Low Temperature Characteristics | Capacitance change   C(-40℃)/C(+20℃)≥0.6(10 to 100V <sub>dc</sub> )   C(-25℃)/C(+20℃)≥0.7(160 to 250V <sub>dc</sub> )<br>C(-25℃)/C(+20℃)≥0.65(350 to 525V <sub>dc</sub> ) (at 120Hz)                                                                                                              |                                      |                                      |
| Insulation Resistance           | When measured between the terminals that are connected to each other and to the mounting clamp on the insulating sleeve covering the case by using an insulation resistance meter of 500V <sub>dc</sub> , the insulation resistance shall not be less than 100MΩ.                                 |                                      |                                      |
| Insulation Withstanding Voltage | When a voltage of 2,000V <sub>ac</sub> is applied for 1 minute between the terminals that are connected to each other and to the mounting clamp on the insulating sleeve covering the case, there shall not be electrical damage.                                                                 |                                      |                                      |
| Endurance                       | The following specifications shall be satisfied when the capacitors are restored to 20℃ after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 5,000 hours (2,000 hours for 500 & 525V <sub>dc</sub> products) at 105℃. |                                      |                                      |
|                                 | Capacitance change                                                                                                                                                                                                                                                                                | ≤ ±20% of the initial value          |                                      |
|                                 | D.F. (tan δ)                                                                                                                                                                                                                                                                                      | ≤200% of the initial specified value |                                      |
|                                 | Leakage current                                                                                                                                                                                                                                                                                   | ≤The initial specified value         |                                      |
| Shelf Life                      | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4.             |                                      |                                      |
|                                 | Rated voltage                                                                                                                                                                                                                                                                                     | 10 to 250V <sub>dc</sub>             | 350 to 525V <sub>dc</sub>            |
|                                 | Capacitance change                                                                                                                                                                                                                                                                                | ≤ ±15% of the initial value          | ≤ ±20% of the initial value          |
|                                 | D.F. (tan δ)                                                                                                                                                                                                                                                                                      | ≤150% of the initial specified value | ≤200% of the initial specified value |
|                                 | Leakage current                                                                                                                                                                                                                                                                                   | ≤The initial specified value         | ≤The initial specified value         |

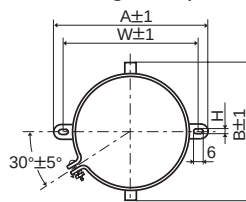
## ◆DIMENSIONS (Screw-Mount) [mm]

●Terminal Code : LG



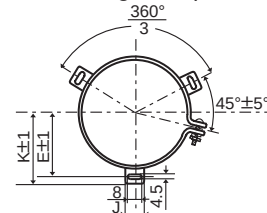
| φD    | G                        |                           |
|-------|--------------------------|---------------------------|
|       | 10 to 250V <sub>dc</sub> | 350 to 525V <sub>dc</sub> |
| φ63.5 | 6                        | 6                         |
| φ76.2 | 5                        | 6                         |
| φ89   | 5                        | 4                         |

●Mounting Clamp Code : B



| φD   | A     | B  | W    | H   | F    |
|------|-------|----|------|-----|------|
| 35   | 58    | 44 | 48   | 3.5 | 12.7 |
| 50   | 78    | 64 | 68   | 4.5 | 22.4 |
| 63.5 | 90    | 76 | 80   | 4.5 | 28.0 |
| 76.2 | 104.5 | 90 | 93.5 | 4.5 | 31.5 |

●Mounting Clamp Code : C



| φD   | E    | K    | J    | F    |
|------|------|------|------|------|
| 50   | 32.5 | 37.0 | 14.0 | 22.4 |
| 63.5 | 38.1 | 43.5 | 14.0 | 28.0 |
| 76.2 | 44.5 | 50.0 | 14.0 | 31.5 |
| 89   | 50.8 | 56.5 | 16.0 | 31.5 |

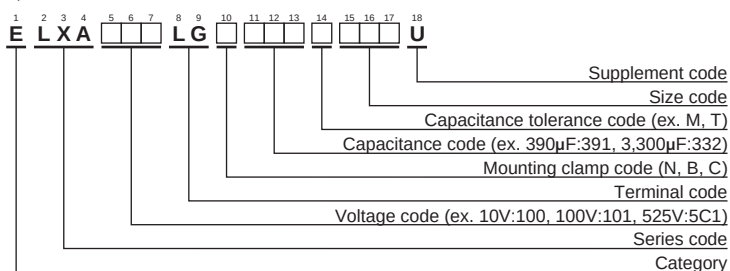
&lt;Screw specifications&gt;

Plus hexagon-headed screw :M5×0.8×10

Maximum screw tightening torque :3.23Nm

\* The screw and the mounting clamp are separately supplied and not attached to the product.

## ◆PART NUMBERING SYSTEM



Please refer to "Product code guide (screw-mount terminal type)"



## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|
| 10                       | 27,000      | 35 × 80               | 0.45  | 4.30                                               | ELXA100LGB273TA80U |
|                          | 33,000      | 35 × 80               | 0.45  | 4.70                                               | ELXA100LGB333TA80U |
|                          | 39,000      | 35 × 80               | 0.45  | 5.30                                               | ELXA100LGB393TA80U |
|                          | 47,000      | 35 × 100              | 0.45  | 6.10                                               | ELXA100LGB473TAA0U |
|                          | 56,000      | 35 × 100              | 0.50  | 6.20                                               | ELXA100LGB563TAA0U |
|                          | 68,000      | 35 × 120              | 0.60  | 6.80                                               | ELXA100LGB683TAC0U |
|                          | 82,000      | 50 × 80               | 0.60  | 7.80                                               | ELXA100LGC823TC80U |
|                          | 100,000     | 50 × 100              | 0.70  | 8.50                                               | ELXA100LGC104TCA0U |
|                          | 120,000     | 50 × 100              | 0.70  | 9.50                                               | ELXA100LGC124TCA0U |
|                          | 150,000     | 63.5 × 100            | 0.80  | 11.0                                               | ELXA100LGC154TDA0U |
|                          | 180,000     | 63.5 × 100            | 0.80  | 12.1                                               | ELXA100LGC184TDA0U |
|                          | 220,000     | 76.2 × 100            | 1.00  | 13.2                                               | ELXA100LGC224TEA0U |
|                          | 270,000     | 76.2 × 120            | 1.20  | 14.4                                               | ELXA100LGC274TEC0U |
|                          | 330,000     | 76.2 × 140            | 1.20  | 17.0                                               | ELXA100LGC334TEE0U |
|                          | 390,000     | 89 × 140              | 1.40  | 18.6                                               | ELXA100LGC394TFE0U |
| 16                       | 15,000      | 35 × 50               | 0.45  | 2.90                                               | ELXA160LGB153TA50U |
|                          | 18,000      | 35 × 80               | 0.45  | 3.50                                               | ELXA160LGB183TA80U |
|                          | 22,000      | 35 × 80               | 0.45  | 3.90                                               | ELXA160LGB223TA80U |
|                          | 27,000      | 35 × 80               | 0.45  | 4.30                                               | ELXA160LGB273TA80U |
|                          | 33,000      | 35 × 100              | 0.50  | 4.80                                               | ELXA160LGB333TAA0U |
|                          | 39,000      | 35 × 100              | 0.50  | 5.30                                               | ELXA160LGB393TAA0U |
|                          | 47,000      | 35 × 120              | 0.50  | 6.20                                               | ELXA160LGB473TAC0U |
|                          | 56,000      | 50 × 80               | 0.60  | 6.30                                               | ELXA160LGC563TC80U |
|                          | 68,000      | 50 × 100              | 0.60  | 7.60                                               | ELXA160LGC683TCA0U |
|                          | 82,000      | 50 × 120              | 0.70  | 8.30                                               | ELXA160LGC823TCC0U |
|                          | 100,000     | 50 × 120              | 0.70  | 9.20                                               | ELXA160LGC104TCC0U |
|                          | 120,000     | 63.5 × 100            | 0.80  | 9.90                                               | ELXA160LGC124TDA0U |
|                          | 150,000     | 76.2 × 100            | 0.80  | 12.3                                               | ELXA160LGC154TEA0U |
|                          | 180,000     | 76.2 × 120            | 0.80  | 14.5                                               | ELXA160LGC184TEC0U |
|                          | 220,000     | 76.2 × 140            | 1.00  | 15.2                                               | ELXA160LGC224TEE0U |
|                          | 270,000     | 89 × 140              | 1.20  | 16.8                                               | ELXA160LGC274TFE0U |
| 25                       | 12,000      | 35 × 80               | 0.35  | 3.30                                               | ELXA250LGB123TA80U |
|                          | 15,000      | 35 × 80               | 0.35  | 3.70                                               | ELXA250LGB153TA80U |
|                          | 18,000      | 35 × 80               | 0.35  | 4.00                                               | ELXA250LGB183TA80U |
|                          | 22,000      | 35 × 80               | 0.35  | 4.50                                               | ELXA250LGB223TA80U |
|                          | 27,000      | 35 × 100              | 0.40  | 5.00                                               | ELXA250LGB273TAA0U |
|                          | 33,000      | 35 × 120              | 0.40  | 5.90                                               | ELXA250LGB333TAC0U |
|                          | 39,000      | 50 × 80               | 0.40  | 6.50                                               | ELXA250LGC393TC80U |
|                          | 47,000      | 50 × 100              | 0.40  | 7.90                                               | ELXA250LGC473TCA0U |
|                          | 56,000      | 50 × 120              | 0.40  | 8.80                                               | ELXA250LGC563TCC0U |
|                          | 68,000      | 50 × 120              | 0.50  | 9.10                                               | ELXA250LGC683TCC0U |
|                          | 82,000      | 63.5 × 100            | 0.50  | 10.6                                               | ELXA250LGC823TDA0U |
|                          | 100,000     | 63.5 × 120            | 0.60  | 11.4                                               | ELXA250LGC104TDC0U |
|                          | 120,000     | 76.2 × 100            | 0.60  | 12.8                                               | ELXA250LGC124TEA0U |
|                          | 150,000     | 76.2 × 120            | 0.75  | 13.7                                               | ELXA250LGC154TEC0U |
|                          | 180,000     | 76.2 × 140            | 0.75  | 16.1                                               | ELXA250LGC184TEE0U |
|                          | 220,000     | 89 × 140              | 1.00  | 16.6                                               | ELXA250LGC224TFE0U |
| 35                       | 8,200       | 35 × 80               | 0.30  | 3.00                                               | ELXA350LGB822TA80U |
|                          | 10,000      | 35 × 80               | 0.30  | 3.30                                               | ELXA350LGB103TA80U |
|                          | 12,000      | 35 × 80               | 0.30  | 3.60                                               | ELXA350LGB123TA80U |
|                          | 15,000      | 35 × 80               | 0.30  | 4.10                                               | ELXA350LGB153TA80U |
|                          | 18,000      | 35 × 100              | 0.30  | 4.80                                               | ELXA350LGB183TAA0U |
|                          | 22,000      | 35 × 120              | 0.35  | 5.20                                               | ELXA350LGB223TAC0U |
|                          | 27,000      | 50 × 80               | 0.40  | 5.90                                               | ELXA350LGC273TC80U |
|                          | 33,000      | 50 × 100              | 0.40  | 6.60                                               | ELXA350LGC333TCA0U |
|                          | 39,000      | 50 × 120              | 0.40  | 7.80                                               | ELXA350LGC393TCC0U |
|                          | 47,000      | 50 × 120              | 0.45  | 8.00                                               | ELXA350LGC473TCC0U |
|                          | 56,000      | 63.5 × 100            | 0.45  | 9.20                                               | ELXA350LGC563TDA0U |
|                          | 68,000      | 63.5 × 120            | 0.45  | 11.0                                               | ELXA350LGC683TDC0U |
|                          | 82,000      | 76.2 × 120            | 0.50  | 12.7                                               | ELXA350LGC823TEC0U |
|                          | 100,000     | 76.2 × 140            | 0.60  | 13.5                                               | ELXA350LGC104TEE0U |
|                          | 120,000     | 89 × 140              | 0.60  | 16.1                                               | ELXA350LGC124TFE0U |
| 50                       | 3,900       | 35 × 50               | 0.20  | 2.00                                               | ELXA500LGB392TA50U |
|                          | 4,700       | 35 × 50               | 0.25  | 2.20                                               | ELXA500LGB472TA50U |
|                          | 5,600       | 35 × 80               | 0.25  | 2.80                                               | ELXA500LGB562TA80U |
|                          | 6,800       | 35 × 80               | 0.25  | 3.00                                               | ELXA500LGB682TA80U |
|                          | 8,200       | 35 × 80               | 0.25  | 3.30                                               | ELXA500LGB822TA80U |
| 50                       | 10,000      | 35 × 80               | 0.25  | 3.70                                               | ELXA500LGB103TA80U |
|                          | 12,000      | 35 × 100              | 0.25  | 4.40                                               | ELXA500LGB123TAA0U |
|                          | 15,000      | 35 × 120              | 0.30  | 4.70                                               | ELXA500LGB153TAC0U |
|                          | 18,000      | 50 × 80               | 0.35  | 4.80                                               | ELXA500LGC183TC80U |
|                          | 22,000      | 50 × 100              | 0.35  | 5.90                                               | ELXA500LGC223TCA0U |
|                          | 27,000      | 50 × 120              | 0.35  | 7.00                                               | ELXA500LGC273TCC0U |
|                          | 33,000      | 63.5 × 100            | 0.40  | 7.60                                               | ELXA500LGC333TDA0U |
|                          | 39,000      | 63.5 × 120            | 0.40  | 8.90                                               | ELXA500LGC393TDC0U |
|                          | 47,000      | 63.5 × 120            | 0.40  | 9.80                                               | ELXA500LGC473TDC0U |
|                          | 56,000      | 76.2 × 120            | 0.40  | 11.9                                               | ELXA500LGC563TEC0U |
|                          | 68,000      | 76.2 × 140            | 0.45  | 13.1                                               | ELXA500LGC683TEE0U |
|                          | 82,000      | 89 × 140              | 0.50  | 14.8                                               | ELXA500LGC823TFE0U |
| 63                       | 2,700       | 35 × 50               | 0.15  | 1.90                                               | ELXA630LGB272TA50U |
|                          | 3,300       | 35 × 50               | 0.15  | 2.10                                               | ELXA630LGB332TA50U |
|                          | 3,900       | 35 × 80               | 0.20  | 2.70                                               | ELXA630LGB392TA80U |
|                          | 4,700       | 35 × 80               | 0.20  | 2.90                                               | ELXA630LGB472TA80U |
|                          | 5,600       | 35 × 80               | 0.20  | 3.20                                               | ELXA630LGB562TA80U |
|                          | 6,800       | 35 × 80               | 0.20  | 3.50                                               | ELXA630LGB682TA80U |
|                          | 8,200       | 35 × 100              | 0.20  | 4.20                                               | ELXA630LGB822TAA0U |
|                          | 10,000      | 35 × 120              | 0.25  | 4.30                                               | ELXA630LGB103TAC0U |
|                          | 12,000      | 50 × 80               | 0.25  | 4.80                                               | ELXA630LGC123TC80U |
|                          | 15,000      | 50 × 100              | 0.25  | 5.90                                               | ELXA630LGC153TCA0U |
|                          | 18,000      | 50 × 120              | 0.25  | 6.30                                               | ELXA630LGC183TCC0U |
|                          | 22,000      | 50 × 120              | 0.30  | 6.70                                               | ELXA630LGC223TCC0U |
|                          | 27,000      | 63.5 × 120            | 0.30  | 8.80                                               | ELXA630LGC273TDC0U |
|                          | 33,000      | 76.2 × 100            | 0.30  | 10.0                                               | ELXA630LGC333TEA0U |
|                          | 39,000      | 76.2 × 120            | 0.35  | 10.7                                               | ELXA630LGC393TEC0U |
| 80                       | 47,000      | 76.2 × 140            | 0.35  | 12.5                                               | ELXA630LGC473TEE0U |
|                          | 56,000      | 89 × 140              | 0.40  | 13.8                                               | ELXA630LGC563TFE0U |
|                          | 2,200       | 35 × 50               | 0.15  | 1.90                                               | ELXA800LGB222TA50U |
|                          | 2,700       | 35 × 80               | 0.15  | 2.20                                               | ELXA800LGB272TA80U |
|                          | 3,300       | 35 × 80               | 0.15  | 2.50                                               | ELXA800LGB332TA80U |
|                          | 3,900       | 35 × 80               | 0.15  | 2.90                                               | ELXA800LGB392TA80U |
|                          | 4,700       | 35 × 100              | 0.15  | 3.10                                               | ELXA800LGB472TAA0U |
|                          | 5,600       | 35 × 100              | 0.15  | 3.50                                               | ELXA800LGB562TAA0U |
|                          | 6,800       | 35 × 120              | 0.20  | 4.10                                               | ELXA800LGB682TAC0U |
|                          | 8,200       | 50 × 80               | 0.20  | 4.80                                               | ELXA800LGC822TC80U |
|                          | 10,000      | 50 × 100              | 0.20  | 5.60                                               | ELXA800LGC103TCA0U |
|                          | 12,000      | 50 × 100              | 0.20  | 6.10                                               | ELXA800LGC123TCA0U |
|                          | 15,000      | 50 × 120              | 0.20  | 7.40                                               | ELXA800LGC153TCC0U |
|                          | 18,000      | 63.5 × 120            | 0.25  | 8.00                                               | ELXA800LGC183TDC0U |
|                          | 22,000      | 76.2 × 100            | 0.25  | 9.10                                               | ELXA800LGC223TEA0U |
| 100                      | 27,000      | 76.2 × 120            | 0.30  | 9.70                                               | ELXA800LGC273TEC0U |
|                          | 33,000      | 76.2 × 140            | 0.30  | 11.5                                               | ELXA800LGC333TEE0U |
|                          | 39,000      | 89 × 140              | 0.35  | 12.5                                               | ELXA800LGC393TFE0U |
|                          | 1,200       | 35 × 50               | 0.15  | 1.40                                               | ELXA101LGB122TA50U |
|                          | 1,500       | 35 × 80               | 0.15  | 1.60                                               | ELXA101LGB152TA80U |
|                          | 1,800       | 35 × 80               | 0.15  | 1.80                                               | ELXA101LGB182TA80U |
|                          | 2,200       | 35 × 80               | 0.15  | 2.00                                               | ELXA101LGB222TA80U |
|                          | 2,700       | 35 × 80               | 0.15  | 2.40                                               | ELXA101LGB272TA80U |
|                          | 3,300       | 35 × 100              | 0.15  | 2.80                                               | ELXA101LGB332TAA0U |
|                          | 3,900       | 35 × 120              | 0.15  | 3.10                                               | ELXA101LGB392TAC0U |
|                          | 4,700       | 50 × 80               | 0.15  | 3.60                                               | ELXA101LGC472TC80U |
|                          | 5,600       | 50 × 100              | 0.15  | 4.30                                               | ELXA101LGC562TCA0U |
|                          | 6,800       | 50 × 120              | 0.15  | 5.00                                               | ELXA101LGC682TCC0U |
|                          | 8,200       | 50 × 120              | 0.15  | 5.50                                               | ELXA101LGC822TCC0U |
|                          | 10,000      | 63.5 × 100            | 0.15  | 6.40                                               | ELXA101LGC103TDA0U |
| 160                      | 12,000      | 63.5 × 120            | 0.20  | 6.60                                               | ELXA101LGC123TDC0U |
|                          | 15,000      | 76.2 × 100            | 0.20  | 7.50                                               | ELXA101LGC153TEA0U |
|                          | 18,000      | 76.2 × 120            | 0.25  | 8.00                                               | ELXA101LGC183TEC0U |
|                          | 22,000      | 76.2 × 140            | 0.25  | 9.40                                               | ELXA101LGC223TEE0U |
|                          | 27,000      | 89 × 140              | 0.30  | 10.4                                               | ELXA101LGC273TFE0U |
|                          | 680         | 35 × 50               | 0.15  | 1.10                                               | ELXA161LGB681TA50U |
|                          | 820         | 35 × 80               | 0.15  | 1.20                                               | ELXA161LGB821TA80U |
|                          | 1,000       | 35 × 80               | 0.15  | 1.30                                               | ELXA161LGB102TA80U |
|                          | 1,200       | 35 × 80               | 0.15  | 1.50                                               | ELXA161LGB122TA80U |
|                          | 1,500       | 35 × 80               | 0.15  | 1.70                                               | ELXA161LGB152TA80U |



## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|
| 160                      | 1,800       | 35 × 100              | 0.15  | 2.00                                               | ELXA161LGB182TAA0U |
|                          | 2,200       | 35 × 120              | 0.15  | 2.30                                               | ELXA161LGB222TAC0U |
|                          | 2,700       | 35 × 120              | 0.15  | 2.70                                               | ELXA161LGB272TAC0U |
|                          | 3,300       | 50 × 100              | 0.15  | 3.30                                               | ELXA161LGC332TCA0U |
|                          | 3,900       | 50 × 120              | 0.15  | 3.80                                               | ELXA161LGC392TCC0U |
|                          | 4,700       | 50 × 120              | 0.15  | 4.20                                               | ELXA161LGC472TCC0U |
|                          | 5,600       | 50 × 120              | 0.15  | 4.70                                               | ELXA161LGC562TCC0U |
|                          | 6,800       | 63.5 × 120            | 0.15  | 5.70                                               | ELXA161LGC682TDC0U |
|                          | 8,200       | 76.2 × 100            | 0.20  | 6.40                                               | ELXA161LGC822TEA0U |
|                          | 10,000      | 76.2 × 120            | 0.20  | 6.60                                               | ELXA161LGC103TEC0U |
|                          | 12,000      | 76.2 × 140            | 0.20  | 7.80                                               | ELXA161LGC123TEE0U |
|                          | 15,000      | 89 × 140              | 0.20  | 9.50                                               | ELXA161LGC153TFE0U |
| 200                      | 470         | 35 × 50               | 0.15  | 0.90                                               | ELXA201LGB471TA50U |
|                          | 560         | 35 × 80               | 0.15  | 1.00                                               | ELXA201LGB561TA80U |
|                          | 680         | 35 × 80               | 0.15  | 1.10                                               | ELXA201LGB681TA80U |
|                          | 820         | 35 × 80               | 0.15  | 1.30                                               | ELXA201LGB821TA80U |
|                          | 1,000       | 35 × 100              | 0.15  | 1.50                                               | ELXA201LGB102TAA0U |
|                          | 1,200       | 35 × 120              | 0.15  | 1.70                                               | ELXA201LGB122TAC0U |
|                          | 1,500       | 35 × 120              | 0.15  | 1.90                                               | ELXA201LGB152TAC0U |
|                          | 1,800       | 50 × 80               | 0.15  | 2.20                                               | ELXA201LGC182TC80U |
|                          | 2,200       | 50 × 100              | 0.15  | 2.70                                               | ELXA201LGC222TCA0U |
|                          | 2,700       | 50 × 120              | 0.15  | 3.20                                               | ELXA201LGC272TCC0U |
|                          | 3,300       | 50 × 120              | 0.15  | 3.50                                               | ELXA201LGC332TCC0U |
|                          | 3,900       | 63.5 × 100            | 0.15  | 4.00                                               | ELXA201LGC392TDA0U |
| 250                      | 4,700       | 63.5 × 120            | 0.15  | 4.70                                               | ELXA201LGC472TDC0U |
|                          | 5,600       | 76.2 × 100            | 0.15  | 5.30                                               | ELXA201LGC562TEA0U |
|                          | 6,800       | 76.2 × 120            | 0.15  | 6.30                                               | ELXA201LGC682TEC0U |
|                          | 8,200       | 76.2 × 140            | 0.20  | 6.40                                               | ELXA201LGC822TEE0U |
|                          | 10,000      | 89 × 140              | 0.20  | 7.70                                               | ELXA201LGC103TFE0U |
|                          | 330         | 35 × 50               | 0.15  | 0.70                                               | ELXA251LGB331TA50U |
|                          | 390         | 35 × 80               | 0.15  | 0.80                                               | ELXA251LGB391TA80U |
|                          | 470         | 35 × 80               | 0.15  | 0.90                                               | ELXA251LGB471TA80U |
|                          | 560         | 35 × 80               | 0.15  | 1.00                                               | ELXA251LGB561TA80U |
|                          | 680         | 35 × 100              | 0.15  | 1.20                                               | ELXA251LGB681TAA0U |
|                          | 820         | 35 × 100              | 0.15  | 1.40                                               | ELXA251LGB821TAA0U |
|                          | 1,000       | 35 × 120              | 0.15  | 1.60                                               | ELXA251LGB102TAC0U |
| 350                      | 1,200       | 50 × 80               | 0.15  | 1.80                                               | ELXA251LGC122TC80U |
|                          | 1,500       | 50 × 100              | 0.15  | 2.20                                               | ELXA251LGC152TCA0U |
|                          | 1,800       | 50 × 120              | 0.15  | 2.60                                               | ELXA251LGC182TCC0U |
|                          | 2,200       | 50 × 120              | 0.15  | 2.80                                               | ELXA251LGC222TCC0U |
|                          | 2,700       | 63.5 × 100            | 0.15  | 3.30                                               | ELXA251LGC272TDA0U |
|                          | 3,300       | 63.5 × 120            | 0.15  | 4.00                                               | ELXA251LGC332TDC0U |
|                          | 3,900       | 76.2 × 100            | 0.15  | 4.40                                               | ELXA251LGC392TEA0U |
|                          | 4,700       | 76.2 × 120            | 0.15  | 5.20                                               | ELXA251LGC472TEC0U |
|                          | 5,600       | 76.2 × 140            | 0.15  | 6.10                                               | ELXA251LGC562TEE0U |
|                          | 6,800       | 89 × 140              | 0.15  | 7.40                                               | ELXA251LGC682TFE0U |
|                          | 820         | 50 × 60               | 0.20  | 3.30                                               | ELXA351LGC821MC60U |
|                          | 1,500       | 50 × 85               | 0.20  | 5.20                                               | ELXA351LGC152MC85U |
| 400                      | 2,200       | 50 × 105              | 0.20  | 7.00                                               | ELXA351LGC222MCA5U |
|                          | 2,700       | 50 × 125              | 0.20  | 8.40                                               | ELXA351LGC272MCC5U |
|                          | 2,700       | 63.5 × 85             | 0.20  | 8.10                                               | ELXA351LGC272MD85U |
|                          | 3,300       | 50 × 145              | 0.20  | 9.90                                               | ELXA351LGC332MCE5U |
|                          | 3,300       | 63.5 × 105            | 0.20  | 9.80                                               | ELXA351LGC332MDA5U |
|                          | 3,900       | 63.5 × 125            | 0.20  | 11.5                                               | ELXA351LGC392MDC5U |
|                          | 3,900       | 76.2 × 85             | 0.20  | 10.8                                               | ELXA351LGC392ME85U |
|                          | 5,600       | 63.5 × 145            | 0.20  | 14.7                                               | ELXA351LGC562MDE5U |
|                          | 6,800       | 76.2 × 125            | 0.20  | 16.8                                               | ELXA351LGC682MEC5U |
|                          | 8,200       | 76.2 × 145            | 0.20  | 19.6                                               | ELXA351LGC822MEE5U |
|                          | 8,200       | 89 × 125              | 0.20  | 18.9                                               | ELXA351LGC822MFC5U |
|                          | 10,000      | 76.2 × 190            | 0.20  | 23.0                                               | ELXA351LGC103MEK0U |
| 450                      | 10,000      | 89 × 145              | 0.20  | 22.2                                               | ELXA351LGC103MFE5U |
|                          | 15,000      | 89 × 190              | 0.20  | 30.6                                               | ELXA351LGC153MFK0U |
|                          | 22,000      | 89 × 270              | 0.20  | 43.5                                               | ELXA351LGC223MFT0U |

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|
| 400                      | 680         | 50 × 60               | 0.20  | 3.00                                               | ELXA401LGC681MC60U |
|                          | 1,200       | 50 × 85               | 0.20  | 4.70                                               | ELXA401LGC122MC85U |
|                          | 1,800       | 50 × 105              | 0.20  | 6.30                                               | ELXA401LGC182MCA5U |
|                          | 2,200       | 50 × 125              | 0.20  | 7.50                                               | ELXA401LGC222MCC5U |
|                          | 2,200       | 63.5 × 85             | 0.20  | 7.30                                               | ELXA401LGC222MD85U |
|                          | 2,700       | 50 × 145              | 0.20  | 8.90                                               | ELXA401LGC272MCE5U |
|                          | 2,700       | 63.5 × 105            | 0.20  | 8.80                                               | ELXA401LGC272MDA5U |
|                          | 3,300       | 63.5 × 125            | 0.20  | 10.5                                               | ELXA401LGC332MDC5U |
|                          | 3,300       | 76.2 × 85             | 0.20  | 9.90                                               | ELXA401LGC332ME85U |
|                          | 4,700       | 63.5 × 145            | 0.20  | 13.4                                               | ELXA401LGC472MDE5U |
|                          | 4,700       | 76.2 × 125            | 0.20  | 13.9                                               | ELXA401LGC472MCE5U |
|                          | 6,800       | 76.2 × 145            | 0.20  | 17.9                                               | ELXA401LGC682MEE5U |
| 450                      | 6,800       | 89 × 125              | 0.20  | 17.2                                               | ELXA401LGC682MFC5U |
|                          | 8,200       | 76.2 × 190            | 0.20  | 20.8                                               | ELXA401LGC822MEK0U |
|                          | 8,200       | 89 × 145              | 0.20  | 20.1                                               | ELXA401LGC822MCE5U |
|                          | 12,000      | 89 × 190              | 0.20  | 27.4                                               | ELXA401LGC123MFK0U |
|                          | 18,000      | 89 × 270              | 0.20  | 39.4                                               | ELXA401LGC183MFT0U |
|                          | 560         | 50 × 60               | 0.20  | 2.60                                               | ELXA451LGC561MC60U |
|                          | 1,000       | 50 × 85               | 0.20  | 4.00                                               | ELXA451LGC102MC85U |
|                          | 1,200       | 50 × 105              | 0.20  | 4.80                                               | ELXA451LGC122MCA5U |
|                          | 1,800       | 50 × 125              | 0.20  | 6.40                                               | ELXA451LGC182MCC5U |
|                          | 1,800       | 63.5 × 85             | 0.20  | 6.20                                               | ELXA451LGC182MD85U |
|                          | 2,200       | 50 × 145              | 0.20  | 7.60                                               | ELXA451LGC222MCE5U |
|                          | 2,200       | 63.5 × 105            | 0.20  | 7.50                                               | ELXA451LGC222MDA5U |
| 500                      | 2,700       | 63.5 × 125            | 0.20  | 8.90                                               | ELXA451LGC272MDC5U |
|                          | 2,700       | 76.2 × 85             | 0.20  | 8.40                                               | ELXA451LGC272ME85U |
|                          | 3,300       | 63.5 × 145            | 0.20  | 10.6                                               | ELXA451LGC332MDE5U |
|                          | 3,300       | 76.2 × 105            | 0.20  | 10.2                                               | ELXA451LGC332MEA5U |
|                          | 3,900       | 76.2 × 125            | 0.20  | 11.9                                               | ELXA451LGC392MEC5U |
|                          | 4,700       | 76.2 × 145            | 0.20  | 14.0                                               | ELXA451LGC472MEE5U |
|                          | 5,600       | 89 × 125              | 0.20  | 14.2                                               | ELXA451LGC562MFC5U |
|                          | 6,800       | 76.2 × 190            | 0.20  | 17.3                                               | ELXA451LGC682MEK0U |
|                          | 6,800       | 89 × 145              | 0.20  | 16.7                                               | ELXA451LGC682MFE5U |
|                          | 10,000      | 89 × 190              | 0.20  | 22.8                                               | ELXA451LGC103MFK0U |
|                          | 15,000      | 89 × 270              | 0.20  | 32.8                                               | ELXA451LGC153MFT0U |
|                          | 470         | 50 × 60               | 0.20  | 2.40                                               | ELXA501LGC471MC60U |
| 525                      | 820         | 50 × 85               | 0.20  | 3.60                                               | ELXA501LGC821MC85U |
|                          | 1,000       | 50 × 105              | 0.20  | 4.40                                               | ELXA501LGC102MCA5U |
|                          | 1,200       | 50 × 125              | 0.20  | 5.20                                               | ELXA501LGC122MCC5U |
|                          | 1,200       | 63.5 × 85             | 0.20  | 5.00                                               | ELXA501LGC122MD85U |
|                          | 1,500       | 50 × 145              | 0.20  | 6.30                                               | ELXA501LGC152MCE5U |
|                          | 1,800       | 63.5 × 105            | 0.20  | 6.80                                               | ELXA501LGC182MDA5U |
|                          | 2,700       | 63.5 × 145            | 0.20  | 9.60                                               | ELXA501LGC272MCE5U |
|                          | 2,700       | 76.2 × 105            | 0.20  | 9.20                                               | ELXA501LGC272MEA5U |
|                          | 3,900       | 76.2 × 145            | 0.20  | 12.7                                               | ELXA501LGC392MEE5U |
|                          | 3,900       | 89 × 125              | 0.20  | 11.9                                               | ELXA501LGC392MFC5U |
|                          | 6,800       | 89 × 190              | 0.20  | 18.8                                               | ELXA501LGC682MFK0U |
|                          | 10,000      | 89 × 270              | 0.20  | 26.8                                               | ELXA501LGC103MFT0U |
| 550                      | 390         | 50 × 60               | 0.20  | 2.20                                               | ELXA5C1LGC391MC60U |
|                          | 680         | 50 × 85               | 0.20  | 3.30                                               | ELXA5C1LGC681MC85U |
|                          | 1,000       | 50 × 125              | 0.20  | 4.80                                               | ELXA5C1LGC102MCC5U |
|                          | 1,500       | 63.5 × 105            | 0.20  | 6.20                                               | ELXA5C1LGC152MDA5U |
|                          | 1,800       | 63.5 × 125            | 0.20  | 7.30                                               | ELXA5C1LGC182MDC5U |
|                          | 2,200       | 63.5 × 145            | 0.20  | 8.60                                               | ELXA5C1LGC222MDE5U |
|                          | 2,200       | 76.2 × 105            | 0.20  | 8.30                                               | ELXA5C1LGC222MEA5U |
|                          | 2,700       | 76.2 × 125            | 0.20  | 9.90                                               | ELXA5C1LGC272MCE5U |
|                          | 3,300       | 76.2 × 145            | 0.20  | 11.7                                               | ELXA5C1LGC332MEE5U |
|                          | 4,700       | 76.2 × 190            | 0.20  | 14.4                                               | ELXA5C1LGC472MEK0U |
|                          | 4,700       | 89 × 145              | 0.20  | 13.9                                               | ELXA5C1LGC472MFE5U |
|                          | 5,600       | 89 × 190              | 0.20  | 17.1                                               | ELXA5C1LGC562MFK0U |



## LXA Series

### ◆RATED RIPPLE CURRENT MULTIPLIERS

#### ● Frequency Multipliers

| Frequency (Hz)            | 50   | 120  | 300  | 1k   | 3k   | 10k  | 50k  |
|---------------------------|------|------|------|------|------|------|------|
| 10 to 50V <sub>dc</sub>   | 0.95 | 1.00 | 1.03 | 1.05 | —    | 1.09 | 1.12 |
| 63 to 80V <sub>dc</sub>   | 0.90 | 1.00 | 1.06 | 1.10 | —    | 1.18 | 1.22 |
| 100 to 250V <sub>dc</sub> | 0.80 | 1.00 | 1.12 | 1.22 | —    | 1.30 | 1.33 |
| 350 to 525V <sub>dc</sub> | 0.80 | 1.00 | 1.20 | 1.50 | 1.60 | —    | —    |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

Also, for the LXA series capacitors (350 to 525V<sub>dc</sub> products), using them at operating voltage can extend their lifetime. For details, please contact a representative of Nippon Chemi-con.

## LXR Series

- Higher ripple capability than LXA series
- Endurance with ripple current : 5,000 hours at 105°C
- RoHS2 Compliant

LXR

Higher ripple  
LXA

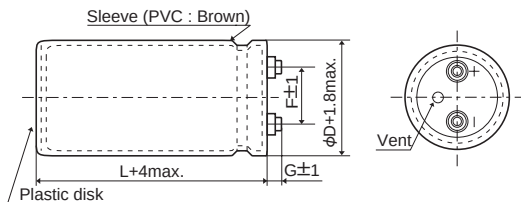


## ◆ SPECIFICATIONS

| Items                           | Characteristics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |                             |              |                                      |                 |                               |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|--------------|--------------------------------------|-----------------|-------------------------------|
| Category                        | -25 to +105°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                    |                             |              |                                      |                 |                               |
| Temperature Range               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |                             |              |                                      |                 |                               |
| Rated Voltage Range             | 350 to 450V <sub>dc</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                    |                             |              |                                      |                 |                               |
| Capacitance Tolerance           | ±20% (M) (at 20°C, 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                    |                             |              |                                      |                 |                               |
| Leakage Current                 | I=0.02CV or 5mA, whichever is smaller.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C after 5 minutes)                                                                                                                                                                                                                                                                                                                                                                                          |                    |                             |              |                                      |                 |                               |
| Dissipation Factor (tan δ)      | 0.15max. (at 20°C, 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                    |                             |              |                                      |                 |                               |
| Low Temperature Characteristics | Capacitance change C (-25°C)/C(+20°C)≥0.7 (at 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |                             |              |                                      |                 |                               |
| Insulation Resistance           | When measured between the terminals that are connected to each other and to the mounting clamp on the insulating sleeve covering the case by using an insulation resistance meter of 500V <sub>dc</sub> , the insulation resistance shall not be less than 100MΩ.                                                                                                                                                                                                                                                                                      |                    |                             |              |                                      |                 |                               |
| Insulation Withstanding Voltage | When a voltage of 2,000V <sub>ac</sub> is applied for 1 minute between the terminals that are connected to each other and to the mounting clamp on the insulating sleeve covering the case, there shall not be electrical damage.                                                                                                                                                                                                                                                                                                                      |                    |                             |              |                                      |                 |                               |
| Endurance                       | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 5,000 hours at 105°C.<br><table border="1"> <tr> <td>Capacitance change</td><td>≤ ±20% of the initial value</td></tr> <tr> <td>D.F. (tan δ)</td><td>≤200% of the initial specified value</td></tr> <tr> <td>Leakage current</td><td>≤ The initial specified value</td></tr> </table>                                         | Capacitance change | ≤ ±20% of the initial value | D.F. (tan δ) | ≤200% of the initial specified value | Leakage current | ≤ The initial specified value |
| Capacitance change              | ≤ ±20% of the initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |                             |              |                                      |                 |                               |
| D.F. (tan δ)                    | ≤200% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |                             |              |                                      |                 |                               |
| Leakage current                 | ≤ The initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                    |                             |              |                                      |                 |                               |
| Shelf Life                      | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4.<br><table border="1"> <tr> <td>Capacitance change</td><td>≤ ±20% of the initial value</td></tr> <tr> <td>D.F. (tan δ)</td><td>≤200% of the initial specified value</td></tr> <tr> <td>Leakage current</td><td>≤ The initial specified value</td></tr> </table> | Capacitance change | ≤ ±20% of the initial value | D.F. (tan δ) | ≤200% of the initial specified value | Leakage current | ≤ The initial specified value |
| Capacitance change              | ≤ ±20% of the initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |                             |              |                                      |                 |                               |
| D.F. (tan δ)                    | ≤200% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |                             |              |                                      |                 |                               |
| Leakage current                 | ≤ The initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                    |                             |              |                                      |                 |                               |

## ◆ DIMENSIONS (Screw-Mount) [mm]

● Terminal Code : LG

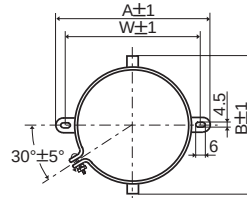


φ63.5 & φ76.2 : G=6  
 φ89 : G=4  
 φ100 : G=10

&lt;Screw specifications&gt;

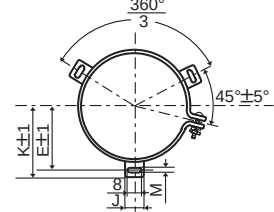
to φ89 Plus hexagon-headed screw : M5×0.8×10  
 Maximum screw tightening torque : 3.23Nm

● Mounting Clamp Code : B



| φD   | A     | B  | W    | F    |
|------|-------|----|------|------|
| 63.5 | 90    | 76 | 80   | 28.0 |
| 76.2 | 104.5 | 90 | 93.5 | 31.5 |

● Mounting Clamp Code : C

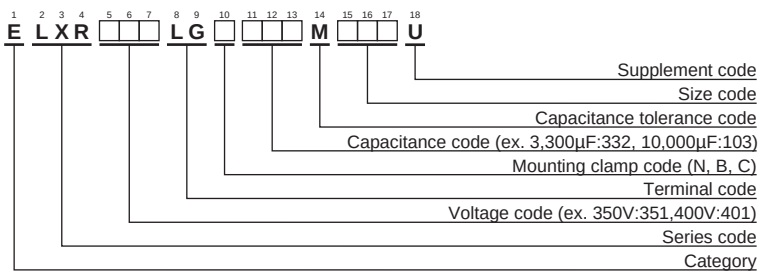


| φD   | E    | K    | M   | F    | J    |
|------|------|------|-----|------|------|
| 63.5 | 38.1 | 43.5 | 4.5 | 28.0 | 14.0 |
| 76.2 | 44.5 | 50.0 | 4.5 | 31.5 | 14.0 |
| 89   | 50.8 | 56.5 | 4.5 | 31.5 | 16.0 |
| 100  | 56.5 | 63.4 | 5.5 | 41.5 | 18.0 |

φ100 Cross-recessed head (Phillips) screw : M8×1.25×16  
 Spring washer, Washer  
 Maximum screw tightening torque : 6.31Nm

\* The screw and the mounting clamp are separately supplied and not attached to the product.

