

# LF Series

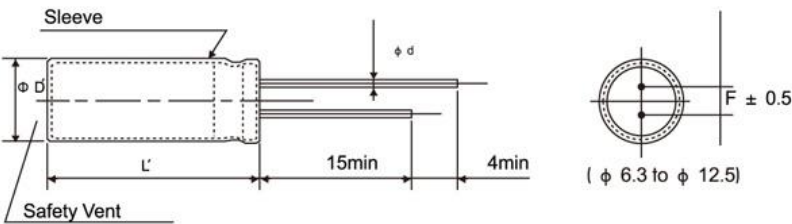
- Low impedance for high frequency
- Life time: +105 °C 2,000 to 4,000 hours
- Suitable for switching power, UPS, power sources etc
- RoHS Compliant



## ● SPECIFICATIONS

| Items                                                 | Characteristics                                                                                                                                                                                            |                                       |      |      |      |      |      |            |                   |                  |  |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|------|------|------|------|------|------------|-------------------|------------------|--|
| Category                                              | Temperature Range                                                                                                                                                                                          |                                       |      |      |      |      |      |            |                   |                  |  |
| Rated Voltage Range                                   | -40 to +105 °C (6.3 to 100Vdc)                                                                                                                                                                             |                                       |      |      |      |      |      |            |                   |                  |  |
| Capacitance Tolerance                                 | 6.3 to 100Vdc                                                                                                                                                                                              |                                       |      |      |      |      |      |            |                   |                  |  |
| Leakage Current                                       | ± 20%(M) (at 20 °C 120Hz)                                                                                                                                                                                  |                                       |      |      |      |      |      |            |                   |                  |  |
| Dissipation Factor (tan δ )                           | 1 ≤ 0.01CVor 3 μ A , whichever is greater<br>Where, I:Max.leakage current( μ A), C:Nominal capacitance ( μ F) V:Rated voltage(V)<br>(at 20 °C ,after 2minutes)                                             |                                       |      |      |      |      |      |            |                   |                  |  |
|                                                       | Rated voltage(Vdc)                                                                                                                                                                                         | 6.3                                   | 10   | 16   | 25   | 35   | 50   | 63         | 100               | (at 20 °C 120Hz) |  |
|                                                       | tan δ (Max)                                                                                                                                                                                                | 0.22                                  | 0.19 | 0.16 | 0.14 | 0.12 | 0.10 | 0.09       | 0.08              |                  |  |
| Low Temperature Characteristics (Max.Impedance Ratio) | When nominal capacitance exceeds 1,000 μ F add 0.02 to the value above for each 1,000uF increase (at 20 °C 120Hz)                                                                                          |                                       |      |      |      |      |      |            |                   |                  |  |
| Endurance                                             | Rate Voltage(Vdc)                                                                                                                                                                                          | 6.3                                   | 10   | 16   | 5    | 35   | 50   | 63         | 100               | (at 120Hz)       |  |
|                                                       | Z(-25 °C )/Z(+20 °C )                                                                                                                                                                                      | 4                                     | 3    | 2    |      |      |      |            |                   |                  |  |
|                                                       | Z(-40 °C )/Z(+20 °C )                                                                                                                                                                                      | 8                                     | 6    | 4    | 3    |      |      |            |                   |                  |  |
| Shelf Life                                            | The following specification shall be satisfied when the capacitors are restored to 20 °C after subjected to DC voltage with the rated ripple current is applied for the specified period of time at 105 °C |                                       |      |      |      |      |      |            |                   |                  |  |
|                                                       | Capacitance Change                                                                                                                                                                                         | ≤ ± 25% of the initial value          |      |      |      |      |      | Case Dia   | Life time(hours)  |                  |  |
|                                                       | D.F. (tan δ )                                                                                                                                                                                              | ≤ 200% of the initial specified value |      |      |      |      |      | Φ D=6.3    | 6.3-100WV<br>2000 |                  |  |
|                                                       | Leakage Current                                                                                                                                                                                            | ≤ The initial specified value         |      |      |      |      |      | Φ D=8&10   | 3000              |                  |  |
|                                                       |                                                                                                                                                                                                            |                                       |      |      |      |      |      | Φ D ≥ 12.5 | 4000              |                  |  |
|                                                       |                                                                                                                                                                                                            |                                       |      |      |      |      |      |            |                   |                  |  |

