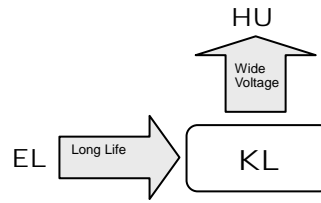


5000 HOURS LONG LIFE ASSURANCE

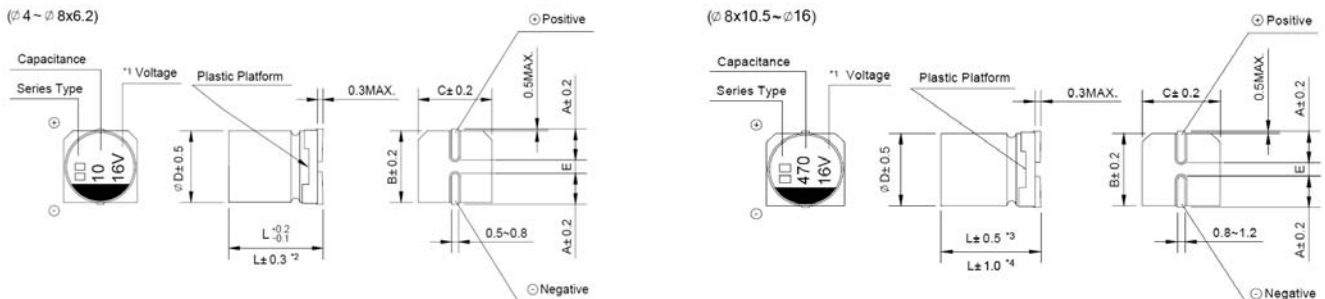
- Wide temperature range -55 ~ +105°C
- Load life of 3000~5000 hours
- Comply with the RoHS directive
RoHS