## ◆ PART NUMBERING SYSTEM



Please refer to "Product code guide (screw-mount terminal type)"

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(Arms/<br>105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|
| 350                      | 3,300       | 63.5 × 115            | 0.15  | 14.4                                               | ELXR351LGC332MDB5U | 400                      | 6,800       | 76.2 × 170            | 0.15  | 27.3                                               | ELXR401LGC682MEH0U |
|                          | 3,900       | 63.5 × 130            | 0.15  | 16.6                                               | ELXR351LGC392MDD0U |                          | 6,800       | 89 × 155              | 0.15  | 26.6                                               | ELXR401LGC682MFF5U |
|                          | 4,700       | 63.5 × 155            | 0.15  | 19.8                                               | ELXR351LGC472MDF5U |                          | 8,200       | 89 × 170              | 0.15  | 30.5                                               | ELXR401LGC822MFH0U |
|                          | 4,700       | 76.2 × 115            | 0.15  | 19.1                                               | ELXR351LGC472MEB5U |                          | 10,000      | 100 × 190             | 0.15  | 34.5                                               | ELXR401LGC103MGK0U |
|                          | 5,600       | 63.5 × 170            | 0.15  | 22.5                                               | ELXR351LGC562MDH0U |                          | 12,000      | 100 × 220             | 0.15  | 40.2                                               | ELXR401LGC123MGN0U |
|                          | 5,600       | 76.2 × 130            | 0.15  | 21.9                                               | ELXR351LGC562MED0U | 450                      | 2,200       | 63.5 × 115            | 0.15  | 11.8                                               | ELXR451LGC222MDB5U |
|                          | 6,800       | 76.2 × 155            | 0.15  | 26.2                                               | ELXR351LGC682MEF5U |                          | 2,700       | 63.5 × 130            | 0.15  | 13.7                                               | ELXR451LGC272MDD0U |
|                          | 8,200       | 76.2 × 170            | 0.15  | 30.0                                               | ELXR351LGC822MEH0U |                          | 2,700       | 76.2 × 115            | 0.15  | 14.5                                               | ELXR451LGC272MEB5U |
|                          | 8,200       | 89 × 155              | 0.15  | 29.2                                               | ELXR351LGC822MFF5U |                          | 3,300       | 63.5 × 155            | 0.15  | 16.5                                               | ELXR451LGC332MDF5U |
|                          | 10,000      | 89 × 170              | 0.15  | 33.7                                               | ELXR351LGC103MFH0U |                          | 3,300       | 76.2 × 130            | 0.15  | 16.9                                               | ELXR451LGC332MED0U |
|                          | 12,000      | 100 × 190             | 0.15  | 37.8                                               | ELXR351LGC123MGK0U |                          | 3,900       | 63.5 × 170            | 0.15  | 18.7                                               | ELXR451LGC392MDH0U |
|                          | 15,000      | 100 × 250             | 0.15  | 47.7                                               | ELXR351LGC153MGR0U |                          | 4,700       | 76.2 × 155            | 0.15  | 21.7                                               | ELXR451LGC472MEF5U |
| 400                      | 2,700       | 63.5 × 115            | 0.15  | 13.1                                               | ELXR401LGC272MDB5U |                          | 5,600       | 76.2 × 190            | 0.15  | 26.1                                               | ELXR451LGC562MEK0U |
|                          | 3,300       | 63.5 × 130            | 0.15  | 15.2                                               | ELXR401LGC332MDD0U |                          | 5,600       | 89 × 155              | 0.15  | 24.1                                               | ELXR451LGC562MFF5U |
|                          | 3,900       | 63.5 × 155            | 0.15  | 17.9                                               | ELXR401LGC392MDF5U |                          | 6,800       | 89 × 170              | 0.15  | 27.8                                               | ELXR451LGC682MFH0U |
|                          | 3,900       | 76.2 × 115            | 0.15  | 18.2                                               | ELXR401LGC392MEB5U |                          | 8,200       | 89 × 190              | 0.15  | 32.0                                               | ELXR451LGC822MFK0U |
|                          | 4,700       | 63.5 × 170            | 0.15  | 20.5                                               | ELXR401LGC472MDH0U |                          | 10,000      | 100 × 220             | 0.15  | 36.8                                               | ELXR451LGC103MGN0U |
|                          | 4,700       | 76.2 × 130            | 0.15  | 20.1                                               | ELXR401LGC472MED0U |                          | 12,000      | 100 × 250             | 0.15  | 42.7                                               | ELXR451LGC123MGR0U |
|                          | 5,600       | 76.2 × 155            | 0.15  | 23.8                                               | ELXR401LGC562MEF5U |                          |             |                       |       |                                                    |                    |

## ◆RATED RIPPLE CURRENT MULTIPLIERS

## ●Frequency Multipliers

| Frequency (Hz) | 120 | 300 | 1k  | 3k  |
|----------------|-----|-----|-----|-----|
| Coefficient    | 1.0 | 1.1 | 1.3 | 1.4 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

Also, for the LXR series capacitors, using them at operating voltage less than their rated voltage can extend their lifetime. For details, please contact a representative of Nippon Chemi-Con.



# RWV Series

- For frequently change of regenerative voltage from AC servo amplifier and inverter control
- Improved the resistance for charge and discharge from same dimension of RWF series
- Endurance with ripple current : 5,000 hours at 85°C
- Rated voltage range : 350 to 450V<sub>dc</sub>, Capacitance 820 to 18,000μF
- RoHS2 Compliant

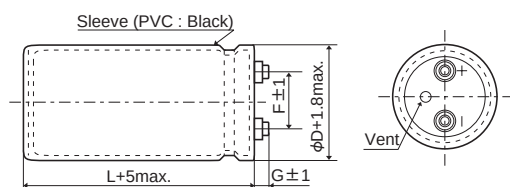


## SPECIFICATIONS

| Items                           | Characteristics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |                             |              |                                       |                 |                               |           |     |                  |                  |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------|--------------|---------------------------------------|-----------------|-------------------------------|-----------|-----|------------------|------------------|
| Category Temperature Range      | -25 to +85°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                    |                             |              |                                       |                 |                               |           |     |                  |                  |
| Rated Voltage Range             | 350 to 450V <sub>dc</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                    |                             |              |                                       |                 |                               |           |     |                  |                  |
| Capacitance Tolerance           | ±20% (M) (at 20°C, 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                    |                             |              |                                       |                 |                               |           |     |                  |                  |
| Leakage Current                 | I=0.02CV or 5mA, whichever is smaller.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C after 5 minutes)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                             |              |                                       |                 |                               |           |     |                  |                  |
| Dissipation Factor (tan δ)      | 0.25 max. (at 20°C, 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |                             |              |                                       |                 |                               |           |     |                  |                  |
| Low Temperature Characteristics | Capacitance change $C(-25^{\circ}\text{C})/C(+20^{\circ}\text{C}) \geq 0.7$ (at 120Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    |                             |              |                                       |                 |                               |           |     |                  |                  |
| Insulation Resistance           | When measured between the terminals shorted each other and the mounting clamp on the insulating sleeve covering the case by using an insulation resistance meter of 500V <sub>dc</sub> , the insulation resistance shall not be less than 100MΩ.                                                                                                                                                                                                                                                                                                                                                                                                                      |                    |                             |              |                                       |                 |                               |           |     |                  |                  |
| Insulation Withstanding Voltage | When a voltage of 2,000V <sub>ac</sub> is applied for 1 minute between the terminals shorted each other and the mounting clamp on the insulating sleeve covering the case, there shall not be electrical damage.                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                    |                             |              |                                       |                 |                               |           |     |                  |                  |
| Charge and Discharge            | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to charge and discharge test with the voltage waveform shown below at room temperature (15 to 35°C). <table border="1"> <tr> <td>Capacitance change</td><td>≤ ±20% of the initial value</td></tr> <tr> <td>D.F. (tan δ)</td><td>≤ 200% of the initial specified value</td></tr> <tr> <td>Leakage current</td><td>≤ The initial specified value</td></tr> </table><br><table border="1"> <tr> <td>Frequency</td><td>3Hz</td></tr> <tr> <td>Number of cycles</td><td>50 million times</td></tr> </table><br><div>           Voltage waveform            </div> | Capacitance change | ≤ ±20% of the initial value | D.F. (tan δ) | ≤ 200% of the initial specified value | Leakage current | ≤ The initial specified value | Frequency | 3Hz | Number of cycles | 50 million times |
| Capacitance change              | ≤ ±20% of the initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                    |                             |              |                                       |                 |                               |           |     |                  |                  |
| D.F. (tan δ)                    | ≤ 200% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                    |                             |              |                                       |                 |                               |           |     |                  |                  |
| Leakage current                 | ≤ The initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                             |              |                                       |                 |                               |           |     |                  |                  |
| Frequency                       | 3Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |                             |              |                                       |                 |                               |           |     |                  |                  |
| Number of cycles                | 50 million times                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                    |                             |              |                                       |                 |                               |           |     |                  |                  |
| Endurance                       | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 5,000 hours at 85°C. <table border="1"> <tr> <td>Capacitance change</td><td>≤ ±20% of the initial value</td></tr> <tr> <td>D.F. (tan δ)</td><td>≤ 200% of the initial specified value</td></tr> <tr> <td>Leakage current</td><td>≤ The initial specified value</td></tr> </table>                                                                                                                                                           | Capacitance change | ≤ ±20% of the initial value | D.F. (tan δ) | ≤ 200% of the initial specified value | Leakage current | ≤ The initial specified value |           |     |                  |                  |
| Capacitance change              | ≤ ±20% of the initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                    |                             |              |                                       |                 |                               |           |     |                  |                  |
| D.F. (tan δ)                    | ≤ 200% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                    |                             |              |                                       |                 |                               |           |     |                  |                  |
| Leakage current                 | ≤ The initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                             |              |                                       |                 |                               |           |     |                  |                  |
| Shelf Life                      | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 500 hours at 85°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. <table border="1"> <tr> <td>Capacitance change</td><td>≤ ±20% of the initial value</td></tr> <tr> <td>D.F. (tan δ)</td><td>≤ 200% of the initial specified value</td></tr> <tr> <td>Leakage current</td><td>≤ The initial specified value</td></tr> </table>                                                                                                                     | Capacitance change | ≤ ±20% of the initial value | D.F. (tan δ) | ≤ 200% of the initial specified value | Leakage current | ≤ The initial specified value |           |     |                  |                  |
| Capacitance change              | ≤ ±20% of the initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                    |                             |              |                                       |                 |                               |           |     |                  |                  |
| D.F. (tan δ)                    | ≤ 200% of the initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                    |                             |              |                                       |                 |                               |           |     |                  |                  |
| Leakage current                 | ≤ The initial specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                             |              |                                       |                 |                               |           |     |                  |                  |

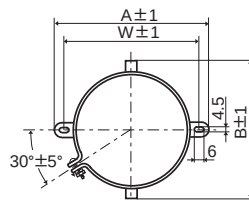
## DIMENSIONS (Screw-Mount) [mm]

●Terminal Code : LG



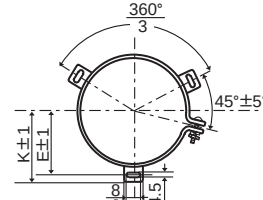
φ50 & φ63.5 : G=6  
φ76.2 & φ89 : G=5

●Mounting Clamp Code : B



| φD   | A     | B    | W    | F    |
|------|-------|------|------|------|
| 50   | 78.0  | 64.0 | 68.0 | 22.4 |
| 63.5 | 90.0  | 76.0 | 80.0 | 28.0 |
| 76.2 | 104.5 | 90.0 | 93.5 | 31.5 |

●Mounting Clamp Code : C



| φD   | E    | K    | F    | J    |
|------|------|------|------|------|
| 50   | 32.5 | 37.0 | 22.4 | 14.0 |
| 63.5 | 38.1 | 43.5 | 28.0 | 14.0 |
| 76.2 | 44.5 | 50.0 | 31.5 | 14.0 |
| 89   | 50.8 | 56.5 | 31.5 | 16.0 |

<Screw specifications>

Plus hexagon-headed screw : M5×0.8×10

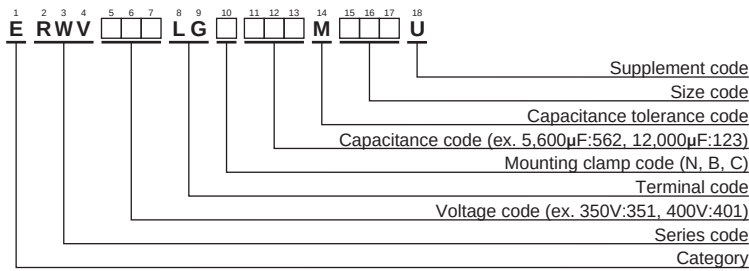
Maximum screw tightening torque : 3.23Nm

\* The screw and the mounting clamp are separately supplied and not attached to the product.



RWV Series

## ◆PART NUMBERING SYSTEM



Please refer to "Product code guide (screw-mount terminal type)"

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | Rated ripple<br>current<br>(Arms/<br>85°C, 120Hz) | Effective value<br>of charge and<br>discharge<br>current<br>(Arms/ 3Hz) | Part No.           |
|--------------------------|-------------|-----------------------|---------------------------------------------------|-------------------------------------------------------------------------|--------------------|
| 350                      | 1,200       | 50 × 60               | 4.70                                              | 1.56                                                                    | ERWV351LGC122MC60U |
|                          | 1,500       | 50 × 70               | 5.50                                              | 1.83                                                                    | ERWV351LGC152MC70U |
|                          | 1,800       | 50 × 80               | 6.40                                              | 2.13                                                                    | ERWV351LGC182MC80U |
|                          | 2,200       | 50 × 96               | 7.60                                              | 2.53                                                                    | ERWV351LGC222MC96U |
|                          | 2,700       | 50 × 105              | 8.80                                              | 2.94                                                                    | ERWV351LGC272MCA5U |
|                          | 2,700       | 50 × 115              | 9.20                                              | 3.06                                                                    | ERWV351LGC272MCB5U |
|                          | 3,300       | 50 × 130              | 10.8                                              | 3.58                                                                    | ERWV351LGC332MCD0U |
|                          | 4,700       | 63.5 × 115            | 13.2                                              | 4.61                                                                    | ERWV351LGC472MDB5U |
|                          | 5,600       | 63.5 × 130            | 15.2                                              | 5.30                                                                    | ERWV351LGC562MDD0U |
|                          | 5,600       | 76.2 × 105            | 15.2                                              | 5.36                                                                    | ERWV351LGC562MEA5U |
|                          | 6,800       | 63.5 × 155            | 18.1                                              | 6.32                                                                    | ERWV351LGC682MDF5U |
|                          | 8,200       | 63.5 × 170            | 20.7                                              | 7.25                                                                    | ERWV351LGC822MDH0U |
|                          | 8,200       | 76.2 × 130            | 20.2                                              | 6.57                                                                    | ERWV351LGC822MED0U |
|                          | 10,000      | 76.2 × 155            | 24.2                                              | 8.47                                                                    | ERWV351LGC103MEF5U |
|                          | 10,000      | 89 × 115              | 23.1                                              | 8.10                                                                    | ERWV351LGC103MFB5U |
|                          | 12,000      | 76.2 × 170            | 27.6                                              | 9.66                                                                    | ERWV351LGC123MEH0U |
|                          | 12,000      | 89 × 130              | 26.6                                              | 9.33                                                                    | ERWV351LGC123MFD0U |
|                          | 15,000      | 89 × 155              | 32.1                                              | 11.2                                                                    | ERWV351LGC153MFF5U |
| 375                      | 1,000       | 50 × 60               | 4.30                                              | 1.42                                                                    | ERWV3H1LGC102MC60U |
|                          | 1,200       | 50 × 70               | 4.90                                              | 1.64                                                                    | ERWV3H1LGC122MC70U |
|                          | 1,500       | 50 × 80               | 5.80                                              | 1.94                                                                    | ERWV3H1LGC152MC80U |
|                          | 2,200       | 50 × 96               | 7.60                                              | 2.54                                                                    | ERWV3H1LGC222MC96U |
|                          | 2,200       | 50 × 105              | 8.00                                              | 2.65                                                                    | ERWV3H1LGC222MCA5U |
|                          | 2,700       | 50 × 115              | 9.20                                              | 3.06                                                                    | ERWV3H1LGC272MCB5U |
|                          | 3,300       | 50 × 130              | 10.8                                              | 3.58                                                                    | ERWV3H1LGC332MCD0U |
|                          | 4,700       | 63.5 × 115            | 13.2                                              | 4.61                                                                    | ERWV3H1LGC472MDB5U |
|                          | 5,600       | 63.5 × 130            | 15.2                                              | 5.30                                                                    | ERWV3H1LGC562MDD0U |
|                          | 5,600       | 76.2 × 105            | 15.2                                              | 5.36                                                                    | ERWV3H1LGC562MEA5U |
|                          | 6,800       | 63.5 × 155            | 18.1                                              | 6.32                                                                    | ERWV3H1LGC682MDF5U |
|                          | 6,800       | 63.5 × 170            | 18.9                                              | 6.60                                                                    | ERWV3H1LGC682MDH0U |
|                          | 8,200       | 76.2 × 130            | 20.2                                              | 7.09                                                                    | ERWV3H1LGC822MED0U |
|                          | 8,200       | 89 × 115              | 20.9                                              | 7.35                                                                    | ERWV3H1LGC822MFB5U |
|                          | 10,000      | 76.2 × 155            | 24.2                                              | 8.48                                                                    | ERWV3H1LGC103MEF5U |
|                          | 10,000      | 76.2 × 170            | 25.2                                              | 8.85                                                                    | ERWV3H1LGC103MEH0U |
|                          | 10,000      | 89 × 130              | 24.3                                              | 8.54                                                                    | ERWV3H1LGC103MFD0U |
|                          | 12,000      | 89 × 155              | 28.7                                              | 10.0                                                                    | ERWV3H1LGC123MFF5U |
| 400                      | 1,000       | 50 × 60               | 4.30                                              | 1.42                                                                    | ERWV401LGC102MC60U |
|                          | 1,200       | 50 × 70               | 4.90                                              | 1.64                                                                    | ERWV401LGC122MC70U |
|                          | 1,500       | 50 × 80               | 5.80                                              | 1.95                                                                    | ERWV401LGC152MC80U |
|                          | 1,800       | 50 × 96               | 6.90                                              | 2.29                                                                    | ERWV401LGC182MC96U |
|                          | 2,200       | 50 × 105              | 8.00                                              | 2.65                                                                    | ERWV401LGC222MCA5U |
|                          | 2,200       | 50 × 115              | 8.30                                              | 2.77                                                                    | ERWV401LGC222MCB5U |
|                          | 2,700       | 50 × 130              | 9.80                                              | 3.23                                                                    | ERWV401LGC272MCD0U |
|                          | 3,900       | 63.5 × 115            | 12.0                                              | 4.21                                                                    | ERWV401LGC392MDB5U |
|                          | 4,700       | 63.5 × 130            | 13.9                                              | 4.86                                                                    | ERWV401LGC472MDD0U |
|                          | 5,600       | 63.5 × 155            | 16.4                                              | 5.75                                                                    | ERWV401LGC562MDF5U |
| 400                      | 5,600       | 63.5 × 170            | 17.1                                              | 5.99                                                                    | ERWV401LGC562MDH0U |
|                          | 5,600       | 76.2 × 105            | 15.2                                              | 5.35                                                                    | ERWV401LGC562MEA5U |
|                          | 6,800       | 76.2 × 130            | 18.4                                              | 6.47                                                                    | ERWV401LGC682MED0U |
|                          | 8,200       | 76.2 × 155            | 21.9                                              | 7.68                                                                    | ERWV401LGC822MEF5U |
|                          | 8,200       | 76.2 × 170            | 22.8                                              | 8.02                                                                    | ERWV401LGC822MEH0U |
|                          | 8,200       | 89 × 115              | 20.9                                              | 7.35                                                                    | ERWV401LGC822MFB5U |
|                          | 10,000      | 89 × 130              | 24.3                                              | 8.26                                                                    | ERWV401LGC103MFD0U |
|                          | 12,000      | 89 × 155              | 28.7                                              | 10.0                                                                    | ERWV401LGC123MFF5U |
|                          | 12,000      | 89 × 170              | 29.9                                              | 10.5                                                                    | ERWV401LGC123MFH0U |
|                          | 15,000      | 89 × 190              | 35.2                                              | 12.3                                                                    | ERWV401LGC153MFK0U |
| 420                      | 820         | 50 × 60               | 3.80                                              | 1.29                                                                    | ERWV421LGC821MC60U |
|                          | 1,000       | 50 × 70               | 4.40                                              | 1.50                                                                    | ERWV421LGC102MC70U |
|                          | 1,200       | 50 × 80               | 5.20                                              | 1.75                                                                    | ERWV421LGC122MC80U |
|                          | 1,800       | 50 × 96               | 6.80                                              | 2.30                                                                    | ERWV421LGC182MC96U |
|                          | 1,800       | 50 × 105              | 7.10                                              | 2.40                                                                    | ERWV421LGC182MCA5U |
|                          | 2,200       | 50 × 115              | 8.20                                              | 2.77                                                                    | ERWV421LGC222MCB5U |
|                          | 2,700       | 50 × 130              | 9.60                                              | 3.25                                                                    | ERWV421LGC272MCD0U |
|                          | 3,300       | 63.5 × 115            | 11.0                                              | 3.87                                                                    | ERWV421LGC332MDB5U |
|                          | 3,900       | 63.5 × 130            | 12.7                                              | 4.44                                                                    | ERWV421LGC392MDD0U |
|                          | 4,700       | 63.5 × 155            | 15.0                                              | 5.28                                                                    | ERWV421LGC472MDF5U |
|                          | 4,700       | 76.2 × 105            | 13.9                                              | 4.92                                                                    | ERWV421LGC472MEA5U |
|                          | 5,600       | 63.5 × 170            | 17.1                                              | 6.02                                                                    | ERWV421LGC562MDH0U |
|                          | 5,600       | 76.2 × 130            | 16.6                                              | 5.90                                                                    | ERWV421LGC562MED0U |
|                          | 6,800       | 76.2 × 155            | 19.8                                              | 7.02                                                                    | ERWV421LGC682MEF5U |
|                          | 6,800       | 89 × 115              | 19.0                                              | 6.73                                                                    | ERWV421LGC682MFB5U |
|                          | 8,200       | 76.2 × 170            | 22.7                                              | 8.04                                                                    | ERWV421LGC822MEH0U |
|                          | 8,200       | 89 × 130              | 22.0                                              | 7.78                                                                    | ERWV421LGC822MFD0U |
|                          | 10,000      | 89 × 155              | 26.2                                              | 9.24                                                                    | ERWV421LGC103MFF5U |
| 450                      | 12,000      | 89 × 170              | 29.9                                              | 10.5                                                                    | ERWV421LGC123MFH0U |
|                          | 12,000      | 89 × 190              | 31.5                                              | 11.0                                                                    | ERWV421LGC123MFK0U |
|                          | 820         | 50 × 60               | 3.80                                              | 1.29                                                                    | ERWV451LGC821MC60U |
|                          | 1,000       | 50 × 70               | 4.40                                              | 1.50                                                                    | ERWV451LGC102MC70U |
|                          | 1,200       | 50 × 80               | 5.20                                              | 1.74                                                                    | ERWV451LGC122MC80U |
|                          | 1,500       | 50 × 96               | 6.20                                              | 2.10                                                                    | ERWV451LGC152MC96U |
|                          | 1,800       | 50 × 105              | 7.10                                              | 2.41                                                                    | ERWV451LGC182MCA5U |
|                          | 1,800       | 50 × 115              | 7.40                                              | 2.51                                                                    | ERWV451LGC182MCB5U |
|                          | 2,200       | 50 × 130              | 8.70                                              | 2.93                                                                    | ERWV451LGC222MCD0U |
|                          | 3,300       | 63.5 × 115            | 11.0                                              | 3.88                                                                    | ERWV451LGC332MDB5U |
|                          | 3,900       | 63.5 × 130            | 12.7                                              | 4.44                                                                    | ERWV451LGC392MDD0U |
|                          | 3,900       | 76.2 × 105            | 13.2                                              | 4.49                                                                    | ERWV451LGC392MEA5U |
|                          | 4,700       | 63.5 × 155            | 15.0                                              | 5.27                                                                    | ERWV451LGC472MDF5U |
|                          | 4,700       | 63.5 × 170            | 15.6                                              | 5.50                                                                    | ERWV451LGC472MDH0U |
|                          | 5,600       | 76.2 × 130            | 16.6                                              | 5.88                                                                    | ERWV451LGC562MED0U |
|                          | 6,800       | 76.2 × 155            | 19.8                                              | 7.04                                                                    | ERWV451LGC682MEF5U |
|                          | 6,800       | 89 × 115              | 19.0                                              | 6.72                                                                    | ERWV451LGC682MFB5U |
|                          | 8,200       | 76.2 × 170            | 22.7                                              | 7.97                                                                    | ERWV451LGC822MEH0U |
|                          | 8,200       | 89 × 130              | 22.0                                              | 7.72                                                                    | ERWV451LGC822MFD0U |
|                          | 10,000      | 89 × 155              | 26.2                                              | 9.22                                                                    | ERWV451LGC103MFF5U |
|                          | 10,000      | 89 × 170              | 27.3                                              | 9.66                                                                    | ERWV451LGC103MFH0U |
|                          | 12,000      | 89 × 190              | 31.5                                              | 11.1                                                                    | ERWV451LGC123MFK0U |



## RWV Series

### ◆ RATED RIPPLE CURRENT MULTIPLIERS

#### ● Frequency Multipliers

| Frequency (Hz) | 50  | 120 | 300 | 1k  | 3k  |
|----------------|-----|-----|-----|-----|-----|
| Coefficient    | 0.8 | 1.0 | 1.1 | 1.3 | 1.4 |

The deterioration of aluminum electrolytic capacitors accelerates their life due to the internal heating produced by ripple current. For details, refer to Section "5-3 Ripple Current Effect on Lifetime" in the catalog, Technical Note.

Also, for the RWV series capacitors, using them at operating voltage less than their rated voltage can extend their lifetime. For the details, please contact a representative of Nippon Chemi-Con.



# U37F Series



- Large Can
- Screw Terminals
- General Purpose U37 Grade
- High Ripple
- 350 to 500VDC Ratings
- RoHS Compliant
- 5,000 Hours Lifetime at +85°C
- Up to 150,000 Hours Useful Life



The U37F series is a general purpose, screw mount U37 grade series specifically designed to provide the ripple current capability and long life required for high reliability inverter applications. The U37F has an endurance rating of 5,000 hours at +85°C with the rated ripple current applied. The useful life can exceed 150,000 hours at +40°C and 1.5x the ripple current. These capacitors are available in a variety of high current English or Metric thread terminals. Mounting options include a three-footed clamp or bottom threaded stud. Custom designs are also available.

## Summary of Specifications

- Screw terminals: high and low post, English and Metric thread.
- Capacitance range: 1,500 to 22,000μF.
- Voltage range: 350 to 500VDC.
- Category temperature range: -40°C to +85°C.
- Leakage current: 0.02CV(μA) or 5mA, whichever is smaller, after 5 minutes at +25°C.
- Standard capacitance tolerance: ±20%
- Nominal case size (D×L): D = 50mm (2.000") to 89mm (3.500"); L = 92mm (3.625") to 219mm (8.625").
- Rated lifetime: 5,000 hours at +85°C with rated ripple current applied.



# U37F Series

## U37F Specifications - Screw Terminals

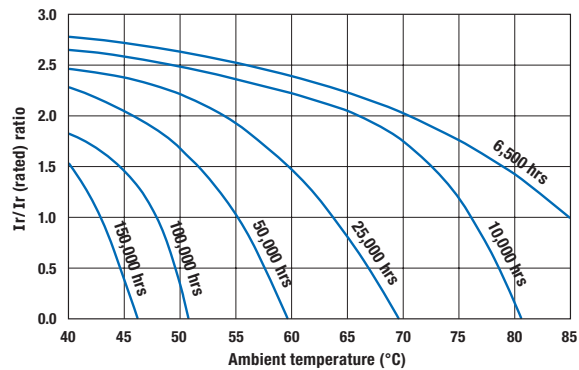
| Item                             | Characteristics                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                    |                      |       |                                                                                                                                                     |      |                      |    |         |    |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------------------|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------|------|----------------------|----|---------|----|
| Category Temperature Range       | − 40 to +85°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                    |                      |       |                                                                                                                                                     |      |                      |    |         |    |
| Rated Voltage Range              | 350 to 500VDC                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                    |                      |       |                                                                                                                                                     |      |                      |    |         |    |
| Capacitance Range                | 1,500 to 22,000μF at +25°C, 120Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    |                      |       |                                                                                                                                                     |      |                      |    |         |    |
| Capacitance Tolerance            | ±20% (M) at +25°C, 120Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                      |       |                                                                                                                                                     |      |                      |    |         |    |
| Leakage Current                  | I = 0.02CV (μA) or 5mA, whichever is smaller, after 5 minutes at +25°C.<br>Where I = Max. leakage current (μA), C = Nominal capacitance (μF) and V= Rated voltage (V)                                                                                                                                                                                                                                                                                                            |                    |                      |       |                                                                                                                                                     |      |                      |    |         |    |
| Rated Ripple Current Multipliers | Ambient Temperature (°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                      |       |                                                                                                                                                     |      |                      |    |         |    |
|                                  | +45°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    | +65°C                |       | +85°C                                                                                                                                               |      |                      |    |         |    |
|                                  | 2.82                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                    | 1.73                 |       | 1.00                                                                                                                                                |      |                      |    |         |    |
|                                  | Frequency (Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |                      |       |                                                                                                                                                     |      |                      |    |         |    |
|                                  | DC Rated Voltage                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 50Hz               | 120Hz                | 300Hz | 1kHz                                                                                                                                                | 3kHz | 10kHz                |    |         |    |
|                                  | 350-500V                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 0.80               | 1.00                 | 1.20  | 1.30                                                                                                                                                | 1.40 | 1.41                 |    |         |    |
|                                  | To determine maximum ripple current at a specified temperature and frequency, use the appropriate multiplier shown.                                                                                                                                                                                                                                                                                                                                                              |                    |                      |       |                                                                                                                                                     |      |                      |    |         |    |
| Endurance (Load Life)            | The following specifications shall be satisfied when the capacitors are restored to +25°C after subjecting them to DC voltage for 5,000 hours at +85°C with the rated ripple current applied. The sum of the DC voltage and peak AC voltage must not exceed the full rated voltage of the capacitors.<br><br>Capacitance change: ≤ 20% from initial measurement<br>ESR change : ≤ 200% of initial specified limit<br>Leakage current : ≤ initial specified limit                 |                    |                      |       |                                                                                                                                                     |      |                      |    |         |    |
| Useful Life                      | With specified standard voltage and ripple current applied, typical life as function of ambient temperature is listed below.                                                                                                                                                                                                                                                                                                                                                     |                    |                      |       |                                                                                                                                                     |      |                      |    |         |    |
|                                  | +85°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    | 6,500 hours max.     |       | Capacitance change: ≤ 30% from initial measurement<br>ESR change : ≤ 300% of initial specified limit<br>Leakage current : ≤ initial specified limit |      |                      |    |         |    |
|                                  | +65°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    | 23,800 hours max.    |       |                                                                                                                                                     |      |                      |    |         |    |
| +45°C                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 124,700 hours max. |                      |       |                                                                                                                                                     |      |                      |    |         |    |
| Shelf Life                       | The following specifications shall be satisfied when the capacitors are restored to +25°C after exposing them for 500 hours at +85°C without voltage applied. The rated voltage shall be applied to the capacitors for a minimum of 30 minutes, at least 24 hours and not more than 48 hours before the measurements.<br><br>Capacitance change: ≤ 20% from initial measurement<br>ESR change : ≤ 200% of initial specified limit<br>Leakage current : ≤ initial specified limit |                    |                      |       |                                                                                                                                                     |      |                      |    |         |    |
| Vibration Rating                 | 10-55Hz, 10g sinusoidal in three axes, 2 hours per axis.                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                      |       |                                                                                                                                                     |      |                      |    |         |    |
| Maximum Tightening Torque        | Terminal Code                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                    | HP                   |       | HL                                                                                                                                                  | CD   | CP                   | CH | CA      | CS |
|                                  | Thread Size                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                    | 10-32 NF-2B          |       | M5x0.8-6H                                                                                                                                           |      | 1/4-28 NF-2B         |    | M6x1-6H |    |
|                                  | 3 Threads Engaged                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    | 2.0 N·m (18.0 in·lb) |       |                                                                                                                                                     |      | 4.0 N·m (35.0 in·lb) |    |         |    |
|                                  | 6 Threads Engaged                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    | 2.8 N·m (25.0 in·lb) |       |                                                                                                                                                     |      | 6.2 N·m (55.0 in·lb) |    |         |    |
| Typical Inductance (nH) at 1MHz  | Case Diameter (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                    | Terminal Code        |       |                                                                                                                                                     |      |                      |    |         |    |
|                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                    | HP                   | HL    | CD                                                                                                                                                  | CP   | CH                   | CA | CS      |    |
|                                  | ø50.8                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | —                  | —                    | NA    | NA                                                                                                                                                  | NA   | NA                   | NA |         |    |
|                                  | ø63.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | —                  | —                    | —     | —                                                                                                                                                   | —    | —                    | —  |         |    |
|                                  | ø76.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 30                 | 30                   | 25    | 20                                                                                                                                                  | 25   | 20                   | 25 |         |    |
| ø89.0                            | 30                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 30                 | 25                   | 20    | 25                                                                                                                                                  | 20   | 25                   |    |         |    |
| Custom Designs                   | Custom CV values per case size and termination type may be available upon request. Contact appropriate representative with specific requirements.                                                                                                                                                                                                                                                                                                                                |                    |                      |       |                                                                                                                                                     |      |                      |    |         |    |

# U37F Series

## U37F Useful Life

### Useful Life: 6,500 Hours at +85°C

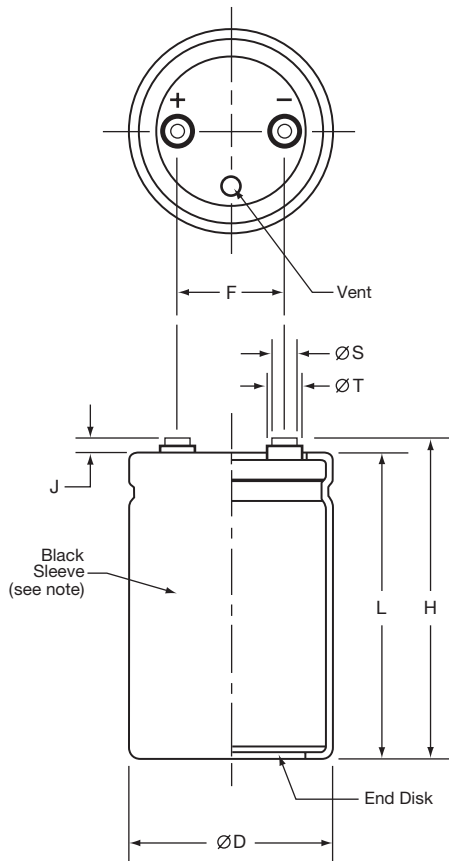
The life expectancy of a capacitor is shown as a function of ambient temperature and ripple current load.



## Diagram of Dimensions - Screw Terminals

### Large Can/Screw Terminals

Unit: mm (inches)



### Case Dimensions and Standard Box Quantities

| Case Size Code                                | ØD<br>+2.0 (0.080) | L<br>±1.0 (0.040)                                                                                    | F<br>±0.25 (0.010) | Standard Box Quantity |
|-----------------------------------------------|--------------------|------------------------------------------------------------------------------------------------------|--------------------|-----------------------|
| CB7<br>CD0                                    | 50.8 (2.000)       | 117 (4.625)<br>130 (5.125)                                                                           | 22.2 (0.875)       | 49                    |
| D92<br>DA5<br>DB7<br>DD0<br>DE3               | 63.5 (2.500)       | 92 (3.625)<br>105 (4.125)<br>117 (4.625)<br>130 (5.125)<br>143 (5.625)                               | 28.6 (1.125)       | 20                    |
| E92<br>EA5<br>EB7<br>EE3<br>EJ1<br>EM9        | 76.2 (3.000)       | 92 (3.625)<br>105 (4.125)<br>117 (4.625)<br>143 (5.625)<br>181 (7.125)<br>219 (8.625)                | 31.8 (1.250)       | 16<br>9               |
| F92<br>FA5<br>FB7<br>FE3<br>FF5<br>FK0<br>FM9 | 89.0 (3.500)       | 92 (3.625)<br>105 (4.125)<br>117 (4.625)<br>143 (5.625)<br>155 (6.125)<br>190 (7.500)<br>219 (8.625) | 31.8 (1.250)       | 5                     |

### Note:

In some cases, the color of the sleeve may change slightly due to the operating conditions, however, the discoloration will not impair capacitor function.

### Terminal Specifications

| Terminal Code | Available Case Diameter |                             | Thread Size  | Minimum Thread Depth | J<br>±0.5 (0.020) | H<br>±2.0 (0.080) | ØS<br>±0.25 (0.010) | ØT<br>±0.25 (0.010) |
|---------------|-------------------------|-----------------------------|--------------|----------------------|-------------------|-------------------|---------------------|---------------------|
|               | ØD Code                 | ØD mm (inches)              |              |                      |                   |                   |                     |                     |
| HP            | C                       | 50.8 (2.000)                | 10-32 NF-2B  | 9.5 (0.375)          | 6.4 (0.250)       | L+J               | 8.0 (0.313)         | 11.1 (0.438)        |
| HL            | C                       | 50.8 (2.000)                | M5x0.8-6H    | 9.5 (0.375)          | 6.4 (0.250)       | L+J               | 8.0 (0.313)         | 11.1 (0.438)        |
| CD            | D-E                     | 63.5 - 76.2 (2.500 - 3.000) | M5x0.8-6H    | 8.5 (0.335)          | 5.0 (0.200)       | L+J               | 13.0 (0.512)        | 18.8 (0.740)        |
| CP            | D-F                     | 63.5 - 89.0 (2.500 - 3.500) | 1/4-28 NF-2B | 8.7 (0.344)          | 2.4 (0.093)       | L+J               | 17.5 (0.689)        | —                   |
| CH            | D-F                     | 63.5 - 89.0 (2.500 - 3.500) | 1/4-28 NF-2B | 11.9 (0.468)         | 6.4 (0.250)       | L+J               | 17.5 (0.689)        | —                   |
| CA            | D-F                     | 63.5 - 89.0 (2.500 - 3.500) | M6x1-6H      | 8.7 (0.344)          | 2.4 (0.093)       | L+J               | 17.5 (0.689)        | —                   |
| CS            | D-F                     | 63.5 - 89.0 (2.500 - 3.500) | M6x1-6H      | 11.9 (0.468)         | 6.4 (0.250)       | L+J               | 17.5 (0.689)        | —                   |

Mounting Hardware is optional. Refer to hardware specifications on the following page.

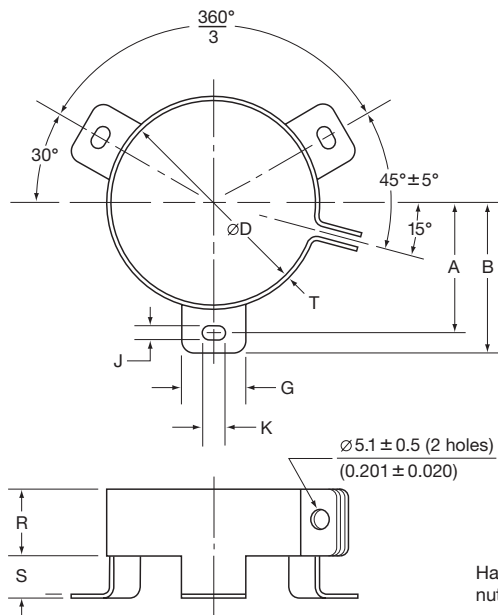


# U37F Series

## Mounting Hardware - Screw Terminals

### Type C: Three-Footed Clamp

Unit: mm (inches)

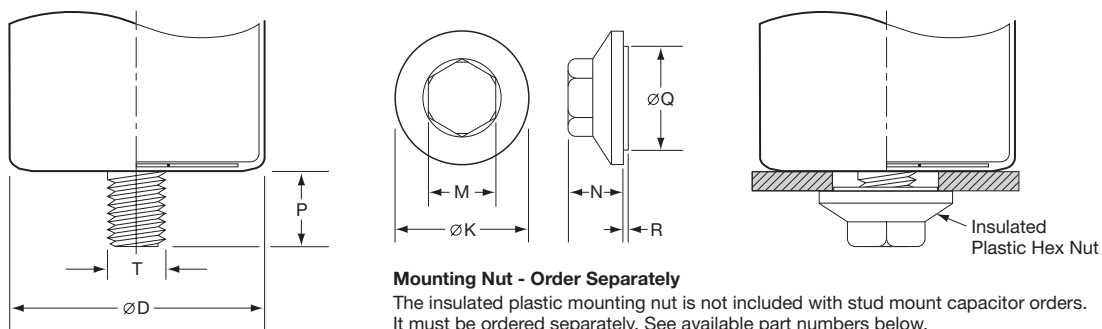


Hardware: Screw, washer and hexagon nut included with each clamp.