## ● DIMENSIONS[mm]



| Φ D  | 6.3        | 8   | 10  | 12.5 |
|------|------------|-----|-----|------|
| Φ d  | 0.5        | 0.5 | 0.6 | 0.6  |
| F    | 2.5        | 3.5 | 5.0 | 5.0  |
| Φ D' | Φ D+0.5max |     |     |      |
| L'   | L+2max     |     |     |      |

## ● RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

| Freq ( Hz )       | 120  | 1k   | 10k  | 100k |
|-------------------|------|------|------|------|
| CAP( μ F )        |      |      |      |      |
| CAP < 220         | 0.40 | 0.75 | 0.90 | 1.00 |
| 220 ≤ Cap < 680   | 0.60 | 0.85 | 0.94 | 1.00 |
| 680 ≤ Cap < 2200  | 0.60 | 0.87 | 0.95 | 1.00 |
| 2200 ≤ Cap < 4700 | 0.75 | 0.90 | 0.95 | 1.00 |
| Cap ≥ 4700        | 0.85 | 0.95 | 0.98 | 1.00 |

The endurance of capacitors is shorted with internal heating produced by ripple current at the rate of halving the lifetime with every 5 °C rise. When long life performance is required in actual use, the rms ripple current has to be reduced

# LF Series

● **STANDARD RATINGS** (Impedance: at 20 °C 100kHz/ Ω max, Ripple current; mA rms/105 °C 100kHz)

| WV<br>[V <sub>d</sub> ] | Cap<br>( μ F) | Case Size<br>φ D × L (mm) | tan δ | Impedance<br>( Ω max) | Ripple current<br>(mA rms) |
|-------------------------|---------------|---------------------------|-------|-----------------------|----------------------------|
| 6.3(OJ)                 | 180           | 6.3 × 11<br>8 × 9         | 0.22  | 0.25<br>0.33          | 340<br>300                 |
|                         | 220           | 6.3 × 11<br>8 × 9         | 0.22  | 0.25<br>0.33          | 340<br>300                 |
|                         | 270           | 6.3 × 11<br>8 × 9         | 0.22  | 0.25<br>0.33          | 340<br>300                 |
|                         | 330           | 8 × 11<br>10 × 9          | 0.22  | 0.13<br>0.17          | 650<br>580                 |
|                         | 470           | 8 × 11<br>10 × 9          | 0.22  | 0.13<br>0.17          | 650<br>580                 |
|                         | 560           | 8 × 11<br>10 × 9          | 0.22  | 0.13<br>0.17          | 650<br>580                 |
|                         | 680           | 8 × 11<br>10 × 9          | 0.22  | 0.13<br>0.17          | 650<br>580                 |
|                         | 820           | 10 × 12                   | 0.22  | 0.08                  | 870                        |
|                         | 1000          | 10 × 9<br>10 × 12         | 0.22  | 0.17<br>0.08          | 580<br>870                 |
|                         | 1200          | 10 × 12                   | 0.22  | 0.08                  | 870                        |
|                         | 1500          | 8 × 20<br>10 × 16         | 0.22  | 0.068<br>0.060        | 1050<br>1210               |
|                         | 1800          | 10 × 20                   | 0.22  | 0.045                 | 1400                       |
|                         | 2200          | 10 × 20                   | 0.24  | 0.045                 | 1400                       |
|                         | 2700          | 10 × 25<br>12.5 × 20      | 0.24  | 0.042<br>0.035        | 1650<br>1900               |
|                         | 3300          | 10 × 25<br>12.5 × 20      | 0.26  | 0.042<br>0.036        | 1860<br>1900               |
|                         | 3900          | 12.5 × 20                 | 0.26  | 0.035                 | 1900                       |
| 10(1A)                  | 150           | 6.3 × 11<br>8 × 9         | 0.19  | 0.25<br>0.33          | 340<br>300                 |
|                         | 180           | 6.3 × 11<br>8 × 9         | 0.19  | 0.25<br>0.33          | 340<br>300                 |
|                         | 220           | 6.3 × 11<br>8 × 9         | 0.19  | 0.25<br>0.33          | 340<br>300                 |
