

## WH Series

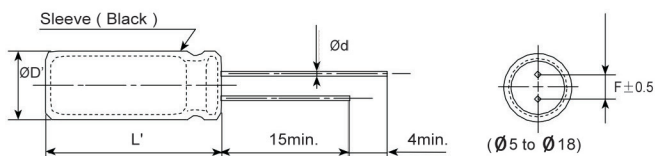
- Standard series for general purpose
- Wide temperature range from -40°C ~ +105°C
- Endurance: +105°C 2,000 hours
- RoHS Compliant



### SPECIFICATIONS

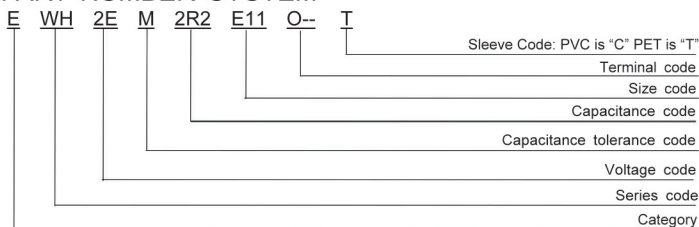
| Items                                                        | Characteristics                                                                                                                                                                         |  |                                       |      |      |                           |                                           |                  |      |                 |                                                                                                                 |         |      |  |
|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|---------------------------------------|------|------|---------------------------|-------------------------------------------|------------------|------|-----------------|-----------------------------------------------------------------------------------------------------------------|---------|------|--|
| Category                                                     |                                                                                                                                                                                         |  |                                       |      |      |                           |                                           |                  |      |                 |                                                                                                                 |         |      |  |
| Temperature Range                                            | -40 to +105℃ (6.3 to 100V <sub>dc</sub> )                                                                                                                                               |  |                                       |      |      |                           | -25 to +105℃ (160 to 450V <sub>dc</sub> ) |                  |      |                 |                                                                                                                 |         |      |  |
| 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> |                                           |                  |      |                 | Where, I : Max. leakage current (μA),<br>C : Nominal capacitance (μF),<br>V : Rated voltage (V)<br><br>(at 20℃) |         |      |  |
|                                                              | I ≤ 0.03CV or 4μA (at 1minute)<br>I ≤ 0.01CV or 3μA (at 2minute)<br>Whichever is greater                                                                                                |  |                                       |      |      | CV                        |                                           | After 1 minutes  |      | After 5 minutes |                                                                                                                 |         |      |  |
|                                                              |                                                                                                                                                                                         |  |                                       |      |      | CV≤1,000                  |                                           | I ≤ 0.1CV+40μA   |      | I ≤ 0.03CV+15μA |                                                                                                                 |         |      |  |
|                                                              |                                                                                                                                                                                         |  |                                       |      |      | CV> 1,000                 |                                           | I ≒ 0.04CV+100μA |      | I ≒ 0.02CV+25μA |                                                                                                                 |         |      |  |
| Dissipation Factor<br>(tanδ)                                 | Rated voltage (V <sub>dc</sub> )                                                                                                                                                        |  | 6.3                                   | 10   | 16   | 25                        | 35                                        | 50               | 63   | 100             | 160~250                                                                                                         | 350~400 | 450  |  |
|                                                              | tanδ (Max.)                                                                                                                                                                             |  | 0.26                                  | 0.19 | 0.16 | 0.14                      | 0.12                                      | 0.10             | 0.09 | 0.08            | 0.20                                                                                                            | 0.24    | 0.24 |  |
|                                                              | When nominal capacitance exceeds 1,000 uF, add 0.02 to the value above for each 1,000 uF increase. (at 20℃, 120Hz)                                                                      |  |                                       |      |      |                           |                                           |                  |      |                 |                                                                                                                 |         |      |  |
| Low Temperature<br>Characteristics<br>(Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                        |  | 6.3                                   | 10   | 16   | 25                        | 35                                        | 50               | 63   | 100             | 160~250                                                                                                         | 350~400 | 450  |  |
|                                                              | Z(-25℃)/Z(+20℃)                                                                                                                                                                         |  | 5                                     | 4    | 3    | 2                         |                                           |                  |      | 3               | 6                                                                                                               | 6       |      |  |
|                                                              | 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 subjected to DC voltage with the rated ripple current is applied for 2,000 hours at 105℃. |  |                                       |      |      |                           |                                           |                  |      |                 |                                                                                                                 |         |      |  |
|                                                              | Capacitance change                                                                                                                                                                      |  | ≤ ±20% of the initial value           |      |      |                           |                                           |                  |      |                 |                                                                                                                 |         |      |  |
|                                                              | D.F. (tanδ)                                                                                                                                                                             |  | ≤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.                            |  |                                       |      |      |                           |                                           |                  |      |                 |                                                                                                                 |         |      |  |
|                                                              | Capacitance change                                                                                                                                                                      |  | ≤ ±20% of the initial value           |      |      |                           |                                           |                  |      |                 |                                                                                                                 |         |      |  |
|                                                              | D.F. (tanδ)                                                                                                                                                                             |  | ≤200% of the initial specified value  |      |      |                           |                                           |                  |      |                 |                                                                                                                 |         |      |  |
|                                                              | Leakage current                                                                                                                                                                         |  | ≤ 200% of the initial specified value |      |      |                           |                                           |                  |      |                 |                                                                                                                 |         |      |  |

### DIMENSIONS [mm]



| ØD  | 5          | 6.3 | 8   | 10  | 12.5 | 16  | 18  |
|-----|------------|-----|-----|-----|------|-----|-----|
| Ød  | 0.5        | 0.5 | 0.5 | 0.6 | 0.6  | 0.8 | 0.8 |
| F   | 2.0        | 2.5 | 3.5 | 5.0 | 5.0  | 7.5 | 7.5 |
| ØD' | ØD+0.5max. |     |     |     |      |     |     |
| L'  | L+2max.    |     |     |     |      |     |     |

### PART NUMBER SYSTEM



※ Sleeve Code and Terminal Code should follow the part number system

### RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

| Freq. (Hz)        | 50   | 120  | 300  | 1k   | 10k  | 100k |
|-------------------|------|------|------|------|------|------|
| Cap. < 10         | 0.65 | 1.00 | 1.35 | 1.75 | 2.30 | 2.50 |
| 10 ≤ Cap. < 100   | 0.75 | 1.00 | 1.25 | 1.50 | 1.75 | 1.80 |
| 100 ≤ Cap. ≤ 1000 | 0.80 | 1.00 | 1.15 | 1.30 | 1.40 | 1.50 |
| Cap. > 1000       | 0.85 | 1.00 | 1.03 | 1.05 | 1.08 | 1.08 |

The endurance of capacitors is shortened 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.

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[450MXK330MA2RFC22X50](#) [63ZLH560MEFCG412.5X30](#) [ELH2DM331O25KT](#) [ELH2DM471P30KT](#)