### Type C: Clamp Dimensions

| Mounting Code | Case ØD      | A<br>±1.0 (0.040) | B<br>±1.0 (0.040) | G<br>±1.0 (0.040) | J<br>±0.5 (0.020) | K<br>±0.5 (0.020) | R<br>±1.0 (0.040) | S<br>±1.0 (0.040) | T<br>±0.5 (0.020) |
|---------------|--------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| C             | 50.8 (2.000) | 31.8 (1.250)      | 36.5 (1.437)      | 13.3 (0.524)      | 4.5 (0.177)       | 7.1 (0.280)       | 19.1 (0.751)      | 9.5 (0.374)       | 0.8 (0.032)       |
| C             | 63.5 (2.500) | 38.1 (1.500)      | 42.9 (1.689)      | 13.3 (0.524)      | 4.5 (0.177)       | 7.1 (0.280)       | 19.1 (0.751)      | 9.5 (0.374)       | 0.8 (0.032)       |
| C             | 76.2 (3.000) | 44.5 (1.750)      | 49.2 (1.937)      | 13.3 (0.524)      | 4.5 (0.177)       | 7.1 (0.280)       | 19.1 (0.751)      | 9.5 (0.374)       | 1.0 (0.040)       |
| C             | 89.0 (3.500) | 50.8 (2.000)      | 56.5 (2.224)      | 16.0 (0.630)      | 4.5 (0.177)       | 8.0 (0.313)       | 21.0 (0.827)      | 9.0 (0.354)       | 1.0 (0.040)       |

### Type S: Stud Mounting



### Type S: Stud Dimensions

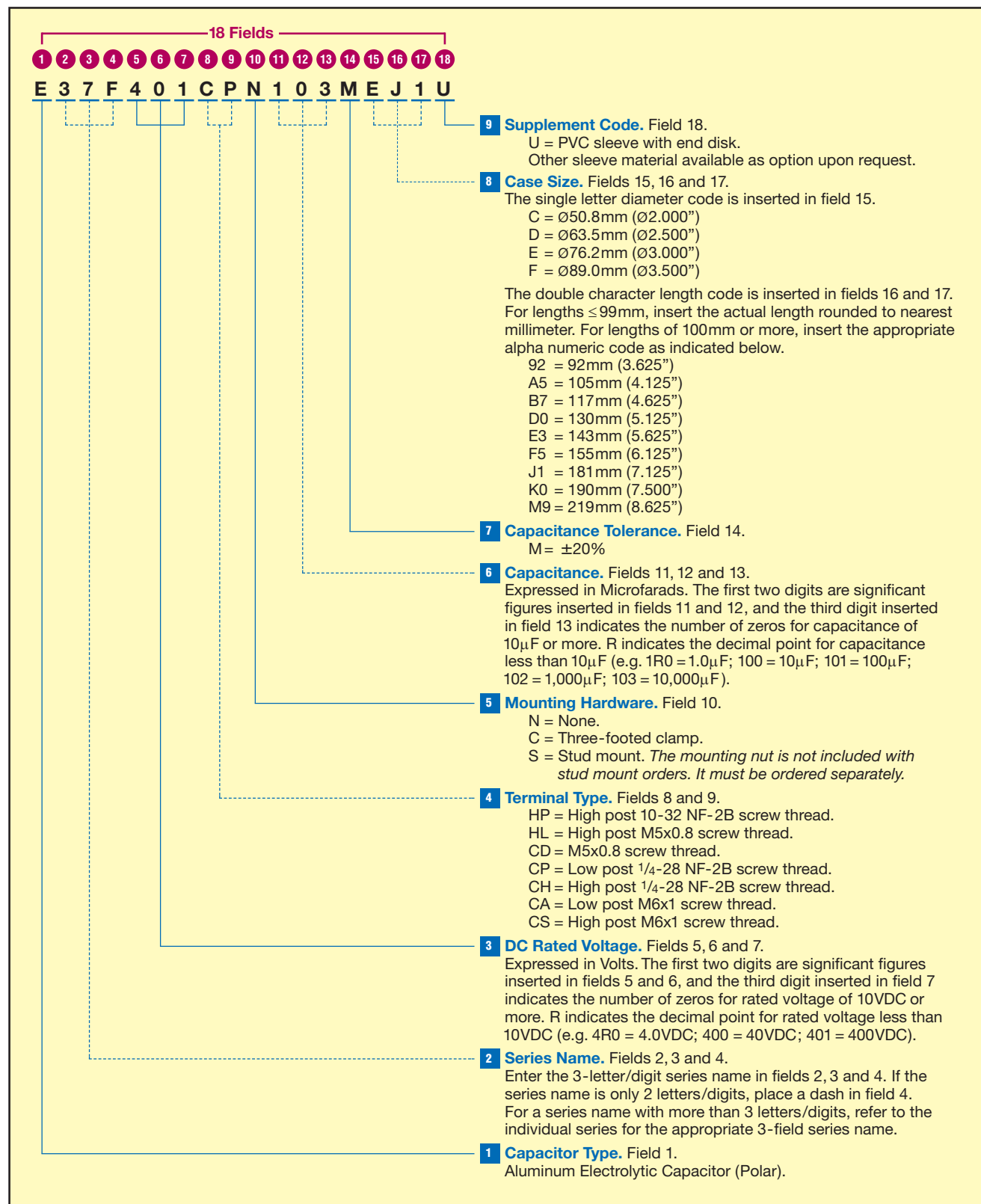
| Mounting Code | P<br>±1.0 (0.040) | T<br>Thread Size |
|---------------|-------------------|------------------|
| S             | 16.0 (0.630)      | M12              |

### Mounting Nut Dimensions

| Part Number | ØK<br>±2.0 (0.080) | M<br>±1.0 (0.040) | N<br>±1.0 (0.040) | ØQ<br>±1.0 (0.040) | R<br>±1.0 (0.040) |
|-------------|--------------------|-------------------|-------------------|--------------------|-------------------|
| 50-8D       | 30.0 (1.181)       | 19.0 (0.748)      | 18.0 (0.709)      | 22.0 (0.866)       | 1.40 (0.055)      |
| 50-8E       | 38.0 (1.496)       | 19.0 (0.748)      | 18.0 (0.709)      | 30.0 (1.181)       | 1.40 (0.055)      |

# U37F Series

**Part Numbering System for U37F Series** When ordering, always specify complete 18-field global part number.





# U37F<sup>Series</sup>

## Standard Voltage Ratings - Screw Terminals

| Rated Voltage (WVDC)         | Capacitance (μF) | Global Part Number† | Nominal Case Size* D × L (mm) | Case Size Code | Maximum ESR (mΩ) at +25°C, 120Hz | Rated Ripple Current (A rms) at +85°C |       |       |
|------------------------------|------------------|---------------------|-------------------------------|----------------|----------------------------------|---------------------------------------|-------|-------|
|                              |                  |                     |                               |                |                                  | 120Hz                                 | 300Hz | >3kHz |
| 350 Volts<br>400 Volts Surge | 3,300            | E37F351HPN332MCB7U  | 50 × 117                      | CB7            | 28                               | 10.8                                  | 12.9  | 15.1  |
|                              | 3,900            | E37F351HPN392MCD0U  | 50 × 130                      | CD0            | 23                               | 12.2                                  | 14.6  | 17.0  |
|                              | 3,300            | E37F351CPN332MD92U  | 63.5 × 92                     | D92            | 28                               | 11.2                                  | 13.4  | 15.6  |
|                              | 3,900            | E37F351CPN392MDA5U  | 63.5 × 105                    | DA5            | 23                               | 12.7                                  | 15.2  | 17.7  |
|                              | 4,700            | E37F351CPN472MDB7U  | 63.5 × 117                    | DB7            | 19                               | 14.5                                  | 17.4  | 20.3  |
|                              | 5,600            | E37F351CPN562MDD0U  | 63.5 × 130                    | DD0            | 16                               | 16.4                                  | 19.7  | 22.9  |
|                              | 5,600            | E37F351CPN562MDE3U  | 63.5 × 143                    | DE3            | 16                               | 17.0                                  | 20.4  | 23.7  |
|                              | 4,700            | E37F351CPN472ME92U  | 76.2 × 92                     | E92            | 20                               | 14.5                                  | 17.4  | 20.2  |
|                              | 5,600            | E37F351CPN562MEA5U  | 76.2 × 105                    | EA5            | 17                               | 16.5                                  | 19.8  | 23.1  |
|                              | 6,800            | E37F351CPN682MEB7U  | 76.2 × 117                    | EB7            | 14                               | 18.9                                  | 22.6  | 26.4  |
|                              | 8,200            | E37F351CPN822MEE3U  | 76.2 × 143                    | EE3            | 12                               | 22.2                                  | 26.7  | 31.1  |
|                              | 12,000           | E37F351CPN123MEJ1U  | 76.2 × 181                    | EJ1            | 8                                | 29.4                                  | 35.2  | 41.1  |
|                              | 15,000           | E37F351CPN153MEM9U  | 76.2 × 219                    | EM9            | 6                                | 35.4                                  | 42.5  | 49.6  |
|                              | 6,800            | E37F351CPN682MF92U  | 89 × 92                       | F92            | 14                               | 19.1                                  | 22.9  | 26.7  |
|                              | 8,200            | E37F351CPN822MFA5U  | 89 × 105                      | FA5            | 12                               | 21.8                                  | 26.2  | 30.5  |
|                              | 10,000           | E37F351CPN103MFB7U  | 89 × 117                      | FB7            | 10                               | 25.0                                  | 30.0  | 35.0  |
|                              | 12,000           | E37F351CPN123MFE3U  | 89 × 143                      | FE3            | 8                                | 29.3                                  | 35.2  | 41.1  |
|                              | 15,000           | E37F351CPN153MFF5U  | 89 × 155                      | FF5            | 6                                | 33.8                                  | 40.5  | 47.3  |
|                              | 18,000           | E37F351CPN183MFK0U  | 89 × 190                      | FK0            | 5                                | 40.0                                  | 47.9  | 55.9  |
|                              | 22,000           | E37F351CPN223MFM9U  | 89 × 219                      | FM9            | 4                                | 46.7                                  | 56.0  | 65.4  |
| 400 Volts<br>450 Volts Surge | 2,700            | E37F401HPN272MCB7U  | 50 × 117                      | CB7            | 30                               | 10.4                                  | 12.5  | 14.6  |
|                              | 3,300            | E37F401HPN332MCD0U  | 50 × 130                      | CD0            | 26                               | 11.6                                  | 13.9  | 16.2  |
|                              | 2,700            | E37F401CPN272MD92U  | 63.5 × 92                     | D92            | 30                               | 10.7                                  | 12.9  | 15.0  |
|                              | 3,300            | E37F401CPN332MDA5U  | 63.5 × 105                    | DA5            | 25                               | 12.3                                  | 14.7  | 17.2  |
|                              | 3,900            | E37F401CPN392MDB7U  | 63.5 × 117                    | DB7            | 21                               | 13.8                                  | 16.5  | 19.3  |
|                              | 4,700            | E37F401CPN472MDD0U  | 63.5 × 130                    | DD0            | 19                               | 15.3                                  | 18.3  | 21.4  |
|                              | 4,700            | E37F401CPN472MDE3U  | 63.5 × 143                    | DE3            | 17                               | 16.8                                  | 20.1  | 23.5  |
|                              | 3,900            | E37F401CPN392ME92U  | 76.2 × 92                     | E92            | 21                               | 14.3                                  | 17.2  | 20.0  |
|                              | 5,600            | E37F401CPN562MEA5U  | 76.2 × 105                    | EA5            | 17                               | 16.4                                  | 19.6  | 22.9  |
|                              | 5,600            | E37F401CPN562MEB7U  | 76.2 × 117                    | EB7            | 15                               | 18.4                                  | 22.0  | 25.7  |
|                              | 8,200            | E37F401CPN822MEE3U  | 76.2 × 143                    | EE3            | 12                               | 22.3                                  | 26.8  | 31.3  |
|                              | 10,000           | E37F401CPN103MEJ1U  | 76.2 × 181                    | EJ1            | 9                                | 28.2                                  | 33.8  | 39.5  |
|                              | 12,000           | E37F401CPN123MEM9U  | 76.2 × 219                    | EM9            | 7                                | 34.0                                  | 40.8  | 47.6  |
|                              | 5,600            | E37F401CPN562MF92U  | 89 × 92                       | F92            | 15                               | 18.6                                  | 22.3  | 26.1  |
|                              | 6,800            | E37F401CPN682MFA5U  | 89 × 105                      | FA5            | 12                               | 21.2                                  | 25.5  | 29.7  |
|                              | 8,200            | E37F401CPN822MFB7U  | 89 × 117                      | FB7            | 11                               | 23.8                                  | 28.6  | 33.4  |
|                              | 10,000           | E37F401CPN103MFE3U  | 89 × 143                      | FE3            | 8                                | 28.9                                  | 34.7  | 40.5  |
|                              | 12,000           | E37F401CPN123MFF5U  | 89 × 155                      | FF5            | 7                                | 31.4                                  | 37.7  | 44.0  |
|                              | 15,000           | E37F401CPN153MFK0U  | 89 × 190                      | FK0            | 6                                | 38.3                                  | 45.9  | 53.6  |
|                              | 18,000           | E37F401CPN183MFM9U  | 89 × 219                      | FM9            | 5                                | 43.9                                  | 52.7  | 61.5  |
| 420 Volts<br>470 Volts Surge | 2,700            | E37F421HPN272MCB7U  | 50 × 117                      | CB7            | 34                               | 9.8                                   | 11.7  | 13.7  |
|                              | 3,300            | E37F421HPN332MCD0U  | 50 × 130                      | CD0            | 28                               | 11.2                                  | 13.4  | 15.7  |
|                              | 2,700            | E37F421CPN272MD92U  | 63.5 × 92                     | D92            | 34                               | 10.1                                  | 12.1  | 14.1  |
|                              | 3,300            | E37F421CPN332MDA5U  | 63.5 × 105                    | DA5            | 28                               | 11.7                                  | 14.0  | 16.3  |
|                              | 3,900            | E37F421CPN392MDB7U  | 63.5 × 117                    | DB7            | 23                               | 13.2                                  | 15.8  | 18.5  |
|                              | 3,900            | E37F421CPN392MDD0U  | 63.5 × 130                    | DD0            | 23                               | 13.7                                  | 16.4  | 19.1  |
|                              | 4,700            | E37F421CPN472MDE3U  | 63.5 × 143                    | DE3            | 19                               | 15.5                                  | 18.6  | 21.8  |
|                              | 3,900            | E37F421CPN392ME92U  | 76.2 × 92                     | E92            | 24                               | 13.2                                  | 15.8  | 18.4  |
|                              | 4,700            | E37F421CPN472MEA5U  | 76.2 × 105                    | EA5            | 20                               | 15.1                                  | 18.1  | 21.1  |
|                              | 5,600            | E37F421CPN562MEB7U  | 76.2 × 117                    | EB7            | 17                               | 17.1                                  | 20.5  | 24.0  |
|                              | 6,800            | E37F421CPN682MEE3U  | 76.2 × 143                    | EE3            | 14                               | 20.2                                  | 24.3  | 28.3  |
|                              | 10,000           | E37F421CPN103MEJ1U  | 76.2 × 181                    | EJ1            | 10                               | 26.8                                  | 32.2  | 37.5  |
|                              | 12,000           | E37F421CPN123MEM9U  | 76.2 × 219                    | EM9            | 8                                | 31.7                                  | 38.0  | 44.4  |
|                              | 5,600            | E37F421CPN562MF92U  | 89 × 92                       | F92            | 17                               | 17.3                                  | 20.8  | 24.2  |
|                              | 6,800            | E37F421CPN682MFA5U  | 89 × 105                      | FA5            | 14                               | 19.9                                  | 23.8  | 27.8  |

† For terminal, mounting and construction options, refer to the part numbering system for descriptions and codes.

\* Refer to diagram of dimensions for detailed case size specifications.



# U37F<sup>Series</sup>

## Standard Voltage Ratings - Screw Terminals

| Rated Voltage (WVDC)         | Capacitance (μF) | Global Part Number† | Nominal Case Size* D × L (mm) | Case Size Code | Maximum ESR (mΩ) at +25°C, 120Hz | Rated Ripple Current (A rms) at +85°C |       |       |
|------------------------------|------------------|---------------------|-------------------------------|----------------|----------------------------------|---------------------------------------|-------|-------|
|                              |                  |                     |                               |                |                                  | 120Hz                                 | 300Hz | >3kHz |
| 420 Volts<br>470 Volts Surge | 8,200            | E37F421CPN822MFB7U  | 89 × 117                      | FB7            | 12                               | 22.7                                  | 27.2  | 31.7  |
|                              | 10,000           | E37F421CPN103MFE3U  | 89 × 143                      | FE3            | 10                               | 26.8                                  | 32.1  | 37.5  |
|                              | 12,000           | E37F421CPN123MFF5U  | 89 × 155                      | FF5            | 8                                | 30.3                                  | 36.3  | 42.4  |
|                              | 15,000           | E37F421CPN153MFK0U  | 89 × 190                      | FK0            | 6                                | 36.5                                  | 43.8  | 51.1  |
|                              | 18,000           | E37F421CPN183MFM9U  | 89 × 219                      | FM9            | 5                                | 42.2                                  | 50.7  | 59.1  |
| 450 Volts<br>500 Volts Surge | 2,700            | E37F451HPN272MCB7U  | 50 × 117                      | CB7            | 34                               | 9.8                                   | 11.7  | 13.7  |
|                              | 2,700            | E37F451HPN272MCD0U  | 50 × 130                      | CD0            | 34                               | 10.1                                  | 12.1  | 14.2  |
|                              | 2,200            | E37F451CPN222MD92U  | 63.5 × 92                     | D92            | 42                               | 9.1                                   | 10.9  | 12.8  |
|                              | 2,700            | E37F451CPN272MDA5U  | 63.5 × 105                    | DA5            | 34                               | 10.5                                  | 12.7  | 14.8  |
|                              | 3,300            | E37F451CPN332MDB7U  | 63.5 × 117                    | DB7            | 28                               | 12.1                                  | 14.6  | 17.0  |
|                              | 3,900            | E37F451CPN392MDD0U  | 63.5 × 130                    | DD0            | 23                               | 13.7                                  | 16.4  | 19.1  |
|                              | 4,700            | E37F451CPN472MDE3U  | 63.5 × 143                    | DE3            | 19                               | 15.5                                  | 18.6  | 21.8  |
|                              | 3,900            | E37F451CPN392ME92U  | 76.2 × 92                     | E92            | 24                               | 13.2                                  | 15.8  | 18.4  |
|                              | 4,700            | E37F451CPN472MEA5U  | 76.2 × 105                    | EA5            | 20                               | 15.1                                  | 18.1  | 21.1  |
|                              | 5,600            | E37F451CPN562MEB7U  | 76.2 × 117                    | EB7            | 17                               | 17.1                                  | 20.5  | 24.0  |
|                              | 6,800            | E37F451CPN682MEE3U  | 76.2 × 143                    | EE3            | 14                               | 20.2                                  | 24.3  | 28.3  |
|                              | 8,200            | E37F451CPN822MEJ1U  | 76.2 × 181                    | EJ1            | 12                               | 24.3                                  | 29.1  | 34.0  |
|                              | 12,000           | E37F451CPN123MEM9U  | 76.2 × 219                    | EM9            | 8                                | 31.7                                  | 38.0  | 44.4  |
|                              | 5,600            | E37F451CPN562MF92U  | 89 × 92                       | F92            | 17                               | 17.3                                  | 20.8  | 24.2  |
|                              | 6,800            | E37F451CPN682MFA5U  | 89 × 105                      | FA5            | 14                               | 19.9                                  | 23.8  | 27.8  |
|                              | 6,800            | E37F451CPN682MFB7U  | 89 × 117                      | FB7            | 14                               | 20.6                                  | 24.8  | 28.9  |
|                              | 8,200            | E37F451CPN822MFE3U  | 89 × 143                      | FE3            | 12                               | 24.3                                  | 29.1  | 34.0  |
|                              | 12,000           | E37F451CPN123MFF5U  | 89 × 155                      | FF5            | 8                                | 30.2                                  | 36.3  | 42.3  |
|                              | 15,000           | E37F451CPN153MFK0U  | 89 × 190                      | FK0            | 6                                | 36.5                                  | 43.8  | 51.1  |
|                              | 15,000           | E37F451CPN153MFM9U  | 89 × 219                      | FM9            | 6                                | 38.6                                  | 46.3  | 54.0  |
| 500 Volts<br>550 Volts Surge | 1,500            | E37F501HPN152MCB7U  | 50 × 117                      | CB7            | 63                               | 7.2                                   | 8.6   | 10.1  |
|                              | 1,800            | E37F501HPN182MCD0U  | 50 × 130                      | CD0            | 55                               | 8.0                                   | 9.6   | 11.2  |
|                              | 1,800            | E37F501CPN182MD92U  | 63.5 × 92                     | D92            | 52                               | 8.2                                   | 9.8   | 11.5  |
|                              | 2,200            | E37F501CPN222MDA5U  | 63.5 × 105                    | DA5            | 43                               | 9.4                                   | 11.2  | 13.1  |
|                              | 2,700            | E37F501CPN272MDB7U  | 63.5 × 117                    | DB7            | 37                               | 10.5                                  | 12.6  | 14.7  |
|                              | 3,300            | E37F501CPN332MDD0U  | 63.5 × 130                    | DD0            | 32                               | 11.7                                  | 14.0  | 16.3  |
|                              | 3,300            | E37F501CPN332MDE3U  | 63.5 × 143                    | DE3            | 29                               | 12.8                                  | 15.4  | 17.9  |
|                              | 2,700            | E37F501CPN272ME92U  | 76.2 × 92                     | E92            | 36                               | 10.9                                  | 13.1  | 15.3  |
|                              | 3,300            | E37F501CPN332MEA5U  | 76.2 × 105                    | EA5            | 30                               | 12.5                                  | 15.0  | 17.5  |
|                              | 3,900            | E37F501CPN392MEB7U  | 76.2 × 117                    | EB7            | 25                               | 14.0                                  | 16.8  | 19.6  |
|                              | 5,600            | E37F501CPN562MEE3U  | 76.2 × 143                    | EE3            | 20                               | 17.1                                  | 20.5  | 23.9  |
|                              | 6,800            | E37F501CPN682MEJ1U  | 76.2 × 181                    | EJ1            | 15                               | 21.5                                  | 25.8  | 30.1  |
|                              | 8,200            | E37F501CPN822MEM9U  | 76.2 × 219                    | EM9            | 12                               | 26.0                                  | 31.2  | 36.3  |
|                              | 3,900            | E37F501CPN392MF92U  | 89 × 92                       | F92            | 25                               | 14.2                                  | 17.1  | 19.9  |
|                              | 4,700            | E37F501CPN472MFA5U  | 89 × 105                      | FA5            | 21                               | 16.2                                  | 19.5  | 22.7  |
|                              | 5,600            | E37F501CPN562MFB7U  | 89 × 117                      | FB7            | 18                               | 18.2                                  | 21.8  | 25.5  |
|                              | 6,800            | E37F501CPN682MFE3U  | 89 × 143                      | FE3            | 14                               | 22.1                                  | 26.5  | 30.9  |
|                              | 8,200            | E37F501CPN822MFF5U  | 89 × 155                      | FF5            | 13                               | 24.0                                  | 28.8  | 33.6  |
|                              | 10,000           | E37F501CPN103MFK0U  | 89 × 190                      | FK0            | 10                               | 29.2                                  | 35.1  | 40.9  |
|                              | 12,000           | E37F501CPN123MFM9U  | 89 × 219                      | FM9            | 8                                | 33.5                                  | 40.2  | 46.9  |

†For terminal, mounting and construction options, refer to the part numbering system for descriptions and codes.

\*Refer to diagram of dimensions for detailed case size specifications.

# U37L Series



- **Large Can**
- **Screw Terminals**
- **General Purpose U37 Grade**
- **High Ripple**
- **350 to 500VDC Ratings**
- **RoHS Compliant**
- **10,000 Hours Lifetime at +85°C**
- **Up to 175,000 Hours Useful Life**



The U37L series is a longer life version of the U37 grade series and is specifically designed to provide the ripple current capability and long life required for high reliability inverter applications. The U37L has an endurance rating of 10,000 hours at +85°C with the rated ripple current applied. The useful life can exceed 175,000 hours at +40°C and 2x the ripple current. These capacitors are available in a variety of high current English or Metric thread terminals. Mounting options include a three-footed clamp or bottom threaded stud. Custom designs are also available.

## Summary of Specifications

- **Screw terminals: high and low post, English and Metric thread.**
- **Capacitance range: 1,500 to 18,000µF.**
- **Voltage range: 350 to 500VDC.**
- **Category temperature range: – 40°C to +85°C.**
- **Leakage current: 0.02CV(µA) or 5mA, whichever is smaller, after 5 minutes at +25°C.**
- **Standard capacitance tolerance: ± 20%**
- **Nominal case size (D × L): D = 50mm (2.000") to 89mm (3.500"); L = 92mm (3.625") to 219mm (8.625").**
- **Rated lifetime: 10,000 hours at +85°C with rated ripple current applied.**



# U37L Series

## U37L Specifications - Screw Terminals

| Item                             | Characteristics                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                    |                      |       |                                                                                                                                                     |      |                      |    |         |    |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------------------|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------|------|----------------------|----|---------|----|
| Category Temperature Range       | − 40 to +85°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                    |                      |       |                                                                                                                                                     |      |                      |    |         |    |
| Rated Voltage Range              | 350 to 500VDC                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                    |                      |       |                                                                                                                                                     |      |                      |    |         |    |
| Capacitance Range                | 1,500 to 18,000μF at +25°C, 120Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    |                      |       |                                                                                                                                                     |      |                      |    |         |    |
| Capacitance Tolerance            | ±20% (M) at +25°C, 120Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                      |       |                                                                                                                                                     |      |                      |    |         |    |
| Leakage Current                  | I = 0.02CV (μA) or 5mA, whichever is smaller, after 5 minutes at +25°C.<br>Where I = Max. leakage current (μA), C = Nominal capacitance (μF) and V = Rated voltage (V)                                                                                                                                                                                                                                                                                                           |                    |                      |       |                                                                                                                                                     |      |                      |    |         |    |
| Rated Ripple Current Multipliers | Ambient Temperature (°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                      |       |                                                                                                                                                     |      |                      |    |         |    |
|                                  | +45°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    | +65°C                |       | +85°C                                                                                                                                               |      |                      |    |         |    |
|                                  | 2.82                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                    | 1.73                 |       | 1.00                                                                                                                                                |      |                      |    |         |    |
|                                  | Frequency (Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |                      |       |                                                                                                                                                     |      |                      |    |         |    |
|                                  | DC Rated Voltage                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 50Hz               | 120Hz                | 300Hz | 1kHz                                                                                                                                                | 3kHz | 10kHz                |    |         |    |
|                                  | 350-500V                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 0.80               | 1.00                 | 1.20  | 1.30                                                                                                                                                | 1.40 | 1.41                 |    |         |    |
|                                  | To determine maximum ripple current at a specified temperature and frequency, use the appropriate multiplier shown.                                                                                                                                                                                                                                                                                                                                                              |                    |                      |       |                                                                                                                                                     |      |                      |    |         |    |
| Endurance (Load Life)            | The following specifications shall be satisfied when the capacitors are restored to +25°C after subjecting them to DC voltage for 10,000 hours at +85°C with the rated ripple current applied. The sum of the DC voltage and peak AC voltage must not exceed the full rated voltage of the capacitors.<br><br>Capacitance change: ≤ 20% from initial measurement<br>ESR change : ≤ 200% of initial specified limit<br>Leakage current : ≤ initial specified limit                |                    |                      |       |                                                                                                                                                     |      |                      |    |         |    |
| Useful Life                      | With specified standard voltage and ripple current applied, typical life as function of ambient temperature is listed below.                                                                                                                                                                                                                                                                                                                                                     |                    |                      |       |                                                                                                                                                     |      |                      |    |         |    |
|                                  | +85°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    | 13,000 hours max.    |       | Capacitance change: ≤ 30% from initial measurement<br>ESR change : ≤ 300% of initial specified limit<br>Leakage current : ≤ initial specified limit |      |                      |    |         |    |
|                                  | +65°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    | 47,700 hours max.    |       |                                                                                                                                                     |      |                      |    |         |    |
| +45°C                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 175,000 hours max. |                      |       |                                                                                                                                                     |      |                      |    |         |    |
| Shelf Life                       | The following specifications shall be satisfied when the capacitors are restored to +25°C after exposing them for 500 hours at +85°C without voltage applied. The rated voltage shall be applied to the capacitors for a minimum of 30 minutes, at least 24 hours and not more than 48 hours before the measurements.<br><br>Capacitance change: ≤ 20% from initial measurement<br>ESR change : ≤ 200% of initial specified limit<br>Leakage current : ≤ initial specified limit |                    |                      |       |                                                                                                                                                     |      |                      |    |         |    |
| Vibration Rating                 | 10-55Hz, 10g sinusoidal in three axes, 2 hours per axis.                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                      |       |                                                                                                                                                     |      |                      |    |         |    |
| Maximum Tightening Torque        | Terminal Code                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                    | HP                   |       | HL                                                                                                                                                  | CD   | CP                   | CH | CA      | CS |
|                                  | Thread Size                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                    | 10-32 NF-2B          |       | M5x0.8-6H                                                                                                                                           |      | 1/4 - 28 NF-2B       |    | M6x1-6H |    |
|                                  | 3 Threads Engaged                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    | 2.0 N·m (18.0 in·lb) |       |                                                                                                                                                     |      | 4.0 N·m (35.0 in·lb) |    |         |    |
|                                  | 6 Threads Engaged                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    | 2.8 N·m (25.0 in·lb) |       |                                                                                                                                                     |      | 6.2 N·m (55.0 in·lb) |    |         |    |
| Typical Inductance (nH) at 1MHz  | Case Diameter (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                    | Terminal Code        |       |                                                                                                                                                     |      |                      |    |         |    |
|                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                    | HP                   | HL    | CD                                                                                                                                                  | CP   | CH                   | CA | CS      |    |
|                                  | ø50.8                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | —                  | —                    | NA    | NA                                                                                                                                                  | NA   | NA                   | NA |         |    |
|                                  | ø63.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | —                  | —                    | —     | —                                                                                                                                                   | —    | —                    | —  |         |    |
|                                  | ø76.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 30                 | 30                   | 25    | 20                                                                                                                                                  | 25   | 20                   | 25 |         |    |
| ø89.0                            | 30                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 30                 | 25                   | 20    | 25                                                                                                                                                  | 20   | 25                   |    |         |    |
| Custom Designs                   | Custom CV values per case size and termination type may be available upon request. Contact appropriate representative with specific requirements.                                                                                                                                                                                                                                                                                                                                |                    |                      |       |                                                                                                                                                     |      |                      |    |         |    |

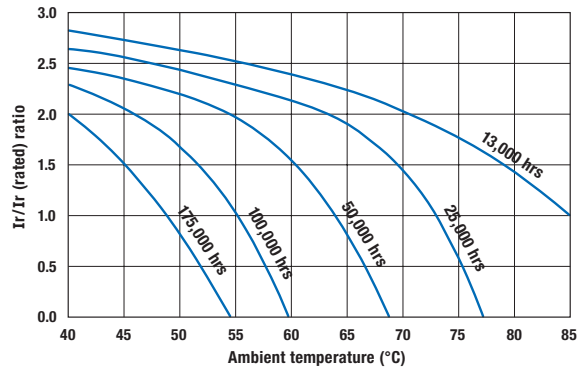


# U37L Series

## U37L Useful Life

### Useful Life: 13,000 Hours at +85°C

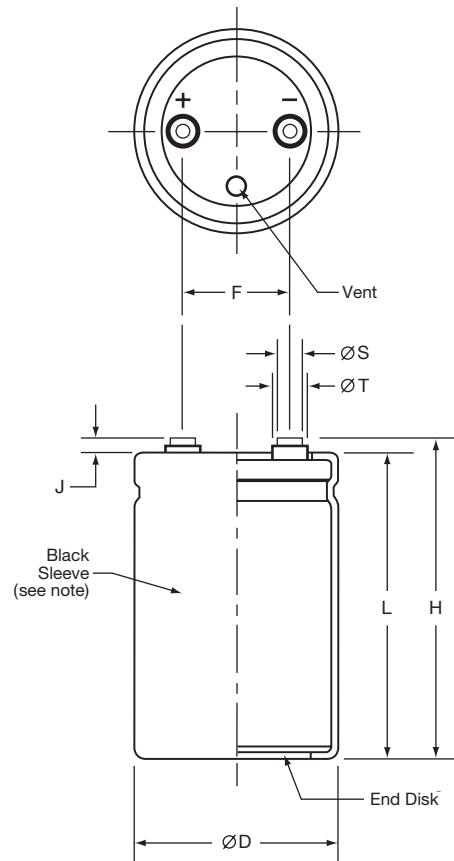
The life expectancy of a capacitor is shown as a function of ambient temperature and ripple current load.



## Diagram of Dimensions - Screw Terminals

### Large Can/Screw Terminals

Unit: mm (inches)



### Case Dimensions and Standard Box Quantities

| Case Size Code                                | ØD<br>+2.0 (0.080) | L<br>±1.0 (0.040)                                                                                    | F<br>±0.25 (0.010) | Standard Box Quantity |
|-----------------------------------------------|--------------------|------------------------------------------------------------------------------------------------------|--------------------|-----------------------|
| CB7<br>CD0                                    | 50.8 (2.000)       | 117 (4.625)<br>130 (5.125)                                                                           | 22.2 (0.875)       | 49                    |
| D92<br>DA5<br>DB7<br>DD0<br>DE3               | 63.5 (2.500)       | 92 (3.625)<br>105 (4.125)<br>117 (4.625)<br>130 (5.125)<br>143 (5.625)                               | 28.6 (1.125)       | 20                    |
| E92<br>EA5<br>EB7<br>EE3<br>EJ1<br>EM9        | 76.2 (3.000)       | 92 (3.625)<br>105 (4.125)<br>117 (4.625)<br>143 (5.625)<br>181 (7.125)<br>219 (8.625)                | 31.8 (1.250)       | 16<br>9               |
| F92<br>FA5<br>FB7<br>FE3<br>FF5<br>FK0<br>FM9 | 89.0 (3.500)       | 92 (3.625)<br>105 (4.125)<br>117 (4.625)<br>143 (5.625)<br>155 (6.125)<br>190 (7.500)<br>219 (8.625) | 31.8 (1.250)       | 5                     |

### Note:

In some cases, the color of the sleeve may change slightly due to the operating conditions, however, the discoloration will not impair capacitor function.

### Terminal Specifications

| Terminal Code | Available Case Diameter |                             | Thread Size  | Minimum Thread Depth | J<br>±0.5 (0.020) | H<br>±2.0 (0.080) | ØS<br>±0.25 (0.010) | ØT<br>±0.25 (0.010) |
|---------------|-------------------------|-----------------------------|--------------|----------------------|-------------------|-------------------|---------------------|---------------------|
|               | ØD Code                 | ØD mm (inches)              |              |                      |                   |                   |                     |                     |
| HP            | C                       | 50.8 (2.000)                | 10-32 NF-2B  | 9.5 (0.375)          | 6.4 (0.250)       | L+J               | 8.0 (0.313)         | 11.1 (0.438)        |
| HL            | C                       | 50.8 (2.000)                | M5x0.8-6H    | 9.5 (0.375)          | 6.4 (0.250)       | L+J               | 8.0 (0.313)         | 11.1 (0.438)        |
| CD            | D-E                     | 63.5 - 76.2 (2.500 - 3.000) | M5x0.8-6H    | 8.5 (0.335)          | 5.0 (0.200)       | L+J               | 13.0 (0.512)        | 18.8 (0.740)        |
| CP            | D-F                     | 63.5 - 89.0 (2.500 - 3.500) | 1/4-28 NF-2B | 8.7 (0.344)          | 2.4 (0.093)       | L+J               | 17.5 (0.689)        | —                   |
| CH            | D-F                     | 63.5 - 89.0 (2.500 - 3.500) | 1/4-28 NF-2B | 11.9 (0.468)         | 6.4 (0.250)       | L+J               | 17.5 (0.689)        | —                   |
| CA            | D-F                     | 63.5 - 89.0 (2.500 - 3.500) | M6x1-6H      | 8.7 (0.344)          | 2.4 (0.093)       | L+J               | 17.5 (0.689)        | —                   |
| CS            | D-F                     | 63.5 - 89.0 (2.500 - 3.500) | M6x1-6H      | 11.9 (0.468)         | 6.4 (0.250)       | L+J               | 17.5 (0.689)        | —                   |

Mounting Hardware is optional. Refer to hardware specifications on the following page.

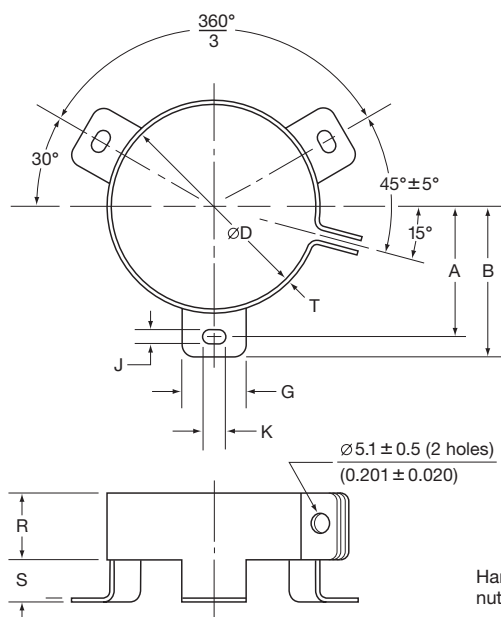


## U37L Series

### Mounting Hardware - Screw Terminals

#### Type C: Three-Footed Clamp

Unit: mm (inches)

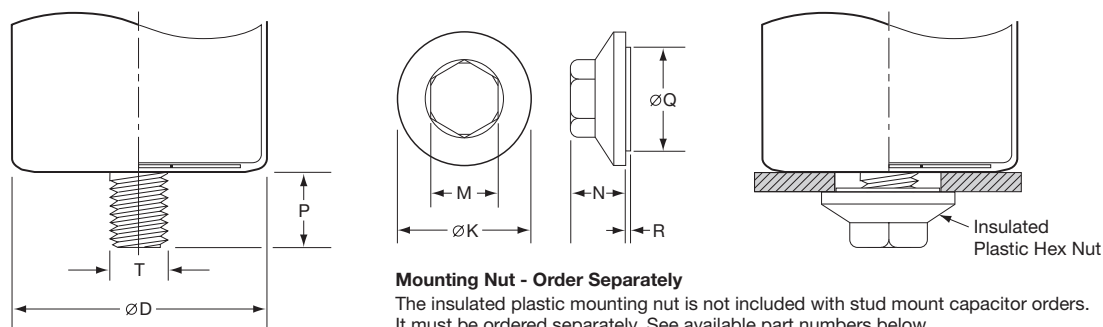


Hardware: Screw, washer and hexagon nut included with each clamp.

#### Type C: Clamp Dimensions

| Mounting Code | Case ØD      | A<br>±1.0 (0.040) | B<br>±1.0 (0.040) | G<br>±1.0 (0.040) | J<br>±0.5 (0.020) | K<br>±0.5 (0.020) | R<br>±1.0 (0.040) | S<br>±1.0 (0.040) | T<br>±0.5 (0.020) |
|---------------|--------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| C             | 50.8 (2.000) | 31.8 (1.250)      | 36.5 (1.437)      | 13.3 (0.524)      | 4.5 (0.177)       | 7.1 (0.280)       | 19.1 (0.751)      | 9.5 (0.374)       | 0.8 (0.032)       |
| C             | 63.5 (2.500) | 38.1 (1.500)      | 42.9 (1.689)      | 13.3 (0.524)      | 4.5 (0.177)       | 7.1 (0.280)       | 19.1 (0.751)      | 9.5 (0.374)       | 0.8 (0.032)       |
| C             | 76.2 (3.000) | 44.5 (1.750)      | 49.2 (1.937)      | 13.3 (0.524)      | 4.5 (0.177)       | 7.1 (0.280)       | 19.1 (0.751)      | 9.5 (0.374)       | 1.0 (0.040)       |
| C             | 89.0 (3.500) | 50.8 (2.000)      | 56.5 (2.224)      | 16.0 (0.630)      | 4.5 (0.177)       | 8.0 (0.313)       | 21.0 (0.827)      | 9.0 (0.354)       | 1.0 (0.040)       |

#### Type S: Stud Mounting



#### Type S: Stud Dimensions

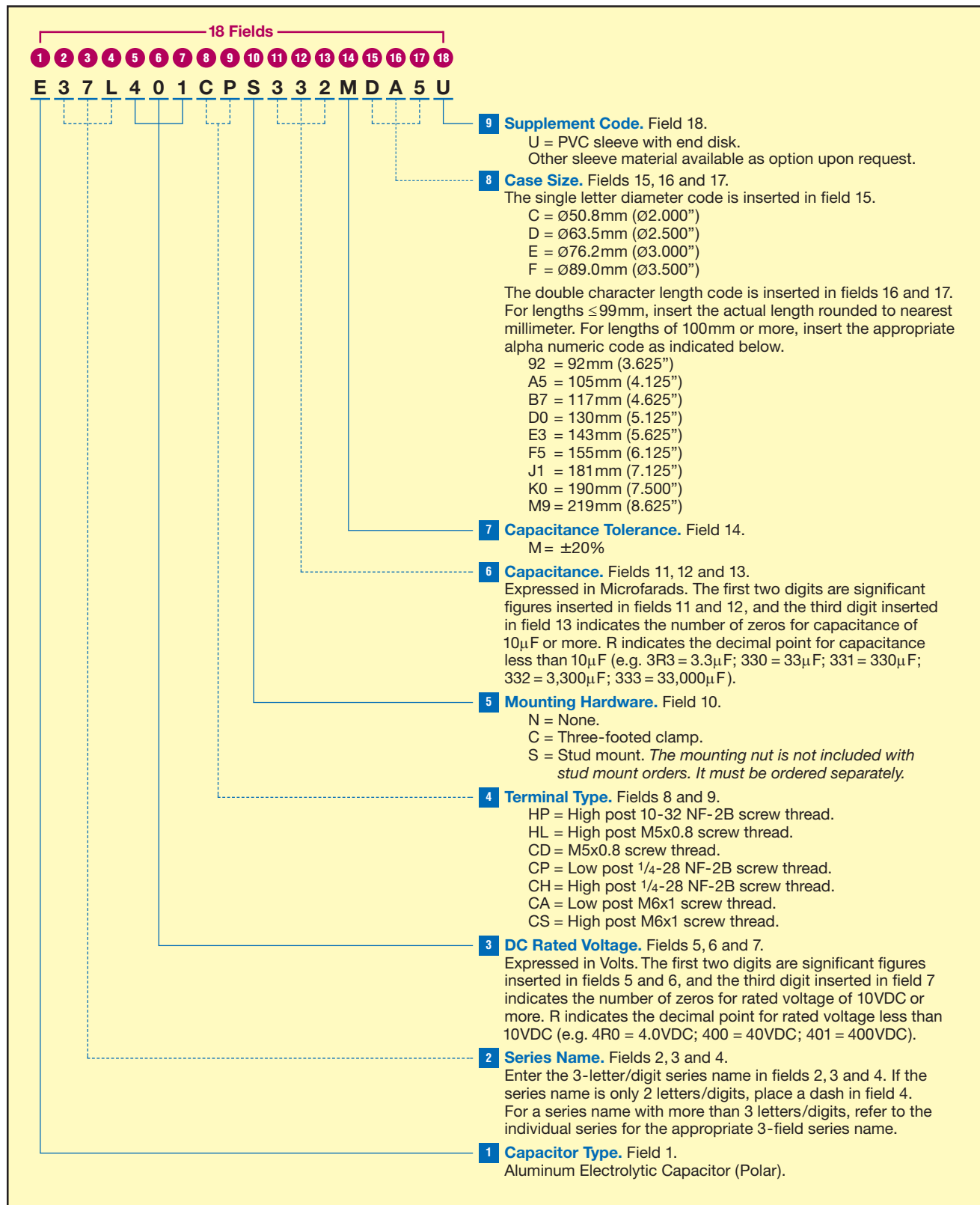
| Mounting Code | P<br>±1.0 (0.040) | T<br>Thread Size |
|---------------|-------------------|------------------|
| S             | 16.0 (0.630)      | M12              |

#### Mounting Nut Dimensions

| Part Number | ØK<br>±2.0 (0.080) | M<br>±1.0 (0.040) | N<br>±1.0 (0.040) | ØQ<br>±1.0 (0.040) | R<br>±1.0 (0.040) |
|-------------|--------------------|-------------------|-------------------|--------------------|-------------------|
| 50-8D       | 30.0 (1.181)       | 19.0 (0.748)      | 18.0 (0.709)      | 22.0 (0.866)       | 1.40 (0.055)      |
| 50-8E       | 38.0 (1.496)       | 19.0 (0.748)      | 18.0 (0.709)      | 30.0 (1.181)       | 1.40 (0.055)      |

# U37L Series

**Part Numbering System for U37L Series** When ordering, always specify complete 18-field global part number.





# U37L Series

## Standard Voltage Ratings - Screw Terminals

| Rated Voltage (WVDC)         | Capacitance (μF) | Global Part Number† | Nominal Case Size* D × L (mm) | Case Size Code | Maximum ESR (mΩ) at +25°C, 120Hz | Rated Ripple Current (A rms) at +85°C |       |       |
|------------------------------|------------------|---------------------|-------------------------------|----------------|----------------------------------|---------------------------------------|-------|-------|
|                              |                  |                     |                               |                |                                  | 120Hz                                 | 300Hz | >3kHz |
| 350 Volts<br>400 Volts Surge | 3,300            | E37L351HPN332MCB7U  | 50 × 117                      | CB7            | 29                               | 10.6                                  | 12.7  | 14.8  |
|                              | 3,300            | E37L351HPN332MCD0U  | 50 × 130                      | CD0            | 29                               | 11.0                                  | 13.1  | 15.3  |
|                              | 3,300            | E37L351CPN332MD92U  | 63.5 × 92                     | D92            | 30                               | 10.7                                  | 12.8  | 15.0  |
|                              | 3,900            | E37L351CPN392MDA5U  | 63.5 × 105                    | DA5            | 26                               | 12.2                                  | 14.6  | 17.0  |
|                              | 3,900            | E37L351CPN392MDB7U  | 63.5 × 117                    | DB7            | 26                               | 12.6                                  | 15.2  | 17.7  |
|                              | 4,700            | E37L351CPN472MDD0U  | 63.5 × 130                    | DD0            | 21                               | 14.4                                  | 17.3  | 20.2  |
|                              | 5,600            | E37L351CPN562MDE3U  | 63.5 × 143                    | DE3            | 18                               | 16.3                                  | 19.5  | 22.8  |
|                              | 4,700            | E37L351CPN472ME92U  | 76.2 × 92                     | E92            | 22                               | 13.9                                  | 16.7  | 19.5  |
|                              | 5,600            | E37L351CPN562MEA5U  | 76.2 × 105                    | EA5            | 18                               | 15.8                                  | 19.0  | 22.1  |
|                              | 6,800            | E37L351CPN682MEB7U  | 76.2 × 117                    | EB7            | 15                               | 18.1                                  | 21.7  | 25.4  |
|                              | 8,200            | E37L351CPN822MEE3U  | 76.2 × 143                    | EE3            | 13                               | 21.3                                  | 25.6  | 29.9  |
|                              | 12,000           | E37L351CPN123MEJ1U  | 76.2 × 181                    | EJ1            | 9                                | 28.2                                  | 33.9  | 39.5  |
|                              | 15,000           | E37L351CPN153MEM9U  | 76.2 × 219                    | EM9            | 7                                | 34.0                                  | 40.8  | 47.6  |
|                              | 6,800            | E37L351CPN682MF92U  | 89 × 92                       | F92            | 15                               | 18.3                                  | 22.0  | 25.6  |
|                              | 8,200            | E37L351CPN822MFA5U  | 89 × 105                      | FA5            | 13                               | 21.0                                  | 25.2  | 29.3  |
|                              | 8,200            | E37L351CPN822MFB7U  | 89 × 117                      | FB7            | 13                               | 21.8                                  | 26.1  | 30.5  |
|                              | 12,000           | E37L351CPN123MFE3U  | 89 × 143                      | FE3            | 9                                | 28.2                                  | 33.8  | 39.5  |
|                              | 12,000           | E37L351CPN123MFF5U  | 89 × 155                      | FF5            | 9                                | 29.0                                  | 34.8  | 40.6  |
|                              | 15,000           | E37L351CPN153MFK0U  | 89 × 190                      | FK0            | 7                                | 35.0                                  | 42.0  | 49.1  |
|                              | 18,000           | E37L351CPN183MFM9U  | 89 × 219                      | FM9            | 6                                | 41.1                                  | 49.4  | 57.6  |
| 400 Volts<br>450 Volts Surge | 2,700            | E37L401HPN272MCB7U  | 50 × 117                      | CB7            | 35                               | 9.5                                   | 11.5  | 13.4  |
|                              | 3,300            | E37L401HPN332MCD0U  | 50 × 130                      | CD0            | 29                               | 11.0                                  | 13.1  | 15.3  |
|                              | 2,700            | E37L401CPN272MD92U  | 63.5 × 92                     | D92            | 37                               | 9.7                                   | 11.6  | 13.6  |
|                              | 3,300            | E37L401CPN332MDA5U  | 63.5 × 105                    | DA5            | 30                               | 11.2                                  | 13.4  | 15.7  |
|                              | 3,900            | E37L401CPN392MDB7U  | 63.5 × 117                    | DB7            | 26                               | 12.6                                  | 15.2  | 17.7  |
|                              | 3,900            | E37L401CPN392MDD0U  | 63.5 × 130                    | DD0            | 26                               | 13.1                                  | 15.7  | 18.4  |
|                              | 4,700            | E37L401CPN472MDE3U  | 63.5 × 143                    | DE3            | 21                               | 14.9                                  | 17.9  | 20.9  |
|                              | 3,900            | E37L401CPN392ME92U  | 76.2 × 92                     | E92            | 27                               | 12.7                                  | 15.2  | 17.7  |
|                              | 4,700            | E37L401CPN472MEA5U  | 76.2 × 105                    | EA5            | 22                               | 14.5                                  | 17.4  | 20.3  |
|                              | 5,600            | E37L401CPN562MEB7U  | 76.2 × 117                    | EB7            | 18                               | 16.4                                  | 19.7  | 23.0  |
|                              | 6,800            | E37L401CPN682MEE3U  | 76.2 × 143                    | EE3            | 15                               | 19.4                                  | 23.3  | 27.2  |
|                              | 10,000           | E37L401CPN103MEJ1U  | 76.2 × 181                    | EJ1            | 10                               | 25.8                                  | 30.9  | 36.1  |
|                              | 12,000           | E37L401CPN123MEM9U  | 76.2 × 219                    | EM9            | 9                                | 30.4                                  | 36.5  | 42.6  |
|                              | 5,600            | E37L401CPN562MF92U  | 89 × 92                       | F92            | 18                               | 16.6                                  | 20.0  | 23.3  |
|                              | 6,800            | E37L401CPN682MFA5U  | 89 × 105                      | FA5            | 15                               | 19.1                                  | 22.9  | 26.7  |
|                              | 8,200            | E37L401CPN822MFB7U  | 89 × 117                      | FB7            | 13                               | 21.8                                  | 26.1  | 30.5  |
|                              | 10,000           | E37L401CPN103MFE3U  | 89 × 143                      | FE3            | 10                               | 25.7                                  | 30.9  | 36.0  |
|                              | 12,000           | E37L401CPN123MFF5U  | 89 × 155                      | FF5            | 9                                | 29.0                                  | 34.8  | 40.6  |
|                              | 15,000           | E37L401CPN153MFK0U  | 89 × 190                      | FK0            | 7                                | 35.0                                  | 42.0  | 49.1  |
|                              | 18,000           | E37L401CPN183MFM9U  | 89 × 219                      | FM9            | 6                                | 40.6                                  | 48.7  | 56.8  |
| 420 Volts<br>470 Volts Surge | 2,700            | E37L421HPN272MCB7U  | 50 × 117                      | CB7            | 35                               | 9.5                                   | 11.5  | 13.4  |
|                              | 2,900            | E37L421HPN292MCD0U  | 50 × 130                      | CD0            | 33                               | 10.3                                  | 12.3  | 14.4  |
|                              | 2,200            | E37L421CPN222MD92U  | 63.5 × 92                     | D92            | 45                               | 8.7                                   | 10.5  | 12.2  |
|                              | 2,700            | E37L421CPN272MDA5U  | 63.5 × 105                    | DA5            | 37                               | 10.1                                  | 12.1  | 14.2  |
|                              | 3,300            | E37L421CPN332MDB7U  | 63.5 × 117                    | DB7            | 30                               | 11.6                                  | 14.0  | 16.3  |
|                              | 3,900            | E37L421CPN392MDD0U  | 63.5 × 130                    | DD0            | 26                               | 13.1                                  | 15.7  | 18.4  |
|                              | 4,700            | E37L421CPN472MDE3U  | 63.5 × 143                    | DE3            | 21                               | 14.9                                  | 17.9  | 20.9  |
|                              | 3,900            | E37L421CPN392ME92U  | 76.2 × 92                     | E92            | 27                               | 12.7                                  | 15.2  | 17.7  |
|                              | 4,700            | E37L421CPN472MEA5U  | 76.2 × 105                    | EA5            | 22                               | 14.5                                  | 17.4  | 20.3  |
|                              | 5,600            | E37L421CPN562MEB7U  | 76.2 × 117                    | EB7            | 18                               | 16.4                                  | 19.7  | 23.0  |
|                              | 6,800            | E37L421CPN682MEE3U  | 76.2 × 143                    | EE3            | 15                               | 19.4                                  | 23.3  | 27.2  |
|                              | 8,200            | E37L421CPN822MEJ1U  | 76.2 × 181                    | EJ1            | 13                               | 23.3                                  | 28.0  | 32.7  |
|                              | 12,000           | E37L421CPN123MEM9U  | 76.2 × 219                    | EM9            | 9                                | 30.4                                  | 36.5  | 42.6  |
|                              | 5,600            | E37L421CPN562MF92U  | 89 × 92                       | F92            | 18                               | 16.6                                  | 20.0  | 23.3  |
|                              | 6,800            | E37L421CPN682MFA5U  | 89 × 105                      | FA5            | 15                               | 19.1                                  | 22.9  | 26.7  |

† For terminal, mounting and construction options, refer to the part numbering system for descriptions and codes.