|                         | 270           | 8 × 9<br>10 × 9           | 0.19  | 0.33<br>0.17          | 300<br>580                 |
|                         | 330           | 10 × 9                    | 0.19  | 0.17                  | 580                        |
|                         | 470           | 10 × 9                    | 0.19  | 0.17                  | 580                        |
|                         | 560           | 10 × 9                    | 0.19  | 0.17                  | 580                        |
|                         | 680           | 10 × 9                    | 0.19  | 0.17                  | 580                        |
|                         | 820           | 10 × 12                   | 0.19  | 0.08                  | 870                        |
|                         | 1000          | 8 × 16<br>10 × 16         | 0.19  | 0.087<br>0.06         | 850<br>1210                |
|                         | 1200          | 10 × 20                   | 0.19  | 0.045                 | 1400                       |
|                         | 1500          | 10 × 20                   | 0.19  | 0.045                 | 1400                       |
|                         | 1800          | 10 × 20                   | 0.19  | 0.045                 | 1400                       |
|                         | 2200          | 10 × 20                   | 0.21  | 0.045                 | 1400                       |
|                         | 2700          | 10 × 25<br>12.5 × 20      | 0.21  | 0.042<br>0.035        | 1650<br>1900               |
|                         | 3300          | 12.5 × 25                 | 0.23  | 0.030                 | 2130                       |
| 16(1C)                  | 100           | 8 × 9                     | 0.16  | 0.33                  | 300                        |
|                         | 120           | 8 × 9                     | 0.16  | 0.33                  | 300                        |
|                         | 150           | 8 × 9<br>10 × 9           | 0.16  | 0.33                  | 300<br>580                 |
|                         | 180           | 8 × 9<br>10 × 9           | 0.16  | 0.33                  | 300<br>580                 |
|                         | 220           | 8 × 9<br>10 × 9           | 0.16  | 0.33                  | 300<br>580                 |
|                         | 270           | 10 × 9                    | 0.16  | 0.17                  | 580                        |
|                         | 330           | 10 × 9                    | 0.16  | 0.17                  | 580                        |
|                         | 470           | 10 × 9<br>10 × 12         | 0.16  | 0.17<br>0.08          | 580<br>870                 |
|                         | 560           | 10 × 12                   | 0.16  | 0.08                  | 870                        |
|                         | 680           | 8 × 16<br>10 × 12         | 0.16  | 0.087<br>0.08         | 850<br>870                 |
|                         | 820           | 10 × 16                   | 0.16  | 0.06                  | 1210                       |
|                         | 1000          | 10 × 16                   | 0.16  | 0.06                  | 1210                       |
|                         | 1200          | 10 × 20                   | 0.16  | 0.045                 | 1400                       |
|                         | 1500          | 10 × 20                   | 0.16  | 0.045                 | 1400                       |
|                         | 1800          | 10 × 25<br>12.5 × 20      | 0.16  | 0.042<br>0.035        | 1650<br>1800               |
|                         | 2200          | 12.5 × 20                 | 0.18  | 0.035                 | 1900                       |
|                         | 2700          | 12.5 × 20                 | 0.18  | 0.030                 | 2130                       |