SPECIFICATIONS

| Items | Characteristics | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------------------|--|--------------------|------------------------------|--------------------|---|-----------------|---------------------------------|--------|--------------|-----------------|--------|--------------------|------|------|------|-----------|------|------|--------------------|------|------|---|---|---|---------------|-----------|--------------------|---|---|---|---|---|--|--------------------|----|----|---|---|---|
| Operation Temperature Range | -55 ~ +105°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Voltage Range | 6.3 ~ 100V | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Capacitance Range | 0.1 ~ 1500μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Capacitance Tolerance | ±20% at 120Hz, 20°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Leakage Current | Leakage current (∅4~∅10) ≅ 0.01CV or 3μA, whichever is greater (after 2 minutes application of rated voltage) Leakage current (∅12.5~∅16) ≅ 0.03CV or 4μA, whichever is greater (after 1 minute application of rated voltage) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dissipation Factor (tan δ) | Measurement frequency : 120Hz, Temperature : 20°C <table border="1"> <thead> <tr> <th>Rated Voltage (V)</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50~100</th> </tr> </thead> <tbody> <tr> <td rowspan="2">tan δ (max.)</td> <td>∅4~∅10</td> <td>0.28</td> <td>0.24</td> <td>0.20</td> <td>0.16</td> <td>0.13</td> </tr> <tr> <td>∅12.5~∅16</td> <td>0.38</td> <td>0.34</td> <td>0.30</td> <td>0.26</td> <td>0.22</td> </tr> </tbody> </table> | Rated Voltage (V) | 6.3 | 10 | 16 | 25 | 35 | 50~100 | tan δ (max.) | ∅4~∅10 | 0.28 | 0.24 | 0.20 | 0.16 | 0.13 | ∅12.5~∅16 | 0.38 | 0.34 | 0.30 | 0.26 | 0.22 | | | | | | | | | | | | | | | | | | |
| Rated Voltage (V) | 6.3 | 10 | 16 | 25 | 35 | 50~100 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| tan δ (max.) | ∅4~∅10 | 0.28 | 0.24 | 0.20 | 0.16 | 0.13 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | ∅12.5~∅16 | 0.38 | 0.34 | 0.30 | 0.26 | 0.22 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stability at Low Temperature | Measurement frequency 120Hz <table border="1"> <thead> <tr> <th colspan="2">Rated Voltage (V)</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50~100</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Impedance Ratio</td> <td>∅4~∅10</td> <td>Z(-25°C) / Z(20°C)</td> <td>3</td> <td>3</td> <td>2</td> <td>2</td> <td>2</td> </tr> <tr> <td></td> <td>Z(-55°C) / Z(20°C)</td> <td>8</td> <td>5</td> <td>4</td> <td>3</td> <td>3</td> </tr> <tr> <td rowspan="2">ZT/Z20 (max.)</td> <td>∅12.5~∅16</td> <td>Z(-25°C) / Z(20°C)</td> <td>5</td> <td>4</td> <td>3</td> <td>2</td> <td>2</td> </tr> <tr> <td></td> <td>Z(-55°C) / Z(20°C)</td> <td>12</td> <td>10</td> <td>8</td> <td>5</td> <td>4</td> </tr> </tbody> </table> | Rated Voltage (V) | | 6.3 | 10 | 16 | 25 | 35 | 50~100 | Impedance Ratio | ∅4~∅10 | Z(-25°C) / Z(20°C) | 3 | 3 | 2 | 2 | 2 | | Z(-55°C) / Z(20°C) | 8 | 5 | 4 | 3 | 3 | ZT/Z20 (max.) | ∅12.5~∅16 | Z(-25°C) / Z(20°C) | 5 | 4 | 3 | 2 | 2 | | Z(-55°C) / Z(20°C) | 12 | 10 | 8 | 5 | 4 |
| Rated Voltage (V) | | 6.3 | 10 | 16 | 25 | 35 | 50~100 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Impedance Ratio | ∅4~∅10 | Z(-25°C) / Z(20°C) | 3 | 3 | 2 | 2 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Z(-55°C) / Z(20°C) | 8 | 5 | 4 | 3 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZT/Z20 (max.) | ∅12.5~∅16 | Z(-25°C) / Z(20°C) | 5 | 4 | 3 | 2 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Z(-55°C) / Z(20°C) | 12 | 10 | 8 | 5 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Load Life | After 5000 hrs. (3000 hrs. for ∅4~∅6.3×5.4 & ∅8×6.2) application of the rated voltage at 105°C, they meet the characteristics listed below. <table border="1"> <tbody> <tr> <td>Capacitance Change</td> <td>Within ±30% of initial value</td> </tr> <tr> <td>Dissipation Factor</td> <td>300% or less of initial specified value</td> </tr> <tr> <td>Leakage Current</td> <td>initial specified value or less</td> </tr> </tbody> </table> | Capacitance Change | Within ±30% of initial value | Dissipation Factor | 300% or less of initial specified value | Leakage Current | initial specified value or less | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Capacitance Change | Within ±30% of initial value | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dissipation Factor | 300% or less of initial specified value | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Leakage Current | initial specified value or less | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Shelf Life | After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for load life characteristics listed above. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Resistance to Soldering Heat | After reflow soldering and restored at room temperature, they meet the characteristics listed below. <table border="1"> <tbody> <tr> <td>Capacitance Change</td> <td>Within ±10% of initial value</td> </tr> <tr> <td>Dissipation Factor</td> <td>initial specified value or less</td> </tr> <tr> <td>Leakage Current</td> <td>initial specified value or less</td> </tr> </tbody> </table> | Capacitance Change | Within ±10% of initial value | Dissipation Factor | initial specified value or less | Leakage Current | initial specified value or less | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Capacitance Change | Within ±10% of initial value | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dissipation Factor | initial specified value or less | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Leakage Current | initial specified value or less | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Marking | Black print on the case top. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

DRAWING (Unit: mm)



- *1. Voltage mark for 6.3V is [6V]
- *2. Applicable to ∅6.3×7.7
- *3. Applicable to ∅8×10.5~∅10
- *4. Applicable to ∅12.5~∅16