\* Refer to diagram of dimensions for detailed case size specifications.



# U37L Series

## Standard Voltage Ratings - Screw Terminals

| Rated Voltage (WVDC)         | Capacitance (μF) | Global Part Number† | Nominal Case Size* D × L (mm) | Case Size Code | Maximum ESR (mΩ) at +25°C, 120Hz | Rated Ripple Current (A rms) at +85°C |       |       |
|------------------------------|------------------|---------------------|-------------------------------|----------------|----------------------------------|---------------------------------------|-------|-------|
|                              |                  |                     |                               |                |                                  | 120Hz                                 | 300Hz | >3kHz |
| 420 Volts<br>470 Volts Surge | 6,800            | E37L421CPN682MFB7U  | 89 × 117                      | FB7            | 15                               | 19.8                                  | 23.8  | 27.8  |
|                              | 10,000           | E37L421CPN103MFE3U  | 89 × 143                      | FE3            | 10                               | 25.7                                  | 30.9  | 36.0  |
|                              | 10,000           | E37L421CPN103MFF5U  | 89 × 155                      | FF5            | 10                               | 26.5                                  | 31.8  | 37.1  |
|                              | 12,000           | E37L421CPN123MFK0U  | 89 × 190                      | FK0            | 9                                | 31.3                                  | 37.6  | 43.9  |
|                              | 15,000           | E37L421CPN153MFM9U  | 89 × 219                      | FM9            | 7                                | 37.0                                  | 44.5  | 51.9  |
| 450 Volts<br>500 Volts Surge | 2,200            | E37L451HPN222MCB7U  | 50 × 117                      | CB7            | 43                               | 8.6                                   | 10.3  | 12.1  |
|                              | 2,200            | E37L451HPN222MCD0U  | 50 × 130                      | CD0            | 43                               | 8.9                                   | 10.7  | 12.5  |
|                              | 2,200            | E37L451CPN222MD92U  | 63.5 × 92                     | D92            | 45                               | 8.7                                   | 10.5  | 12.2  |
|                              | 2,200            | E37L451CPN222MDA5U  | 63.5 × 105                    | DA5            | 45                               | 9.1                                   | 11.0  | 12.8  |
|                              | 2,700            | E37L451CPN272MDB7U  | 63.5 × 117                    | DB7            | 37                               | 10.5                                  | 12.6  | 14.7  |
|                              | 3,300            | E37L451CPN332MDD0U  | 63.5 × 130                    | DD0            | 30                               | 12.1                                  | 14.5  | 16.9  |
|                              | 3,900            | E37L451CPN392MDE3U  | 63.5 × 143                    | DE3            | 26                               | 13.6                                  | 16.3  | 19.0  |
|                              | 3,300            | E37L451CPN332ME92U  | 76.2 × 92                     | E92            | 31                               | 11.6                                  | 14.0  | 16.3  |
|                              | 3,900            | E37L451CPN392MEA5U  | 76.2 × 105                    | EA5            | 27                               | 13.2                                  | 15.8  | 18.5  |
|                              | 4,700            | E37L451CPN472MEB7U  | 76.2 × 117                    | EB7            | 22                               | 15.1                                  | 18.1  | 21.1  |
|                              | 5,600            | E37L451CPN562MEE3U  | 76.2 × 143                    | EE3            | 18                               | 17.6                                  | 21.2  | 24.7  |
|                              | 6,800            | E37L451CPN682MEJ1U  | 76.2 × 181                    | EJ1            | 15                               | 21.2                                  | 25.5  | 29.7  |
|                              | 10,000           | E37L451CPN103MEM9U  | 76.2 × 219                    | EM9            | 10                               | 27.8                                  | 33.3  | 38.9  |
|                              | 4,700            | E37L451CPN472MF92U  | 89 × 92                       | F92            | 22                               | 15.2                                  | 18.3  | 21.3  |
|                              | 5,600            | E37L451CPN562MFA5U  | 89 × 105                      | FA5            | 18                               | 17.3                                  | 20.8  | 24.2  |
|                              | 5,600            | E37L451CPN562MFB7U  | 89 × 117                      | FB7            | 18                               | 18.0                                  | 21.6  | 25.2  |
|                              | 8,200            | E37L451CPN822MFE3U  | 89 × 143                      | FE3            | 13                               | 23.3                                  | 28.0  | 32.6  |
|                              | 8,200            | E37L451CPN822MFF5U  | 89 × 155                      | FF5            | 13                               | 24.0                                  | 28.8  | 33.6  |
|                              | 12,000           | E37L451CPN123MFK0U  | 89 × 190                      | FK0            | 9                                | 31.3                                  | 37.6  | 43.9  |
|                              | 12,000           | E37L451CPN123MFM9U  | 89 × 219                      | FM9            | 9                                | 33.1                                  | 39.8  | 46.4  |
| 500 Volts<br>550 Volts Surge | 1,500            | E37L501HPN152MCB7U  | 50 × 117                      | CB7            | 64                               | 7.1                                   | 8.5   | 10.0  |
|                              | 1,500            | E37L501HPN152MCD0U  | 50 × 130                      | CD0            | 64                               | 7.4                                   | 8.9   | 10.3  |
|                              | 1,800            | E37L501CPN182MD92U  | 63.5 × 92                     | D92            | 55                               | 7.9                                   | 9.5   | 11.1  |
|                              | 2,200            | E37L501CPN222MDA5U  | 63.5 × 105                    | DA5            | 45                               | 9.1                                   | 11.0  | 12.8  |
|                              | 2,200            | E37L501CPN222MDB7U  | 63.5 × 117                    | DB7            | 45                               | 9.5                                   | 11.4  | 13.3  |
|                              | 2,700            | E37L501CPN272MDD0U  | 63.5 × 130                    | DD0            | 37                               | 10.9                                  | 13.1  | 15.3  |
|                              | 2,700            | E37L501CPN272MDE3U  | 63.5 × 143                    | DE3            | 37                               | 11.3                                  | 13.6  | 15.8  |
|                              | 2,700            | E37L501CPN272ME92U  | 76.2 × 92                     | E92            | 38                               | 10.5                                  | 12.6  | 14.7  |
|                              | 3,300            | E37L501CPN332MEA5U  | 76.2 × 105                    | EA5            | 31                               | 12.1                                  | 14.6  | 17.0  |
|                              | 3,300            | E37L501CPN332MEB7U  | 76.2 × 117                    | EB7            | 31                               | 12.6                                  | 15.2  | 17.7  |
|                              | 4,700            | E37L501CPN472MEE3U  | 76.2 × 143                    | EE3            | 22                               | 16.2                                  | 19.4  | 22.6  |
|                              | 5,600            | E37L501CPN562MEJ1U  | 76.2 × 181                    | EJ1            | 18                               | 19.3                                  | 23.1  | 27.0  |
|                              | 8,200            | E37L501CPN822MEM9U  | 76.2 × 219                    | EM9            | 13                               | 25.2                                  | 30.2  | 35.2  |
|                              | 3,900            | E37L501CPN392MF92U  | 89 × 92                       | F92            | 27                               | 13.9                                  | 16.6  | 19.4  |
|                              | 3,900            | E37L501CPN392MFA5U  | 89 × 105                      | FA5            | 27                               | 14.5                                  | 17.3  | 20.2  |
|                              | 4,700            | E37L501CPN472MFB7U  | 89 × 117                      | FB7            | 22                               | 16.5                                  | 19.8  | 23.1  |
|                              | 6,800            | E37L501CPN682MFE3U  | 89 × 143                      | FE3            | 15                               | 21.2                                  | 25.5  | 29.7  |
|                              | 6,800            | E37L501CPN682MFF5U  | 89 × 155                      | FF5            | 15                               | 21.9                                  | 26.2  | 30.6  |
|                              | 8,200            | E37L501CPN822MFK0U  | 89 × 190                      | FK0            | 12                               | 26.7                                  | 32.0  | 37.4  |
|                              | 10,000           | E37L501CPN103MFM9U  | 89 × 219                      | FM9            | 9                                | 33.1                                  | 39.8  | 46.4  |

† For terminal, mounting and construction options, refer to the part numbering system for descriptions and codes.

\* Refer to diagram of dimensions for detailed case size specifications.



# U37X Series



- **Large Can**
- **Screw Terminals**
- **General Purpose U37 Grade**
- **High Ripple**
- **350 to 500VDC Ratings**
- **RoHS Compliant**
- **15,000 Hours Lifetime at +85°C**
- **Up to 175,000 Hours Useful Life**



The U37X series is the longest life version of the U37 grade series and is specifically designed to provide the ripple current capability and long life required for high reliability inverter applications. The U37X has an endurance rating of 15,000 hours at +85°C with the rated ripple current applied. The useful life can exceed 175,000 hours at +40°C and 2.1x the ripple current. These capacitors are available in a variety of high current English or Metric thread terminals. Mounting options include a three-footed clamp or bottom threaded stud. Custom designs are also available.

## Summary of Specifications

- **Screw terminals: high and low post, English and Metric thread.**
- **Capacitance range: 1,200 to 18,000µF.**
- **Voltage range: 350 to 500VDC.**
- **Category temperature range: -40°C to +85°C.**
- **Leakage current: 0.02CV(µA) or 5mA, whichever is smaller, after 5 minutes at +25°C.**
- **Standard capacitance tolerance: ±20%**
- **Nominal case size (D×L): D = 50mm (2.000") to 89mm (3.500"); L = 92mm (3.625") to 219mm (8.625").**
- **Rated lifetime: 15,000 hours at +85°C with rated ripple current applied.**





# U37X<sub>Series</sub>

## U37X Specifications - Screw Terminals

| Item                             | Characteristics                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                    |                      |       |                                                                                                                                                     |      |                      |    |         |    |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------------------|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------|------|----------------------|----|---------|----|
| Category Temperature Range       | − 40 to +85°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                    |                      |       |                                                                                                                                                     |      |                      |    |         |    |
| Rated Voltage Range              | 350 to 500VDC                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                    |                      |       |                                                                                                                                                     |      |                      |    |         |    |
| Capacitance Range                | 1,200 to 18,000μF at +25°C, 120Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    |                      |       |                                                                                                                                                     |      |                      |    |         |    |
| Capacitance Tolerance            | ±20% (M) at +25°C, 120Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                      |       |                                                                                                                                                     |      |                      |    |         |    |
| Leakage Current                  | I = 0.02CV (μA) or 5mA, whichever is smaller, after 5 minutes at +25°C.<br>Where I = Max. leakage current (μA), C = Nominal capacitance (μF) and V = Rated voltage (V)                                                                                                                                                                                                                                                                                                           |                    |                      |       |                                                                                                                                                     |      |                      |    |         |    |
| Rated Ripple Current Multipliers | Ambient Temperature (°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                      |       |                                                                                                                                                     |      |                      |    |         |    |
|                                  | +45°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    | +65°C                |       | +85°C                                                                                                                                               |      |                      |    |         |    |
|                                  | 2.82                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                    | 1.73                 |       | 1.00                                                                                                                                                |      |                      |    |         |    |
|                                  | Frequency (Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |                      |       |                                                                                                                                                     |      |                      |    |         |    |
|                                  | DC Rated Voltage                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 50Hz               | 120Hz                | 300Hz | 1kHz                                                                                                                                                | 3kHz | 10kHz                |    |         |    |
|                                  | 350-500V                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 0.80               | 1.00                 | 1.20  | 1.30                                                                                                                                                | 1.40 | 1.41                 |    |         |    |
|                                  | To determine maximum ripple current at a specified temperature and frequency, use the appropriate multiplier shown.                                                                                                                                                                                                                                                                                                                                                              |                    |                      |       |                                                                                                                                                     |      |                      |    |         |    |
| Endurance (Load Life)            | The following specifications shall be satisfied when the capacitors are restored to +25°C after subjecting them to DC voltage for 15,000 hours at +85°C with the rated ripple current applied. The sum of the DC voltage and peak AC voltage must not exceed the full rated voltage of the capacitors.<br><br>Capacitance change: ≤ 20% from initial measurement<br>ESR change : ≤ 200% of initial specified limit<br>Leakage current : ≤ initial specified limit                |                    |                      |       |                                                                                                                                                     |      |                      |    |         |    |
| Useful Life                      | With specified standard voltage and ripple current applied, typical life as function of ambient temperature is listed below.                                                                                                                                                                                                                                                                                                                                                     |                    |                      |       |                                                                                                                                                     |      |                      |    |         |    |
|                                  | +85°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    | 20,000 hours max.    |       | Capacitance change: ≤ 30% from initial measurement<br>ESR change : ≤ 300% of initial specified limit<br>Leakage current : ≤ initial specified limit |      |                      |    |         |    |
|                                  | +65°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    | 71,600 hours max.    |       |                                                                                                                                                     |      |                      |    |         |    |
| +45°C                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 175,000 hours max. |                      |       |                                                                                                                                                     |      |                      |    |         |    |
| Shelf Life                       | The following specifications shall be satisfied when the capacitors are restored to +25°C after exposing them for 500 hours at +85°C without voltage applied. The rated voltage shall be applied to the capacitors for a minimum of 30 minutes, at least 24 hours and not more than 48 hours before the measurements.<br><br>Capacitance change: ≤ 20% from initial measurement<br>ESR change : ≤ 200% of initial specified limit<br>Leakage current : ≤ initial specified limit |                    |                      |       |                                                                                                                                                     |      |                      |    |         |    |
| Vibration Rating                 | 10-55Hz, 10g sinusoidal in three axes, 2 hours per axis.                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                      |       |                                                                                                                                                     |      |                      |    |         |    |
| Maximum Tightening Torque        | Terminal Code                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                    | HP                   |       | HL                                                                                                                                                  | CD   | CP                   | CH | CA      | CS |
|                                  | Thread Size                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                    | 10-32 NF-2B          |       | M5x0.8-6H                                                                                                                                           |      | 1/4-28 NF-2B         |    | M6x1-6H |    |
|                                  | 3 Threads Engaged                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    | 2.0 N·m (18.0 in·lb) |       |                                                                                                                                                     |      | 4.0 N·m (35.0 in·lb) |    |         |    |
|                                  | 6 Threads Engaged                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    | 2.8 N·m (25.0 in·lb) |       |                                                                                                                                                     |      | 6.2 N·m (55.0 in·lb) |    |         |    |
| Typical Inductance (nH) at 1MHz  | Case Diameter (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                    | Terminal Code        |       |                                                                                                                                                     |      |                      |    |         |    |
|                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                    | HP                   | HL    | CD                                                                                                                                                  | CP   | CH                   | CA | CS      |    |
|                                  | ø50.8                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | —                  | —                    | NA    | NA                                                                                                                                                  | NA   | NA                   | NA |         |    |
|                                  | ø63.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | —                  | —                    | —     | —                                                                                                                                                   | —    | —                    | —  |         |    |
|                                  | ø76.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 30                 | 30                   | 25    | 20                                                                                                                                                  | 25   | 20                   | 25 |         |    |
| ø89.0                            | 30                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 30                 | 25                   | 20    | 25                                                                                                                                                  | 20   | 25                   |    |         |    |
| Custom Designs                   | Custom CV values per case size and termination type may be available upon request. Contact appropriate representative with specific requirements.                                                                                                                                                                                                                                                                                                                                |                    |                      |       |                                                                                                                                                     |      |                      |    |         |    |

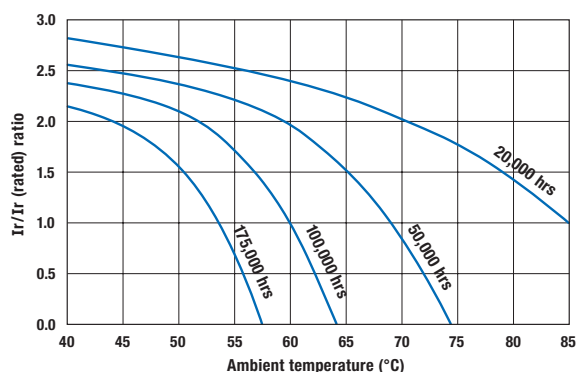


## U37X Series

### U37X Useful Life

#### Useful Life: 20,000 Hours at +85°C

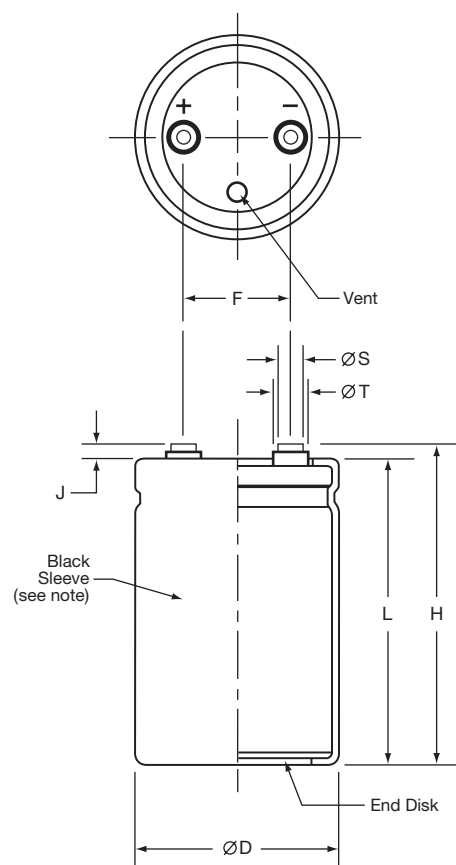
The life expectancy of a capacitor is shown as a function of ambient temperature and ripple current load.



### Diagram of Dimensions - Screw Terminals

#### Large Can/Screw Terminals

Unit: mm (inches)



#### Case Dimensions and Standard Box Quantities

| Case Size Code                                | øD<br>+2.0 (0.080) | L<br>±1.0 (0.040)                                                                                    | F<br>±0.25 (0.010) | Standard Box Quantity |
|-----------------------------------------------|--------------------|------------------------------------------------------------------------------------------------------|--------------------|-----------------------|
| CB7<br>CD0                                    | 50.8 (2.000)       | 117 (4.625)<br>130 (5.125)                                                                           | 22.2 (0.875)       | 49                    |
| D92<br>DA5<br>DB7<br>DD0<br>DE3               | 63.5 (2.500)       | 92 (3.625)<br>105 (4.125)<br>117 (4.625)<br>130 (5.125)<br>143 (5.625)                               | 28.6 (1.125)       | 20                    |
| E92<br>EA5<br>EB7<br>EE3<br>EJ1<br>EM9        | 76.2 (3.000)       | 92 (3.625)<br>105 (4.125)<br>117 (4.625)<br>143 (5.625)<br>181 (7.125)<br>219 (8.625)                | 31.8 (1.250)       | 16<br>9               |
| F92<br>FA5<br>FB7<br>FE3<br>FF5<br>FK0<br>FM9 | 89.0 (3.500)       | 92 (3.625)<br>105 (4.125)<br>117 (4.625)<br>143 (5.625)<br>155 (6.125)<br>190 (7.500)<br>219 (8.625) | 31.8 (1.250)       | 5                     |

#### Note:

In some cases, the color of the sleeve may change slightly due to the operating conditions, however, the discoloration will not impair capacitor function.

#### Terminal Specifications

| Terminal Code | Available Case Diameter |                             | Thread Size  | Minimum Thread Depth | J<br>±0.5 (0.020) | H<br>±2.0 (0.080) | øS<br>±0.25 (0.010) | øT<br>±0.25 (0.010) |
|---------------|-------------------------|-----------------------------|--------------|----------------------|-------------------|-------------------|---------------------|---------------------|
|               | øD Code                 | øD mm (inches)              |              |                      |                   |                   |                     |                     |
| HP            | C                       | 50.8 (2.000)                | 10-32 NF-2B  | 9.5 (0.375)          | 6.4 (0.250)       | L+J               | 8.0 (0.313)         | 11.1 (0.438)        |
| HL            | C                       | 50.8 (2.000)                | M5x0.8-6H    | 9.5 (0.375)          | 6.4 (0.250)       | L+J               | 8.0 (0.313)         | 11.1 (0.438)        |
| CD            | D-E                     | 63.5 - 76.2 (2.500 - 3.000) | M5x0.8-6H    | 8.5 (0.335)          | 5.0 (0.200)       | L+J               | 13.0 (0.512)        | 18.8 (0.740)        |
| CP            | D-F                     | 63.5 - 89.0 (2.500 - 3.500) | 1/4-28 NF-2B | 8.7 (0.344)          | 2.4 (0.093)       | L+J               | 17.5 (0.689)        | —                   |
| CH            | D-F                     | 63.5 - 89.0 (2.500 - 3.500) | 1/4-28 NF-2B | 11.9 (0.468)         | 6.4 (0.250)       | L+J               | 17.5 (0.689)        | —                   |
| CA            | D-F                     | 63.5 - 89.0 (2.500 - 3.500) | M6x1-6H      | 8.7 (0.344)          | 2.4 (0.093)       | L+J               | 17.5 (0.689)        | —                   |
| CS            | D-F                     | 63.5 - 89.0 (2.500 - 3.500) | M6x1-6H      | 11.9 (0.468)         | 6.4 (0.250)       | L+J               | 17.5 (0.689)        | —                   |

Mounting Hardware is optional. Refer to hardware specifications on the following page.

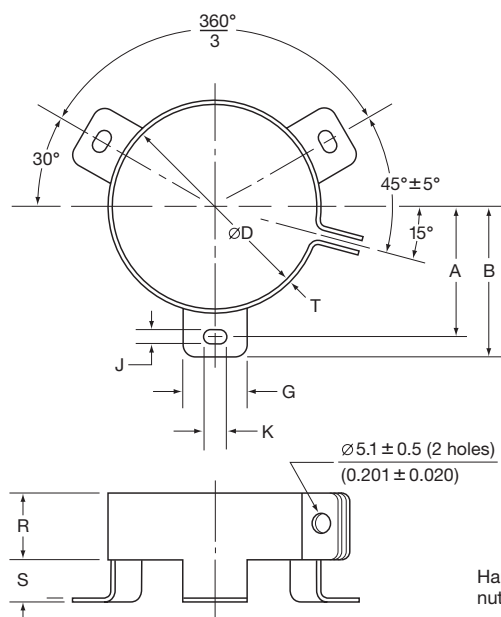


## U37X Series

### Mounting Hardware - Screw Terminals

#### Type C: Three-Footed Clamp

Unit: mm (inches)

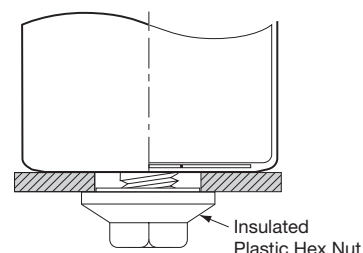
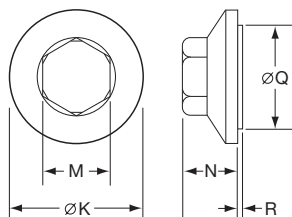
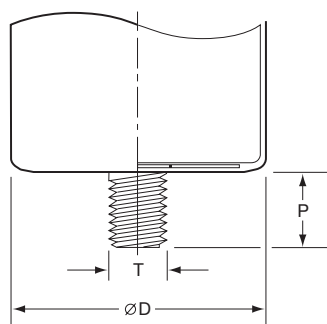


Hardware: Screw, washer and hexagon nut included with each clamp.

#### Type C: Clamp Dimensions

| Mounting Code | Case ØD      | A<br>±1.0 (0.040) | B<br>±1.0 (0.040) | G<br>±1.0 (0.040) | J<br>±0.5 (0.020) | K<br>±0.5 (0.020) | R<br>±1.0 (0.040) | S<br>±1.0 (0.040) | T<br>±0.5 (0.020) |
|---------------|--------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| C             | 50.8 (2.000) | 31.8 (1.250)      | 36.5 (1.437)      | 13.3 (0.524)      | 4.5 (0.177)       | 7.1 (0.280)       | 19.1 (0.751)      | 9.5 (0.374)       | 0.8 (0.032)       |
| C             | 63.5 (2.500) | 38.1 (1.500)      | 42.9 (1.689)      | 13.3 (0.524)      | 4.5 (0.177)       | 7.1 (0.280)       | 19.1 (0.751)      | 9.5 (0.374)       | 0.8 (0.032)       |
| C             | 76.2 (3.000) | 44.5 (1.750)      | 49.2 (1.937)      | 13.3 (0.524)      | 4.5 (0.177)       | 7.1 (0.280)       | 19.1 (0.751)      | 9.5 (0.374)       | 1.0 (0.040)       |
| C             | 89.0 (3.500) | 50.8 (2.000)      | 56.5 (2.224)      | 16.0 (0.630)      | 4.5 (0.177)       | 8.0 (0.313)       | 21.0 (0.827)      | 9.0 (0.354)       | 1.0 (0.040)       |

#### Type S: Stud Mounting



#### Mounting Nut - Order Separately

The insulated plastic mounting nut is not included with stud mount capacitor orders. It must be ordered separately. See available part numbers below.

#### Type S: Stud Dimensions

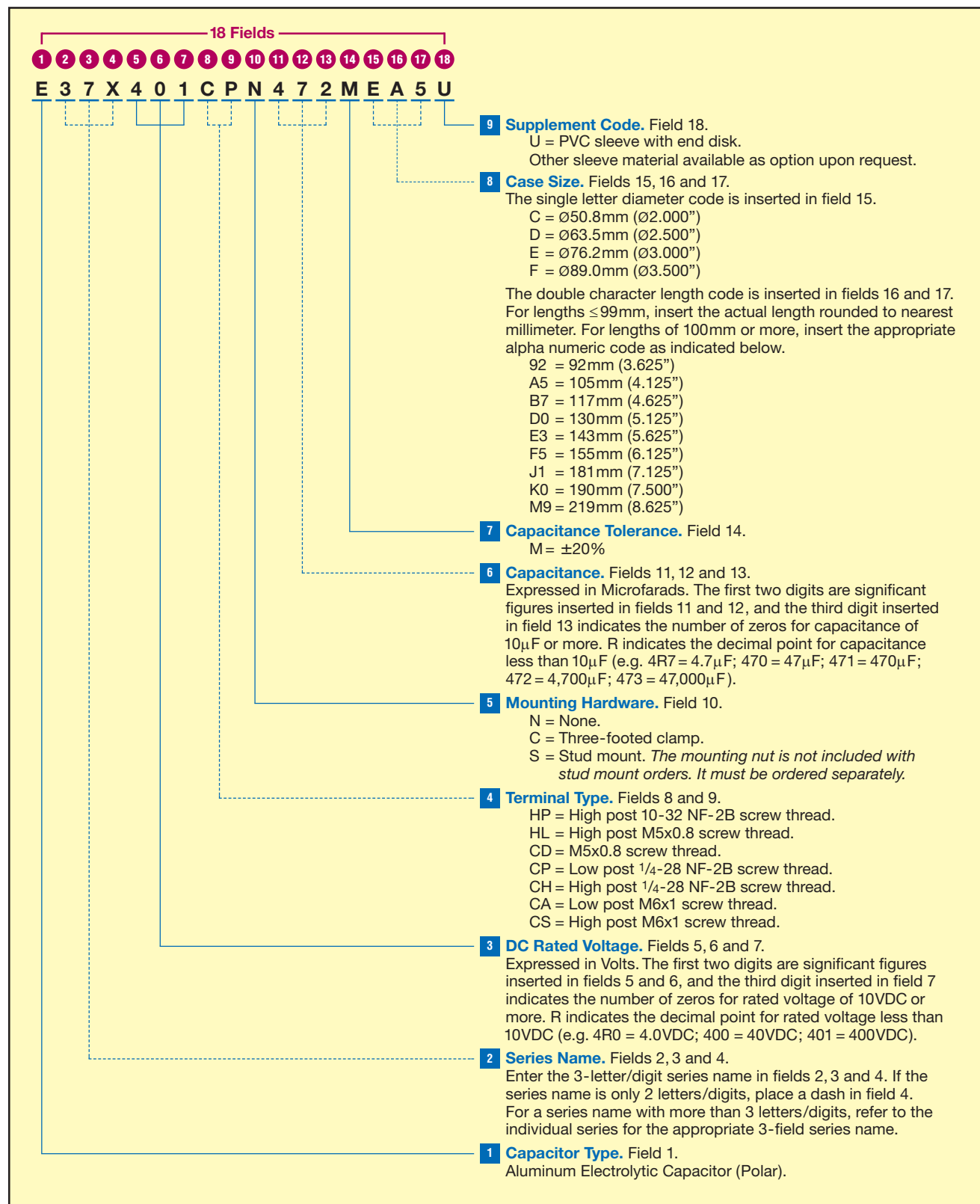
| Mounting Code | P<br>±1.0 (0.040) | T<br>Thread Size |
|---------------|-------------------|------------------|
| S             | 16.0 (0.630)      | M12              |

#### Mounting Nut Dimensions

| Part Number | ØK<br>±2.0 (0.080) | M<br>±1.0 (0.040) | N<br>±1.0 (0.040) | ØQ<br>±1.0 (0.040) | R<br>±1.0 (0.040) |
|-------------|--------------------|-------------------|-------------------|--------------------|-------------------|
| 50-8D       | 30.0 (1.181)       | 19.0 (0.748)      | 18.0 (0.709)      | 22.0 (0.866)       | 1.40 (0.055)      |
| 50-8E       | 38.0 (1.496)       | 19.0 (0.748)      | 18.0 (0.709)      | 30.0 (1.181)       | 1.40 (0.055)      |

# U37X Series

**Part Numbering System for U37X Series** When ordering, always specify complete 18-field global part number.





# U37X<sub>Series</sub>

## Standard Voltage Ratings - Screw Terminals

| Rated Voltage (WVDC)         | Capacitance (μF) | Global Part Number† | Nominal Case Size* D × L (mm) | Case Size Code | Maximum ESR (mΩ) at +25°C, 120Hz | Rated Ripple Current (A rms) at +85°C |       |       |
|------------------------------|------------------|---------------------|-------------------------------|----------------|----------------------------------|---------------------------------------|-------|-------|
|                              |                  |                     |                               |                |                                  | 120Hz                                 | 300Hz | >3kHz |
| 350 Volts<br>400 Volts Surge | 2,700            | E37X351HPN272MCB7U  | 50 × 117                      | CB7            | 35                               | 9.6                                   | 11.5  | 13.4  |
|                              | 3,300            | E37X351HPN332MCD0U  | 50 × 130                      | CD0            | 31                               | 10.6                                  | 12.8  | 14.9  |
|                              | 2,700            | E37X351CPN272MD92U  | 63.5 × 92                     | D92            | 37                               | 9.7                                   | 11.6  | 13.5  |
|                              | 3,300            | E37X351CPN332MDA5U  | 63.5 × 105                    | DA5            | 31                               | 11.1                                  | 13.3  | 15.5  |
|                              | 3,900            | E37X351CPN392MDB7U  | 63.5 × 117                    | DB7            | 26                               | 12.4                                  | 14.9  | 17.4  |
|                              | 4,700            | E37X351CPN472MDD0U  | 63.5 × 130                    | DD0            | 23                               | 13.8                                  | 16.5  | 19.3  |
|                              | 4,700            | E37X351CPN472MDE3U  | 63.5 × 143                    | DE3            | 21                               | 15.1                                  | 18.1  | 21.2  |
|                              | 3,900            | E37X351CPN392ME92U  | 76.2 × 92                     | E92            | 26                               | 12.7                                  | 15.2  | 17.8  |
|                              | 4,700            | E37X351CPN472MEA5U  | 76.2 × 105                    | EA5            | 22                               | 14.5                                  | 17.4  | 20.3  |
|                              | 5,600            | E37X351CPN562MEB7U  | 76.2 × 117                    | EB7            | 19                               | 16.3                                  | 19.5  | 22.8  |
|                              | 8,200            | E37X351CPN822MEE3U  | 76.2 × 143                    | EE3            | 15                               | 19.8                                  | 23.7  | 27.7  |
|                              | 10,000           | E37X351CPN103MEJ1U  | 76.2 × 181                    | EJ1            | 11                               | 25.0                                  | 30.0  | 35.0  |
|                              | 12,000           | E37X351CPN123MEM9U  | 76.2 × 219                    | EM9            | 9                                | 30.1                                  | 36.1  | 42.2  |
|                              | 5,600            | E37X351CPN562MF92U  | 89 × 92                       | F92            | 19                               | 16.2                                  | 19.4  | 22.7  |
|                              | 6,800            | E37X351CPN682MFA5U  | 89 × 105                      | FA5            | 16                               | 18.5                                  | 22.2  | 25.9  |
|                              | 8,200            | E37X351CPN822MFB7U  | 89 × 117                      | FB7            | 14                               | 20.7                                  | 24.9  | 29.0  |
|                              | 12,000           | E37X351CPN123MFE3U  | 89 × 143                      | FE3            | 11                               | 25.2                                  | 30.2  | 35.2  |
|                              | 12,000           | E37X351CPN123MFF5U  | 89 × 155                      | FF5            | 10                               | 27.3                                  | 32.8  | 38.2  |
| 400 Volts<br>450 Volts Surge | 15,000           | E37X351CPN153MFK0U  | 89 × 190                      | FK0            | 8                                | 33.3                                  | 40.0  | 46.6  |
|                              | 18,000           | E37X351CPN183MFM9U  | 89 × 219                      | FM9            | 6                                | 38.2                                  | 45.8  | 53.5  |
| 400 Volts<br>450 Volts Surge | 2,700            | E37X401HPN272MCB7U  | 50 × 117                      | CB7            | 41                               | 8.9                                   | 10.7  | 12.5  |
|                              | 2,700            | E37X401HPN272MCD0U  | 50 × 130                      | CD0            | 35                               | 9.9                                   | 11.9  | 13.9  |
|                              | 2,700            | E37X401CPN272MD92U  | 63.5 × 92                     | D92            | 43                               | 9.0                                   | 10.8  | 12.6  |
|                              | 2,700            | E37X401CPN272MDA5U  | 63.5 × 105                    | DA5            | 36                               | 10.3                                  | 12.3  | 14.4  |
|                              | 3,300            | E37X401CPN332MDB7U  | 63.5 × 117                    | DB7            | 31                               | 11.6                                  | 13.9  | 16.2  |
|                              | 3,900            | E37X401CPN392MDD0U  | 63.5 × 130                    | DD0            | 27                               | 12.8                                  | 15.4  | 18.0  |
|                              | 3,900            | E37X401CPN392MDE3U  | 63.5 × 143                    | DE3            | 24                               | 14.1                                  | 16.9  | 19.7  |
|                              | 3,900            | E37X401CPN392ME92U  | 76.2 × 92                     | E92            | 30                               | 11.8                                  | 14.2  | 16.5  |
|                              | 4,700            | E37X401CPN472MEA5U  | 76.2 × 105                    | EA5            | 25                               | 13.5                                  | 16.2  | 18.9  |
|                              | 5,600            | E37X401CPN562MEB7U  | 76.2 × 117                    | EB7            | 22                               | 15.2                                  | 18.2  | 21.2  |
|                              | 6,800            | E37X401CPN682MEE3U  | 76.2 × 143                    | EE3            | 17                               | 18.4                                  | 22.1  | 25.8  |
|                              | 8,200            | E37X401CPN822MEJ1U  | 76.2 × 181                    | EJ1            | 13                               | 23.3                                  | 27.9  | 32.6  |
|                              | 12,000           | E37X401CPN123MEM9U  | 76.2 × 219                    | EM9            | 10                               | 28.0                                  | 33.6  | 39.3  |
|                              | 5,600            | E37X401CPN562MF92U  | 89 × 92                       | F92            | 22                               | 15.1                                  | 18.1  | 21.1  |
|                              | 6,800            | E37X401CPN682MFA5U  | 89 × 105                      | FA5            | 19                               | 17.2                                  | 20.6  | 24.1  |
|                              | 6,800            | E37X401CPN682MFB7U  | 89 × 117                      | FB7            | 16                               | 19.3                                  | 23.2  | 27.0  |
|                              | 10,000           | E37X401CPN103MFE3U  | 89 × 143                      | FE3            | 12                               | 23.4                                  | 28.1  | 32.8  |
|                              | 10,000           | E37X401CPN103MFF5U  | 89 × 155                      | FF5            | 11                               | 25.4                                  | 30.5  | 35.6  |
| 420 Volts<br>470 Volts Surge | 12,000           | E37X401CPN123MFK0U  | 89 × 190                      | FK0            | 9                                | 31.0                                  | 37.2  | 43.4  |
|                              | 15,000           | E37X401CPN153MFM9U  | 89 × 219                      | FM9            | 7                                | 35.6                                  | 42.7  | 49.8  |
| 420 Volts<br>470 Volts Surge | 2,200            | E37X421HPN222MCB7U  | 50 × 117                      | CB7            | 44                               | 8.5                                   | 10.2  | 11.9  |
|                              | 2,700            | E37X421HPN272MCD0U  | 50 × 130                      | CD0            | 39                               | 9.4                                   | 11.3  | 13.2  |
|                              | 2,200            | E37X421CPN222MD92U  | 63.5 × 92                     | D92            | 47                               | 8.6                                   | 10.3  | 12.0  |
|                              | 2,700            | E37X421CPN272MDA5U  | 63.5 × 105                    | DA5            | 39                               | 9.8                                   | 11.8  | 13.8  |
|                              | 3,300            | E37X421CPN332MDB7U  | 63.5 × 117                    | DB7            | 33                               | 11.0                                  | 13.3  | 15.5  |
|                              | 3,900            | E37X421CPN392MDD0U  | 63.5 × 130                    | DD0            | 29                               | 12.2                                  | 14.7  | 17.1  |
|                              | 3,900            | E37X421CPN392MDE3U  | 63.5 × 143                    | DE3            | 26                               | 13.4                                  | 16.1  | 18.8  |
|                              | 3,300            | E37X421CPN332ME92U  | 76.2 × 92                     | E92            | 33                               | 11.3                                  | 13.5  | 15.8  |
|                              | 3,900            | E37X421CPN392MEA5U  | 76.2 × 105                    | EA5            | 28                               | 12.9                                  | 15.5  | 18.0  |
|                              | 4,700            | E37X421CPN472MEB7U  | 76.2 × 117                    | EB7            | 24                               | 14.5                                  | 17.4  | 20.3  |
|                              | 5,600            | E37X421CPN562MEE3U  | 76.2 × 143                    | EE3            | 19                               | 17.6                                  | 21.1  | 24.6  |
|                              | 8,200            | E37X421CPN822MEJ1U  | 76.2 × 181                    | EJ1            | 14                               | 22.2                                  | 26.6  | 31.1  |
|                              | 10,000           | E37X421CPN103MEM9U  | 76.2 × 219                    | EM9            | 11                               | 26.8                                  | 32.1  | 37.5  |
|                              | 4,700            | E37X421CPN472MF92U  | 89 × 92                       | F92            | 25                               | 14.4                                  | 17.3  | 20.2  |
|                              | 5,600            | E37X421CPN562MFA5U  | 89 × 105                      | FA5            | 21                               | 16.4                                  | 19.7  | 23.0  |

† For terminal, mounting and construction options, refer to the part numbering system for descriptions and codes.