| WV<br>[V <sub>d</sub> ] | Cap<br>( μ F) | Case Size<br>φ D × L (mm)             | tan δ | Impedance<br>( Ω max)          | Ripple current<br>(mA rms) |
|-------------------------|---------------|---------------------------------------|-------|--------------------------------|----------------------------|
| 25(1E)                  | 82            | 6.3 × 11<br>8 × 9                     | 0.14  | 0.25<br>0.33                   | 340<br>300                 |
|                         | 100           | 6.3 × 11<br>8 × 9                     | 0.14  | 0.25<br>0.23                   | 340<br>300                 |
|                         | 120           | 8 × 11<br>10 × 9                      | 0.14  | 0.13<br>0.17                   | 650<br>580                 |
|                         | 150           | 8 × 11<br>10 × 9                      | 0.14  | 0.13<br>0.17                   | 650<br>580                 |
|                         | 180           | 8 × 11<br>10 × 9                      | 0.14  | 0.13<br>0.17                   | 650<br>580                 |
|                         | 220           | 8 × 11<br>10 × 9                      | 0.14  | 0.13<br>0.17                   | 650<br>580                 |
|                         | 270           | 10 × 9<br>10 × 12                     | 0.14  | 0.17<br>0.08                   | 580<br>870                 |
|                         | 330           | 10 × 9<br>10 × 12                     | 0.14  | 0.17<br>0.08                   | 580<br>870                 |
|                         | 470           | 8 × 16<br>10 × 12                     | 0.14  | 0.087<br>0.080                 | 840<br>870                 |
|                         | 560           | 10 × 16                               | 0.14  | 0.060                          | 1210                       |
|                         | 680           | 10 × 16                               | 0.14  | 0.060                          | 1210                       |
|                         | 820           | 10 × 20                               | 0.14  | 0.045                          | 1400                       |
|                         | 1000          | 10 × 20                               | 0.14  | 0.045                          | 1400                       |
|                         | 1200          | 10 × 20                               | 0.14  | 0.045                          | 1400                       |
|                         | 1500          | 10 × 25<br>12.5 × 20                  | 0.14  | 0.042<br>0.035                 | 1650<br>1900               |
|                         | 1800          | 12.5 × 25                             | 0.14  | 0.030                          | 2130                       |
|                         | 2200          | 12.5 × 25                             | 0.16  | 0.030                          | 2130                       |
| 35(1V)                  | 47            | 6.3 × 11<br>8 × 9                     | 0.12  | 0.25<br>0.33                   | 340<br>300                 |
|                         | 56            | 6.3 × 11<br>8 × 9                     | 0.12  | 0.25<br>0.33                   | 340<br>300                 |
|                         | 68            | 6.3 × 11<br>8 × 9                     | 0.12  | 0.25<br>0.33                   | 340<br>300                 |
|                         | 82            | 8 × 11<br>10 × 9                      | 0.12  | 0.13<br>0.17                   | 650<br>580                 |
|                         | 100           | 8 × 11<br>10 × 9                      | 0.12  | 0.13<br>0.17                   | 650<br>580                 |
|                         | 120           | 8 × 11<br>10 × 9                      | 0.12  | 0.13<br>0.17                   | 650<br>580                 |
|                         | 150           | 8 × 11<br>10 × 9                      | 0.12  | 0.13<br>0.17                   | 650<br>580                 |
|                         | 180           | 10 × 12                               | 0.12  | 0.080                          | 870                        |
|                         | 220           | 8 × 11<br>10 × 9<br>8 × 16<br>10 × 12 | 0.12  | 0.13<br>0.17<br>0.087<br>0.080 | 650<br>580<br>840<br>870   |
|                         | 270           | 10 × 15                               | 0.12  | 0.06                           | 1210                       |
|                         | 330           | 8 × 20<br>10 × 12<br>10 × 16          | 0.12  | 0.069<br>0.080<br>0.060        | 1000<br>870<br>1210        |
|                         | 470           | 10 × 16                               | 0.12  | 0.060                          | 1210                       |
|                         | 560           | 10 × 20                               | 0.12  | 0.045                          | 1400                       |
|                         | 680           | 10 × 20                               | 0.12  | 0.045                          | 1400                       |
|                         | 820           | 10 × 25<br>12.5 × 20                  | 0.12  | 0.042<br>0.035                 | 1650<br>1900               |
|                         | 1000          | 12.5 × 20<br>12.5 × 25                | 0.12  | 0.035<br>0.030                 | 1900<br>2130               |
| 50(1H)                  | 33            | 6.3 × 11<br>8 × 9                     | 0.10  | 0.30<br>0.40                   | 295<br>260                 |
|                         | 39            | 6.3 × 11<br>8 × 9                     | 0.10  | 0.30<br>0.40                   | 295<br>260                 |
|                         | 47            | 6.3 × 11<br>8 × 9                     | 0.10  | 0.30<br>0.40                   | 295<br>260                 |
|                         | 56            | 8 × 11<br>10 × 9                      | 0.10  | 0.17<br>0.23                   | 560<br>500                 |
|                         | 68            | 8 × 11<br>10 × 9                      | 0.10  | 0.17<br>0.23                   | 560<br>500                 |
|                         | 82            | 8 × 11<br>10 × 9                      | 0.10  | 0.17<br>0.23                   | 560<br>500                 |
|                         | 100           | 10 × 12                               | 0.10  | 0.12                           | 760                        |
|                         | 120           | 8 × 16<br>10 × 12                     | 0.10  | 0.12<br>0.12                   | 730<br>760                 |
|                         | 150           | 10 × 16                               | 0.10  | 0.084                          | 1050                       |
|                         | 180           | 8 × 20<br>10 × 16                     | 0.10  | 0.090<br>0.084                 | 1050                       |
|                         | 220           | 10 × 16                               | 0.10  | 0.084                          | 1050                       |
|                         | 270           | 10 × 25                               | 0.10  | 0.055                          | 1440                       |
|                         | 330           | 12.5 × 20                             | 0.10  | 0.045                          | 1660                       |
|                         | 470           | 12.5 × 25                             | 0.10  | 0.034                          | 1950                       |
|                         | 580           | 12.5 × 25                             | 0.10  | 0.034                          | 1950                       |