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□ DIMENSIONS (Unit: mm)

| ∅D x L | 4 x 5.8 | 5 x 5.8 | 6.3 x 5.8 | 6.3 x 7.7 | 8 x 6.2 | 8 x 10.5 | 10 x 10.5 | 10 x 13.5 | 12.5 x 13.5 | 12.5 x 16 | 16 x 16.5 |
|---------|---------|---------|-----------|-----------|---------|----------|-----------|-----------|-------------|-----------|-----------|
| A | 1.8 | 2.1 | 2.4 | 2.4 | 3.3 | 2.9 | 3.2 | 3.2 | 4.7 | 4.7 | 5.5 |
| B | 4.3 | 5.3 | 6.6 | 6.6 | 8.3 | 8.3 | 10.3 | 10.3 | 13.0 | 13.0 | 17.0 |
| C | 4.3 | 5.3 | 6.6 | 6.6 | 8.3 | 8.3 | 10.3 | 10.3 | 13.0 | 13.0 | 17.0 |
| E ± 0.2 | 1.0 | 1.3 | 2.2 | 2.2 | 2.2 | 3.1 | 4.4 | 4.4 | 4.4 | 4.4 | 6.7 |
| L | 5.4 | 5.4 | 5.4 | 7.7 | 6.2 | 10.5 | 10.5 | 13.5 | 13.5 | 16.0 | 16.5 |

□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

| μF | WV Code | 6.3 | | 10 | | 16 | | 25 | |
|------|---------|----------------------------|--------------|----------------------------|--------------|------------------------|------------|----------------------------|----------------|
| | | 0J | | 1A | | 1C | | 1E | |
| 10 | 100 | | | | | 4 x 5.8 | 18 | 5 x 5.8 | 27 |
| 22 | 220 | 4 x 5.8 | 22 | 5 x 5.8 | 30 | 5 x 5.8 | 30 | 6.3 x 5.8 | 44 |
| 33 | 330 | 5 x 5.8 | 35 | 5 x 5.8 | 36 | 6.3 x 5.8 | 48 | 6.3 x 5.8 | 50 |
| 47 | 470 | 5 x 5.8 | 38 | 6.3 x 5.8 | 50 | 6.3 x 5.8 | 50 | 6.3 x 7.7 (8 x 6.2) | 63 (63) |
| 100 | 101 | 6.3 x 5.8 | 69 | 6.3 x 7.7 (8 x 6.2) | 81 (81) | 6.3 x 7.7 (8 x 6.2) | 81 (81) | 8 x 10.5 | 116 |
| 150 | 151 | 6.3 x 7.7 (8 x 6.2) | 85 (85) | 8 x 10.5 | 125 | 8 x 10.5 | 125 | 10 x 10.5 | 320 |
| 220 | 221 | 6.3 x 7.7 (8 x 6.2) | 120 (120) | 8 x 10.5 | 141 | 10 x 10.5 | 216 | 10 x 10.5 | 320 |
| 330 | 331 | 8 x 10.5 | 290 | 10 x 10.5 | 290 | 10 x 10.5 | 290 | 10 x 10.5 | 320 |
| 470 | 471 | 10 x 10.5 | 320 | 10 x 10.5 | 320 | 10 x 10.5 | 320 | 12.5 x 13.5 (10 x 13.5) | 400 (350) |
| 680 | 681 | 10 x 10.5 | 320 | 10 x 10.5 | 320 | 10 x 13.5 | 420 | 12.5 x 13.5 | 415 |
| 1000 | 102 | 10 x 10.5 | 410 | 10x13.5 | 390 | 12.5 x 13.5 | 550 | 12.5 x 13.5 | 460 |
| 1500 | 152 | 10 x 13.5 | 450 | 12.5 x 13.5 | 480 | 12.5 x 13.5 | 650 | 12.5 x 16 | 700 |
| 2200 | 222 | 12.5 x 13.5 | 680 | 12.5 x 16 (12.5 x 13.5) | 750 (510) | 16 x 16.5 | 800 | | |
| 3300 | 332 | 12.5 x 16 (12.5 x 13.5) | 850 (800) | 16 x 16.5 | 800 | | | Case size | Ripple current |