\* Refer to diagram of dimensions for detailed case size specifications.



# U37X<sub>Series</sub>

## Standard Voltage Ratings - Screw Terminals

| Rated Voltage (WVDC)         | Capacitance (μF) | Global Part Number† | Nominal Case Size* D × L (mm) | Case Size Code | Maximum ESR (mΩ) at +25°C, 120Hz | Rated Ripple Current (A rms) at +85°C |       |       |
|------------------------------|------------------|---------------------|-------------------------------|----------------|----------------------------------|---------------------------------------|-------|-------|
|                              |                  |                     |                               |                |                                  | 120Hz                                 | 300Hz | >3kHz |
| 420 Volts<br>470 Volts Surge | 6,800            | E37X421CPN682MFB7U  | 89 × 117                      | FB7            | 18                               | 18.4                                  | 22.1  | 25.8  |
|                              | 8,200            | E37X421CPN822MFE3U  | 89 × 143                      | FE3            | 14                               | 22.4                                  | 26.8  | 31.3  |
|                              | 10,000           | E37X421CPN103MFF5U  | 89 × 155                      | FF5            | 12                               | 24.3                                  | 29.1  | 34.0  |
|                              | 12,000           | E37X421CPN123MFK0U  | 89 × 190                      | FK0            | 10                               | 29.6                                  | 35.5  | 41.4  |
|                              | 15,000           | E37X421CPN153MFM9U  | 89 × 219                      | FM9            | 8                                | 34.0                                  | 40.7  | 47.5  |
| 450 Volts<br>500 Volts Surge | 1,800            | E37X451HPN182MCB7U  | 50 × 117                      | CB7            | 51                               | 8.0                                   | 9.6   | 11.2  |
|                              | 2,200            | E37X451HPN222MCD0U  | 50 × 130                      | CD0            | 44                               | 8.9                                   | 10.6  | 12.4  |
|                              | 2,200            | E37X451CPN222MD92U  | 63.5 × 92                     | D92            | 53                               | 8.1                                   | 9.7   | 11.3  |
|                              | 2,200            | E37X451CPN222MDA5U  | 63.5 × 105                    | DA5            | 44                               | 9.2                                   | 11.1  | 12.9  |
|                              | 2,700            | E37X451CPN272MDB7U  | 63.5 × 117                    | DB7            | 38                               | 10.4                                  | 12.4  | 14.5  |
|                              | 3,300            | E37X451CPN332MDD0U  | 63.5 × 130                    | DD0            | 33                               | 11.5                                  | 13.8  | 16.1  |
|                              | 3,900            | E37X451CPN392MDE3U  | 63.5 × 143                    | DE3            | 30                               | 12.6                                  | 15.1  | 17.6  |
|                              | 3,300            | E37X451CPN332ME92U  | 76.2 × 92                     | E92            | 38                               | 10.6                                  | 12.7  | 14.8  |
|                              | 3,900            | E37X451CPN392MEA5U  | 76.2 × 105                    | EA5            | 32                               | 12.1                                  | 14.5  | 16.9  |
|                              | 3,900            | E37X451CPN392MEB7U  | 76.2 × 117                    | EB7            | 27                               | 13.6                                  | 16.3  | 19.0  |
|                              | 5,600            | E37X451CPN562MEE3U  | 76.2 × 143                    | EE3            | 21                               | 16.5                                  | 19.8  | 23.1  |
|                              | 6,800            | E37X451CPN682MEJ1U  | 76.2 × 181                    | EJ1            | 16                               | 20.8                                  | 25.0  | 29.2  |
|                              | 8,200            | E37X451CPN822MEM9U  | 76.2 × 219                    | EM9            | 13                               | 25.1                                  | 30.1  | 35.2  |
|                              | 3,900            | E37X451CPN392MF92U  | 89 × 92                       | F92            | 28                               | 13.5                                  | 16.2  | 18.9  |
|                              | 4,700            | E37X451CPN472MFA5U  | 89 × 105                      | FA5            | 23                               | 15.4                                  | 18.5  | 21.6  |
|                              | 5,600            | E37X451CPN562MFB7U  | 89 × 117                      | FB7            | 20                               | 17.3                                  | 20.7  | 24.2  |
|                              | 8,200            | E37X451CPN822MFE3U  | 89 × 143                      | FE3            | 16                               | 21.0                                  | 25.2  | 29.4  |
|                              | 8,200            | E37X451CPN822MFF5U  | 89 × 155                      | FF5            | 14                               | 22.8                                  | 27.3  | 31.9  |
|                              | 10,000           | E37X451CPN103MFK0U  | 89 × 190                      | FK0            | 11                               | 27.8                                  | 33.3  | 38.9  |
|                              | 12,000           | E37X451CPN123MFM9U  | 89 × 219                      | FM9            | 9                                | 32.2                                  | 38.6  | 45.0  |
| 500 Volts<br>550 Volts Surge | 1,200            | E37X501HPN122MCB7U  | 50 × 117                      | CB7            | 78                               | 6.4                                   | 7.7   | 9.0   |
|                              | 1,500            | E37X501HPN152MCD0U  | 50 × 130                      | CD0            | 68                               | 7.2                                   | 8.6   | 10.0  |
|                              | 1,500            | E37X501CPN152MD92U  | 63.5 × 92                     | D92            | 67                               | 7.2                                   | 8.6   | 10.1  |
|                              | 1,800            | E37X501CPN182MDA5U  | 63.5 × 105                    | DA5            | 56                               | 8.2                                   | 9.9   | 11.5  |
|                              | 2,200            | E37X501CPN222MDB7U  | 63.5 × 117                    | DB7            | 48                               | 9.3                                   | 11.1  | 13.0  |
|                              | 2,700            | E37X501CPN272MDD0U  | 63.5 × 130                    | DD0            | 42                               | 10.3                                  | 12.3  | 14.4  |
|                              | 2,700            | E37X501CPN272MDE3U  | 63.5 × 143                    | DE3            | 37                               | 11.3                                  | 13.5  | 15.8  |
|                              | 2,200            | E37X501CPN222ME92U  | 76.2 × 92                     | E92            | 48                               | 9.5                                   | 11.3  | 13.2  |
|                              | 2,700            | E37X501CPN272MEA5U  | 76.2 × 105                    | EA5            | 40                               | 10.8                                  | 13.0  | 15.1  |
|                              | 3,300            | E37X501CPN332MEB7U  | 76.2 × 117                    | EB7            | 34                               | 12.1                                  | 14.6  | 17.0  |
|                              | 3,900            | E37X501CPN392MEE3U  | 76.2 × 143                    | EE3            | 26                               | 14.8                                  | 17.7  | 20.7  |
|                              | 5,600            | E37X501CPN562MEJ1U  | 76.2 × 181                    | EJ1            | 20                               | 18.6                                  | 22.3  | 26.1  |
|                              | 6,800            | E37X501CPN682MEM9U  | 76.2 × 219                    | EM9            | 16                               | 22.5                                  | 26.9  | 31.4  |
|                              | 3,300            | E37X501CPN332MF92U  | 89 × 92                       | F92            | 35                               | 12.1                                  | 14.5  | 16.9  |
|                              | 3,900            | E37X501CPN392MFA5U  | 89 × 105                      | FA5            | 29                               | 13.8                                  | 16.5  | 19.3  |
|                              | 4,700            | E37X501CPN472MFB7U  | 89 × 117                      | FB7            | 25                               | 15.5                                  | 18.5  | 21.6  |
|                              | 5,600            | E37X501CPN562MFE3U  | 89 × 143                      | FE3            | 19                               | 18.8                                  | 22.5  | 26.3  |
|                              | 6,800            | E37X501CPN682MFF5U  | 89 × 155                      | FF5            | 18                               | 20.4                                  | 24.4  | 28.5  |
|                              | 8,200            | E37X501CPN822MFK0U  | 89 × 190                      | FK0            | 14                               | 24.8                                  | 29.8  | 34.8  |
|                              | 10,000           | E37X501CPN103MFM9U  | 89 × 219                      | FM9            | 12                               | 28.5                                  | 34.2  | 39.9  |

†For terminal, mounting and construction options, refer to the part numbering system for descriptions and codes.

\*Refer to diagram of dimensions for detailed case size specifications.

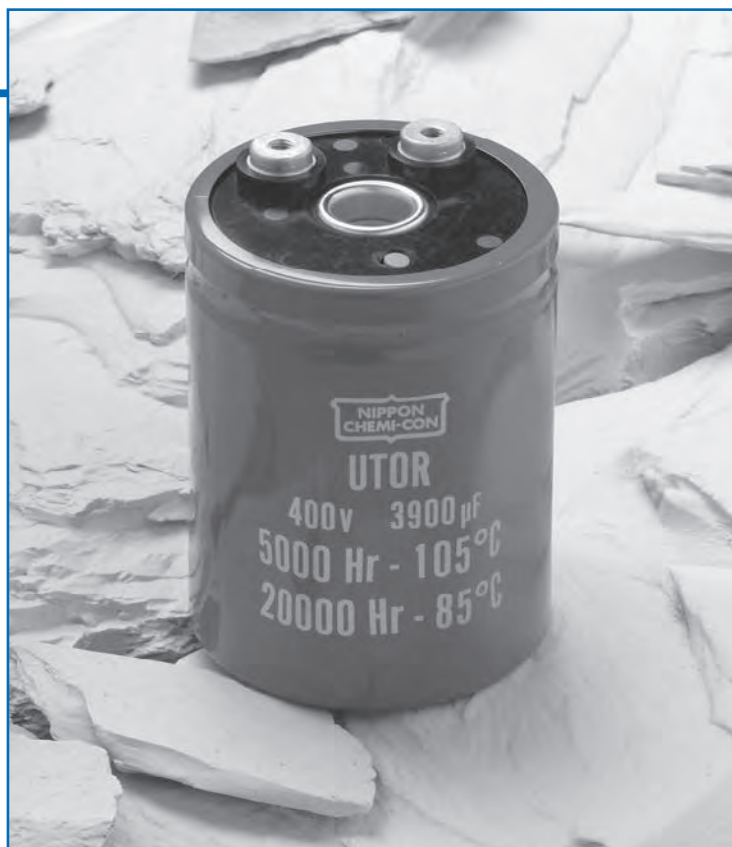




# UTOR Series



- Large Can Toroidal Design
- Lowest Thermal Resistance
- Optimum Cooling Capability
- New Lower Profile Sizes
- New Heat-Sink Mounting Kit
- RoHS Compliant



The UTOR series now offers higher capacitance and ripple current per case size. The upgrade allows the inverter designer to significantly reduce the size, weight, and cost of the capacitor bank. Toroidal geometry is ideal for cooling by either forced air or by heat-sink with the use of a new mounting kit option. The heat-sink kit option provides optimum thermal transfer while maintaining electrical isolation. These capacitors have an endurance rating of 5,000 hours at 105°C or 20,000 hours at 85°C with the rated ripple current applied. The UTOR series represents the optimum cost per amp of ripple current for a screw terminal mounted electrolytic capacitor.

## Summary of Specifications

- Screw terminals, high ripple Metric thread.
- Capacitance range: 680 to 10,000µF.
- Voltage range: 350 to 500VDC.
- Operating temperature range: -40°C to +105°C.
- Leakage current: 0.02CV(µA) or 5mA, whichever is smaller, after 5 minutes at +25°C.
- Standard capacitance tolerance: ±20%
- Nominal case size (D×L): D = 76mm (3.000"); L = 54mm (2.125") to 168mm (6.625").
- Rated lifetime: 5,000 hours at +105°C with rated ripple current applied.



# UTOR<sup>Series</sup>

## UTOR Specifications - Screw Terminals

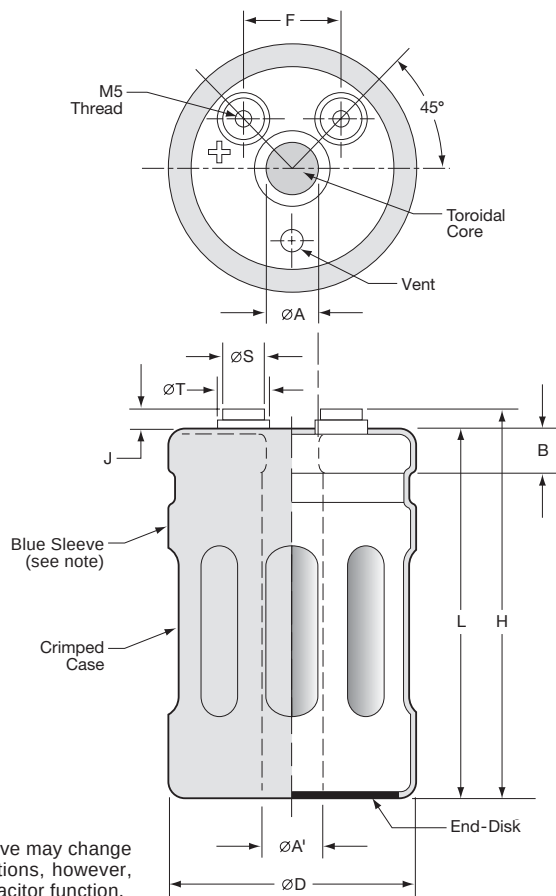
| Item                             | Characteristics                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |              |      |                   |  |
|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|--------------|------|-------------------|--|
| Category Temperature Range       | − 40 to +105°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |              |      |                   |  |
| Rated Voltage Range              | 350 to 500VDC                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |              |      |                   |  |
| Capacitance Range                | 680 to 10,000μF at +25°C, 120Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |              |      |                   |  |
| Capacitance Tolerance            | ±20% (M) at +25°C, 120Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |              |      |                   |  |
| Leakage Current                  | I = 0.02CV (μA) or 5mA, whichever is smaller, after 5 minutes at +25°C.<br>Where I = Max. leakage current (μA), C = Nominal capacitance (μF) and V= Rated voltage (V)                                                                                                                                                                                                                                                                                                                 |      |              |      |                   |  |
| Rated Ripple Current Multipliers | Ambient Temperature (°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |              |      |                   |  |
|                                  | +45°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      | +65°C        |      | +85°C             |  |
|                                  | 2.45                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      | 2.12         |      | 1.73              |  |
|                                  | Cooling                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      |              |      |                   |  |
|                                  | Mounting Type                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      | Air Velocity |      |                   |  |
|                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      | Static       |      | 1.0m/s            |  |
| Clamp Mount                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1.00 |              | 1.20 |                   |  |
| Heat-Sink (air cooled)           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1.20 |              | 1.45 |                   |  |
| Heat-Sink (fluid cooled)         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1.35 |              | 1.65 |                   |  |
| Endurance (Load Life)            | The following specifications shall be satisfied when the capacitors are restored to +25°C after subjecting them to DC voltage for 5,000 hours at +105°C with the rated ripple current applied. The sum of the DC voltage and peak AC voltage must not exceed the full rated voltage of the capacitors.<br><br>Capacitance change: ≤ ±20% of initial measured value<br>ESR change : ≤ 200% of initial specified value<br>Leakage current : ≤ initial specified value                   |      |              |      |                   |  |
| Shelf Test                       | The following specifications shall be satisfied when the capacitors are restored to +25°C after exposing them for 1,000 hours at +105°C without voltage applied. The rated voltage shall be applied to the capacitors for a minimum of 30 minutes, at least 24 hours and not more than 48 hours before the measurements.<br><br>Capacitance change: ≤ ±20% of initial measured value<br>ESR change : ≤ 200% of initial specified value<br>Leakage current : ≤ initial specified value |      |              |      |                   |  |
| Vibration Rating                 | 10-55Hz, 10g sinusoidal in three axis, 2 hours per axis.                                                                                                                                                                                                                                                                                                                                                                                                                              |      |              |      |                   |  |
| Maximum Tightening Torque        | Terminal Code                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      | Thread Size  |      | 3 Threads Engaged |  |
|                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |              |      | 6 Threads Engaged |  |
|                                  | CT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      | M5x0.8       |      | 18.0              |  |
| Typical Inductance               | 25nH at 1MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |              |      |                   |  |
| Custom Designs                   | Custom CV values per case size may be available upon request. Contact appropriate representative with specific requirements.                                                                                                                                                                                                                                                                                                                                                          |      |              |      |                   |  |

# UTOR Series

## Diagram of Dimensions - Screw Terminals

### Toroidal Large Can/Screw Terminals

Unit: mm and inches



Note:  
In some cases, the color of the sleeve may change slightly due to the operating conditions, however, the discoloration will not impair capacitor function.

### Terminal Specifications in Millimeters

| Terminal Code | Thread Size | Minimum Thread Depth | J<br>± 0.50 | ØS<br>± 0.25 | ØT<br>± 0.25 |
|---------------|-------------|----------------------|-------------|--------------|--------------|
| CT            | M5x0.8      | 10.5                 | 7.0         | 13.0         | 18.5         |

### Terminal Specifications in Inches

| Terminal Code | Thread Size | Minimum Thread Depth | J<br>± 0.020 | ØS<br>± 0.010 | ØT<br>± 0.010 |
|---------------|-------------|----------------------|--------------|---------------|---------------|
| CT            | M5x0.8      | 0.413                | 0.276        | 0.512         | 0.728         |

### Case Dimensions in Millimeters

| ØA<br>± 0.20 | ØA'<br>± 0.30 | B<br>± 0.5 | F<br>± 0.25 |
|--------------|---------------|------------|-------------|
| 16.3         | 18.9          | 9.5        | 31.8        |

### Case Dimensions in Inches

| ØA<br>± 0.008 | ØA'<br>± 0.012 | B<br>± 0.020 | F<br>± 0.010 |
|---------------|----------------|--------------|--------------|
| 0.642         | 0.744          | 0.374        | 1.250        |

| Case Size Code | ØD<br>+2.0 | L<br>+2.0 | H<br>±1.0 |
|----------------|------------|-----------|-----------|
| E54            | 76         | 54        | 61        |
| E67            | 76         | 67        | 74        |
| E79            | 76         | 79        | 86        |
| E92            | 76         | 92        | 99        |
| EA5            | 76         | 105       | 112       |
| EB7            | 76         | 117       | 124       |
| ED0            | 76         | 130       | 137       |
| EE3            | 76         | 143       | 150       |
| EF5            | 76         | 155       | 162       |
| EG8            | 76         | 168       | 175       |

| Case Size Code | ØD<br>+0.080 | L<br>+0.080 | H<br>± 0.040 |
|----------------|--------------|-------------|--------------|
| E54            | 3.000        | 2.125       | 2.402        |
| E67            | 3.000        | 2.625       | 2.913        |
| E79            | 3.000        | 3.125       | 3.386        |
| E92            | 3.000        | 3.625       | 3.898        |
| EA5            | 3.000        | 4.125       | 4.409        |
| EB7            | 3.000        | 4.625       | 4.882        |
| ED0            | 3.000        | 5.125       | 5.394        |
| EE3            | 3.000        | 5.625       | 5.906        |
| EF5            | 3.000        | 6.125       | 6.378        |
| EG8            | 3.000        | 6.625       | 6.890        |

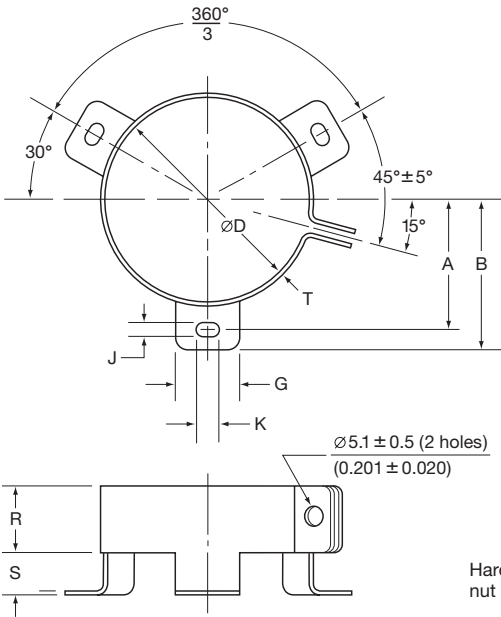


# UTORSeries

## Mounting Hardware - Screw Terminals

### Type C: Three-Footed Clamp

Unit: mm (inches)



Hardware: Screw, washer and hexagon nut included with each clamp.

### Type C: Clamp Specifications

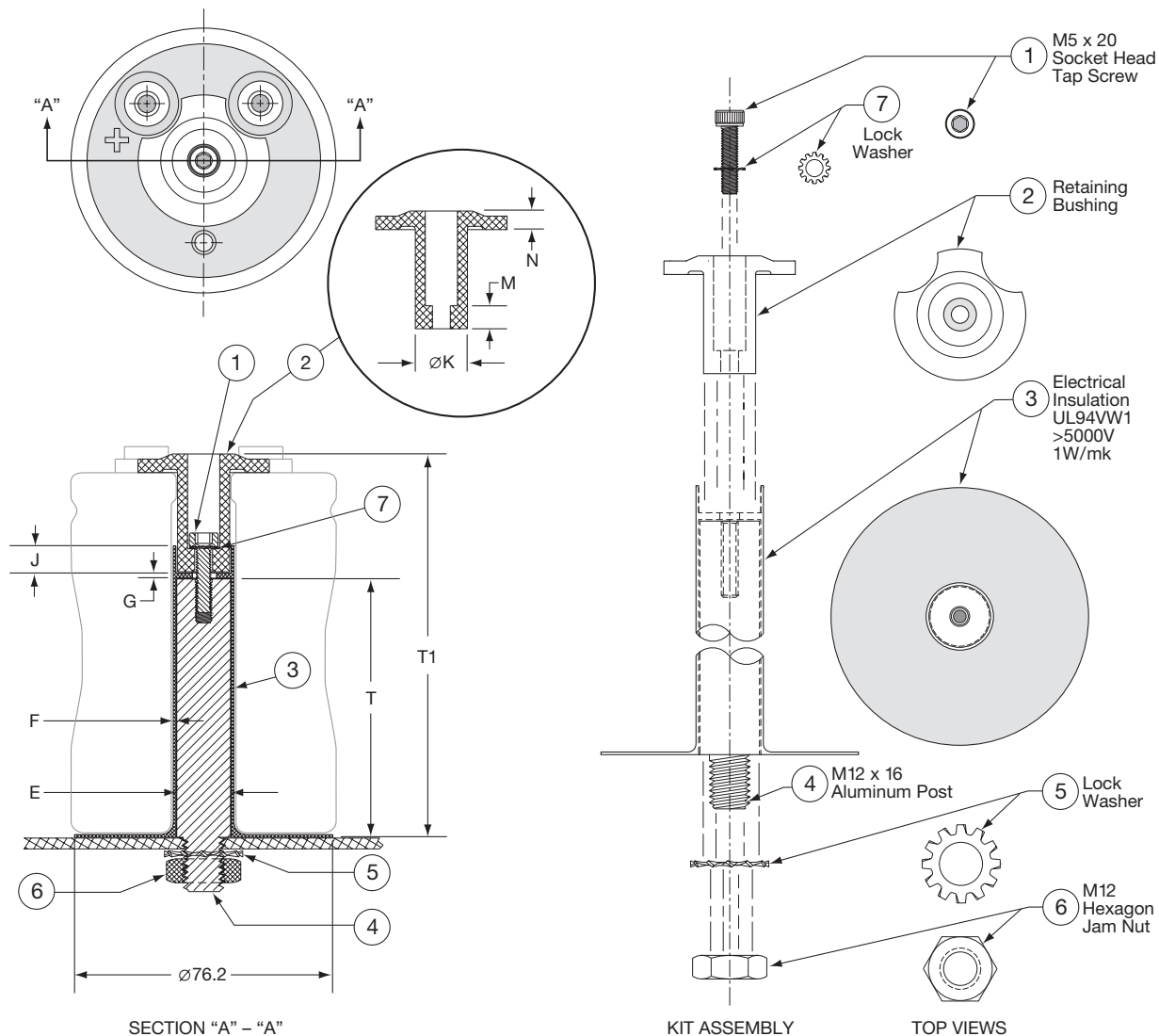
| Mounting Code | Case ØD      | A<br>±1.0 (0.040) | B<br>±1.0 (0.040) | G<br>±1.0 (0.040) | J<br>±0.5 (0.020) | K<br>±0.5 (0.020) | R<br>±1.0 (0.040) | S<br>±1.0 (0.040) | T<br>±0.5 (0.020) |
|---------------|--------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| C             | 76.2 (3.000) | 44.5 (1.750)      | 49.2 (1.937)      | 13.3 (0.524)      | 4.5 (0.177)       | 7.1 (0.280)       | 19.1 (0.751)      | 9.5 (0.374)       | 1.0 (0.040)       |

# UTOR Series

## Mounting Hardware - Screw Terminals

### Type H: Heat Sink Mounting Kit

Unit: mm (inches)



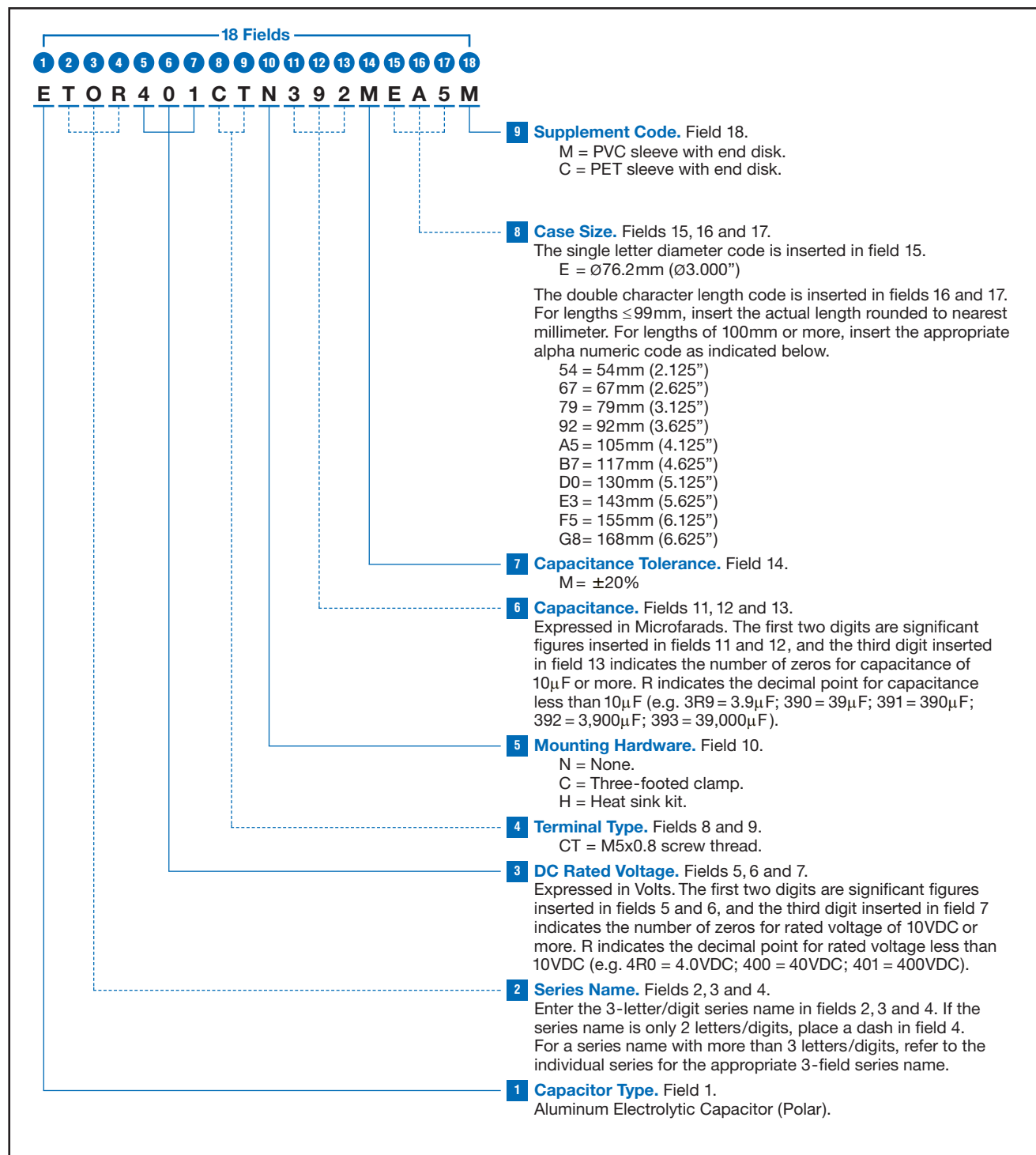
### Type H: Heat Sink Mounting Kit Dimensions

| Mounting Code | Case Size Code | T<br>± 0.2 (0.008) | T1<br>± 0.5 (0.020) |
|---------------|----------------|--------------------|---------------------|
| H             | E54            | 35 (1.378)         | 58 (2.280)          |
| H             | E67            | 35 (1.378)         | 71 (2.780)          |
| H             | E79            | 60 (2.362)         | 83 (3.280)          |
| H             | E92            | 60 (2.362)         | 96 (3.780)          |
| H             | EA5            | 60 (2.362)         | 109 (4.280)         |
| H             | EB7            | 60 (2.362)         | 121 (4.780)         |
| H             | ED0            | 111 (4.370)        | 134 (5.280)         |
| H             | EE3            | 111 (4.370)        | 147 (5.780)         |
| H             | EF5            | 111 (4.370)        | 160 (6.280)         |
| H             | EG8            | 111 (4.370)        | 172 (6.780)         |

| Dimension | Millimeters  | Inches        |
|-----------|--------------|---------------|
| E         | 18.6 Max.    | 0.732 Max.    |
| F         | 0.56 ± 0.05  | 0.022 ± 0.002 |
| G         | 2.00 ± 0.13  | 0.080 ± 0.005 |
| J         | 8.00 ± 0.13  | 0.315 ± 0.005 |
| ØK        | 15.24 ± 0.20 | 0.600 ± 0.008 |
| M         | 6.76 ± 0.13  | 0.266 ± 0.005 |
| N         | 5.49 ± 0.13  | 0.216 ± 0.005 |

# UTOR Series

**Part Numbering System for UTOR Series** When ordering, always specify complete 18-field global part number.







## UTOR<sup>Series</sup>

### Standard Voltage Ratings - Screw Terminals

| Rated Voltage<br>(WVDC)      | Capacitance<br>(μF) | Global<br>Part Number† | Nominal<br>Case Size*<br>D × L (mm) | Case<br>Size<br>Code | Maximum ESR<br>(mΩ) at<br>+25°C, 120Hz | Rated Ripple Current<br>(A rms) at +105°C |       |       |
|------------------------------|---------------------|------------------------|-------------------------------------|----------------------|----------------------------------------|-------------------------------------------|-------|-------|
|                              |                     |                        |                                     |                      |                                        | 120Hz                                     | 300Hz | >3kHz |
| 350 Volts<br>400 Volts Surge | 1,800               | ETOR351CTN182ME54M     | 76 × 54                             | E54                  | 44                                     | 11.8                                      | 14.1  | 16.5  |
|                              | 2,700               | ETOR351CTN272ME67M     | 76 × 67                             | E67                  | 30                                     | 15.4                                      | 18.5  | 21.6  |
|                              | 3,300               | ETOR351CTN332ME79M     | 76 × 79                             | E79                  | 24                                     | 17.1                                      | 20.5  | 23.9  |
|                              | 4,700               | ETOR351CTN472ME92M     | 76 × 92                             | E92                  | 17                                     | 21.6                                      | 26.0  | 30.3  |
|                              | 5,600               | ETOR351CTN562MEA5M     | 76 × 105                            | EA5                  | 14                                     | 24.9                                      | 29.9  | 34.9  |
|                              | 6,800               | ETOR351CTN682MED0M     | 76 × 130                            | ED0                  | 12                                     | 30.2                                      | 36.2  | 42.2  |
|                              | 8,200               | ETOR351CTN822MEE3M     | 76 × 143                            | EE3                  | 10                                     | 34.5                                      | 41.4  | 48.3  |
|                              | 10,000              | ETOR351CTN103MEG8M     | 76 × 168                            | EG8                  | 8                                      | 41.0                                      | 49.2  | 57.4  |
| 400 Volts<br>450 Volts Surge | 1,500               | ETOR401CTN152ME54M     | 76 × 54                             | E54                  | 53                                     | 10.7                                      | 12.9  | 15.0  |
|                              | 2,200               | ETOR401CTN222ME67M     | 76 × 67                             | E67                  | 36                                     | 13.9                                      | 16.7  | 19.5  |
|                              | 2,700               | ETOR401CTN272ME79M     | 76 × 79                             | E79                  | 30                                     | 15.4                                      | 18.5  | 21.6  |
|                              | 3,300               | ETOR401CTN332ME92M     | 76 × 92                             | E92                  | 24                                     | 18.1                                      | 21.8  | 25.4  |
|                              | 3,900               | ETOR401CTN392MEA5M     | 76 × 105                            | EA5                  | 21                                     | 20.8                                      | 25.0  | 29.1  |
|                              | 4,700               | ETOR401CTN472MEB7M     | 76 × 117                            | EB7                  | 17                                     | 24.0                                      | 28.8  | 33.6  |
|                              | 5,600               | ETOR401CTN562MED0M     | 76 × 130                            | ED0                  | 14                                     | 27.4                                      | 32.9  | 38.3  |
|                              | 6,800               | ETOR401CTN682MEE3M     | 76 × 143                            | EE3                  | 12                                     | 31.4                                      | 37.7  | 44.0  |
|                              | 8,200               | ETOR401CTN822MEG8M     | 76 × 168                            | EG8                  | 10                                     | 37.1                                      | 44.5  | 52.0  |
| 420 Volts<br>470 Volts Surge | 1,200               | ETOR421CTN122ME54M     | 76 × 54                             | E54                  | 89                                     | 9.3                                       | 11.1  | 13.0  |
|                              | 1,800               | ETOR421CTN182ME67M     | 76 × 67                             | E67                  | 59                                     | 12.2                                      | 14.6  | 17.1  |
|                              | 2,200               | ETOR421CTN222ME79M     | 76 × 79                             | E79                  | 40                                     | 14.9                                      | 17.9  | 20.9  |
|                              | 3,300               | ETOR421CTN332ME92M     | 76 × 92                             | E92                  | 32                                     | 17.5                                      | 21.0  | 24.5  |
|                              | 3,900               | ETOR421CTN392MEA5M     | 76 × 105                            | EA5                  | 27                                     | 20.1                                      | 24.1  | 28.2  |
|                              | 4,700               | ETOR421CTN472MED0M     | 76 × 130                            | ED0                  | 23                                     | 24.2                                      | 29.1  | 33.9  |
|                              | 5,600               | ETOR421CTN562MEE3M     | 76 × 143                            | EE3                  | 19                                     | 27.6                                      | 33.1  | 38.6  |
|                              | 6,800               | ETOR421CTN682MEG8M     | 76 × 168                            | EG8                  | 16                                     | 32.7                                      | 39.2  | 45.7  |
| 450 Volts<br>500 Volts Surge | 1,000               | ETOR451CTN102ME54M     | 76 × 54                             | E54                  | 89                                     | 9.3                                       | 11.1  | 13.0  |
|                              | 1,500               | ETOR451CTN152ME67M     | 76 × 67                             | E67                  | 59                                     | 12.2                                      | 14.6  | 17.1  |
|                              | 2,200               | ETOR451CTN222ME79M     | 76 × 79                             | E79                  | 48                                     | 13.5                                      | 16.2  | 18.9  |
|                              | 2,700               | ETOR451CTN272ME92M     | 76 × 92                             | E92                  | 40                                     | 15.9                                      | 19.0  | 22.2  |
|                              | 3,300               | ETOR451CTN332MEA5M     | 76 × 105                            | EA5                  | 32                                     | 18.5                                      | 22.2  | 25.9  |
|                              | 3,900               | ETOR451CTN392MEB7M     | 76 × 117                            | EB7                  | 27                                     | 21.1                                      | 25.3  | 29.6  |
|                              | 4,700               | ETOR451CTN472MED0M     | 76 × 130                            | ED0                  | 23                                     | 24.2                                      | 29.1  | 33.9  |
|                              | 5,600               | ETOR451CTN562MEF5M     | 76 × 155                            | EF5                  | 19                                     | 28.6                                      | 34.3  | 40.1  |
| 500 Volts<br>550 Volts Surge | 680                 | ETOR501CTN681ME54M     | 76 × 54                             | E54                  | 206                                    | 6.5                                       | 7.8   | 9.1   |
|                              | 1,000               | ETOR501CTN102ME67M     | 76 × 67                             | E67                  | 140                                    | 8.4                                       | 10.1  | 11.8  |
|                              | 1,500               | ETOR501CTN152ME79M     | 76 × 79                             | E79                  | 93                                     | 10.3                                      | 12.4  | 14.4  |
|                              | 1,800               | ETOR501CTN182ME92M     | 76 × 92                             | E92                  | 78                                     | 12.0                                      | 14.4  | 16.8  |
|                              | 2,200               | ETOR501CTN222MEA5M     | 76 × 105                            | EA5                  | 64                                     | 14.0                                      | 16.8  | 19.6  |
|                              | 2,700               | ETOR501CTN272MEB7M     | 76 × 117                            | EB7                  | 52                                     | 16.3                                      | 19.5  | 22.8  |
|                              | 3,300               | ETOR501CTN332MEE3M     | 76 × 143                            | EE3                  | 42                                     | 19.6                                      | 23.5  | 27.4  |
|                              | 3,900               | ETOR501CTN392MEG8M     | 76 × 168                            | EG8                  | 36                                     | 22.1                                      | 26.5  | 31.0  |

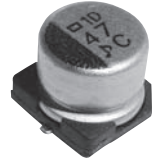
†For mounting and construction options, refer to the part numbering system for descriptions and codes.

\*Refer to diagram of dimensions for detailed case size specifications.



## Alchip™-MAR Series

- Suitable for small and low profile product such as the car audio and electronics
- Non solvent resistant type
- RoHS2 Compliant

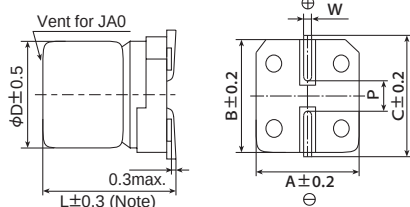


## ◆ SPECIFICATIONS

| Items                                                        | Characteristics                                                                                                                                                                                                                                                                    |            |                                      |      |      |      |      |      |                 |  |
|--------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|--------------------------------------|------|------|------|------|------|-----------------|--|
| Category                                                     | -40 to +85℃                                                                                                                                                                                                                                                                        |            |                                      |      |      |      |      |      |                 |  |
| Temperature Range                                            |                                                                                                                                                                                                                                                                                    |            |                                      |      |      |      |      |      |                 |  |
| Rated Voltage Range                                          | 6.3 to 50V <sub>dc</sub>                                                                                                                                                                                                                                                           |            |                                      |      |      |      |      |      |                 |  |
| Capacitance Tolerance                                        | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                          |            |                                      |      |      |      |      |      |                 |  |
| Leakage Current                                              | I=0.01CV or 3μA, whichever is greater.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 2 minutes)                                                                                                                       |            |                                      |      |      |      |      |      |                 |  |
| Dissipation Factor<br>(tan δ )                               | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                   |            | 6.3V                                 | 10V  | 16V  | 25V  | 35V  | 50V  | (at 20℃, 120Hz) |  |
|                                                              | tan δ (Max.)                                                                                                                                                                                                                                                                       | D55 to F55 | 0.30                                 | 0.24 | 0.20 | 0.16 | 0.14 | 0.12 |                 |  |
|                                                              |                                                                                                                                                                                                                                                                                    | H63 to JA0 | 0.40                                 | 0.30 | 0.26 | 0.16 | 0.14 | 0.12 |                 |  |
| Low Temperature<br>Characteristics<br>(Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                   |            | 6.3V                                 | 10V  | 16V  | 25V  | 35V  | 50V  | (at 120Hz)      |  |
|                                                              | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                    |            | 4                                    | 3    | 2    | 2    | 2    | 2    |                 |  |
|                                                              | Z(-40℃)/Z(+20℃)                                                                                                                                                                                                                                                                    |            | 12                                   | 8    | 6    | 4    | 3    | 3    |                 |  |
| Endurance                                                    | The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 2,000 hours at 85℃.                                                                                                                                 |            |                                      |      |      |      |      |      |                 |  |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                 |            | ≤ ±20% of the initial value          |      |      |      |      |      |                 |  |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                      |            | ≤200% of the initial specified value |      |      |      |      |      |                 |  |
|                                                              | Leakage current                                                                                                                                                                                                                                                                    |            | ≤The initial specified value         |      |      |      |      |      |                 |  |
| Shelf Life                                                   | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 500 hours at 85℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |            |                                      |      |      |      |      |      |                 |  |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                 |            | ≤ ±20% of the initial value          |      |      |      |      |      |                 |  |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                      |            | ≤200% of the initial specified value |      |      |      |      |      |                 |  |
|                                                              | Leakage current                                                                                                                                                                                                                                                                    |            | ≤The initial specified value         |      |      |      |      |      |                 |  |

## ◆ DIMENSIONS[mm]

## ● Terminal Code : A



Note : L±0.5 for H63 to JA0

| Size code | D   | L    | A    | B    | C    | W          | P   |
|-----------|-----|------|------|------|------|------------|-----|
| D55       | 4   | 5.2  | 4.3  | 4.3  | 5.1  | 0.5 to 0.8 | 1.0 |
| E55       | 5   | 5.2  | 5.3  | 5.3  | 5.9  | 0.5 to 0.8 | 1.4 |
| F55       | 6.3 | 5.2  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| H63       | 8   | 6.3  | 8.3  | 8.3  | 9.0  | 0.5 to 0.8 | 2.3 |
| HA0       | 8   | 10.0 | 8.3  | 8.3  | 9.0  | 0.7 to 1.1 | 3.1 |
| JA0       | 10  | 10.0 | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |

## ◆ MARKING

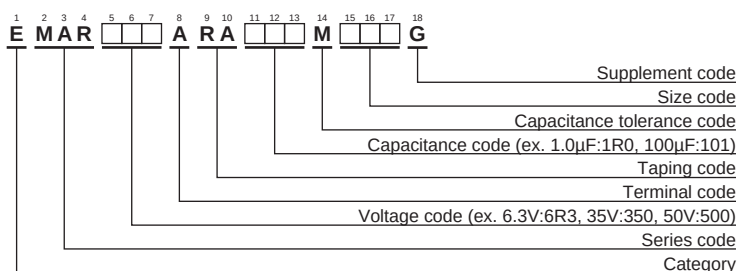
EX) 16V47μF



## ● Rated voltage symbol

| Rated voltage(V <sub>dc</sub> ) | Symbol |
|---------------------------------|--------|
| 6.3                             | j      |
| 10                              | A      |
| 16                              | C      |
| 25                              | E      |
| 35                              | V      |
| 50                              | H      |

## ◆ PART NUMBERING SYSTEM



Please refer to "Product code guide (surface mount type)"



## Alchip™-MAR Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Size Code | tan δ | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Size Code | tan δ | Part No.           |
|--------------------------|-------------|-----------|-------|--------------------|--------------------------|-------------|-----------|-------|--------------------|
| 6.3                      | 22          | D55       | 0.30  | EMAR6R3ARA220MD55G | 25                       | 4.7         | D55       | 0.16  | EMAR250ARA4R7MD55G |
|                          | 33          | E55       | 0.30  | EMAR6R3ARA330ME55G |                          | 10          | E55       | 0.16  | EMAR250ARA100ME55G |
|                          | 47          | E55       | 0.30  | EMAR6R3ARA470ME55G |                          | 22          | F55       | 0.16  | EMAR250ARA220MF55G |
|                          | 100         | F55       | 0.30  | EMAR6R3ARA101MF55G |                          | 33          | F55       | 0.16  | EMAR250ARA330MF55G |
|                          | 220         | H63       | 0.40  | EMAR6R3ARA221MH63G |                          | 47          | H63       | 0.16  | EMAR250ARA470MH63G |
|                          | 330         | H63       | 0.40  | EMAR6R3ARA331MH63G |                          | 100         | H63       | 0.16  | EMAR250ARA101MH63G |
|                          | 470         | HA0       | 0.40  | EMAR6R3ARA471MHA0G |                          | 220         | HA0       | 0.16  | EMAR250ARA221MHA0G |
| 10                       | 1,000       | JA0       | 0.40  | EMAR6R3ARA102MJA0G |                          | 330         | JA0       | 0.16  | EMAR250ARA331MJA0G |
|                          | 10          | D55       | 0.24  | EMAR100ARA100MD55G | 35                       | 3.3         | D55       | 0.14  | EMAR350ARA3R3MD55G |
|                          | 22          | E55       | 0.24  | EMAR100ARA220ME55G |                          | 4.7         | D55       | 0.14  | EMAR350ARA4R7MD55G |
|                          | 33          | E55       | 0.24  | EMAR100ARA330ME55G |                          | 10          | E55       | 0.14  | EMAR350ARA100ME55G |
|                          | 47          | F55       | 0.24  | EMAR100ARA470MF55G |                          | 22          | F55       | 0.14  | EMAR350ARA220MF55G |
|                          | 100         | F55       | 0.24  | EMAR100ARA101MF55G |                          | 33          | H63       | 0.14  | EMAR350ARA330MH63G |
|                          | 220         | H63       | 0.30  | EMAR100ARA221MH63G |                          | 47          | H63       | 0.14  | EMAR350ARA470MH63G |
|                          | 330         | HA0       | 0.30  | EMAR100ARA331MHA0G |                          | 100         | HA0       | 0.14  | EMAR350ARA101MHA0G |
| 16                       | 470         | JA0       | 0.30  | EMAR100ARA471MJA0G |                          | 220         | JA0       | 0.14  | EMAR350ARA221MJA0G |
|                          | 4.7         | D55       | 0.20  | EMAR160ARA4R7MD55G | 50                       | 1.0         | D55       | 0.12  | EMAR500ARA1R0MD55G |
|                          | 10          | D55       | 0.20  | EMAR160ARA100MD55G |                          | 2.2         | D55       | 0.12  | EMAR500ARA2R2MD55G |
|                          | 22          | E55       | 0.20  | EMAR160ARA220ME55G |                          | 3.3         | D55       | 0.12  | EMAR500ARA3R3MD55G |
|                          | 33          | F55       | 0.20  | EMAR160ARA330MF55G |                          | 4.7         | E55       | 0.12  | EMAR500ARA4R7ME55G |
|                          | 47          | F55       | 0.20  | EMAR160ARA470MF55G |                          | 10          | F55       | 0.12  | EMAR500ARA100MF55G |
|                          | 100         | H63       | 0.26  | EMAR160ARA101MH63G |                          | 22          | H63       | 0.12  | EMAR500ARA220MH63G |
|                          | 220         | HA0       | 0.26  | EMAR160ARA221MHA0G |                          | 33          | H63       | 0.12  | EMAR500ARA330MH63G |
|                          | 330         | HA0       | 0.26  | EMAR160ARA331MHA0G |                          | 47          | HA0       | 0.12  | EMAR500ARA470MHA0G |
|                          | 470         | JA0       | 0.26  | EMAR160ARA471MJA0G |                          | 100         | JA0       | 0.12  | EMAR500ARA101MJA0G |

Production of the products shown in   is scheduled to be discontinued.