# LF Series

● **STANDARD RATINGS** (Impedance: at 20 °C 100kHz/ Ω max, Ripple current; mA rms/105 °C 100kHz)

| WV<br>[V <sub>d</sub> ] | Cap<br>( μ F) | Case Size<br>φ D × L (mm) | tan δ | Impedance<br>( Ω max) | Ripple current<br>(mA rms) |
|-------------------------|---------------|---------------------------|-------|-----------------------|----------------------------|
| 63(1J)                  | 22            | 6.3 × 11<br>8 × 9         | 0.09  | 0.95<br>1.24          | 120<br>100                 |
|                         | 27            | 6.3 × 11<br>8 × 9         | 0.09  | 0.95<br>1.24          | 120<br>100                 |
|                         | 33            | 6.3 × 11<br>8 × 9         | 0.09  | 0.95<br>1.24          | 120<br>100                 |
|                         | 39            | 8 × 11<br>10 × 9          | 0.09  | 0.51<br>0.67          | 235<br>210                 |
|                         | 47            | 8 × 11<br>10 × 9          | 0.09  | 0.51<br>0.67          | 235<br>210                 |
|                         | 56            | 8 × 11<br>10 × 9          | 0.09  | 0.51<br>0.67          | 235<br>210                 |
|                         | 68            | 8 × 11<br>10 × 9          | 0.09  | 0.51<br>0.67          | 235<br>210                 |
|                         | 82            | 10 × 12                   | 0.09  | 0.340                 | 315                        |
|                         | 100           | 8 × 16<br>10 × 12         | 0.09  | 0.350<br>0.340        | 300<br>315                 |
|                         | 120           | 10 × 16                   | 0.09  | 0.245                 | 360                        |
|                         | 150           | 8 × 20                    | 0.09  | 0.265                 | 360                        |
|                         | 180           | 10 × 20                   | 0.09  | 0.165                 | 470                        |
|                         | 220           | 10 × 20                   | 0.09  | 0.165                 | 470                        |
|                         | 270           | 12.5 × 20                 | 0.09  | 0.125                 | 700                        |
|                         | 330           | 12.5 × 20                 | 0.09  | 0.125                 | 700                        |
|                         | 390           | 12.6 × 25                 | 0.09  | 0.095                 | 930                        |

| WV<br>[V <sub>d</sub> ] | Cap<br>( μ F) | Case Size<br>φ D × L (mm) | tan δ | Impedance<br>( Ω max) | Ripple current<br>(mA rms) |
|-------------------------|---------------|---------------------------|-------|-----------------------|----------------------------|
| 100(2A)                 | 15            | 6.3 × 11<br>8 × 9         | 0.08  | 0.95<br>1.24          | 120<br>100                 |
|                         | 27            | 8 × 11<br>10 × 9          | 0.08  | 0.51<br>0.67          | 235<br>210                 |
|                         | 39            | 8 × 16                    | 0.08  | 0.36                  | 300                        |
|                         | 47            | 10 × 12                   | 0.08  | 0.34                  | 315                        |
|                         | 56            | 8 × 20                    | 0.08  | 0.265                 | 360                        |
|                         | 68            | 10 × 16                   | 0.08  | 0.245                 | 360                        |
|                         | 82            | 10 × 20                   | 0.08  | 0.165                 | 470                        |
|                         | 100           | 10 × 20                   | 0.08  | 0.165                 | 470                        |
|                         | 120           | 12.5 × 20                 | 0.08  | 0.125                 | 700                        |
|                         | 180           | 12.5 × 25                 | 0.08  | 0.095                 | 930                        |
|                         | 220           | 12.5 × 25                 | 0.08  | 0.095                 | 930                        |

# LF Series

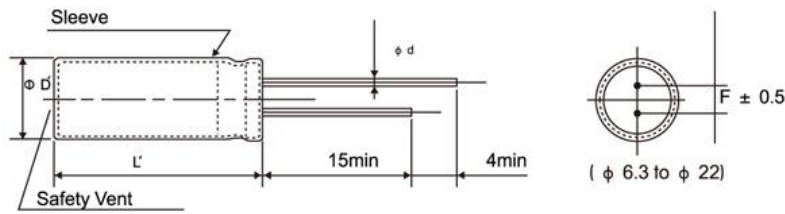
- High frequency, low impedance
- Endurance; +105 °C 2,000 ~ 3,000 hours
- RoHS Compliant