| μF | WV Code | 35 | | 50 | | 63 | | 100 | |
|------|---------|----------------------------|--------------|----------------------------|--------------|--------------------------|--------------|---|-----------------------|
| | | 1V | | 1H | | 1J | | 2A | |
| 0.1 | 0R1 | | | 4 x 5.8 | 1.0 | | | | |
| 0.22 | R22 | | | 4 x 5.8 | 2.6 | | | | |
| 0.33 | R33 | | | 4 x 5.8 | 3.2 | | | | |
| 0.47 | R47 | | | 4 x 5.8 | 5 | | | | |
| 1 | 010 | | | 4 x 5.8 | 8 | | | | |
| 2.2 | 2R2 | | | 4 x 5.8 | 12 | | | | |
| 3.3 | 3R3 | | | 4 x 5.8 | 17 | | | 6.3 x 7.7 (8 x 6.2) | 30 (30) |
| 4.7 | 4R7 | 4 x 5.8 | 16 | 5 x 5.8 | 22 | | | 8 x 10.5 | 50 |
| 10 | 100 | 5 x 5.8 | 27 | 6.3 x 5.8 | 32 | 6.3 x 7.7 (8 x 6.2) | 45 (45) | 8 x 10.5 | 55 |
| 22 | 220 | 6.3 x 5.8 | 44 | 6.3 x 7.7 (8 x 6.2) | 58 (58) | 8 x 10.5 | 65 | 10 x 10.5 | 70 |
| 33 | 330 | 6.3 x 7.7 (8 x 6.2) | 57 (57) | 8 x 10.5 | 140 | 10 x 10.5 | 80 | 10 x 10.5 | 80 |
| 47 | 470 | 8 x 10.5 | 92 | 10 x 10.5 | 310 | 10 x 10.5 | 90 | 12.5 x 13.5 (10 x 13.5) | 250 (150) |
| 100 | 101 | 10 x 10.5 | 151 | 10 x 10.5 | 310 | 10 x 13.5 | 150 | 12.5 x 13.5 | 300 |
| 150 | 151 | 10 x 10.5 | 290 | 10 x 10.5 | 310 | | | 16 x 16.5 (12.5 x 16) (12.5 x 13.5) | 600 (420) (380) |
| 220 | 221 | 10 x 10.5 | 375 | 12.5 x 13.5 (10 x 13.5) | 340 (320) | 12.5 x 13.5 | 470 | | |
| 330 | 331 | 12.5 x 13.5 (10 x 13.5) | 380 (375) | 12.5 x 16 (12.5 x 13.5) | 600 (500) | 16 x 16.5 (12.5 x 16) | 650 (550) | | |
| 470 | 471 | 12.5 x 13.5 | 520 | 16 x 16.5 | 700 | | | | |
| 680 | 681 | 12.5 x 13.5 | 550 | | | | | | |
| 1000 | 102 | 16 x 16.5 (12.5 x 16) | 750 (600) | | | | | Case size | Ripple current |

•Case size ∅D×L(mm), ripple current (mA rms) at 105°C 120Hz

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□ FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT

| Frequency | | 50Hz | 120Hz | 300Hz | 1KHz | 10KHz~ | |
|-------------|-------------|--------------|-------|-------|------|--------|------|
| Coefficient | Ø4 ~ Ø10 | 0.70 | 1.00 | 1.17 | 1.36 | 1.50 | |
| | Ø12.5 ~ Ø16 | ~ 68µF | 0.75 | 1.00 | 1.35 | 1.57 | 2.00 |
| | | 100 ~ 470µF | 0.80 | 1.00 | 1.23 | 1.34 | 1.50 |
| | | 680 ~ 3300µF | 0.85 | 1.00 | 1.10 | 1.13 | 1.15 |

- Taping specifications are given in page 11.
- Please refer to page 12 for the minimum package quantity.



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