## Alchip™-MAK Series

- Suitable for small and low profile product such as the car audio and electronics
- Non solvent resistant type
- RoHS2 Compliant

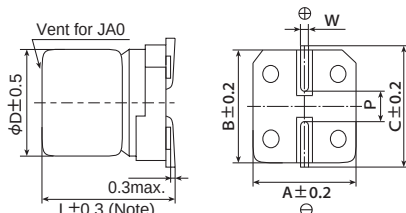


## ◆ SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                       |                                      |      |      |      |      |                                      |                 |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------|------|------|------|--------------------------------------|-----------------|
| Category                                               |                                                                                                                                                                                                                                                                                       |                                      |      |      |      |      |                                      |                 |
| Temperature Range                                      | -40 to +105℃                                                                                                                                                                                                                                                                          |                                      |      |      |      |      |                                      |                 |
| Rated Voltage Range                                    | 6.3 to 50V <sub>dc</sub>                                                                                                                                                                                                                                                              |                                      |      |      |      |      |                                      |                 |
| Capacitance Tolerance                                  | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                             |                                      |      |      |      |      |                                      |                 |
| Leakage Current                                        | I=0.01CV or 3μA, whichever is greater.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 2 minutes)                                                                                                                          |                                      |      |      |      |      |                                      |                 |
| Dissipation Factor (tan δ )                            | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 6.3V                                 | 10V  | 16V  | 25V  | 35V  | 50V                                  | (at 20℃, 120Hz) |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.30                                 | 0.26 | 0.22 | 0.16 | 0.13 | 0.12                                 |                 |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 6.3V                                 | 10V  | 16V  | 25V  | 35V  | 50V                                  | (at 120Hz)      |
|                                                        | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 4                                    | 3    | 2    | 2    | 2    | 2                                    |                 |
|                                                        | Z(-40℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 8                                    | 5    | 4    | 3    | 3    | 3                                    |                 |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 1,000 hours at 105℃.                                                                                                                                   |                                      |      |      |      |      |                                      |                 |
|                                                        | Size code                                                                                                                                                                                                                                                                             | D55 to F55                           |      |      |      |      | H63 to JA0                           |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±30% of the initial value          |      |      |      |      | ≤ ±20% of the initial value          |                 |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤200% of the initial specified value |      |      |      |      | ≤200% of the initial specified value |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value         |      |      |      |      | ≤The initial specified value         |                 |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                      |      |      |      |      |                                      |                 |
|                                                        | Size code                                                                                                                                                                                                                                                                             | D55 to F55                           |      |      |      |      | H63 to JA0                           |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | ≤ ±30% of the initial value          |      |      |      |      | ≤ ±20% of the initial value          |                 |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                         | ≤200% of the initial specified value |      |      |      |      | ≤200% of the initial specified value |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | ≤The initial specified value         |      |      |      |      | ≤The initial specified value         |                 |

## ◆ DIMENSIONS[mm]

- Terminal Code : A



Note : L±0.5 for H63 to JA0

| Size code | D   | L    | A    | B    | C    | W          | P   |
|-----------|-----|------|------|------|------|------------|-----|
| D55       | 4   | 5.2  | 4.3  | 4.3  | 5.1  | 0.5 to 0.8 | 1.0 |
| E55       | 5   | 5.2  | 5.3  | 5.3  | 5.9  | 0.5 to 0.8 | 1.4 |
| F55       | 6.3 | 5.2  | 6.6  | 6.6  | 7.2  | 0.5 to 0.8 | 1.9 |
| H63       | 8   | 6.3  | 8.3  | 8.3  | 9.0  | 0.5 to 0.8 | 2.3 |
| HA0       | 8   | 10.0 | 8.3  | 8.3  | 9.0  | 0.7 to 1.1 | 3.1 |
| JA0       | 10  | 10.0 | 10.3 | 10.3 | 11.0 | 0.7 to 1.1 | 4.5 |

## ◆ MARKING

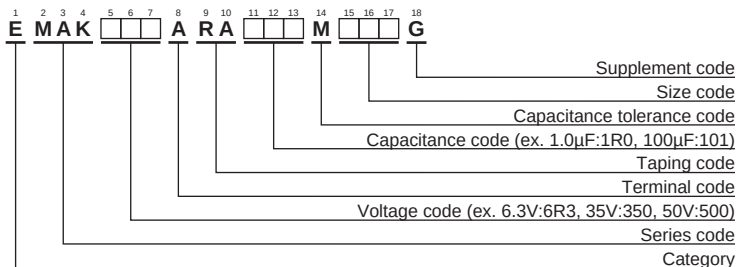
EX) 10V100μF



- Rated voltage symbol

| Rated voltage(V <sub>dc</sub> ) | Symbol |
|---------------------------------|--------|
| 6.3                             | j      |
| 10                              | A      |
| 16                              | C      |
| 25                              | E      |
| 35                              | V      |
| 50                              | H      |

## ◆ PART NUMBERING SYSTEM



Please refer to "Product code guide (surface mount type)"



## Alchip™-MAK Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Size Code | tan δ | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Size Code | tan δ | Part No.           |
|--------------------------|-------------|-----------|-------|--------------------|--------------------------|-------------|-----------|-------|--------------------|
| 6.3                      | 22          | D55       | 0.30  | EMAK6R3ARA220MD55G | 25                       | 4.7         | D55       | 0.16  | EMAK250ARA4R7MD55G |
|                          | 33          | E55       | 0.30  | EMAK6R3ARA330ME55G |                          | 10          | E55       | 0.16  | EMAK250ARA100ME55G |
|                          | 47          | E55       | 0.30  | EMAK6R3ARA470ME55G |                          | 22          | F55       | 0.16  | EMAK250ARA220MF55G |
|                          | 100         | F55       | 0.30  | EMAK6R3ARA101MF55G |                          | 33          | F55       | 0.16  | EMAK250ARA330MF55G |
|                          | 220         | H63       | 0.30  | EMAK6R3ARA221MH63G |                          | 47          | H63       | 0.16  | EMAK250ARA470MH63G |
|                          | 330         | H63       | 0.30  | EMAK6R3ARA331MH63G |                          | 100         | HA0       | 0.16  | EMAK250ARA101MHA0G |
|                          | 470         | HA0       | 0.30  | EMAK6R3ARA471MHA0G |                          | 330         | JA0       | 0.16  | EMAK250ARA331MJA0G |
| 10                       | 1,000       | JA0       | 0.30  | EMAK6R3ARA102MJA0G | 35                       | 4.7         | D55       | 0.13  | EMAK350ARA4R7MD55G |
|                          | 22          | E55       | 0.26  | EMAK100ARA220ME55G |                          | 10          | E55       | 0.13  | EMAK350ARA100ME55G |
|                          | 33          | E55       | 0.26  | EMAK100ARA330ME55G |                          | 22          | F55       | 0.13  | EMAK350ARA220MF55G |
|                          | 47          | F55       | 0.26  | EMAK100ARA470MF55G |                          | 33          | H63       | 0.13  | EMAK350ARA330MH63G |
|                          | 100         | F55       | 0.26  | EMAK100ARA101MF55G |                          | 47          | HA0       | 0.13  | EMAK350ARA470MHA0G |
|                          | 220         | H63       | 0.26  | EMAK100ARA221MH63G |                          | 100         | JA0       | 0.13  | EMAK350ARA101MJA0G |
|                          | 330         | HA0       | 0.26  | EMAK100ARA331MHA0G |                          | 220         | JA0       | 0.13  | EMAK350ARA221MJA0G |
| 16                       | 470         | JA0       | 0.26  | EMAK100ARA471MJA0G | 50                       | 1.0         | D55       | 0.12  | EMAK500ARA1R0MD55G |
|                          | 10          | D55       | 0.22  | EMAK160ARA100MD55G |                          | 2.2         | D55       | 0.12  | EMAK500ARA2R2MD55G |
|                          | 22          | E55       | 0.22  | EMAK160ARA220ME55G |                          | 3.3         | D55       | 0.12  | EMAK500ARA3R3MD55G |
|                          | 47          | F55       | 0.22  | EMAK160ARA470MF55G |                          | 4.7         | E55       | 0.12  | EMAK500ARA4R7ME55G |
|                          | 100         | H63       | 0.22  | EMAK160ARA101MH63G |                          | 10          | F55       | 0.12  | EMAK500ARA100MF55G |
|                          | 220         | HA0       | 0.22  | EMAK160ARA221MHA0G |                          | 22          | H63       | 0.12  | EMAK500ARA220MH63G |
|                          | 330         | HA0       | 0.22  | EMAK160ARA331MHA0G |                          | 33          | HA0       | 0.12  | EMAK500ARA330MHA0G |
|                          | 470         | JA0       | 0.22  | EMAK160ARA471MJA0G |                          | 47          | HA0       | 0.12  | EMAK500ARA470MHA0G |
|                          |             |           |       |                    |                          | 100         | JA0       | 0.12  | EMAK500ARA101MJA0G |

Production of the products shown in   is scheduled to be discontinued.

# AVH Series

- The oxide free copper lead wire and electrolyte on audio purpose are employed
- Non solvent resistant type
- RoHS2 Compliant

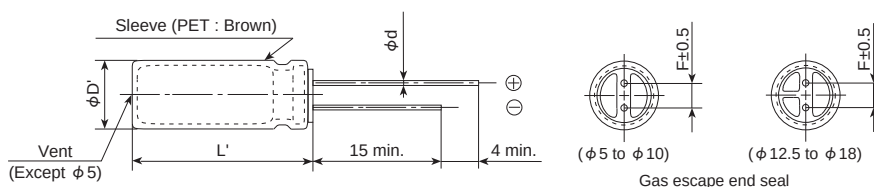


## SPECIFICATIONS

| Items                                                        | Characteristics                                                                                                                                                                                                                                                                    |                                      |      |      |      |      |      |      |      |      |
|--------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------|------|------|------|------|------|------|------|
| Category                                                     | -40 to +85℃                                                                                                                                                                                                                                                                        |                                      |      |      |      |      |      |      |      |      |
| Temperature Range                                            |                                                                                                                                                                                                                                                                                    |                                      |      |      |      |      |      |      |      |      |
| Rated Voltage Range                                          | 6.3 to 100V <sub>dc</sub>                                                                                                                                                                                                                                                          |                                      |      |      |      |      |      |      |      |      |
| Capacitance Tolerance                                        | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                          |                                      |      |      |      |      |      |      |      |      |
| Leakage Current                                              | I=0.03CV or 4μA, whichever is greater. (at 20℃ after 1 minute)<br>I=0.01CV or 3μA, whichever is greater. (at 20℃ after 2 minutes)<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)                                                     |                                      |      |      |      |      |      |      |      |      |
| Dissipation Factor<br>(tan δ )                               | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                   | 6.3V                                 | 10V  | 16V  | 25V  | 35V  | 50V  | 63V  | 80V  | 100V |
|                                                              | tan δ (Max.)                                                                                                                                                                                                                                                                       | 0.24                                 | 0.20 | 0.16 | 0.14 | 0.12 | 0.10 | 0.09 | 0.08 | 0.07 |
|                                                              | When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase. (at 20℃, 120Hz)                                                                                                                                                                   |                                      |      |      |      |      |      |      |      |      |
| Low Temperature<br>Characteristics<br>(Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                   | 6.3V                                 | 10V  | 16V  | 25V  | 35V  | 50V  | 63V  | 80V  | 100V |
|                                                              | Z(-25℃)／Z(+20℃)                                                                                                                                                                                                                                                                    | 4                                    | 3    | 2    | 2    | 2    | 2    | 2    | 2    | 2    |
|                                                              | Z(-40℃)／Z(+20℃)                                                                                                                                                                                                                                                                    | 10                                   | 8    | 6    | 4    | 3    | 3    | 3    | 3    | 3    |
| (at 120Hz)                                                   |                                                                                                                                                                                                                                                                                    |                                      |      |      |      |      |      |      |      |      |
| Endurance                                                    | The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 1,000 hours at 85℃.                                                                                                                                 |                                      |      |      |      |      |      |      |      |      |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                 | ≤ ±20% of the initial value          |      |      |      |      |      |      |      |      |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                      | ≤150% of the initial specified value |      |      |      |      |      |      |      |      |
|                                                              | Leakage current                                                                                                                                                                                                                                                                    | ≤The initial specified value         |      |      |      |      |      |      |      |      |
| Shelf Life                                                   | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 500 hours at 85℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                      |      |      |      |      |      |      |      |      |
|                                                              | Capacitance change                                                                                                                                                                                                                                                                 | ≤ ±20% of the initial value          |      |      |      |      |      |      |      |      |
|                                                              | D.F. (tan δ )                                                                                                                                                                                                                                                                      | ≤150% of the initial specified value |      |      |      |      |      |      |      |      |
|                                                              | Leakage current                                                                                                                                                                                                                                                                    | ≤The initial specified value         |      |      |      |      |      |      |      |      |

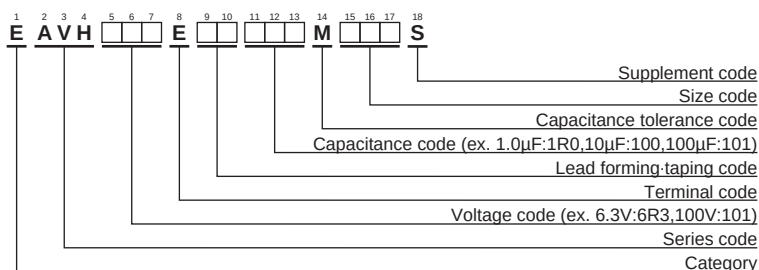
## DIMENSIONS[mm]

- Terminal Code : E



| φD  | 5           | 6.3 | 8   | 10  | 12.5 | 16         | 18  |
|-----|-------------|-----|-----|-----|------|------------|-----|
| φd  | 0.6         | 0.6 | 0.6 | 0.8 | 0.8  | 0.8        | 0.8 |
| F   | 2.0         | 2.5 | 3.5 | 5.0 | 5.0  | 7.5        | 7.5 |
| φD' | φD+0.5 max. |     |     |     |      |            |     |
| L'  | L+1.5 max.  |     |     |     |      | L+2.0 max. |     |

## PART NUMBERING SYSTEM



Please refer to "Product code guide (radial lead type)"





## AVH Series

## ◆ STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Part No.           |
|--------------------------|-------------|-----------------------|-------|--------------------|--------------------------|-------------|-----------------------|-------|--------------------|
| 6.3                      | 470         | 10 × 12.5             | 0.24  | EAVH6R3E□□471MJC5S | 50                       | 1.0         | 5 × 11                | 0.10  | EAVH500E□□1R0ME11S |
|                          | 1,000       | 10 × 20               | 0.24  | EAVH6R3E□□102MJ20S |                          | 2.2         | 5 × 11                | 0.10  | EAVH500E□□2R2ME11S |
|                          | 2,200       | 12.5 × 25             | 0.26  | EAVH6R3E□□222MK25S |                          | 3.3         | 5 × 11                | 0.10  | EAVH500E□□3R3ME11S |
|                          | 3,300       | 16 × 25               | 0.28  | EAVH6R3E□□332ML25S |                          | 4.7         | 5 × 11                | 0.10  | EAVH500E□□4R7ME11S |
|                          | 4,700       | 16 × 31.5             | 0.30  | EAVH6R3E□□472MLN3S |                          | 10          | 5 × 11                | 0.10  | EAVH500E□□100ME11S |
|                          | 6,800       | 16 × 35.5             | 0.34  | EAVH6R3E□□682MLP1S |                          | 22          | 6.3 × 11              | 0.10  | EAVH500E□□220MF11S |
|                          | 10,000      | 18 × 40               | 0.42  | EAVH6R3E□□103MM40S |                          | 33          | 8 × 11.5              | 0.10  | EAVH500E□□330MHB5S |
| 10                       | 47          | 5 × 11                | 0.20  | EAVH100E□□470ME11S |                          | 47          | 8 × 11.5              | 0.10  | EAVH500E□□470MHB5S |
|                          | 100         | 6.3 × 11              | 0.20  | EAVH100E□□101MF11S |                          | 100         | 10 × 16               | 0.10  | EAVH500E□□101MJ16S |
|                          | 220         | 8 × 11.5              | 0.20  | EAVH100E□□221MHB5S |                          | 220         | 12.5 × 20             | 0.10  | EAVH500E□□221MK20S |
|                          | 330         | 10 × 12.5             | 0.20  | EAVH100E□□331MJC5S |                          | 330         | 12.5 × 20             | 0.10  | EAVH500E□□331MK20S |
|                          | 470         | 10 × 16               | 0.20  | EAVH100E□□471MJ16S |                          | 470         | 16 × 25               | 0.10  | EAVH500E□□471ML25S |
|                          | 1,000       | 12.5 × 20             | 0.20  | EAVH100E□□102MK20S |                          | 1,000       | 16 × 31.5             | 0.10  | EAVH500E□□102MLN3S |
|                          | 2,200       | 16 × 25               | 0.22  | EAVH100E□□222ML25S | 63                       | 2.2         | 5 × 11                | 0.09  | EAVH630E□□2R2ME11S |
|                          | 3,300       | 16 × 31.5             | 0.24  | EAVH100E□□332MLN3S |                          | 3.3         | 5 × 11                | 0.09  | EAVH630E□□3R3ME11S |
|                          | 4,700       | 16 × 35.5             | 0.26  | EAVH100E□□472MLP1S |                          | 4.7         | 5 × 11                | 0.09  | EAVH630E□□4R7ME11S |
|                          | 6,800       | 18 × 40               | 0.30  | EAVH100E□□682MM40S |                          | 10          | 6.3 × 11              | 0.09  | EAVH630E□□100MF11S |
| 16                       | 33          | 5 × 11                | 0.16  | EAVH160E□□330ME11S |                          | 22          | 8 × 11.5              | 0.09  | EAVH630E□□220MHB5S |
|                          | 100         | 8 × 11.5              | 0.16  | EAVH160E□□101MHB5S |                          | 33          | 8 × 11.5              | 0.09  | EAVH630E□□330MHB5S |
|                          | 220         | 10 × 12.5             | 0.16  | EAVH160E□□221MJC5S |                          | 47          | 10 × 12.5             | 0.09  | EAVH630E□□470MJC5S |
|                          | 330         | 10 × 16               | 0.16  | EAVH160E□□331MJ16S |                          | 100         | 10 × 20               | 0.09  | EAVH630E□□101MJ20S |
|                          | 470         | 10 × 20               | 0.16  | EAVH160E□□471MJ20S |                          | 220         | 12.5 × 20             | 0.09  | EAVH630E□□221MK20S |
|                          | 1,000       | 12.5 × 25             | 0.16  | EAVH160E□□102MK25S |                          | 330         | 12.5 × 25             | 0.09  | EAVH630E□□331MK25S |
|                          | 2,200       | 16 × 25               | 0.18  | EAVH160E□□222ML25S |                          | 470         | 16 × 25               | 0.09  | EAVH630E□□471ML25S |
|                          | 3,300       | 16 × 35.5             | 0.20  | EAVH160E□□332MLP1S |                          | 1,000       | 18 × 35.5             | 0.09  | EAVH630E□□102MMP1S |
|                          | 4,700       | 18 × 35.5             | 0.22  | EAVH160E□□472MMP1S | 80                       | 47          | 10 × 16               | 0.08  | EAVH800E□□470MJ16S |
| 25                       | 22          | 5 × 11                | 0.14  | EAVH250E□□220ME11S |                          | 220         | 12.5 × 25             | 0.08  | EAVH800E□□221MK25S |
|                          | 47          | 6.3 × 11              | 0.14  | EAVH250E□□470MF11S |                          | 330         | 16 × 31.5             | 0.08  | EAVH800E□□331MLN3S |
|                          | 100         | 8 × 11.5              | 0.14  | EAVH250E□□101MHB5S |                          | 470         | 16 × 35.5             | 0.08  | EAVH800E□□471MLP1S |
|                          | 220         | 10 × 16               | 0.14  | EAVH250E□□221MJ16S | 100                      | 1.0         | 5 × 11                | 0.07  | EAVH101E□□1R0ME11S |
|                          | 330         | 10 × 20               | 0.14  | EAVH250E□□331MJ20S |                          | 2.2         | 5 × 11                | 0.07  | EAVH101E□□2R2ME11S |
|                          | 470         | 12.5 × 20             | 0.14  | EAVH250E□□471MK20S |                          | 3.3         | 5 × 11                | 0.07  | EAVH101E□□3R3ME11S |
|                          | 1,000       | 16 × 25               | 0.14  | EAVH250E□□102ML25S |                          | 4.7         | 6.3 × 11              | 0.07  | EAVH101E□□4R7MF11S |
|                          | 2,200       | 16 × 35.5             | 0.16  | EAVH250E□□222MLP1S |                          | 10          | 8 × 11.5              | 0.07  | EAVH101E□□100MHB5S |
|                          | 3,300       | 18 × 40               | 0.18  | EAVH250E□□332MM40S |                          | 22          | 10 × 12.5             | 0.07  | EAVH101E□□220MJC5S |
|                          | 33          | 6.3 × 11              | 0.12  | EAVH350E□□330MF11S |                          | 33          | 10 × 16               | 0.07  | EAVH101E□□330MJ16S |
|                          | 100         | 10 × 12.5             | 0.12  | EAVH350E□□101MJC5S |                          | 47          | 10 × 20               | 0.07  | EAVH101E□□470MJ20S |
|                          | 220         | 10 × 20               | 0.12  | EAVH350E□□221MJ20S |                          | 100         | 12.5 × 20             | 0.07  | EAVH101E□□101MK20S |
| 35                       | 470         | 12.5 × 25             | 0.12  | EAVH350E□□471MK25S |                          | 220         | 16 × 25               | 0.07  | EAVH101E□□221ML25S |
|                          | 1,000       | 16 × 25               | 0.12  | EAVH350E□□102ML25S |                          | 330         | 16 × 31.5             | 0.07  | EAVH101E□□331MLN3S |
|                          | 2,200       | 18 × 35.5             | 0.14  | EAVH350E□□222MMP1S |                          | 470         | 18 × 35.5             | 0.07  | EAVH101E□□471MMP1S |

□□ : Enter the appropriate lead forming or taping code.

Production of the products shown in □□□□ is scheduled to be discontinued.

# AWJ Series

- Please consult with us when you need "Bi-polar" type
- Non solvent resistant type
- RoHS2 Compliant

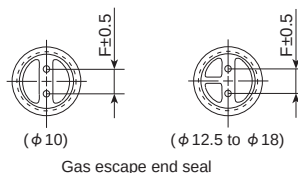
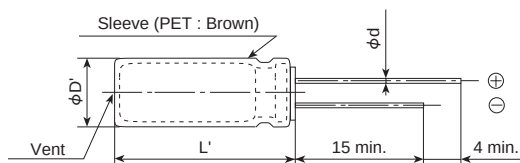


## ◆ SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                    |                                      |      |      |      |      |                 |
|--------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------|------|------|------|-----------------|
| Category                                               | Temperature Range                                                                                                                                                                                                                                                                  |                                      |      |      |      |      |                 |
| Temperature Range                                      | -40 to +85℃                                                                                                                                                                                                                                                                        |                                      |      |      |      |      |                 |
| Rated Voltage Range                                    | 16 to 100V <sub>dc</sub>                                                                                                                                                                                                                                                           |                                      |      |      |      |      |                 |
| Capacitance Tolerance                                  | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                          |                                      |      |      |      |      |                 |
| Leakage Current                                        | I =0.01CV or 3μA, whichever is greater.<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 2 minutes)                                                                                                                      |                                      |      |      |      |      |                 |
| Dissipation Factor (tan δ )                            | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                   | 16V                                  | 25V  | 50V  | 80V  | 100V | (at 20℃, 120Hz) |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                       | 0.16                                 | 0.14 | 0.10 | 0.08 | 0.07 |                 |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                   | 16V                                  | 25V  | 50V  | 80V  | 100V | (at 120Hz)      |
|                                                        | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                    | 2                                    | 2    | 2    | 2    | 2    |                 |
|                                                        | Z(-40℃)/Z(+20℃)                                                                                                                                                                                                                                                                    | 6                                    | 4    | 3    | 3    | 3    |                 |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 1,000 hours at 85℃.                                                                                                                                 |                                      |      |      |      |      |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                 | ≤ ±20% of the initial value          |      |      |      |      |                 |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                      | ≤150% of the initial specified value |      |      |      |      |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                    | ≤The initial specified value         |      |      |      |      |                 |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 500 hours at 85℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                      |      |      |      |      |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                 | ≤ ±20% of the initial value          |      |      |      |      |                 |
|                                                        | D.F. (tan δ )                                                                                                                                                                                                                                                                      | ≤150% of the initial specified value |      |      |      |      |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                    | ≤The initial specified value         |      |      |      |      |                 |

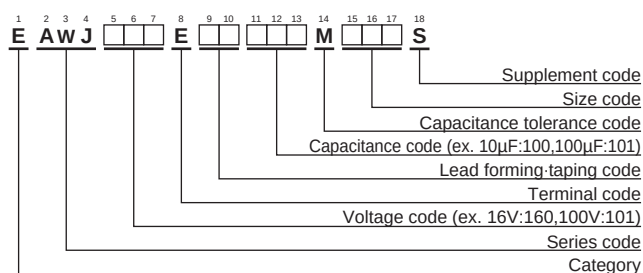
◆ DIMENSIONS [mm]

- Terminal Code : E



|           |                             |      |              |     |
|-----------|-----------------------------|------|--------------|-----|
| $\phi D$  | 10                          | 12.5 | 16           | 18  |
| $\phi d$  | 0.8                         | 0.8  | 0.8          | 0.8 |
| F         | 5.0                         |      | 7.5          |     |
| $\phi D'$ | $\phi D + 0.5 \text{ max.}$ |      |              |     |
| L'        | L + 1.5 max.                |      | L + 2.0 max. |     |

## ◆PART NUMBERING SYSTEM



Please refer to "Product code guide (radial lead type)"



## AWJ Series

## ◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Part No.           |
|--------------------------|-------------|-----------------------|-------|--------------------|--------------------------|-------------|-----------------------|-------|--------------------|
| 16                       | 220         | 10 × 20               | 0.16  | EAWJ160E□□221MJ20S | 80                       | 22          | 10 × 16               | 0.08  | EAWJ800E□□220MJ16S |
|                          | 330         | 12.5 × 20             | 0.16  | EAWJ160E□□331MK20S |                          | 33          | 10 × 20               | 0.08  | EAWJ800E□□330MJ20S |
|                          | 470         | 12.5 × 25             | 0.16  | EAWJ160E□□471MK25S |                          | 47          | 10 × 20               | 0.08  | EAWJ800E□□470MJ20S |
|                          | 1,000       | 16 × 31.5             | 0.16  | EAWJ160E□□102MLN3S |                          | 100         | 12.5 × 25             | 0.08  | EAWJ800E□□101MK25S |
| 25                       | 100         | 10 × 16               | 0.14  | EAWJ250E□□101MJ16S |                          | 220         | 16 × 31.5             | 0.08  | EAWJ800E□□221MLN3S |
|                          | 220         | 12.5 × 20             | 0.14  | EAWJ250E□□221MK20S |                          | 330         | 16 × 35.5             | 0.08  | EAWJ800E□□331MLP1S |
|                          | 330         | 12.5 × 25             | 0.14  | EAWJ250E□□331MK25S |                          | 470         | 18 × 40               | 0.08  | EAWJ800E□□471MM40S |
|                          | 470         | 16 × 25               | 0.14  | EAWJ250E□□471ML25S | 100                      | 10          | 10 × 16               | 0.07  | EAWJ101E□□100MJ16S |
|                          | 1,000       | 16 × 35.5             | 0.14  | EAWJ250E□□102MLP1S |                          | 22          | 10 × 20               | 0.07  | EAWJ101E□□220MJ20S |
| 50                       | 22          | 10 × 16               | 0.10  | EAWJ500E□□220MJ16S |                          | 33          | 12.5 × 20             | 0.07  | EAWJ101E□□330MK20S |
|                          | 33          | 10 × 16               | 0.10  | EAWJ500E□□330MJ16S |                          | 47          | 12.5 × 25             | 0.07  | EAWJ101E□□470MK25S |
|                          | 47          | 10 × 16               | 0.10  | EAWJ500E□□470MJ16S |                          | 100         | 16 × 25               | 0.07  | EAWJ101E□□101ML25S |
|                          | 100         | 12.5 × 20             | 0.10  | EAWJ500E□□101MK20S |                          | 220         | 18 × 35.5             | 0.07  | EAWJ101E□□221MMP1S |
|                          | 220         | 16 × 25               | 0.10  | EAWJ500E□□221ML25S |                          | 330         | 18 × 45               | 0.07  | EAWJ101E□□331MM45S |
|                          | 330         | 16 × 31.5             | 0.10  | EAWJ500E□□331MLN3S |                          |             |                       |       |                    |
|                          | 470         | 16 × 35.5             | 0.10  | EAWJ500E□□471MLP1S |                          |             |                       |       |                    |
|                          | 1,000       | 18 × 45               | 0.10  | EAWJ500E□□102MM45S |                          |             |                       |       |                    |

□□ : Enter the appropriate lead forming or taping code.

# Technical Note

## ——— Judicious Use of Aluminum Electrolytic Capacitors ———

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# 1. Overview of Aluminum Electrolytic Capacitors

## 1-1 Basic Model of Aluminum Electrolytic Capacitors

Capacitors are passive components. Among the various kinds of capacitors, aluminum electrolytic capacitors offer larger CV product per case size and lower cost than the others. In principles of capacitor, its fundamental model is shown in Fig. 1 and its capacitance (C) is expressed by Equation (1) below:

$$C = 8.854 \times 10^{-12} \frac{\epsilon r S}{d} \text{ (F)} \quad (1)$$

$\epsilon r$  : Dielectric constant

S : Surface area of dielectric (m<sup>2</sup>)

d : Thickness of dielectric (m)

Equation (1) shows that the capacitance (C) increases as the dielectric constant ( $\epsilon r$ ) and/or its surface area (S) increases and/or the dielectric thickness (d) decreases.

An aluminum electrolytic capacitor comprises a dielectric layer of aluminum oxide (Al<sub>2</sub>O<sub>3</sub>), the dielectric constant ( $\epsilon r$ ) of which is 8 to 10. This value is not significantly larger than those of other types of capacitors.

However, by extending the surface area (S) of the aluminum foil electrode by means of etching, and by electrochemically forming a thinner but highly voltage-withstandable layer of oxide layer dielectric, the aluminum electrolytic capacitor can offer a larger CV product per case size than other types of capacitors.

A basic model of aluminum electrolytic capacitor is shown in Fig. 2. An aluminum electrolytic capacitor comprises:

Anode ...Aluminum foil

Dielectric...Electrochemically formed oxide layer (Al<sub>2</sub>O<sub>3</sub>) on the anode

Cathode ...A true cathode is electrolytic solution (electrolyte).

Other component materials include a paper separator that holds electrolyte in place and another aluminum foil that functions as a draw-out electrode coming into contact with the true cathode (electrolyte).

In general, an aluminum electrolytic capacitor is asymmetrical in structure and polarized. The other capacitor type known as a bi-polar (non-polar) comprises the anodic aluminum foils for both electrodes.

## 1-2 Structure of Aluminum Electrolytic Capacitor

The aluminum electrolytic capacitor has, as shown in Fig. 3, a roll of anode foil, paper separator, cathode foil and electrode terminals (internal and external terminals) with the electrolyte impregnated, which is sealed in an aluminum can case with a sealing material.

The terminal draw-out structure, sealing material and structure differ depending on the type of the capacitor.

Figure 4 shows typical examples.

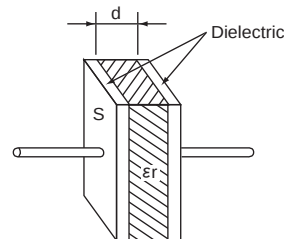
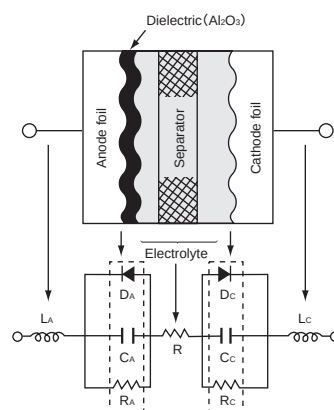


Fig-1 Basic model of capacitor



$C_A, C_C$  : Capacitance due to anode and cathodes foils  
 $D_A, D_C$  : Diode effects due to oxide layer on anode and cathode foils  
 $L_A, L_C$  : Inductance due to anode and cathode terminals  
 $R$  : Resistance of electrolyte and separator  
 $R_A, R_C$  : Internal resistance of oxide layer on anode and cathode foils

Fig-2 Basic model and equivalent circuit of aluminum electrolytic capacitor

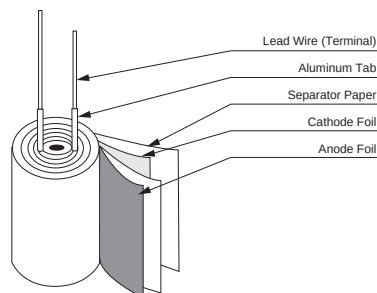


Fig-3 Basic model of element

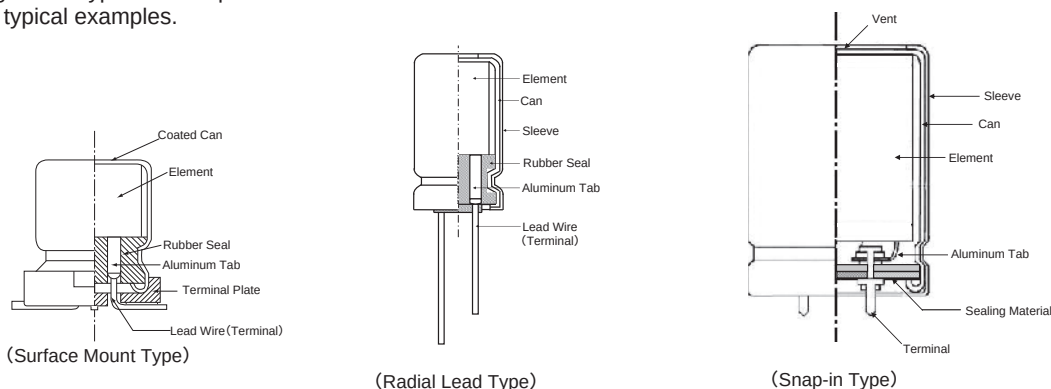


Fig-4 Construction of Aluminum Electrolytic Capacitors

### 1-3 Features of Capacitor Materials

Aluminum, which is main material in an aluminum electrolytic capacitor, forms an oxide layer ( $\text{Al}_2\text{O}_3$ ) on its surface when the aluminum is set as anode and charged with electricity in electrolyte.

The aluminum foil with an oxide layer formed thereon, as shown in Fig. 5, is capable of rectifying electric current in electrolyte. Such a metal is called a valve metal.

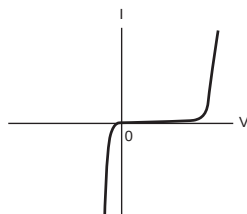


Fig-5 V-I characteristics of aluminum oxide

#### <Anode aluminum foil>

First, the foil material is electromechanically etched in a chloride solution to extend the surface area of the foil.

Secondly, for the foil to form an aluminum oxide layer ( $\text{Al}_2\text{O}_3$ ) as a dielectric, more than the rated voltage is applied to the foil in a solution such as ammonium borate. This dielectric layer is as dense and thin as 1.1 - 1.5 nm/volt and showing a high insulation resistance ( $10^8$  -  $10^9 \Omega/\text{m}$ ).

The thickness of the oxide layer determines the withstand voltage according to their direct proportional relationship. For the etching pits to be shaped to the intended thickness of the oxide layer, the pit patterns have been designed to have efficient surface area extension depending on the intended withstand voltage (see Fig. 6)

#### <Cathode aluminum foil>

An etching process is performed to the cathode aluminum foil as well as the anode foil. However, the formation process for oxide layer is generally not performed. Therefore, the surface of the cathode foil only has an oxide layer ( $\text{Al}_2\text{O}_3$ ) that has spontaneously formed, which gives a withstand voltage of about 0.5 volt.

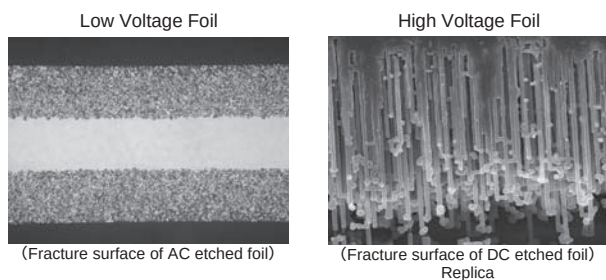


Fig-6 Cross section of aluminum etched foil (SEM)

#### <Electrolyte>

The electrolyte, an ion-conductive liquid functions as a true cathode coming into contact with the dielectric layer on the surface of the anode foil. The cathode foil serves as a collector electrode to connect the true cathode with the external circuit. Electrolyte is an essential material that controls the performance of the capacitor (temperature characteristics, frequency characteristics, service life, etc.).

#### <Paper separator >

The separator maintains uniform distribution of the electrolyte and keeps the anode-to-cathode foil distance unchanged.

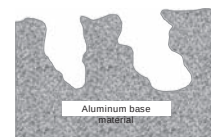
#### <Can case and sealing materials>

An aluminum can case and seal materials mainly consisting of rubber are used for the purpose of keeping airtightness.

### 1-4 Manufacturing Process

#### ① Etching (for extending the surface area)

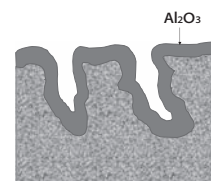
This etching process serves to extend the surface area of the aluminum foil. This is an AC or DC current-employed electrochemical process for etching the foil surface in a chloride solution.



Etching Model

#### ② Formation (for forming a dielectric)

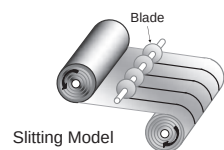
This is a process for forming a dielectric layer ( $\text{Al}_2\text{O}_3$ ), which is normally performed on the anode aluminum foil.



Forming Model

#### ③ Slitting

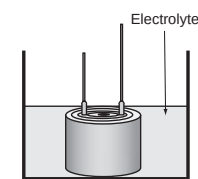
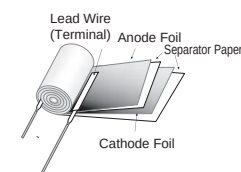
This is a process for slitting aluminum foils (both the anode and cathode) and paper separators to the specified product size.



Slitting Model

#### ④ Winding

This is a process for rolling a set of anode and cathode foils into a cylindrical form with a paper separator inserted between them. During this process, an inner terminal (called a tab) is attached to each of the aluminum foils. The roll made at this process is called a capacitor element.



Impregnation

#### ⑤ Impregnation

This is a process for impregnating the element with electrolyte as a true cathode. The electrolyte also functions to repair the dielectric layer.

#### ⑥ Sealing

This process seals the element using the aluminum can case and sealing materials (rubber, rubber-lined cover, etc.) for keeping the case airtight.

#### ⑦ Aging (reforming)

The process of applying voltage to a post-sealed capacitor at high temperature is called "aging". This serves to repair defective dielectrics that have been made on the foil during the slitting or winding process.

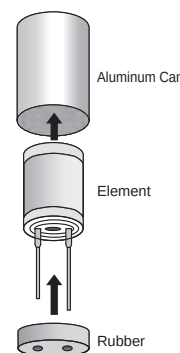
#### ⑧ 100% inspection and packaging

After the aging, all products shall undergo testing for checking their electrical characteristics with chip termination, lead reforming, taping etc. finished, and then be packaged.

#### ⑨ Outgoing inspections

Outgoing inspections are performed as per standard inspection procedures.

#### ⑩ Shipment





## 2. Basic Performance

### 2-1 Basic Electrical Characteristics

#### 2-1-1 Capacitance

The larger the surface area of an electrode is, the higher the capacitance (capacity for storing electricity) is. For aluminum electrolytic capacitors, the capacitance is measured under the standard measuring conditions of 20°C and a 120Hz AC signal of about 0.5V. Generally, as the temperature rises, the capacitance increases; as the temperature decreases, the capacitance decreases (Fig. 7). With a higher frequency, the capacitance is smaller; with a lower frequency, the capacitance is larger (Fig. 8).

#### 2-1-2 $\tan \delta$ (also called tangent of loss angle or dissipation factor)

(Fig. 9) is a simplified model of the equivalent circuit shown in (Fig. 2). For an ideal capacitor with an equivalent series resistance of  $R = 0$ , the  $\tan \delta$  shown in (Fig. 10) is zero. For an aluminum electrolytic capacitor, the equivalent series resistance ( $R$ ) is not zero due to the presence of resistance of the electrolyte and paper separator and other contact resistances.  $1/\omega C$  and  $R$  are correlated as shown in (Fig. 10) and Equation (2).