## ● SPECIFICATIONS

| Items                                                       | Characteristics                                                                                                                                                                                            |                                       |      |      |      |      |      |                 |                  |  |
|-------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|------|------|------|------|------|-----------------|------------------|--|
| Category                                                    | Temperature Range                                                                                                                                                                                          |                                       |      |      |      |      |      |                 |                  |  |
| Temperature Range                                           | -25 to +105 °C (160V-450Vdc)                                                                                                                                                                               |                                       |      |      |      |      |      |                 |                  |  |
| Rated Voltage Range                                         | 160 to 450Vdc                                                                                                                                                                                              |                                       |      |      |      |      |      |                 |                  |  |
| Capacitance Tolerance                                       | ± 20%(M) (at20 °C 120Hz)                                                                                                                                                                                   |                                       |      |      |      |      |      |                 |                  |  |
| Leakage Current                                             | 1 ≤ 0.02CVor 10 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 2minutes)                                               |                                       |      |      |      |      |      |                 |                  |  |
| Dissipation Factor<br>(tan δ )                              | Rated voltage(Vdc)                                                                                                                                                                                         | 160                                   | 200  | 250  | 350  | 400  | 450  | (at20 °C 120Hz) |                  |  |
|                                                             | tan δ (Max)                                                                                                                                                                                                | 0.12                                  | 0.12 | 0.12 | 0.15 | 0.15 | 0.20 |                 |                  |  |
| Low Temperature<br>Characteristics<br>(Max.Impedance Ratio) | Rate Voltage(Vdc)                                                                                                                                                                                          | 160                                   | 200  | 250  | 350  | 400  | 450  | (at120Hz)       |                  |  |
|                                                             | Z(-25 °C )/Z(+20 °C )                                                                                                                                                                                      | 3                                     | 5    |      |      | 6    |      |                 |                  |  |
|                                                             | Z(-40 °C )/Z(+20 °C )                                                                                                                                                                                      | 4                                     | 7    |      |      | -    |      |                 |                  |  |
| Endurance                                                   | The following specification shall be satisfied when the capacitors are restored to 20 °C after subjected to DC voltage with the rated ripple current is applied for the specified period of time at 105 °C |                                       |      |      |      |      |      |                 |                  |  |
|                                                             | Capacitance Change                                                                                                                                                                                         | ≤ ± 20% of the initial value          |      |      |      |      |      | Case Dia        | Life time(hours) |  |
|                                                             | D.F. (tan δ )                                                                                                                                                                                              | ≤ 200% of the initial specified value |      |      |      |      |      | Φ D ≤ 8         | 2000             |  |
|                                                             | Leakage Current                                                                                                                                                                                            | ≤ The initial specified value         |      |      |      |      |      | Φ D ≥ 10        | 3000             |  |
| 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                                            |                                       |      |      |      |      |      |                 |                  |  |
|                                                             | Capacitance Change                                                                                                                                                                                         | ≤ ± 20% of the initial value          |      |      |      |      |      |                 |                  |  |
|                                                             | D.F. (tan δ )                                                                                                                                                                                              | ≤ 200% of the initial specified value |      |      |      |      |      |                 |                  |  |
|                                                             | Leakage Current                                                                                                                                                                                            | ≤ 200%The initial specified value     |      |      |      |      |      |                 |                  |  |

## ● DIMENSIONS[mm]



| Φ D  | 6.3        | 8   | 10  | 12.5 | 16  | 18  | 22   |
|------|------------|-----|-----|------|-----|-----|------|
| Φ d  | 0.5        | 0.5 | 0.6 | 0.6  | 0.6 | 0.8 | 0.8  |
| F    | 2.5        | 3.5 | 5.0 | 5.0  | 7.5 | 7.5 | 10.0 |
| Φ D' | Φ D+0.5max |     |     |      |     |     |      |
| L'   | L+2max     |     |     |      |     |     |      |

## ● RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

| Cap(μF)         | 120  | 1k   | 10k  | 100k |
|-----------------|------|------|------|------|
| CAP < 18        | 0.59 | 0.85 | 0.97 | 1.00 |
| 18 ≤ Cap. < 100 | 0.62 | 0.89 | 0.97 | 1.00 |
| Cap ≥ 100       | 0.72 | 0.90 | 0.98 | 1.00 |

