

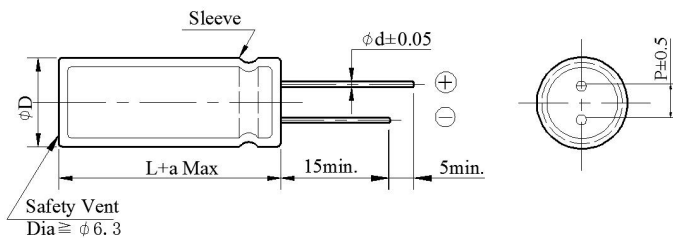
## HG Series

- High-temperature 115°C, High reliability.
- Load life 2,000 hours at 115°C.

### ◆ SPECIFICATIONS

| Item                                                    | Performance Characteristics                                                                                                                                                                                                                                 |      |                              |      |      |      |              |      |           |           |            |
|---------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------------------------|------|------|------|--------------|------|-----------|-----------|------------|
| Category Temperature Range                              | -40 ~ +115°C                                                                                                                                                                                                                                                |      |                              |      |      |      | -25 ~ +115°C |      |           |           |            |
| Working Voltage Range                                   | 10 ~ 100Vdc                                                                                                                                                                                                                                                 |      |                              |      |      |      | 160 ~ 450Vdc |      |           |           |            |
| Capacitance Range                                       | 4.7 ~ 1000 μF                                                                                                                                                                                                                                               |      |                              |      |      |      | 4.7~ 150 μF  |      |           |           |            |
| Capacitance Tolerance                                   | ±20% (at 20°C and 120Hz)                                                                                                                                                                                                                                    |      |                              |      |      |      |              |      |           |           |            |
| Dissipation Factor<br>(tan δ)<br>(at 20°C, 120Hz)       | Rated Voltage (V)                                                                                                                                                                                                                                           | 10   | 16                           | 25   | 35   | 50   | 63           | 100  | 160 ~ 250 | 350 ~ 450 |            |
|                                                         | tan δ (Max)                                                                                                                                                                                                                                                 | 0.20 | 0.16                         | 0.14 | 0.12 | 0.10 | 0.10         | 0.09 | 0.20      | 0.24      |            |
|                                                         | The above values should be increased by 0.02 for every additional 1000μF                                                                                                                                                                                    |      |                              |      |      |      |              |      |           |           |            |
| Leakage Current                                         | I≤0.01CV or 3μA whichever is greater (10 ~ 100V)<br>I≤0.02CV+10μA (160 ~ 450V)<br>I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V)<br>Apply rated voltage the rated voltage for 2 minutes.                                         |      |                              |      |      |      |              |      |           |           |            |
| Low Temperature Characteristics<br>Impedance Ratio(MAX) | Rated Voltage (V)                                                                                                                                                                                                                                           | 10   | 16                           | 25   | 35   | 50   | 63           | 100  | 160 ~ 250 | 350 ~ 450 | (at 120Hz) |
|                                                         | Z(-25°C)/Z(+25°C)                                                                                                                                                                                                                                           | 3    | 2                            | 2    | 2    | 2    | 2            | 2    | 3         | 6         |            |
|                                                         | Z(-40°C)/Z(+20°C)                                                                                                                                                                                                                                           | 6    | 4                            | 4    | 4    | 4    | 4            | 4    | 6         | 10        |            |
| 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 for 2,000 hours at 115°C                                                                    |      |                              |      |      |      |              |      |           |           |            |
|                                                         | Capacitance change                                                                                                                                                                                                                                          |      | ≒±25% of the initial value   |      |      |      |              |      |           |           |            |
|                                                         | Dissipation factor(tan δ)                                                                                                                                                                                                                                   |      | ≒200% of the specified value |      |      |      |              |      |           |           |            |
|                                                         | Leakage current                                                                                                                                                                                                                                             |      | ≒specified value             |      |      |      |              |      |           |           |            |
| Shelf Life                                              | The following requirements shall be satisfied when the capacitor are restored to 20°C after the rated voltage applied for 1,000 hours at 115°C without voltage applied.<br>After test : UR to be applied for 30 minutes, 24 to 48 hours before measurement. |      |                              |      |      |      |              |      |           |           |            |
|                                                         | Capacitance change                                                                                                                                                                                                                                          |      | ≒±25% of the initial value   |      |      |      |              |      |           |           |            |
|                                                         | Dissipation factor(tan δ)                                                                                                                                                                                                                                   |      | ≒200% of the specified value |      |      |      |              |      |           |           |            |
|                                                         | Leakage current                                                                                                                                                                                                                                             |      | ≒200% of the specified value |      |      |      |              |      |           |           |            |
| Others                                                  | Conforms to JIS-C-5101-4 (1998) and IEC 60384-4                                                                                                                                                                                                             |      |                              |      |      |      |              |      |           |           |            |