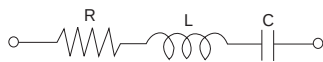


Fig-9 Simplified equivalent circuit

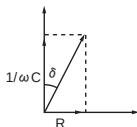


Fig-10 Dissipation Factor ( $\tan \delta$ )

$$\tan \delta = \frac{R}{1/\omega C} = \omega CR \quad \dots\dots\dots (2)$$

$$\omega : 2\pi f$$

$$\pi = \text{Circular constant, } f : \text{Frequency (} f = 120\text{Hz)}$$

#### 2-1-3 Leakage Current (LC)

As a feature of an aluminum electrolytic capacitor, when DC voltage is applied to it, the oxide layer that acts as a dielectric in the electrolyte allows a small amount of electric current to flow in it. The small amount of current is called a leakage current (LC). An ideal capacitor does not allow the leakage current to flow (this is not the case for charging current).

The leakage current (LC) changes with time as shown in (Fig. 12). Note that LC, decreasing with time, will reach a steady-state value. Therefore, the specifications of LC are defined as a value measured several minutes after the beginning of the application of the rated voltage at 20°C. As the temperature rises, the LC increases; as the temperature decreases, the LC decreases (Fig.13). As the applied voltage decreases, the LC decreases.

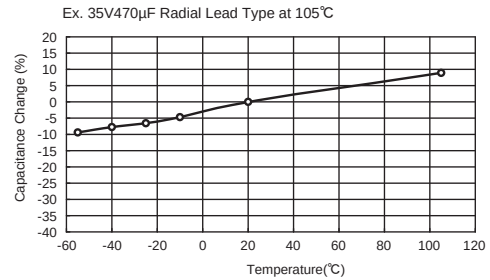


Fig-7 Temperature Characteristics of Capacitance

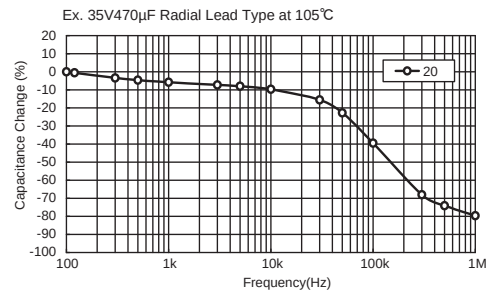


Fig-8 Frequency Characteristics of Capacitance

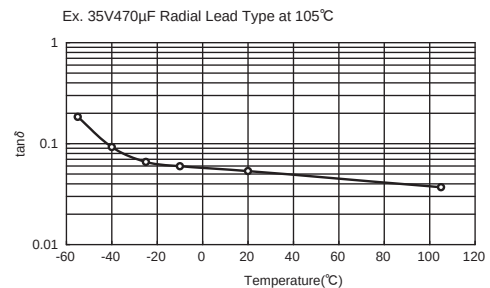


Fig-11 Temperature Characteristics of  $\tan \delta$

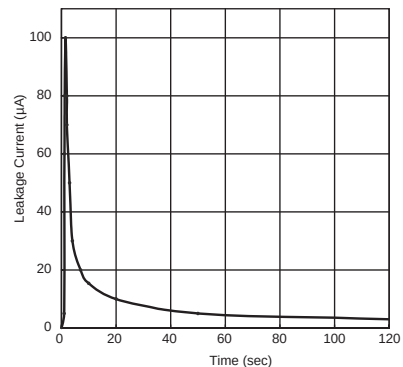


Fig-12 Leakage Current vs. Time

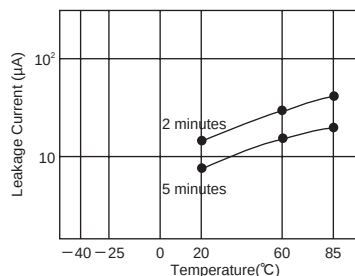


Fig-13 Temperature Characteristics of Leakage Current

## 2-2 Frequency Characteristics of Impedance

When a capacitor is applied with a voltage with the frequency changed, the impedance (Z), a factor of preventing the AC current changes as shown in (Fig. 14). This is the impedance-frequency characteristics of the capacitor.

(Fig. 9) is a simplified model of an equivalent circuit of an aluminum electrolyte capacitor. (Fig. 14) shows dotted lines representing a breakdown of the impedance-frequency characteristic curve into components (C, R and L). As can be seen in this figure, the impedance-frequency characteristics are a composition of C, R and L frequency characteristics.

The value  $1/\omega C$  shows the pure capacitive reactance graphically presented by a straight line going downward at an angle of  $45^\circ$ , and  $\omega L$  shows the pure inductive reactance graphically presented by a straight line going upward at  $45^\circ$ . R shows the equivalent series resistance (ESR). At a range of lower frequencies, the R curve goes downward due to the dielectric loss frequency-dependence. At a range of higher frequencies, the R curve tends to be almost flat since resistance of electrolyte and paper separator is dominant and independent on frequency. Equation (3) shows this tendency.

$$Z = \sqrt{R^2 + \left( \omega L - \frac{1}{\omega C} \right)^2} \dots\dots\dots (3)$$

Because the impedance characteristics of an aluminum electrolyte capacitor depend on resistance of the electrolyte and paper separator, the Z value at the self-resonant frequency tends to be relatively higher, as shown by the solid line in (Fig. 15). The resistance of the electrolyte varies depending on temperature: as the temperature rises, the impedance decreases; and as the temperature decreases, the impedance increases, as shown in (Fig. 16).

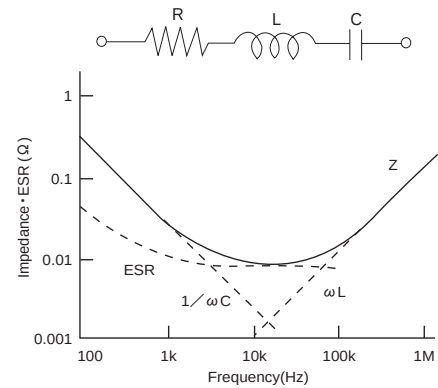


Fig-14 Factor of Impedance Frequency

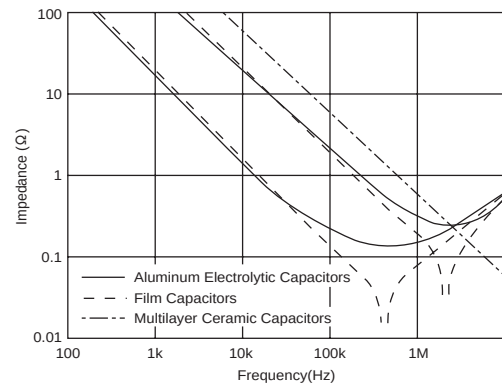


Fig-15 Frequency Characteristics of each Capacitors Impedance

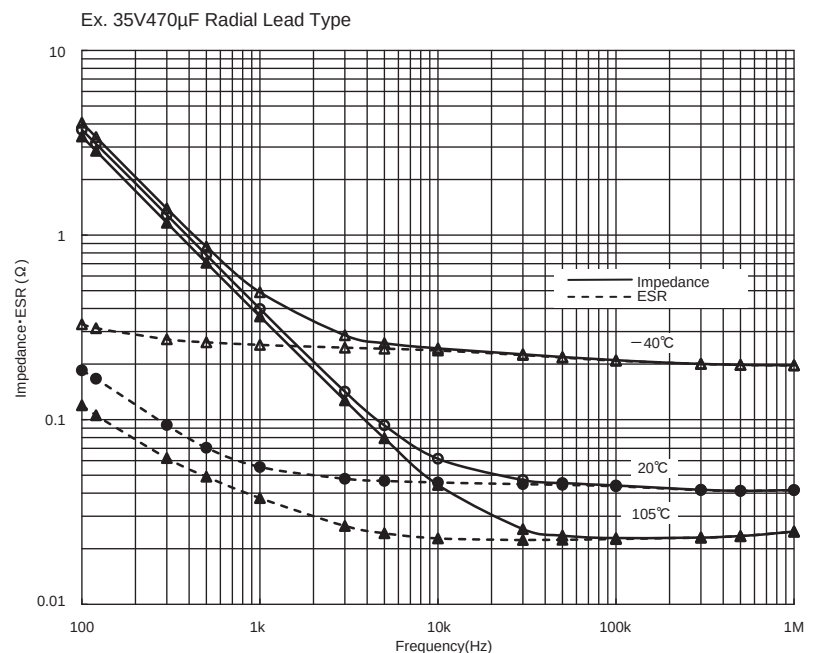


Fig-16 Temperature and Frequency Characteristics of Impedance · ESR

### 3. Reliability

For designing the device with aluminum electrolytic capacitors, a failure rate and useful life are necessary to be considered for their reliability. The failure rate of aluminum electrolytic capacitors is approximated by the bathtub curve shown in (Fig.17).

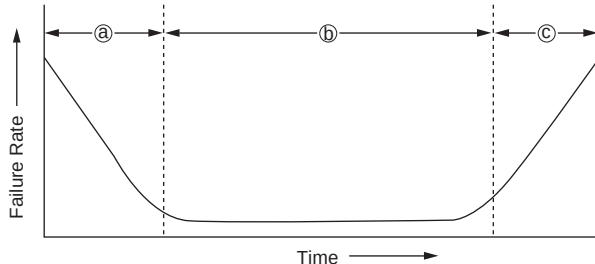


Fig-17 Bathtub curve

#### (a) Early failure period

At the comparatively early periods of use, devices/components fail by deficiencies in design or manufacturing process or incompatibility with operation conditions. For aluminum electrolytic capacitors, these defectives are removed by debugging at one of manufacturing processes before shipments.

#### (b) Random failure period

Failure is stable low in occurrence and appears unrelated to their served term. Aluminum electrolytic capacitors are low in catastrophic failures in this period compared with semi-conductors and solid tantalum capacitors.

#### (c) Wear-out failure period

In this period, the failure rate increases with the served time. For aluminum electrolytic capacitors, since they were completed in manufacturing, the electrolyte impregnated has gradually evaporated and diffused out of the capacitors through the rubber seal materials with time, which leads to decrease in the capacitance and/or increase  $\tan\delta$ . When any of these values changes beyond the allowable range of specifications, the capacitors are defined as "fell into the wear-out failure". The served term until the capacitors fall into the wear-out failure period is called a useful life.

Aluminum electrolytic capacitors have two categories of failures: catastrophic failure and wear-out failure.

#### <Catastrophic failure>

This is a failure mode that completely destroys the function of the capacitor such as short circuit and open circuit failure.

#### <Wear-out failure>

This is a failure mode where the electrical parameters of the capacitor gradually deteriorate and fail. The criteria for determining if this failure has occurred depend on the purpose of a device. For each series of capacitors, the following electrical parameters have been defined as criteria in the specifications of Endurance in the catalogs or product specifications:

- Change in capacitance
- $\tan\delta$
- Leakage current

Failure rates are often measured in units of % per 1000 hours ( $10^{-5}/\text{hour}$ ). For higher reliability devices designed with a smaller failure rate, units of Failure In Time (FIT) ( $10^{-9}/\text{hour}$ ) is used.

Aluminum electrolytic capacitors are considered as components of wear-out failure mode, the electrical characteristics of which gradually deteriorate and their failure rate increases with time. In general, the failure rate in FIT is determined by total component-hours (product of the number of tested components and test hours).

Due to the definition of FIT, the same FIT rate can be calculated in both cases of testing on the large number of tested components and also testing for long test periods of time. However, these cases mean differently for aluminum electrolytic capacitors. Using the failure rate is not suited to express the reliability of aluminum electrolytic capacitors, but the electrical characteristics based lifetime in hour should be considered to express the reliability.

Also, there are MTBF (Mean Time Between Failures) and MTTF (Mean Time To Failure) to express reliability. The latter is applicable for aluminum electrolytic capacitors because they are categorized into a group of non-repairable systems, equipment and devices for which MTTF is applicable.

### 4. Failure Modes

Failure modes depend on the application conditions that lead to fail. (Fig. 18).

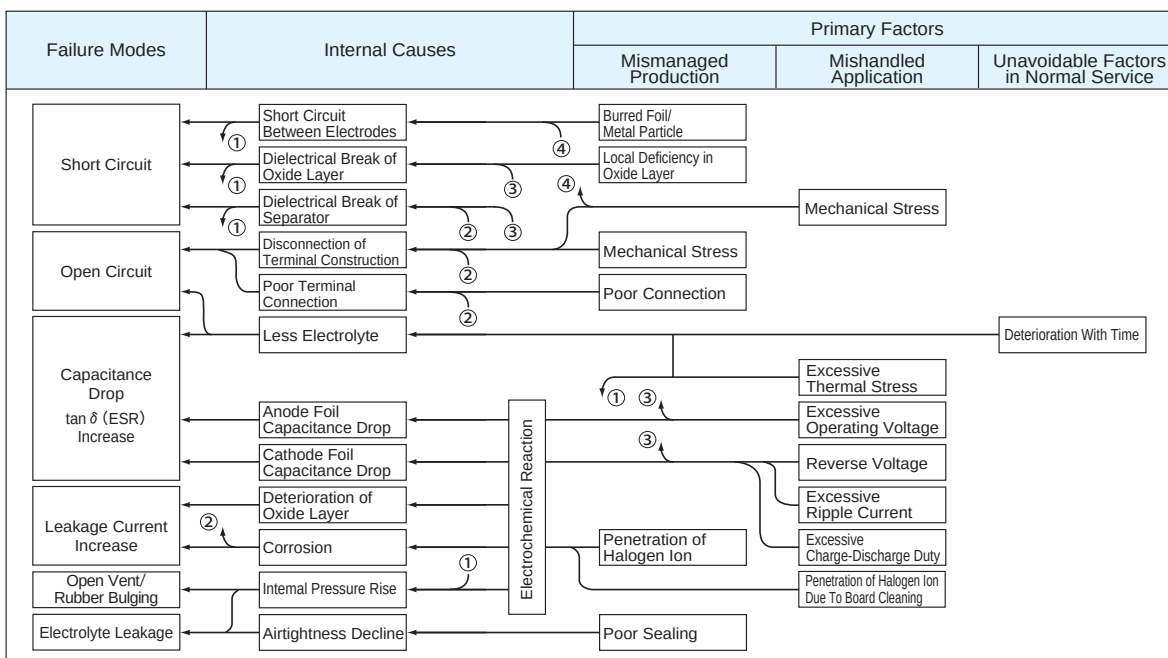


Fig-18 Failure Modes

## 5. Lifetime of Aluminum Electrolytic Capacitors

The lifetime of aluminum electrolytic capacitors is largely dependent on the application conditions. Environmental factors include temperature, humidity, atmospheric pressure and vibrations. Electrical factors include operating voltage, ripple current and charge-discharge. Where the capacitors are used in a normal filtering circuit, ambient temperature and heating due to the ripple current are crucial factors for determining the lifetime of the capacitors. These factors are included to the lifetime specifications titled "Endurance" on the catalogs or product specifications.

For applications subject to high humidity and/or continuous vibrations, or subject to frequent charge and discharge operations, the endurance of individual conditions should be considered.

### 5-1 Ambient Temperature Effect on Lifetime

The lifetime of aluminum electrolytic capacitors is affected mainly by the loss of electrolyte as the result of diffusion through the rubber seal materials, which leads to a decrease in capacitance and increase in  $\tan\delta$ .

The relationship of temperature to the diffusion of electrolyte follows the Arrhenius' Law (Equations (4) and (5)):

$$k = Ae^{\frac{-E}{RT}} \quad \dots\dots\dots (4)$$

$$\ln k = \left( \frac{-E}{RT} \right) + \ln A \quad \dots\dots\dots (5)$$

$k$  : Reaction rate constant

$A$  : Frequency factor

$E$  : Activation energy

$R$  : Gas constant (8.31J/deg)

$T$  : Absolute temperature (K)

Applying Equation (5) to the lifetime of the capacitors brings Equation (6), which is converted to Equation (7):

$$\log \left( \frac{L_x}{L_o} \right) = \frac{E}{2.303R} \left( \frac{1}{T_x} - \frac{1}{T_o} \right) \quad \dots\dots\dots (6)$$

$$\log L_x = \frac{E}{2.303R} \left( \frac{1}{T_x} - \frac{1}{T_o} \right) + \log L_o \quad \dots\dots\dots (7)$$

Practical estimation of the lifetime has been using Equation (8) as an approximation:

$$L_x = L_o \cdot Bt^{(T_o - T_x)/10} \quad \dots\dots\dots (8)$$

$L_o$  : Specified lifetime (hour) with the rated voltage applied (or the rated ripple current superimposed to a DC voltage) at the upper limit of the category temperature. Refer to the lifetime specifications of individual products.

$L_x$  : Estimated life on actual usage (hour)

$T_o$  : Maximum Category Temperature (°C)

$T_x$  : Actual Ambient Temperature (°C)

$Bt$  : Temperature acceleration factor

Where, the temperature acceleration factor (BT) is approximately 2 over an ambient temperature range from 60°C to 95°C, which means that the lifetime is approximately halved for every 10°C rise in ambient temperature. However, according to the Arrhenius Equation (6), the reciprocal of  $T$  is directly proportional to the logarithm of lifetime, which means that, strictly speaking, there is the temperature range where the theory of lifetime reducing by half at every 10°C rise is not applied. (Fig. 19).

Especially for capacitors whose maximum operating temperature is a 105°C or higher, the temperature acceleration factor (BT) needs to be modified depending on temperature ranges of the lifetime estimation.

For details, please consult us.

For lifetime estimation at a lower-temperature range, evaluation test data have not been obtained, and for evaluating long term endurance, it is necessary to take into account some additional factors such as deterioration of the rubber seal materials as well as the diffusion of electrolyte. Accordingly, in Equation (8),  $T_x$  should be 40°C at the lowest for the lifetime calculation purpose, and also the estimated lifetime ( $L_x$ ) should be 15 years at the longest.

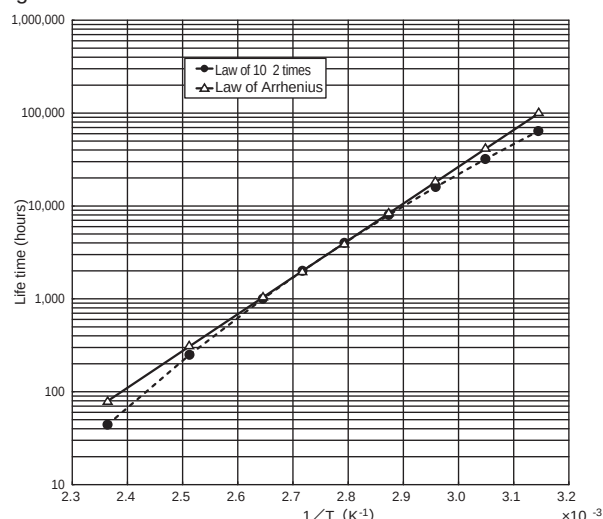


Fig-19 Estimated result by Law of 10°C 2 times and Law of Arrhenius

### 5-2 Applying Voltage Effect on Lifetime

Where a capacitor is used at lower than the rated voltage, the lifetime may not be adversely affected, which means that the effect of the applying voltage is negligibly small, while the effect of the ambient temperature and heat generation due to ripple current is significant.

(Fig-20)

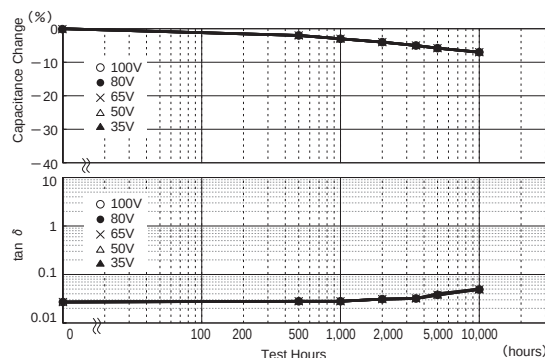


Fig-20 Endurance (measured by each apply voltage, result curves are overlapped)  
Note: Due to the very small effect of the applying voltages, the plots cannot be distinguished from one another.

However, for capacitors of larger size and higher rated voltage contain a larger volume of electrolyte, difference in applying voltages can affect degradation of the oxide layer, other than the diffusion of electrolyte.

Therefore, with the exception of certain items, for board-mount products with a rated voltage of 160Vdc or higher, and screw mount terminal-type products with a rated voltage of 350Vdc or higher, the product lifespan estimation includes the effect of applying a lower voltage than the rated voltage (derating voltage).

### 5-3 Ripple Current Effect on Lifetime

Since an aluminum electrolytic capacitor has a larger  $\tan\delta$  than other types of capacitors, the capacitor produces more internal heat when a ripple current flows through it. The temperature rise due to this heat may significantly affect the lifetime of the capacitor. This is the reason why ripple current ratings are specified for capacitors.

#### 5-3-1 Heat Generation due to Ripple Current

Power consumption by the ripple current can be expressed as follows:

$$W = I_R^2 R + V_{IL} \dots\dots\dots (9)$$

W : Internal power dissipation

$I_R$  : Ripple Current

R : Internal Resistance (Equivalent Series Resistance)

V : Applied voltage

$I_L$  : Leakage Current

Leakage current  $I_L$  at the maximum operating temperature can be 5 to 10 times higher than the values measured at 20°C. However, considering  $I_R \gg I_L$ , the above equation can be simplified as Equation (10).

$$W \approx I_R^2 R \dots\dots\dots (10)$$

To obtain the temperature at which equilibrium is achieved between heat generation and dissipation, derive Equation (11).

$$I_R^2 R = \beta A \Delta T \dots\dots\dots (11)$$

$\beta$  : Radiation Constant

A : Surface area of can case ( $m^2$ )

$\Delta T$  : Temperature-rise due to the Ripple Current(°C)

$$A = \frac{\pi}{4} D (D + 4L)$$

D : Can Diameter (m)

L : Can Length (m)

From the above equation, the internal temperature rise ( $\Delta T$ ) is given by Equation (12):

$$\Delta T = \frac{I_R^2 R}{\beta A} \dots\dots\dots (12)$$

Also, for a ripple frequency of 120Hz, Equation (12) for calculating  $\Delta T$  is rewritten as Equation (13):

$$\Delta T = \frac{I_R^2 R}{\beta A} = \frac{I_R^2 \tan \delta}{\beta A \omega C} \dots\dots\dots (13)$$

$$\text{Where } R = \frac{\tan \delta}{\omega C}$$

$\tan \delta$  : Dissipation Factor at 120Hz

$\omega$  :  $2\pi f$  ( $f = 120\text{Hz}$ )

C : Capacitance at 120Hz(F)

An approximate value of ripple current-caused  $\Delta T$  can be calculated using Equation (14):

$$\Delta T = (I_x/I_o)^2 \times \Delta T_o \dots\dots\dots (14)$$

$I_o$  : Rated ripple current (Arms), frequency compensated, at the upper limit of the category temperature range

$I_x$  : Operating ripple current (Arms) actually flowing in the capacitor

$\Delta T_o$  : Rise in internal temperature due to the rated ripple current (°C): different for each product series. Please consult us.

There are some product families that can accept a higher ripple current than the rated value providing that ambient temperature  $T_x$  is lower than the upper limit of the category temperature range. However, in this case, remember that the lifetime decreases due to the higher  $\Delta T$  due to the ripple current. Be sure that  $\Delta T$  does not exceed the specified limit that has been determined as a function of ambient temperature. Note that the core temperature limit of the element is shown by  $[T_x + \Delta T \text{ limit}]$ .

Examples of  $\Delta T$  limits at some ambient temperatures are shown below.

|                           |                    |       |
|---------------------------|--------------------|-------|
| Ambient Temp $T_x$        | 85°C less or equal | 105°C |
| Limit value of $\Delta T$ | 15°C               | 5°C   |

Each product family has a different  $\Delta T$  limit. For details, consult us.

#### 5-3-2 Ripple Current and Frequency

The ripple current rating is specified normally by the effective value (r.m.s value) of 120Hz or 100kHz sine wave. However, since the equivalent series resistance

(ESR) of a capacitor is frequency-dependent, the allowable ripple current depends on the frequency. Where the operating ripple current consists of a mains power frequency element and switching frequency element(s) like switching mode power supplies do, the internal power loss is expressed by Equation (15):

$$W = I_{r1}^2 R_{r1} + I_{r2}^2 R_{r2} + \dots\dots I_{rn}^2 R_{rn} \dots\dots\dots (15)$$

W : Power consumption

$I_{r1}, I_{r2}, \dots, I_{rn}$  : Ripple current (Arms) at frequency  $f_1 \dots f_n$

$R_{r1}, R_{r2}, \dots, R_{rn}$  : ESR ( $\Omega$ ) at  $f_1 \dots f_n$

Given a frequency compensation factor (Frequency Multiplier) =  $F_n$  and reference frequency for the ripple current =  $f_o$ ,  $R_n = R_o/F_n^2$  is obtained. Therefore, the ripple current at any frequency can be converted into its r.m.s. value at the reference frequency ( $I_{fo}$ ) using Equation (16):

$$I_{fo} = \sqrt{(I_{r1}/F_{r1})^2 + (I_{r2}/F_{r2})^2 + \dots\dots (I_{rn}/F_{rn})^2} \dots\dots\dots (16)$$

$I_{fo}$  : Reference ripple current (Arms), i.e., that at the reference frequency

$F_{r1}, F_{r2}, \dots, F_{rn}$  : Frequency compensation factor (Frequency Multiplier) at frequency  $f_1 \dots f_n$  (Refer to the catalogs)

Note that the ESR depends on the temperature and the value of  $\beta$  depends on the installation conditions of the capacitor on the board. To determine more accurate values of  $\Delta T$ , they can be actually measured using a thermocouple.

#### 5-3-3 Lifetime Estimation

Equations (17) through (19) can be used for estimating the lifetime of a non-solid aluminum electrolytic capacitor based on the ambient temperature, the rise of internal temperature due to ripple current, and operating voltage applied.

For a surface mount type or radial lead type capacitor :

Endurance specifications are defined by the rated voltage.

$$L_x = L_o \times 2^{\frac{T_o - T_x}{10}} \times 2^{\frac{-\Delta T}{5}} \dots\dots\dots (17)$$

For a surface mount type or radial lead type capacitor : Endurance specifications are defined by "the rated ripple current superimposition".

$$L_x = L_r \times 2^{\frac{T_o - T_x}{10}} \times 2^{\frac{\Delta T_o - \Delta T}{5}} \dots\dots\dots (18)$$

For a snap-in type or screw terminal type capacitor

$$L_x = L_r \times 2^{\frac{K(T_o - T_x)}{10}} \times 2^{\frac{\Delta T_o - \Delta T}{5}} \times K_v \dots\dots\dots (19)$$

$L_o$  : Specified lifetime (hour) at the upper limit of the category temperature range and at the rated voltage

$L_r$  : Specified lifetime (hour) at the upper limit of the category temperature range and at the rated ripple current superimposed to a DC voltage

$L_x$  : Estimation of actual lifetime (hour)

$T_o$  : Upper limit of the category temperature range (°C)

$T_x$  : Actual ambient temperature of the capacitor (°C)  
Use 40°C if the actual ambient temperature is below it.

$\Delta T$  : Rise of internal temperature due to actual ripple current (°C)

\* $\Delta T_o$  : Rise of internal temperature due to the rated ripple current (°C)

\*Kt : Correction factor of ambient temperature acceleration factor

\* $K_v$  : Derating voltage factor (a snap-in type capacitor with the rated voltage of less than 160V<sub>dc</sub> and a screw terminal type capacitor with the rated voltage of less than 350V<sub>dc</sub> :1)

\*A : Acceleration factor of temperature-rise due to the ripple current (This factor depends on use conditions.)

For the values marked with \*, consult us.

Please consult us about lifetime equations for the series of the category temperature 125°C or more.

Subject series : MXB, MHS, MVH, MHL, MHB, MHJ, MHK, GPA, GVA, GXF, GXL, GPD, GVD, GQB, GXA, GXM.

Note that the calculation results above are not considered as a guaranteed value. When designing the lifetime of a device, please select a capacitor that has an extra margin against the device lifetime requirements. Also, where the estimation result calculated exceeds 15 years, please consider 15 years to be a maximum. If 15 years or more may be required as an expected lifetime, please consult us.



## 5-4 Charge and Discharge Operation Effect on Lifetime

Applying a voltage to an aluminum electrolytic capacitor makes the electric charges accumulate on the anode foil dielectric. Discharging the electricity through a discharging resistance makes the electric charges move to the cathode foil and cause chemical reactions between the cathode aluminum and electrolyte, thereby forming a dielectric oxide layer.

When this charge and discharge is repeatedly operated, the chemical reactions proceed to further form the oxide layer on the cathode foil, causing the capacitance of the cathode foil to reduce and thereby reducing the capacitance of the capacitor. Moreover, the chemical reactions bring heat and gases. Depending on the charge and discharge conditions, the internal pressure may increase, the pressure relief vent may open or the capacitor may have destructive failures. Consult us for using a capacitor with the following applications:

- Frequently repeating power on/off.
- Repeating rapid charge and discharge operations at a short interval cycle.
- Repeating charge and discharge operations with a large voltage drop.

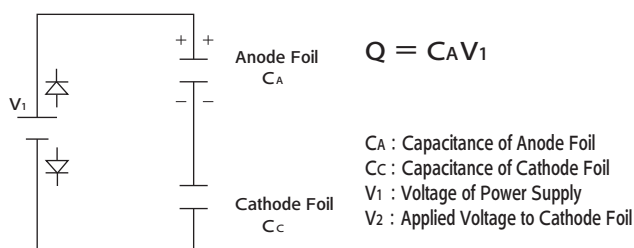


Fig-21 Charge Condition at Charge

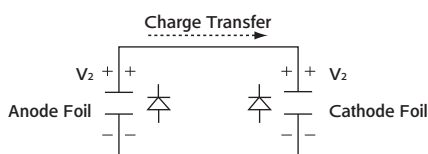


Fig-22 Charge Condition at Discharge  
(Disconnect V1 and Discharged condition)

$$Q = C_A V_2 + C_C V_2$$

$$\text{then } C_A V_1 = C_A V_2 + C_C V_2$$

$$V_2 = \frac{C_A V_1}{C_A + C_C} \quad (20)$$

Figures 23 through 25 show some test data of special-design capacitors for charge and discharge application, compared with general-purpose capacitors.

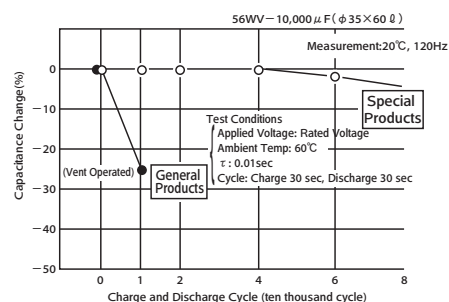


Fig-23 Rapid charge and discharge characteristics  
(Effects of Frequency)

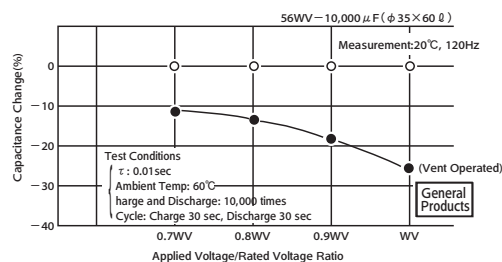


Fig-24 Rapid charge and discharge characteristics  
(Effects of Applied Voltage)

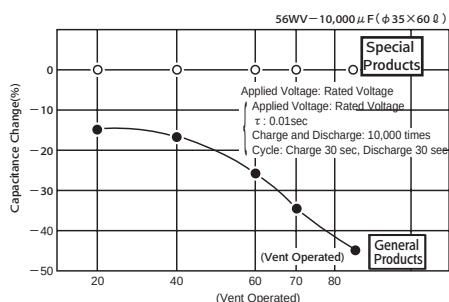


Fig-25 Rapid charge and discharge characteristics  
(Effects of Ambient Temperature)

## 5-5 Inrush Current

For the power supply inrush current that can occur on the start-up of a power supply or on the charge of a welding machine lasts only milliseconds, but its magnitude may reach 10 to 1,000 times more than the normal current. Usually, a single, non-repeated inrush current produces a negligibly small amount of heat, so it does not matter.

However, frequently repeating inrush currents may heat up the element inside a capacitor more than the allowable limit and/or overheat the external terminal connections or the connections between the internal lead and foil electrode.



## 5-6 Abnormal Voltage Effect on Lifetime

Applying abnormal voltage can increase the internal pressure with heat and gases produced, causing the pressure relief vent to open or the capacitor to have destructive failures.

### 5-6-1 Overvoltage

Applying a voltage higher than the rated voltage will cause chemical reactions (formation of dielectric) to occur on the anode foil with the leakage current rapidly increasing, which produces heat and gases and thereby increases the internal pressure. The reactions are accelerated by the voltage, current density and ambient temperature, causing the pressure relief vent to open or the capacitor to have destructive failures. It may also accompany a reduction in capacitance and an increase in  $\tan \delta$  as well as an increase in the leakage current, which can lead to internal short-circuiting failure. An example of capacitor overvoltage characteristics is shown in Fig. 26.

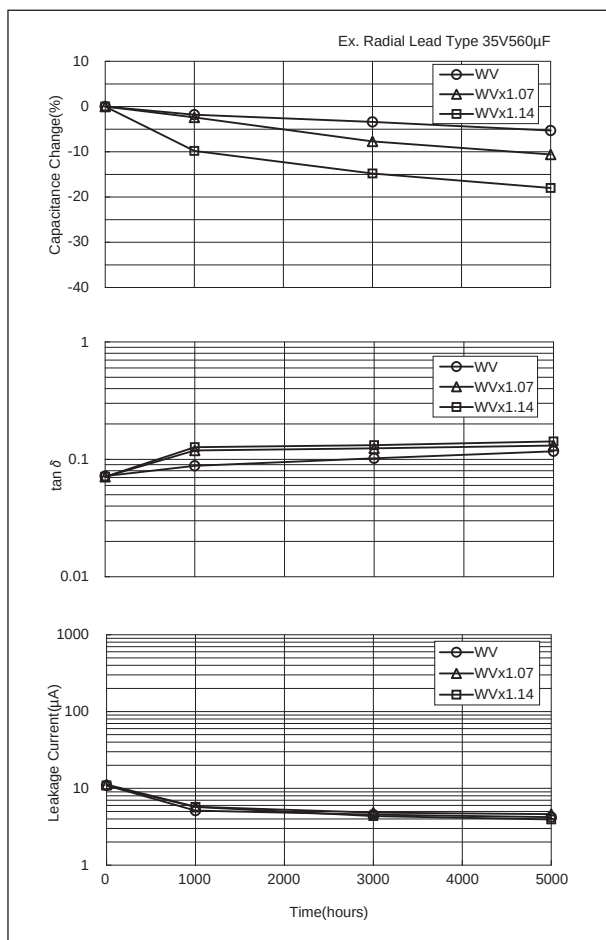


Fig-26 Applied overvoltage characteristic at 105°C

### 5-6-2 Reverse Voltage

Applying a reverse voltage will cause chemical reactions (formation of dielectric) to occur on the cathode foil, and, as is the case with overvoltage, the leakage current will rapidly increase with heat and gases generating and thus the internal pressure increases. The reactions are accelerated by the voltage, current density and ambient temperature. It may also accompany a reduction in capacitance and an increase in  $\tan \delta$  as well as an increase in the leakage current. An example of capacitor reverse-voltage characteristics is shown in Fig. 27.

A reverse voltage of as small as 1V can cause the capacitance to decrease. A reverse voltage of 2 to 3V can shorten lifetime due to a reduction in capacitance, increase in  $\tan \delta$ , and/or increase in leakage current. A reverse voltage of even higher value can open the pressure relief vent or lead to destructive failures (Fig. 27).

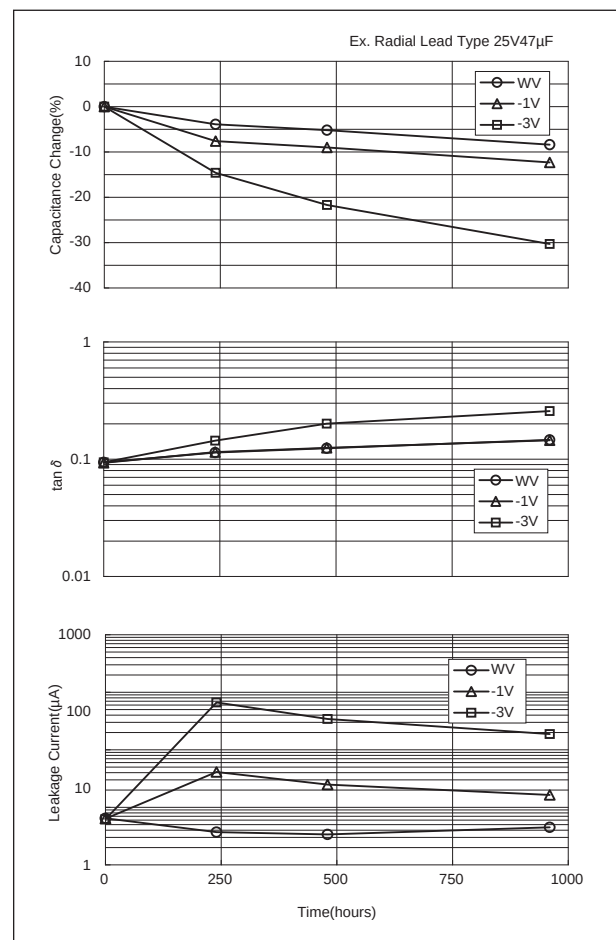


Fig-27 Applied Reverse voltage characteristic at 105°C

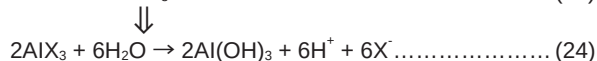
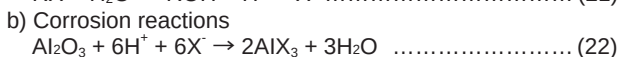
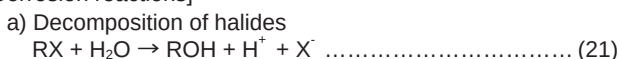
### 5-6-3 Do not Use Aluminum Electrolytic Capacitors in an AC Circuit

Using an aluminum electrolytic capacitor in an AC circuit will result in the same situation as that with a positive potential being applied to the cathode (like a reverse voltage) and with an excessively large ripple current flowing in the capacitor, which may increase the internal pressure due to the generation of heat and gases, open the pressure relief vent, leak the electrolyte with the rubber seal bung expelled or cause the capacitor to blow up or catch fire in the worst case. If the capacitor blows up, it may scatter flammable materials such as electrolyte and element-supporting wax materials, which can lead to short-circuiting of the device. Therefore, do not use aluminum electrolytic capacitors in any of the AC circuits.

## 6. Effect of Halogens

Aluminum electrolytic capacitors are sensitive to contamination of halogen ions (especially to chlorine and bromine ions) though the degree of the effect depends on the properties of the electrolyte and/or sealing materials used in the capacitors. For using a halide-containing flux, solvent (cleaning agent, adhesive or coating materials) or fumigant, the halide may penetrate into the capacitor through the rubber seal materials and cause the following corrosion reactions to occur. These reactions can lead to an increase in leakage current, opening of the pressure relief vent, and/or open-circuit failure in the capacitor. The reactions are accelerated as the voltage and/or temperature rises.

[Corrosion reactions]



RX : Halogenated compound

X<sup>-</sup> : Halogen ions (Cl<sup>-</sup>, F<sup>-</sup>, Br<sup>-</sup>)

Halides that penetrated the element inside a capacitor make contact with the electrolyte, by which the halides are hydrolyzed and release halogen ions as shown on Reaction (21). The halogen ions then attack aluminum by anodic half-cell reaction, producing AlX<sub>3</sub> (Reaction 22 and 23).

AlX<sub>3</sub> is then hydrolyzed, which is decomposed to aluminum hydroxide and the halogen ions (Reaction (24)). The halogen ions reproduced are repeatedly used and reproduced by the reactions of (22) ~ (24), and then the corrosion develops endlessly.

Shown below are precautions for use of flux, cleaning agents, adhesive, coating materials and fumigant.

### 6-1 Effect of Flux

Usually flux products contain an activator of ionic halide system, which has been associated with the corrosion issues of capacitors, and nowadays non-ionic halide system type flux products have been increasingly available on the market. Some of the latter flux type have been classified into the so called "non-halogen flux" or "halogen-free flux", and parts of the "non-halogen" or "halogen-free" flux products may contain a large amount of non-ionic halides, which can also adversely affect the capacitors.

### 6-2 Cleaning Agents

Where cleaning the solvent resistance type of aluminum electrolytic capacitors, confirm the following conditions:

- Control the contamination (the conductivity, pH, specific gravity, water content, etc.) of the cleaning agents.
- After the cleaning, do not leave the capacitors (assembly boards) in an environment of cleaning agent-rich or in a closed container. Sufficiently evaporate the residual cleaning agent from the assembly boards and the capacitors by forced hot air at temperatures less than the upper limit of category temperature range for more than 10 minutes.

In general, aluminum electrolytic capacitors are sensitive to contamination of halogen ions (particularly to chlorine ions). Depending on the properties of the electrolyte and rubber seal materials used in a capacitor, the halogen ions lead up to catastrophic failures on the capacitor. Where the inside of a capacitor has been contaminated with more than a certain amount of halogen ions and the capacitor is in use, the corrosion reaction of aluminum occurs. The corrosion causes the capacitor to have a significant increase in leakage cur-

rent with heat produced, open the pressure relief vent and become open circuit mode failure.

Due to global environmental issues (greenhouse effects and other environmental destruction by depletion of the ozone layer), the conventional cleaning solvents of CFC 113, Trichloroethylene and 1,1,1-trichloroethylene were replaced by substitutes.

#### 6-2-1 Alcohol Cleaning Agents

- Fatty-alcohol cleaning agents (New type of solvent)  
 Pine Alpha ST-100S (Arakawa Chemical)  
 Clean Through 750H, 750HS and 750J (Kao)
- IPA (Isopropyl alcohol)

[Compatible capacitor products]

| Terminal Shape     | Subject Series                                  |
|--------------------|-------------------------------------------------|
| Surface Mount Type | All Series                                      |
| Radial Lead Type   | All Series                                      |
| Snap-in Type       | All Series (Less and equal 100V <sub>dc</sub> ) |

[Cleaning conditions]

Either of Immersion or ultrasonic cleaning, for a maximum of 10 minutes at a maximum liquid temperature of 60°C.

[Precautions]

- Make sure that the markings on a capacitor are not rubbed against any other component or the PC board during cleaning. Note that shower cleaning can cause the markings on the capacitor to be washed off.
- Depending on the cleaning method, the markings may be erased or blur.
- A drying process following a water cleaning or rinsing process may cause the outer sleeve materials of a capacitor to swell or shrink.
- After using a weak-alkaline cleaning agent (e.g. Clean Through 750HS, 750J), rinse with water to make sure that no alkaline residue is left on the capacitor.
- Control a flux concentration in a cleaning agent within 2 wt%.
- IPS (Isopropyl Alcohol), if containing xylene or other solvent to improve its cleanability, may swell the rubber seal materials.
- Depending on the type of cleaning agent or conditions, note that the outer sleeve of a capacitor may lose a gloss or whiten in appearance.

#### 6-2-2 HCFC (Freon-225), as Alternative CFCs AK225AES (Asahi Glass)

[Cleaning conditions]

Solvent resistant type capacitors, which were originally developed to intend to resist Freon TE or Freon TES, are also capable of withstanding either of immersion or ultrasonic cleaning, for a maximum of 5 minutes (or 2 minutes for KRE series or 3 minutes for SRM series). However, in view of global environmental issues, HCFCs has not been recommended.