The endurance of capacitors is shorted with internal heating produced by ripple current at the rate of halving the lifetime with every 5 °C rise,When long life performance is required in actual use,the rms ripple current has to be reduced

# LF Series

● STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>( μ F) | Case Size<br>φ D × L(mm) | tan δ | Ripple current<br>(mA <sub>rms</sub> /105 °C ,100kHz) |
|--------------------------|---------------|--------------------------|-------|-------------------------------------------------------|
| 160(2C)                  | 2.2           | 6.3 × 11                 | 0.12  | 54                                                    |
|                          | 3.3           | 6.3 × 11                 | 0.12  | 70                                                    |
|                          | 4.7           | 8 × 12                   | 0.12  | 82                                                    |
|                          | 10            | 10 × 12                  | 0.12  | 142                                                   |
|                          | 22            | 10 × 16                  | 0.12  | 206                                                   |
|                          | 33            | 10 × 20                  | 0.12  | 265                                                   |
|                          | 47            | 12.5 × 20                | 0.12  | 332                                                   |
|                          | 100           | 12.5 × 25                | 0.12  | 546                                                   |
|                          | 220           | 16 × 30                  | 0.12  | 822                                                   |
| 200(2D)                  | 1             | 5 × 11                   | 0.12  | 34                                                    |
|                          | 2.2           | 6.3 × 11                 | 0.12  | 52                                                    |
|                          | 3.3           | 6.3 × 11                 | 0.12  | 70                                                    |
|                          | 4.7           | 8 × 12                   | 0.12  | 82                                                    |
|                          | 10            | 10 × 12                  | 0.12  | 144                                                   |
|                          | 22            | 10 × 16                  | 0.12  | 206                                                   |
|                          | 22            | 10 × 20                  | 0.12  | 215                                                   |
|                          | 33            | 10 × 20                  | 0.12  | 288                                                   |
|                          | 33            | 12.5 × 20                | 0.12  | 330                                                   |
|                          | 47            | 12.5 × 20                | 0.12  | 366                                                   |
|                          | 56            | 12.5 × 25                | 0.12  | 430                                                   |
|                          | 68            | 12.5 × 25                | 0.12  | 488                                                   |
|                          | 82            | 10 × 30                  | 0.12  | 518                                                   |
|                          | 100           | 16 × 25                  | 0.12  | 720                                                   |
|                          | 120           | 16 × 25                  | 0.12  | 745                                                   |
|                          | 150           | 18 × 25                  | 0.12  | 845                                                   |
|                          | 180           | 12.5 × 35                | 0.12  | 882                                                   |
|                          | 220           | 18 × 30                  | 0.12  | 960                                                   |
| 250(2E)                  | 0.47          | 6.3 × 11                 | 0.12  | 35                                                    |
|                          | 1             | 6.3 × 11                 | 0.12  | 40                                                    |
|                          | 2.2           | 6.3 × 11                 | 0.12  | 52                                                    |
|                          | 3.3           | 8 × 12                   | 0.12  | 72                                                    |
|                          | 4.7           | 8 × 12                   | 0.12  | 84                                                    |
|                          | 10            | 10 × 12                  | 0.12  | 144                                                   |
|                          | 22            | 10 × 20                  | 0.12  | 220                                                   |
|                          | 33            | 12.5 × 20                | 0.12  | 335                                                   |
|                          | 47            | 12.5 × 25                | 0.12  | 382                                                   |
|                          | 56            | 12.5 × 25                | 0.12  | 426                                                   |
|                          | 82            | 16 × 25                  | 0.12  | 575                                                   |
|                          | 100           | 16 × 30                  | 0.12  | 740                                                   |
|                          | 220           | 18 × 35                  | 0.12  | 1010                                                  |
|                          | 330           | 18 × 45                  | 0.12  | 1100                                                  |
|                          | 470           | 22 × 45                  | 0.12  | 1200                                                  |
| 350(2V)                  | 0.47          | 6.3 × 11                 | 0.15  | 35                                                    |
|                          | 1             | 6.3 × 11                 | 0.15  | 40                                                    |
|                          | 2.2           | 8 × 12                   | 0.15  | 54                                                    |
|                          | 3.3           | 8 × 12                   | 0.15  | 74                                                    |
|                          | 3.3           | 10 × 12                  | 0.15  | 80                                                    |
|                          | 4.7           | 10 × 16                  | 0.15  | 104                                                   |
|                          | 10            | 10 × 16                  | 0.15  | 170                                                   |
|                          | 22            | 12.5 × 25                | 0.15  | 285                                                   |
|                          | 33            | 16 × 25                  | 0.15  | 330                                                   |
|                          | 47            | 16 × 30                  | 0.15  | 480                                                   |