### ◆ DIMENSIONS(mm)



| ΦD | 5                                               | 6.3 | 8       | 10  | 12.5/13 | 16  | 18  |
|----|-------------------------------------------------|-----|---------|-----|---------|-----|-----|
| ΦD | ΦD $\pm 0.5$ Max                                |     |         |     |         |     |     |
| Φd | 0.5                                             | 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 |
| a  | $< 20 L \pm 1.5$ Max<br>$\geq 20 L \pm 2.0$ Max |     |         |     |         |     |     |

### ◆ PART NUMBER SYSTEM( Example :450V 15 $\mu$ F)

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | H | G | 4 | 5 | 0 | M | 1 | 5 | 0 | K | 1 | 6 | L | O | 5 | 0 | A | A |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                             |
|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|---------------------------------------------|
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Special Request                             |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Lead size                                   |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Lead type                                   |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Height code (L: 16mm)                       |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Diameter code (K: $\Phi 13$ )               |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Capacitance code (15 $\mu$ F)               |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Capacitance tolerance code (M: $\pm 20\%$ ) |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Voltage code (450V)                         |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Series code (HG)                            |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Category code                               |

# HG Series

◆ Case size & Permissible rated ripple current: (mA rms) at 115°C / 120Hz

| WV(V) | Nominal capacitance (uF) | Case Size ΦD×L (mm) | Max. Rated ripple current @115°C/120Hz (mA rms) | WV(V) | Nominal capacitance (uF) | Case Size ΦD×L (mm) | Max. Rated ripple current @115°C /120Hz (mA rms) |
|-------|--------------------------|---------------------|-------------------------------------------------|-------|--------------------------|---------------------|--------------------------------------------------|
| 10    | 100                      | 5×11                | 155                                             | 16    | 100                      | 6.3×11              | 165                                              |
|       | 220                      | 6.3×11              | 260                                             |       | 220                      | 8×12                | 290                                              |
|       | 330                      | 8×12                | 380                                             |       | 390                      | 8×14                | 420                                              |
|       | 470                      | 8×12                | 450                                             |       | 470                      | 8×16                | 490                                              |
|       | 1000                     | 8×16                | 750                                             |       | 1000                     | 10×20               | 880                                              |
|       | 1500                     | 10×20               | 1150                                            |       | 3300                     | 10×25               | 1450                                             |
| 25    | 47                       | 5×11                | 95                                              | 35    | 33                       | 5×11                | 85                                               |
|       | 100                      | 8×11                | 180                                             |       | 47                       | 6.3×11              | 120                                              |
|       | 220                      | 8×12                | 280                                             |       | 100                      | 6.3×12              | 170                                              |
|       | 330                      | 8×16                | 390                                             |       | 220                      | 10×13               | 350                                              |
|       | 470                      | 10×16               | 520                                             |       | 330                      | 10×20               | 520                                              |
|       | 680                      | 10×16               | 630                                             |       | 470                      | 10×20               | 620                                              |
|       | 1000                     | 10×20               | 850                                             |       | 1000                     | 13×20               | 1000                                             |
| 50    | 33                       | 5×11                | 80                                              | 100   | 4.7                      | 5×11                | 40                                               |
|       | 47                       | 5×12                | 100                                             |       | 10                       | 5×11                | 50                                               |
|       | 100                      | 6.3×12              | 170                                             |       | 22                       | 6.3×11              | 80                                               |
|       | 120                      | 6.3×15              | 200                                             |       | 33                       | 10×13               | 170                                              |
|       | 220                      | 10×16               | 370                                             |       | 47                       | 10×13               | 200                                              |
|       | 330                      | 10×16               | 460                                             |       | 100                      | 13×20               | 410                                              |
|       | 470                      | 13×20               | 700                                             |       | 220                      | 13×25               | 680                                              |
| 160   | 4.7                      | 5×11                | 30                                              | 200   | 15                       | 10×13               | 105                                              |
|       | 10                       | 6.3×12              | 50                                              |       | 22                       | 10×16               | 140                                              |
|       | 100                      | 16×21               | 360                                             |       | 33                       | 10×16               | 170                                              |
|       | 150                      | 16×21               | 440                                             |       | 47                       | 10×20               | 230                                              |
|       | 470                      | 18×32               | 1000                                            |       | 68                       | 16×20               | 360                                              |
| 250   |                          |                     |                                                 |       | 100                      | 16×25               | 480                                              |
|       | 15                       | 10×13               | 100                                             | 350   | 4.7                      | 10×16               | 60                                               |
|       | 33                       | 10×15               | 160                                             |       | 10                       | 10×16               | 80                                               |
|       | 47                       | 10×17               | 170                                             |       | 22                       | 12.5×20             | 150                                              |
|       | 68                       | 16×26               | 380                                             |       | 33                       | 16×25               | 240                                              |
| 400   |                          |                     |                                                 |       | 47                       | 16×30               | 300                                              |
|       | 10                       | 8×12                | 70                                              | 400   | 39                       | 10×20               | 200                                              |
|       |                          | 8×14                | 76                                              |       | 47                       | 13×20               | 250                                              |
|       |                          | 10×12               | 80                                              |       | 82                       | 16×25               | 410                                              |
|       | 12                       | 10×12               | 90                                              |       | 100                      | 13×35               | 470                                              |
|       |                          | 10×14               | 95                                              |       | 120                      | 18×25               | 530                                              |
|       |                          |                     |                                                 |       |                          |                     |                                                  |
|       | 15                       | 8×16                | 100                                             |       |                          |                     |                                                  |
|       |                          | 10×12               | 100                                             |       |                          |                     |                                                  |
|       |                          | 10×14               | 105                                             |       |                          |                     |                                                  |
|       | 22                       | 8×18                | 125                                             |       |                          |                     |                                                  |
|       |                          | 10×16               | 135                                             |       |                          |                     |                                                  |
|       | 27                       | 8×20                | 150                                             |       |                          |                     |                                                  |
|       |                          | 10×16               | 150                                             |       |                          |                     |                                                  |
|       |                          | 12.5×16             | 170                                             |       |                          |                     |                                                  |
|       | 33                       | 10×17               | 170                                             |       |                          |                     |                                                  |
|       |                          | 10×19               | 180                                             |       |                          |                     |                                                  |
|       |                          | 13×16               | 190                                             |       |                          |                     |                                                  |