[Compatible capacitor products]

| Terminal Shape     | Subject Series                                                                                                                                                                           |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Surface Mount Type | MVE (~63V <sub>dc</sub> ), MZS, MZL, MZR, MZJ, MZA, MVY (6.3 ~ 63V <sub>dc</sub> ), MZF, MZE, MZK, MLA, MLF, MLE, MLK, MVL, MVJ, MHS, MVH (~50V <sub>dc</sub> ), MHL, MHB, MHJ, MXB, MHK |
| Radial Lead Type   | SRG, KRG, KMQ (~100V <sub>dc</sub> ), LZA, LXZ, LXY, LXV, LE, GPA, GVA, GXF, GXL, GPD, GVD, GQB, Lbv, LBG                                                                                |

When a capacitor is mounted closely flush on the PC board, a residual cleaning agent may be left in the gap between the body of the capacitor and PC board surface. Dry out the residue with a forced hot air of 50 to 85°C for 10 minutes or more.

### 6-2-3 Other Solvents

To avoid capacitor failures, do not use the following cleaning agents:

- Halogenated system: causes capacitor failures due to corrosion.
- Alkali system: corrodes (dissolves) the aluminum can case.
- Terpene and petroleum system: deteriorates the rubber seal materials.
- Xylene and toluene: deteriorates the rubber seal materials as well.
- Acetone: erases the markings printed on a capacitor.

### 6-3 Adhesive and Coating Materials

To use adhesives and/or coating materials for aluminum electrolytic capacitors, make sure of the following conditions:

- Do not use any of adhesive or coating materials containing halogenated solvents.
- No flux residue nor stain is left between the rubber seal of a capacitor and PC board.
- Dry the capacitor to remove residual cleaning agents before applying adhesive and coating materials. Do not cover up the entire surface of the rubber seal of the capacitor with adhesive and coating materials.
- Improper heating and/or curing conditions for adhesives and coating materials may cause the sleeve to swell or shrink. Please consult us for proper conditions.
- For a non-solid aluminum electrolytic capacitor, covering up

the entire surface of the rubber seal with resin mold materials will obstruct the normal diffusion of internal hydrogen gas from the capacitor and result in serious failures. Also, where the adhesive and coating materials contain a large amount of halogen ions, the halogen ions will contaminate the inside of the capacitor through the rubber seal materials, which cause the capacitor to become a failure.

- The outer sleeve of a capacitor may lose a gloss or whiten in appearance depending on solvent materials that the adhesive or coating materials contains.
- Some adhesives or coating materials contain organic solvent such as Xylene. Xylene can deteriorate the rubber seal materials, which cause the flux ingredients to penetrate into the capacitor.

### 6-4 Effect of Fumigation

In exporting or importing electronic devices, they may be exposed to fumigation with halide such as methyl bromide. Where aluminum electrolytic capacitors exposed to halide such as methyl bromide, the capacitors will be damaged with the corrosion reaction with the halogen ions.

For the export and import, Nippon Chemi-Con considers using some packaging method and so forth that the fumigation is not required to. For customers to export or import electronic devices, semi-assembly products or capacitor components, confirm if they will be exposed to fumigation and also consider final condition of packaging. (Note that either cardboard or vinyl package has a risk of fumigation gas penetration.)

## 7. Recovery Voltage

Where a capacitor is once charged and discharged with both of the terminals short-circuiting and then left the terminals open for a while, a voltage across the capacitor spontaneously increases again. This is called "recovery voltage phenomenon". The mechanism for this phenomenon can be interpreted as follows:

When charged with a voltage, the dielectric produces some electrical changes within, and then the inside of the dielectric is electrified with the opposite polarities (dielectric polarization). The dielectric polarization occurs in both ways of proceeding rapidly and slowly. When a charged capacitor was discharged until the voltage across the capacitor disappears, and then being left the terminals open, the slow polarization will discharge within the capacitor and appear as recovery voltage. (Fig. 28).

The recovery voltage changes with time as shown in Fig. 29. Its peak will appear 10 to 20 days after the terminals are opened, with gradual weakening thereafter. Larger sized capacitors (screw terminal type and snap-in type) may produce larger recovery voltage.

With a recovery voltage residing in a capacitor, carelessly short-circuiting the terminals can cause sparks to occur, which may scare workers and/or damage low-voltage operating components such as CPU's and memories in the device circuit. To avoid this trouble, discharge the capacitor through 100 - 1kΩ resistors before use. Also, Nippon Chemi-Con may provide some solutions with some packaging method for it. Please consult us.

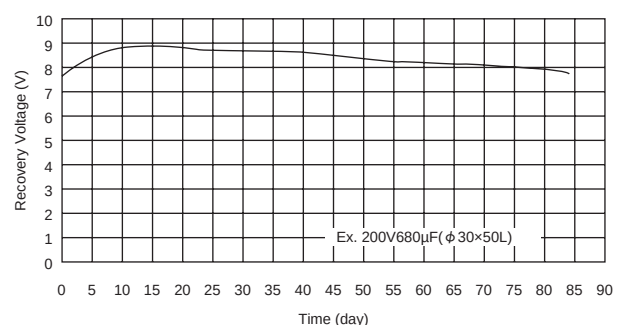
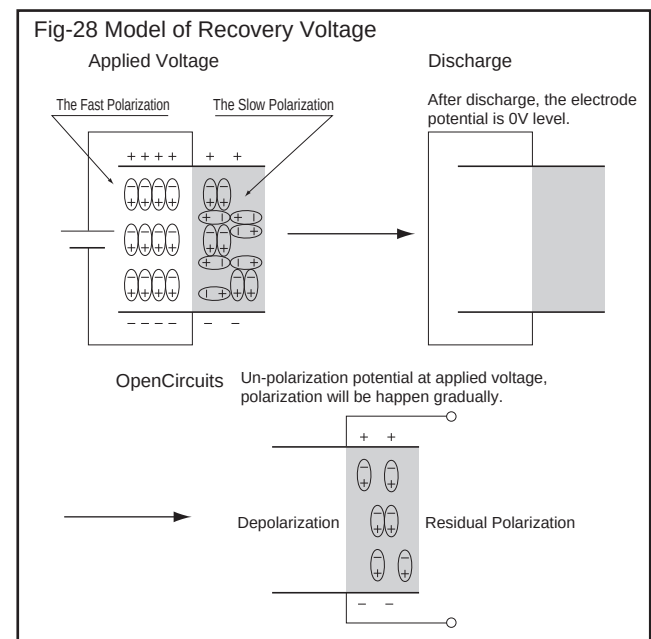


**Fig-29 Change of Recovery Voltage**

## 8. Storage

Some characteristics of an aluminum electrolytic capacitor are temperature-dependent. The higher the temperature is, the more deteriorated the capacitor will be. An increase in temperature accelerates the increase in leakage current and  $\tan\delta$  and the decrease in capacitance. Leaving a capacitor exposed to high humidity for long hours may lead to discoloration of the lead wires and terminals, and poor solderability. To store aluminum electrolytic capacitors, keep them at normal temperature and humidity without exposure to direct sunlight.

Leaving them exposed to high temperatures (higher than the normal ambient temperature) for long periods of time may lead to chemical reactions between the anode oxide layer and electrolyte, which drop the withstanding voltage and increase leakage current. If this is the case, applying the rated voltage to the capacitor will lead to dielectric breakdown due to the heat produced with the large leakage current, which finally causes the pressure relief vent to open.

Capacitors that have been stored for long periods of time should be subjected to a voltage treatment process (see Note 1) which will reform the dielectric ( $\text{Al}_2\text{O}_3$ ) by electrolyte and return the leakage current to the initial level. Leakage current increase during storage will vary with the withstanding voltage of a capacitor. In general, the higher the rated voltage, the larger increased the leakage current tends to be. Also, since storing for long period of time may shorten the lifetime of the capacitors, consider storage conditions according to the requirements of device life expectancy.

(Note 1) In the voltage treatment process, connecting resistor (around  $1\text{k}\Omega$ ) in series with the capacitor, applied the rated voltage and then be kept the rated voltage for 30 to 60 minutes.

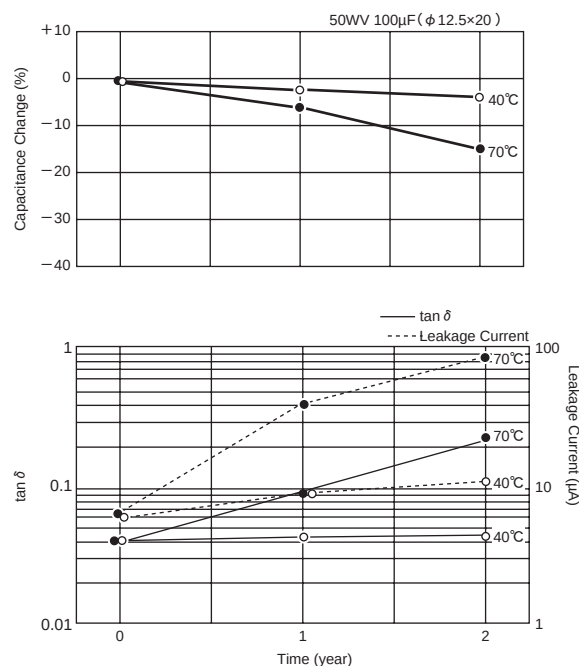


Fig-30 Temperature Characteristics of Storage

## 9. Tips for Selecting Capacitors Appropriate for Individual Applications

Aluminum electrolytic capacitors are used mainly for the filtering application of power supplies. Select appropriate capacitors for the specific requirements of each application, referring to the following examples for typical applications:

### 9-1 Input Filtering Capacitors for Switching Mode Power Supplies

An input filtering capacitor functions to smooth 50-120 Hz waveforms that come from a rectifying circuit, the waveforms of which are superimposed with the ripples with the switching frequency from the switching stage where the capacitor supplies the electric power. Therefore, the capacitor must be capable of managing both ripple currents with each frequency. The ESR of a capacitor is frequency-dependent, so that a ripple current of different frequency produces a different thermal energy in the capacitor.

For PFC power supplies or lighting ballasts, capacitors are subjected to ripple current whose frequency is several dozens of kHz to 100kHz. Therefore, to select capacitors, take their impedance characteristics into consideration.

#### ●Representative output filtering capacitors for SMPS

| Characteristics<br>Type | 85°C     |             | 105°C    |         |             |
|-------------------------|----------|-------------|----------|---------|-------------|
|                         | Standard | Longer Life | Standard | Compact | Longer Life |
| Radial Lead             | —        | —           | KMQ      | PAG     | KXJ         |
| Snap-in                 | SMQ      | SMM         | KMQ      | KMS,KMR | LXS,LXM     |

### 9-2 Output Filtering Capacitors for Switching Mode Power Supplies

In the output filtering, a capacitor must be capable of managing a ripple current with the frequency as high as around 100 kHz. Therefore, Nippon Chemi-Con provides excellent product line-ups with low impedance characteristic at high frequencies, including high temperature and long-life versions, which can be chosen according to the application purpose.

The 125°C maximum temperature series capacitors have a shorter lifetime than the "Long Life" series of 105°C max. temperature though the electrical characteristics are highly stable. The "wide temperature range" series has two subseries that differ by the applicable temperature range: -55 to 105°C and -40 to 125°C. The "Long Life" series capacitors have been designed for specializing lower impedance and also longer lifetime. Compared to the "wide temperature range" series, the Long Life series can serve longer with the lower impedance, though the maximum operating temperature is limited to 105°C and the electrical characteristics are large in change over the temperature range.

#### ●Representative output filtering capacitors for SMPS

| Characteristics<br>Type | 105°C    |       | 125°C     |
|-------------------------|----------|-------|-----------|
|                         | Standard | Low Z | High Temp |
| Wide Temp Range         | LXY      | LZA   | GPA       |
| Longer Life             | KYB      | KZN   | —         |

### 9-3 Filtering Capacitors for Inverter Main Circuits

These capacitors are used in a similar way to those for the input of the switching mode power supplies. Additionally, please understand the following precautions:

For the filtering circuit for 400Vac line, two capacitors of each a rated voltage 350 to 400Vdc can be used with being connected in series. In the series connection, voltages across the individual capacitors during charging depend on their individual capacitance values. After completion of the charging, the voltages come to depend on their leakage current values as the voltage distribution to the individual capacitors inversely corresponds to their leakage current values. For the voltage not to exceed the rated value after the charging is completed, balancing resistors should be connected in parallel with each capacitor. For guidance on choosing balancing resistors, please consult us.

Where capacitors connected in series are frequently charged and discharged, individual charging voltages depend on the variations in their capacitance values. Therefore, keeping the voltage balance will be difficult even if balancing resistors are employed. For servo amplifiers and other application where the voltage fluctuates frequently due to regeneration, use capacitor families that have been especially designed for intensive charge and discharge operations, or consult us for individual designs.

#### ●Representative filtering capacitors for inverter main circuits

| Characteristics<br>Type | 85°C     |             | 105°C    |             |
|-------------------------|----------|-------------|----------|-------------|
|                         | Standard | Longer Life | Standard | Longer Life |
| Snap-in                 | SMQ      | SMM         | KMQ      | LXS,LXM     |
| Screw Mount             | RWE      | RWF,RWH     | KMH      | LXA,LXR     |

#### ●Representative capacitors for servo amplifiers

| Characteristics<br>Type | 85°C     | 105°C     |
|-------------------------|----------|-----------|
|                         | Standard | High Temp |
| Snap-in                 | —        | KMV       |
| Screw Mount             | RWV      | —         |

## Appendix



## Appendix (Part number)

### ◆Capacitance code

\* How to use the table

| 1st        | 2nd |
|------------|-----|
| Cap. Value |     |

Capacitance value part

| 2nd | 1st  |      |      |      |      |      |      |      |      |
|-----|------|------|------|------|------|------|------|------|------|
|     | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    |
| 0   | 10.0 | 20.0 | 30.0 | 40.0 | 50.0 | 60.0 | 70.0 | 80.0 | 90.0 |
| A   | 10.5 | 20.5 | 30.5 | 40.5 | 50.5 | 60.5 | 70.5 | 80.5 | 90.5 |
| 1   | 11.0 | 21.0 | 31.0 | 41.0 | 51.0 | 61.0 | 71.0 | 81.0 | 91.0 |
| B   | 11.5 | 21.5 | 31.5 | 41.5 | 51.5 | 61.5 | 71.5 | 81.5 | 91.5 |
| 2   | 12.0 | 22.0 | 32.0 | 42.0 | 52.0 | 62.0 | 72.0 | 82.0 | 92.0 |
| C   | 12.5 | 22.5 | 32.5 | 42.5 | 52.5 | 62.5 | 72.5 | 82.5 | 92.5 |
| 3   | 13.0 | 23.0 | 33.0 | 43.0 | 53.0 | 63.0 | 73.0 | 83.0 | 93.0 |
| D   | 13.5 | 23.5 | 33.5 | 43.5 | 53.5 | 63.5 | 73.5 | 83.5 | 93.5 |
| 4   | 14.0 | 24.0 | 34.0 | 44.0 | 54.0 | 64.0 | 74.0 | 84.0 | 94.0 |
| E   | 14.5 | 24.5 | 34.5 | 44.5 | 54.5 | 64.5 | 74.5 | 84.5 | 94.5 |
| 5   | 15.0 | 25.0 | 35.0 | 45.0 | 55.0 | 65.0 | 75.0 | 85.0 | 95.0 |
| F   | 15.5 | 25.5 | 35.5 | 45.5 | 55.5 | 65.5 | 75.5 | 85.5 | 95.5 |
| 6   | 16.0 | 26.0 | 36.0 | 46.0 | 56.0 | 66.0 | 76.0 | 86.0 | 96.0 |
| G   | 16.5 | 26.5 | 36.5 | 46.5 | 56.5 | 66.5 | 76.5 | 86.5 | 96.5 |
| 7   | 17.0 | 27.0 | 37.0 | 47.0 | 57.0 | 67.0 | 77.0 | 87.0 | 97.0 |
| H   | 17.5 | 27.5 | 37.5 | 47.5 | 57.5 | 67.5 | 77.5 | 87.5 | 97.5 |
| 8   | 18.0 | 28.0 | 38.0 | 48.0 | 58.0 | 68.0 | 78.0 | 88.0 | 98.0 |
| J   | 18.5 | 28.5 | 38.5 | 48.5 | 58.5 | 68.5 | 78.5 | 88.5 | 98.5 |
| 9   | 19.0 | 29.0 | 39.0 | 49.0 | 59.0 | 69.0 | 79.0 | 89.0 | 99.0 |
| K   | 19.5 | 29.5 | 39.5 | 49.5 | 59.5 | 69.5 | 79.5 | 89.5 | 99.5 |



For less than 10μF, a decimal point position is displayed with R.

For 10μF or more, capacitance code is set to the first 2 digits and index (1digit).

Treatment of fraction (Refer to the table)

Example of conversion

| Real cap.  | The first 2 digits | Treatment of fraction | Code |      |      |
|------------|--------------------|-----------------------|------|------|------|
|            |                    |                       | 11th | 12th | 13th |
| 10.0μF →   | 10.0 →             | 10.0 →                | 1    | 0    | 0    |
| 10.1μF →   | 10.1 →             | 10.0 →                | 1    | 0    | 0    |
| 10.2μF →   | 10.2 →             | 10.0 →                | 1    | 0    | 0    |
| 10.3μF →   | 10.3 →             | 10.5 →                | 1    | A    | 0    |
| 10.4μF →   | 10.4 →             | 10.5 →                | 1    | A    | 0    |
| 10.5μF →   | 10.5 →             | 10.5 →                | 1    | A    | 0    |
| 10.6μF →   | 10.6 →             | 10.5 →                | 1    | A    | 0    |
| 10.7μF →   | 10.7 →             | 10.5 →                | 1    | A    | 0    |
| 10.8μF →   | 10.8 →             | 11.0 →                | 1    | 1    | 0    |
| 10.9μF →   | 10.9 →             | 11.0 →                | 1    | 1    | 0    |
| 11.0μF →   | 11.0 →             | 11.0 →                | 1    | 1    | 0    |
| 132μF →    | 13.2 →             | 13.0 →                | 1    | 3    | 1    |
| 133μF →    | 13.3 →             | 13.5 →                | 1    | D    | 1    |
| 167μF →    | 16.7 →             | 16.5 →                | 1    | G    | 1    |
| 168μF →    | 16.8 →             | 17.0 →                | 1    | 7    | 1    |
| 1110μF →   | 11.1 →             | 11.0 →                | 1    | 1    | 2    |
| 1340μF →   | 13.4 →             | 13.5 →                | 1    | D    | 2    |
| 13200μF →  | 13.2 →             | 13.0 →                | 1    | 3    | 3    |
| 13600μF →  | 13.6 →             | 13.5 →                | 1    | D    | 3    |
| 270000μF → | 27.0 →             | 27.0 →                | 2    | 7    | 4    |

### ◆Case length (Radial lead type)

| Case length [mm] | 16th | 17th |
|------------------|------|------|
| 0.0              | —    | —    |
| 0.1              | 0    | B    |
| 0.2              | 0    | C    |
| 0.3              | 0    | D    |
| 0.4              | 0    | E    |
| 0.5              | 0    | F    |
| 0.6              | 0    | G    |
| 0.7              | 0    | H    |
| 0.8              | 0    | J    |
| 0.9              | 0    | K    |

| Case length [mm] | 16th | 17th |
|------------------|------|------|
| 1.0              | 0    | 1    |
| 1.1              | 1    | B    |
| 1.2              | 1    | C    |
| 1.3              | 1    | D    |
| 1.4              | 1    | E    |
| 1.5              | 1    | F    |
| 1.6              | 1    | G    |
| 1.7              | 1    | H    |
| 1.8              | 1    | J    |
| 1.9              | 1    | K    |

| Case length [mm] | 16th | 17th |
|------------------|------|------|
| 2.0              | 0    | 2    |
| 2.1              | 2    | B    |
| 2.2              | 2    | C    |
| 2.3              | 2    | D    |
| 2.4              | 2    | E    |
| 2.5              | 2    | F    |
| 2.6              | 2    | G    |
| 2.7              | 2    | H    |
| 2.8              | 2    | J    |
| 2.9              | 2    | K    |

| Case length [mm] | 16th | 17th |
|------------------|------|------|
| 3.0              | 0    | 3    |
| 3.1              | 3    | B    |
| 3.2              | 3    | C    |
| 3.3              | 3    | D    |
| 3.4              | 3    | E    |
| 3.5              | 3    | F    |
| 3.6              | 3    | G    |
| 3.7              | 3    | H    |
| 3.8              | 3    | J    |
| 3.9              | 3    | K    |

| Case length [mm] | 16th | 17th |
|------------------|------|------|
| 4.0              | 0    | 4    |
| 4.1              | 4    | B    |
| 4.2              | 4    | C    |
| 4.3              | 4    | D    |
| 4.4              | 4    | E    |
| 4.5              | 4    | F    |
| 4.6              | 4    | G    |
| 4.7              | 4    | H    |
| 4.8              | 4    | J    |
| 4.9              | 4    | K    |

| Case length [mm] | 16th | 17th |
|------------------|------|------|
| 5.0              | 0    | 5    |
| 5.1              | 5    | B    |
| 5.2              | 5    | C    |
| 5.3              | 5    | D    |
| 5.4              | 5    | E    |
| 5.5              | 5    | F    |
| 5.6              | 5    | G    |
| 5.7              | 5    | H    |
| 5.8              | 5    | J    |
| 5.9              | 5    | K    |

| Case length [mm] | 16th | 17th |
|------------------|------|------|
| 6.0              | 0    | 6    |
| 6.1              | 6    | B    |
| 6.2              | 6    | C    |
| 6.3              | 6    | D    |
| 6.4              | 6    | E    |
| 6.5              | 6    | F    |
| 6.6              | 6    | G    |
| 6.7              | 6    | H    |
| 6.8              | 6    | J    |
| 6.9              | 6    | K    |

| Case length [mm] | 16th | 17th |
|------------------|------|------|
| 7.0              | 0    | 7    |
| 7.1              | 7    | B    |
| 7.2              | 7    | C    |
| 7.3              | 7    | D    |
| 7.4              | 7    | E    |
| 7.5              | 7    | F    |
| 7.6              | 7    | G    |
| 7.7              | 7    | H    |
| 7.8              | 7    | J    |
| 7.9              | 7    | K    |

| Case length [mm] | 16th | 17th |
|------------------|------|------|
| 8.0              | 0    | 8    |
| 8.1              | 8    | B    |
| 8.2              | 8    | C    |
| 8.3              | 8    | D    |
| 8.4              | 8    | E    |
| 8.5              | 8    | F    |
| 8.6              | 8    | G    |
| 8.7              | 8    | H    |
| 8.8              | 8    | J    |
| 8.9              | 8    | K    |

| Case length [mm] | 16th | 17th |
|------------------|------|------|
| 9.0              | 0    | 9    |
| 9.1              | 9    | B    |
| 9.2              | 9    | C    |
| 9.3              | 9    | D    |
| 9.4              | 9    | E    |
| 9.5              | 9    | F    |
| 9.6              | 9    | G    |
| 9.7              | 9    | H    |
| 9.8              | 9    | J    |
| 9.9              | 9    | K    |

| Case length [mm] | 16th | 17th |
|------------------|------|------|
| 10.0             | 1    | 0    |
| 10.1             | A    | 1    |
| 10.2             | A    | 2    |
| 10.3             | A    | 3    |
| 10.4             | A    | 4    |
| 10.5             | A    | 5    |
| 10.6             | A    | 6    |
| 10.7             | A    | 7    |
| 10.8             | A    | 8    |
| 10.9             | A    | 9    |

| Case length [mm] | 16th | 17th |
|------------------|------|------|
| 11.0             | 1    | 1    |
| 11.1             | B    | 1    |
| 11.2             | B    | 2    |
| 11.3             | B    | 3    |
| 11.4             | B    | 4    |
| 11.5             | B    | 5    |
| 11.6             | B    | 6    |
| 11.7             | B    | 7    |
| 11.8             | B    | 8    |
| 11.9             | B    | 9    |

| Case length [mm] | 16th | 17th |
|------------------|------|------|
| 12.0             | 1    | 2    |
| 12.1             | C    | 1    |
| 12.2             | C    | 2    |
| 12.3             | C    | 3    |
| 12.4             | C    | 4    |
| 12.5             | C    | 5    |
| 12.6             | C    | 6    |
| 12.7             | C    | 7    |
| 12.8             | C    | 8    |
| 12.9             | C    | 9    |

| Case length [mm] | 16th | 17th |
|------------------|------|------|
| 13.0             | 1    | 3    |
| 13.1             | D    | 1    |
| 13.2             | D    | 2    |
| 13.3             | D    | 3    |
| 13.4             | D    | 4    |
| 13.5             | D    | 5    |
| 13.6             | D    | 6    |
| 13.7             | D    | 7    |
| 13.8             | D    | 8    |
| 13.9             | D    | 9    |

| Case length [mm] | 16th | 17th |
|------------------|------|------|
| 14.0             | 1    | 4    |
| 14.1             | E    | 1    |
| 14.2             | E    | 2    |
| 14.3             | E    | 3    |
| 14.4             | E    | 4    |
| 14.5             | E    | 5    |
| 14.6             | E    | 6    |
| 14.7             | E    | 7    |
| 14.8             | E    | 8    |
| 14.9             | E    | 9    |



## PART NUMBERING SYSTEM

| Case length<br>[mm] | 16th | 17th | Case length<br>[mm] | 16th | 17th | Case length<br>[mm] | 16th | 17th | Case length<br>[mm] | 16th | 17th | Case length<br>[mm] | 16th | 17th |
|---------------------|------|------|---------------------|------|------|---------------------|------|------|---------------------|------|------|---------------------|------|------|
| 15.0                | 1    | 5    | 16.0                | 1    | 6    | 17.0                | 1    | 7    | 18.0                | 1    | 8    | 19.0                | 1    | 9    |
| 15.1                | F    | 1    | 16.1                | G    | 1    | 17.1                | H    | 1    | 18.1                | J    | 1    | 19.1                | K    | 1    |
| 15.2                | F    | 2    | 16.2                | G    | 2    | 17.2                | H    | 2    | 18.2                | J    | 2    | 19.2                | K    | 2    |
| 15.3                | F    | 3    | 16.3                | G    | 3    | 17.3                | H    | 3    | 18.3                | J    | 3    | 19.3                | K    | 3    |
| 15.4                | F    | 4    | 16.4                | G    | 4    | 17.4                | H    | 4    | 18.4                | J    | 4    | 19.4                | K    | 4    |
| 15.5                | F    | 5    | 16.5                | G    | 5    | 17.5                | H    | 5    | 18.5                | J    | 5    | 19.5                | K    | 5    |
| 15.6                | F    | 6    | 16.6                | G    | 6    | 17.6                | H    | 6    | 18.6                | J    | 6    | 19.6                | K    | 6    |
| 15.7                | F    | 7    | 16.7                | G    | 7    | 17.7                | H    | 7    | 18.7                | J    | 7    | 19.7                | K    | 7    |
| 15.8                | F    | 8    | 16.8                | G    | 8    | 17.8                | H    | 8    | 18.8                | J    | 8    | 19.8                | K    | 8    |
| 15.9                | F    | 9    | 16.9                | G    | 9    | 17.9                | H    | 9    | 18.9                | J    | 9    | 19.9                | K    | 9    |

| Case length<br>[mm] | 16th | 17th | Case length<br>[mm] | 16th | 17th | Case length<br>[mm] | 16th | 17th | Case length<br>[mm] | 16th | 17th | Case length<br>[mm] | 16th | 17th |
|---------------------|------|------|---------------------|------|------|---------------------|------|------|---------------------|------|------|---------------------|------|------|
| 20.0                | 2    | 0    | 30.0                | 3    | 0    | 40.0                | 4    | 0    | 50.0                | 5    | 0    | 60.0                | 6    | 0    |
| 20.5                | L    | 1    | 30.5                | N    | 1    | 40.5                | Q    | 1    | 50.5                | S    | 1    | 60.5                | U    | 1    |
| 21.0                | 2    | 1    | 31.0                | 3    | 1    | 41.0                | 4    | 1    | 51.0                | S    | 1    | 61.0                | 6    | 1    |
| 21.5                | L    | 3    | 31.5                | N    | 3    | 41.5                | Q    | 3    | 51.5                | S    | 3    | 61.5                | U    | 3    |
| 22.0                | 2    | 2    | 32.0                | 3    | 2    | 42.0                | 4    | 2    | 52.0                | S    | 2    | 62.0                | 6    | 2    |
| 22.5                | L    | 5    | 32.5                | N    | 5    | 42.5                | Q    | 5    | 52.5                | S    | 5    | 62.5                | U    | 5    |
| 23.0                | 2    | 3    | 33.0                | 3    | 3    | 43.0                | 4    | 3    | 53.0                | S    | 3    | 63.0                | 6    | 3    |
| 23.5                | L    | 7    | 33.5                | N    | 7    | 43.5                | Q    | 7    | 53.5                | S    | 7    | 63.5                | U    | 7    |
| 24.0                | 2    | 4    | 34.0                | 3    | 4    | 44.0                | 4    | 4    | 54.0                | S    | 4    | 64.0                | 6    | 4    |
| 24.5                | L    | 9    | 34.5                | N    | 9    | 44.5                | Q    | 9    | 54.5                | S    | 9    | 64.5                | U    | 9    |
| 25.0                | 2    | 5    | 35.0                | 3    | 5    | 45.0                | 4    | 5    | 55.0                | S    | 5    | 65.0                | 6    | 5    |
| 25.5                | M    | 1    | 35.5                | P    | 1    | 45.5                | R    | 1    | 55.5                | T    | 1    | 65.5                | V    | 1    |
| 26.0                | 2    | 6    | 36.0                | 3    | 6    | 46.0                | 4    | 6    | 56.0                | S    | 6    | 66.0                | 6    | 6    |
| 26.5                | M    | 3    | 36.5                | P    | 3    | 46.5                | R    | 3    | 56.5                | T    | 3    | 66.5                | V    | 3    |
| 27.0                | 2    | 7    | 37.0                | 3    | 7    | 47.0                | 4    | 7    | 57.0                | S    | 7    | 67.0                | 6    | 7    |
| 27.5                | M    | 5    | 37.5                | P    | 5    | 47.5                | R    | 5    | 57.5                | T    | 5    | 67.5                | V    | 5    |
| 28.0                | 2    | 8    | 38.0                | 3    | 8    | 48.0                | 4    | 8    | 58.0                | S    | 8    | 68.0                | 6    | 8    |
| 28.5                | M    | 7    | 38.5                | P    | 7    | 48.5                | R    | 7    | 58.5                | T    | 7    | 68.5                | V    | 7    |
| 29.0                | 2    | 9    | 39.0                | 3    | 9    | 49.0                | 4    | 9    | 59.0                | S    | 9    | 69.0                | 6    | 9    |
| 29.5                | M    | 9    | 39.5                | P    | 9    | 49.5                | R    | 9    | 59.5                | T    | 9    | 69.5                | V    | 9    |

| Case length<br>[mm] | 16th | 17th | Case length<br>[mm] | 16th | 17th |
|---------------------|------|------|---------------------|------|------|
| 70.0                | 7    | 0    | 80.0                | 8    | 0    |
| 70.5                | W    | 1    | 80.5                | Y    | 1    |
| 71.0                | 7    | 1    | 81.0                | 8    | 1    |
| 71.5                | W    | 3    | 81.5                | Y    | 3    |
| 72.0                | 7    | 2    | 82.0                | 8    | 2    |
| 72.5                | W    | 5    | 82.5                | Y    | 5    |
| 73.0                | 7    | 3    | 83.0                | 8    | 3    |
| 73.5                | W    | 7    | 83.5                | Y    | 7    |
| 74.0                | 7    | 4    | 84.0                | 8    | 4    |
| 74.5                | W    | 9    | 84.5                | Y    | 9    |
| 75.0                | 7    | 5    | 85.0                | 8    | 5    |
| 75.5                | X    | 1    | 85.5                | Z    | 1    |
| 76.0                | 7    | 6    | 86.0                | 8    | 6    |
| 76.5                | X    | 3    | 86.5                | Z    | 3    |
| 77.0                | 7    | 7    | 87.0                | 8    | 7    |
| 77.5                | X    | 5    | 87.5                | Z    | 5    |
| 78.0                | 7    | 8    | 88.0                | 8    | 8    |
| 78.5                | X    | 7    | 88.5                | Z    | 7    |
| 79.0                | 7    | 9    | 89.0                | 8    | 9    |
| 79.5                | X    | 9    | 89.5                | Z    | 9    |

## ◆Case length (Snap-in type / Screw mount terminal type)

| Case length<br>[mm] | 16th | 17th |
|---------------------|------|------|
| 20                  | 2    | 0    |
| 21                  | 2    | 1    |
| 22                  | 2    | 2    |
| 23                  | 2    | 3    |
| 24                  | 2    | 4    |
| 25                  | 2    | 5    |
| 26                  | 2    | 6    |
| 27                  | 2    | 7    |
| 28                  | 2    | 8    |
| 29                  | 2    | 9    |

| Case length<br>[mm] | 16th | 17th |
|---------------------|------|------|
| 30                  | 3    | 0    |
| 31                  | 3    | 1    |
| 32                  | 3    | 2    |
| 33                  | 3    | 3    |
| 34                  | 3    | 4    |
| 35                  | 3    | 5    |
| 36                  | 3    | 6    |
| 37                  | 3    | 7    |
| 38                  | 3    | 8    |
| 39                  | 3    | 9    |

| Case length<br>[mm] | 16th | 17th |
|---------------------|------|------|
| 40                  | 4    | 0    |
| 41                  | 4    | 1    |
| 42                  | 4    | 2    |
| 43                  | 4    | 3    |
| 44                  | 4    | 4    |
| 45                  | 4    | 5    |
| 46                  | 4    | 6    |
| 47                  | 4    | 7    |
| 48                  | 4    | 8    |
| 49                  | 4    | 9    |

| Case length<br>[mm] | 16th | 17th |
|---------------------|------|------|
| 50                  | 5    | 0    |
| 51                  | 5    | 1    |
| 52                  | 5    | 2    |
| 53                  | 5    | 3    |
| 54                  | 5    | 4    |
| 55                  | 5    | 5    |
| 56                  | 5    | 6    |
| 57                  | 5    | 7    |
| 58                  | 5    | 8    |
| 59                  | 5    | 9    |

| Case length<br>[mm] | 16th | 17th |
|---------------------|------|------|
| 60                  | 6    | 0    |
| 61                  | 6    | 1    |
| 62                  | 6    | 2    |
| 63                  | 6    | 3    |
| 64                  | 6    | 4    |
| 65                  | 6    | 5    |
| 66                  | 6    | 6    |
| 67                  | 6    | 7    |
| 68                  | 6    | 8    |
| 69                  | 6    | 9    |

| Case length<br>[mm] | 16th | 17th |
|---------------------|------|------|
| 70                  | 7    | 0    |
| 71                  | 7    | 1    |
| 72                  | 7    | 2    |
| 73                  | 7    | 3    |
| 74                  | 7    | 4    |
| 75                  | 7    | 5    |
| 76                  | 7    | 6    |
| 77                  | 7    | 7    |
| 78                  | 7    | 8    |
| 79                  | 7    | 9    |

| Case length<br>[mm] | 16th | 17th |
|---------------------|------|------|
| 80                  | 8    | 0    |
| 81                  | 8    | 1    |
| 82                  | 8    | 2    |
| 83                  | 8    | 3    |
| 84                  | 8    | 4    |
| 85                  | 8    | 5    |
| 86                  | 8    | 6    |
| 87                  | 8    | 7    |
| 88                  | 8    | 8    |
| 89                  | 8    | 9    |

| Case length<br>[mm] | 16th | 17th |
|---------------------|------|------|
| 90                  | 9    | 0    |
| 91                  | 9    | 1    |
| 92                  | 9    | 2    |
| 93                  | 9    | 3    |
| 94                  | 9    | 4    |
| 95                  | 9    | 5    |
| 96                  | 9    | 6    |
| 97                  | 9    | 7    |
| 98                  | 9    | 8    |
| 99                  | 9    | 9    |

| Case length<br>[mm] | 16th | 17th |
|---------------------|------|------|
| 100                 | A    | 0    |
| 101                 | A    | 1    |
| 102                 | A    | 2    |
| 103                 | A    | 3    |
| 104                 | A    | 4    |
| 105                 | A    | 5    |
| 106                 | A    | 6    |
| 107                 | A    | 7    |
| 108                 | A    | 8    |
| 109                 | A    | 9    |

| Case length<br>[mm] | 16th | 17th |
|---------------------|------|------|
| 110                 | B    | 0    |
| 111                 | B    | 1    |
| 112                 | B    | 2    |
| 113                 | B    | 3    |
| 114                 | B    | 4    |
| 115                 | B    | 5    |
| 116                 | B    | 6    |
| 117                 | B    | 7    |
| 118                 | B    | 8    |
| 119                 | B    | 9    |

| Case length<br>[mm] | 16th | 17th |
|---------------------|------|------|
| 120                 | C    | 0    |
| 121                 | C    | 1    |
| 122                 | C    | 2    |
| 123                 | C    | 3    |
| 124                 | C    | 4    |
| 125                 | C    | 5    |
| 126                 | C    | 6    |
| 127                 | C    | 7    |
| 128                 | C    | 8    |
| 129                 | C    | 9    |

| Case length<br>[mm] | 16th | 17th |
|---------------------|------|------|
| 130                 | D    | 0    |
| 131                 | D    | 1    |
| 132                 | D    | 2    |
| 133                 | D    | 3    |
| 134                 | D    | 4    |
| 135                 | D    | 5    |
| 136                 | D    | 6    |
| 137                 | D    | 7    |
| 138                 | D    | 8    |
| 139                 | D    | 9    |

| Case length<br>[mm] | 16th | 17th |
|---------------------|------|------|
| 140                 | E    | 0    |
| 141                 | E    | 1    |
| 142                 | E    | 2    |
| 143                 | E    | 3    |
| 144                 | E    | 4    |
| 145                 | E    | 5    |
| 146                 | E    | 6    |
| 147                 | E    | 7    |
| 148                 | E    | 8    |
| 149                 | E    | 9    |

| Case length<br>[mm] | 16th | 17th |
|---------------------|------|------|
| 150                 | F    | 0    |
| 151                 | F    | 1    |
| 152                 | F    | 2    |
| 153                 | F    | 3    |
| 154                 | F    | 4    |
| 155                 | F    | 5    |
| 156                 | F    | 6    |
| 157                 | F    | 7    |
| 158                 | F    | 8    |
| 159                 | F    | 9    |

| Case length<br>[mm] | 16th | 17th |
|---------------------|------|------|
| 160                 | G    | 0    |
| 161                 | G    | 1    |
| 162                 | G    | 2    |
| 163                 | G    | 3    |
| 164                 | G    | 4    |
| 165                 | G    | 5    |
| 166                 | G    | 6    |
| 167                 | G    | 7    |
| 168                 | G    | 8    |
| 169                 | G    | 9    |

| Case length<br>[mm] | 16th | 17th |
|---------------------|------|------|
| 170                 | H    | 0    |
| 171                 | H    | 1    |
| 172                 | H    | 2    |
| 173                 | H    | 3    |
| 174                 | H    | 4    |
| 175                 | H    | 5    |
| 176                 | H    | 6    |
| 177                 | H    | 7    |
| 178                 | H    | 8    |
| 179                 | H    | 9    |

| Case length<br>[mm] | 16th | 17th |
|---------------------|------|------|
| 180                 | J    | 0    |
| 181                 | J    | 1    |
| 182                 | J    | 2    |
| 183                 | J    | 3    |
| 184                 | J    | 4    |
| 185                 | J    | 5    |
| 186                 | J    | 6    |
| 187                 | J    | 7    |
| 188                 | J    | 8    |
| 189                 | J    | 9    |

| Case length<br>[mm] | 16th | 17th |
|---------------------|------|------|
| 190                 | K    | 0    |
| 191                 | K    | 1    |
| 192                 | K    | 2    |
| 193                 | K    | 3    |
| 194                 | K    | 4    |
| 195                 | K    | 5    |
| 196                 | K    | 6    |
| 197                 | K    | 7    |
| 198                 | K    | 8    |
| 199                 | K    | 9    |

| Case length<br>[mm] | 16th | 17th |
|---------------------|------|------|
| 200                 | L    | 0    |
| 201                 | L    | 1    |
| 202                 | L    | 2    |
| 203                 | L    | 3    |
| 204                 | L    | 4    |
| 205                 | L    | 5    |
| 206                 | L    | 6    |
| 207                 | L    | 7    |
| 208                 | L    | 8    |
| 209                 | L    | 9    |

| Case length<br>[mm] | 16th | 17th |
|---------------------|------|------|
| 210                 | M    | 0    |
| 211                 | M    | 1    |
| 212                 | M    | 2    |
| 213                 | M    | 3    |
| 214                 | M    | 4    |
| 215                 | M    | 5    |
| 216                 | M    | 6    |
| 217                 | M    | 7    |
| 218                 | M    | 8    |
| 219                 | M    | 9    |

| Case length<br>[mm] | 16th | 17th |
|---------------------|------|------|
| 220                 | N    | 0    |
| 221                 | N    | 1    |
| 222                 | N    | 2    |
| 223                 | N    | 3    |
| 224                 | N    | 4    |
| 225                 | N    | 5    |
| 226                 | N    | 6    |
| 227                 | N    | 7    |
| 228                 | N    | 8    |
| 229                 | N    | 9    |

| Case length<br>[mm] | 16th | 17th |
|---------------------|------|------|
| 230                 | P    | 0    |
| 231                 | P    | 1    |
| 232                 | P    | 2    |
| 233                 | P    | 3    |
| 234                 | P    | 4    |
| 235                 | P    | 5    |
| 236                 | P    | 6    |
| 237                 | P    | 7    |
| 238                 | P    | 8    |
| 239                 | P    | 9    |

| Case length<br>[mm] | 16th | 17th |
|---------------------|------|------|
| 240                 | Q    | 0    |
| 241                 | Q    | 1    |
| 242                 | Q    | 2    |
| 243                 | Q    | 3    |
| 244                 | Q    | 4    |
| 245                 | Q    | 5    |
| 246                 | Q    | 6    |
| 247                 | Q    | 7    |
| 248                 | Q    | 8    |
| 249                 | Q    | 9    |

| Case length<br>[mm] | 16th | 17th |
|---------------------|------|------|
| 250                 | R    | 0    |
| 251                 | R    | 1    |
| 252                 | R    | 2    |
| 253                 | R    | 3    |
| 254                 | R    | 4    |
| 255                 | R    | 5    |
| 256                 | R    | 6    |
| 257                 | R    | 7    |
| 258                 | R    | 8    |
| 259                 | R    | 9    |



## PART NUMBERING SYSTEM

### ◆ Supplement code

Conductive Polymer Aluminum Solid Capacitors (Chip and Radial lead type)

Conductive Polymer Hybrid Aluminum Electrolytic Capacitors (Chip and Radial lead type)

Aluminum Electrolytic Capacitors (Chip type)

|              | Terminal plating material |       |
|--------------|---------------------------|-------|
|              | Sn                        | Sn-Bi |
| Coating case | S                         | G     |

### Aluminum Electrolytic Capacitors (Radial lead and Snap-in type)

|              |              | Terminal plating material |       |
|--------------|--------------|---------------------------|-------|
|              |              | Sn                        | Sn-Bi |
| Outer sleeve | PET          | S                         | D     |
|              | Coating case | H                         | G     |
|              | Polyolefin   | L                         | —     |
|              | PVC          | M                         | —     |

\* Standard design of "environmental friendly" snap-in are not equipped with a plastic disk on the top of the can case.  
We also produce snap-in type with "Plastic disk, PVC sleeve and Sn terminal plating".

### Aluminum Electrolytic Capacitors (Screw mount terminal type)

| Outer sleeve | Supplement code |
|--------------|-----------------|
| PVC          | U               |
| Polyolefin   | S               |
| PET          | C               |

\* For the screw-mount type, the standard design has a plastic disk on the bottom side.

## ELECTRONIC COMPONENTS & DEVICES

### PRODUCTS

|                                                | CAT.No. |
|------------------------------------------------|---------|
| Aluminum Electrolytic Capacitors               | 1001    |
| Multilayer Ceramic Capacitors                  | 1002    |
| Film Capacitors                                | 1003    |
| Metal Oxide Varistors TNR™                     | 1006    |
| Nanocrystalline / Amorphous / Dust Choke Coils | 1008    |
| Electric Double Layer Capacitors               | 1009    |
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