| WV<br>(V <sub>dc</sub> ) | Cap<br>( μ F) | Case Size<br>φ D × L(mm) | tan δ | Ripple current<br>(mA <sub>rms</sub> /105 °C ,100kHz) |
|--------------------------|---------------|--------------------------|-------|-------------------------------------------------------|
| 400(2G)                  | 1             | 8 × 12                   | 0.15  | 40                                                    |
|                          | 2.2           | 8 × 12                   | 0.15  | 62                                                    |
|                          | 3.3           | 8 × 12                   | 0.15  | 85                                                    |
|                          | 3.3           | 10 × 12                  | 0.15  | 90                                                    |
|                          | 4.7           | 10 × 12                  | 0.15  | 106                                                   |
|                          | 10            | 10 × 16                  | 0.15  | 175                                                   |
|                          | 10            | 10 × 20                  | 0.15  | 200                                                   |
|                          | 22            | 12.5 × 20                | 0.15  | 300                                                   |
|                          | 27            | 10 × 30                  | 0.15  | 385                                                   |
|                          | 33            | 10 × 35                  | 0.15  | 450                                                   |
|                          | 33            | 16 × 20                  | 0.15  | 440                                                   |
|                          | 39            | 10 × 40                  | 0.15  | 490                                                   |
|                          | 47            | 12.5 × 30                | 0.15  | 595                                                   |
|                          | 47            | 16 × 25                  | 0.15  | 584                                                   |
|                          | 56            | 10 × 45                  | 0.15  | 655                                                   |
|                          | 56            | 12.5 × 35                | 0.15  | 650                                                   |
|                          | 68            | 12.5 × 40                | 0.15  | 815                                                   |
|                          | 68            | 16 × 30                  | 0.15  | 780                                                   |
|                          | 82            | 12.5 × 40                | 0.15  | 850                                                   |
|                          | 82            | 18 × 30                  | 0.15  | 835                                                   |
| 450(2W)                  | 100           | 12.5 × 50                | 0.15  | 890                                                   |
|                          | 100           | 18 × 30                  | 0.15  | 870                                                   |
|                          | 120           | 22 × 31                  | 0.15  | 895                                                   |
|                          | 150           | 12.5 × 60                | 0.15  | 950                                                   |
|                          | 150           | 22 × 31                  | 0.15  | 940                                                   |
|                          | 1             | 8 × 12                   | 0.20  | 40                                                    |
|                          | 2.2           | 10 × 12                  | 0.20  | 65                                                    |
|                          | 3.3           | 10 × 16                  | 0.20  | 92                                                    |
|                          | 4.7           | 10 × 20                  | 0.20  | 108                                                   |
|                          | 10            | 12.5 × 20                | 0.20  | 160                                                   |
|                          | 18            | 10 × 30                  | 0.20  | 200                                                   |
|                          | 22            | 16 × 20                  | 0.20  | 305                                                   |
|                          | 27            | 10 × 30                  | 0.20  | 385                                                   |
|                          | 33            | 10 × 35                  | 0.20  | 460                                                   |
|                          | 33            | 16 × 25                  | 0.20  | 455                                                   |
|                          | 39            | 10 × 40                  | 0.20  | 500                                                   |
|                          | 47            | 10 × 45                  | 0.20  | 635                                                   |
|                          | 47            | 12.5 × 30                | 0.20  | 630                                                   |
|                          | 47            | 18 × 25                  | 0.20  | 620                                                   |
|                          | 56            | 12.5 × 35                | 0.20  | 705                                                   |
|                          | 56            | 18 × 25                  | 0.20  | 695                                                   |
|                          | 68            | 12.5 × 40                | 0.20  | 750                                                   |
|                          | 68            | 18 × 30                  | 0.20  | 730                                                   |
|                          | 82            | 12.5 × 45                | 0.20  | 800                                                   |
|                          | 82            | 18 × 30                  | 0.20  | 770                                                   |
|                          | 100           | 18 × 35                  | 0.20  | 860                                                   |
|                          | 120           | 18 × 40                  | 0.20  | 1050                                                  |
|                          | 150           | 22 × 40                  | 0.20  | 1260                                                  |
|                          | 220           | 22 × 46                  | 0.20  | 1430                                                  |

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