## HG Series

◆ Case size & Permissible rated ripple current: (mA rms) at 115°C / 120Hz

| WV(V) | Nominal capacitance (uF) | Case Size ΦD×L (mm) | Max. Rated ripple current @115°C/120Hz (mA rms) | WV(V) | Nominal capacitance (uF) | Case Size ΦD×L (mm) | Max. Rated ripple current @115°C /120Hz (mA rms) |
|-------|--------------------------|---------------------|-------------------------------------------------|-------|--------------------------|---------------------|--------------------------------------------------|
| 420   | 15                       | 8×17                | 90                                              | 450   | 4.7                      | 8×12                | 60                                               |
|       | 20                       | 10×16               | 115                                             |       | 10                       | 10×20               | 100                                              |
|       | 22                       | 10×16               | 120                                             |       | 22                       | 10×20               | 150                                              |
|       | 27                       | 10×20               | 150                                             |       | 33                       | 16×20               | 240                                              |
|       | 33                       | 10×20               | 160                                             |       | 47                       | 16×20               | 280                                              |
|       | 56                       | 10×40               | 300                                             |       | 82                       | 16×25               | 410                                              |
|       | 68                       | 10×45               | 340                                             |       | 120                      | 18×25               | 540                                              |
|       |                          | 18×21               | 340                                             |       |                          |                     |                                                  |
|       |                          |                     |                                                 |       |                          |                     |                                                  |
|       |                          |                     |                                                 |       |                          |                     |                                                  |

◆ RIPPLE CURRENT MULTIPLIERS

Frequency Multipliers

| Vdc       | Cap(uF)   | Frequency (Hz) |      |      |      |      |
|-----------|-----------|----------------|------|------|------|------|
|           |           | 50/60          | 120  | 1K   | 10K  | 100K |
| 10 ~ 100  | <100      | 0.75           | 1.00 | 1.57 | 1.83 | 2.00 |
|           | 100 ~ 470 | 0.80           | 1.00 | 1.34 | 1.43 | 1.50 |
|           | >470      | 0.85           | 1.00 | 1.10 | 1.12 | 1.15 |
| 160 ~ 450 | 4.7~33    | 0.75           | 1.00 | 1.50 | 1.75 | 1.80 |
|           | 47~150    | 0.80           | 1.00 | 1.30 | 1.40 | 1.50 |