



TL Series

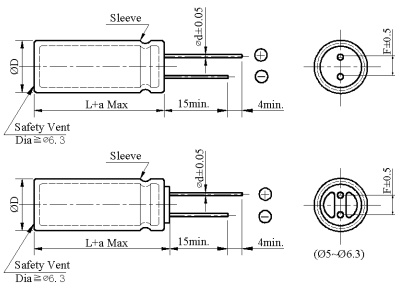
- High-temperature 125°C, high reliability
- Load life 3,000~ 5,000 hours at 125°C



◆ SPECIFICATIONS

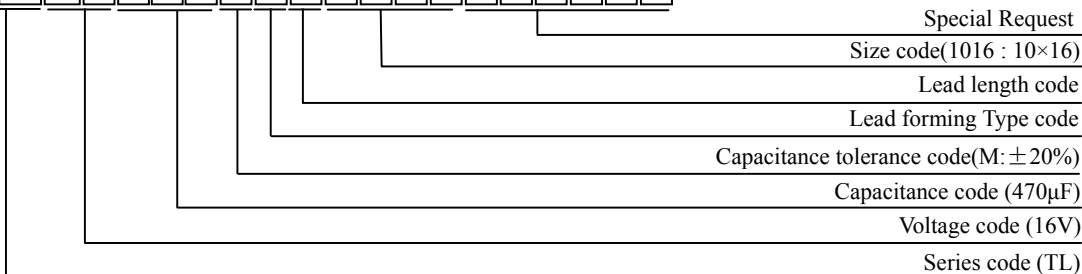
| Item | Performance Characteristics | | | | | | | | | | | | | | | | |
|--|--|--------------------|-----------------------------|--------------------------|-------------------------------|--------------------------|-------------------------------|-------------------|-------|-----------------|-------------------|------|-------|--|--|--------|-------|
| Category Temperature Range | -55 ~ +125°C | | | | | | | | | | | | | | | | |
| Working Voltage Range | 10 ~ 50Vdc | | | | | | | | | | | | | | | | |
| Capacitance Range | 22 ~ 1000 μF | | | | | | | | | | | | | | | | |
| Capacitance Tolerance | ±20% (at 25°C and 120Hz) | | | | | | | | | | | | | | | | |
| Dissipation Factor (tanδ) (at 25°C, 120Hz) | <table border="1"> <tr> <td>Rated Voltage (V)</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> </tr> <tr> <td>tanδ(Max)</td> <td>0.20</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> <td>0.10</td> </tr> </table> <p>The above values should be increased by 0.02 for every additional 1000μF</p> | Rated Voltage (V) | 10 | 16 | 25 | 35 | 50 | tanδ(Max) | 0.20 | 0.16 | 0.14 | 0.12 | 0.10 | | | | |
| Rated Voltage (V) | 10 | 16 | 25 | 35 | 50 | | | | | | | | | | | | |
| tanδ(Max) | 0.20 | 0.16 | 0.14 | 0.12 | 0.10 | | | | | | | | | | | | |
| Leakage Current | <p>$I \leq 0.01CV$ or $2\mu A$ whichever is greater</p> <p>I : Leakage current (μA) C : Rated capacitance (μF) V : Rated voltage (V)</p> <p>Impress the rated voltage for 2 minutes</p> | | | | | | | | | | | | | | | | |
| Low Temperature Characteristics Impedance Ratio(MAX) | <table border="1"> <tr> <td>Rated voltage (V)</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> </tr> <tr> <td>Z(-55°C)/Z(+20°C)</td> <td>6</td> <td>4</td> <td>4</td> <td>4</td> <td>4</td> </tr> </table> <p>(at 120Hz)</p> | Rated voltage (V) | 10 | 16 | 25 | 35 | 50 | Z(-55°C)/Z(+20°C) | 6 | 4 | 4 | 4 | 4 | | | | |
| Rated voltage (V) | 10 | 16 | 25 | 35 | 50 | | | | | | | | | | | | |
| Z(-55°C)/Z(+20°C) | 6 | 4 | 4 | 4 | 4 | | | | | | | | | | | | |
| Endurance | <p>The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 3,000~5,000 hours at 125°C</p> <table border="1"> <tr> <td>Capacitance change</td> <td>≒ ±25% of the initial value</td> <td>Size</td> <td>Life time (hours)</td> </tr> <tr> <td>Dissipation factor(tanδ)</td> <td>≒ 200% of the specified value</td> <td>≒ 6.3Φ</td> <td>3,000</td> </tr> <tr> <td>Leakage current</td> <td>≒ specified value</td> <td>8 Φ</td> <td>4,000</td> </tr> <tr> <td></td> <td></td> <td>≒ 10 Φ</td> <td>5,000</td> </tr> </table> | Capacitance change | ≒ ±25% of the initial value | Size | Life time (hours) | Dissipation factor(tanδ) | ≒ 200% of the specified value | ≒ 6.3Φ | 3,000 | Leakage current | ≒ specified value | 8 Φ | 4,000 | | | ≒ 10 Φ | 5,000 |
| Capacitance change | ≒ ±25% of the initial value | Size | Life time (hours) | | | | | | | | | | | | | | |
| Dissipation factor(tanδ) | ≒ 200% of the specified value | ≒ 6.3Φ | 3,000 | | | | | | | | | | | | | | |
| Leakage current | ≒ specified value | 8 Φ | 4,000 | | | | | | | | | | | | | | |
| | | ≒ 10 Φ | 5,000 | | | | | | | | | | | | | | |
| Shelf Life | <p>The following requirements shall be satisfied when the capacitor are restored to 25°C after the rated voltage applied for 1,000 hours at 125°C without voltage applied.</p> <p>After test : UR to be applied for 30 minutes, 24 to 48 hours before measurement.</p> <table border="1"> <tr> <td>Capacitance change</td> <td>≒ ±25% of the initial value</td> </tr> <tr> <td>Dissipation factor(tanδ)</td> <td>≒ 200% of the specified value</td> </tr> <tr> <td>Leakage current</td> <td>≒ 200% of the specified value</td> </tr> </table> | Capacitance change | ≒ ±25% of the initial value | Dissipation factor(tanδ) | ≒ 200% of the specified value | Leakage current | ≒ 200% of the specified value | | | | | | | | | | |
| Capacitance change | ≒ ±25% of the initial value | | | | | | | | | | | | | | | | |
| Dissipation factor(tanδ) | ≒ 200% of the specified value | | | | | | | | | | | | | | | | |
| Leakage current | ≒ 200% of the specified value | | | | | | | | | | | | | | | | |
| Others | Conforms to JIS-C-5101-4 (1998), characteristic W | | | | | | | | | | | | | | | | |

◆ DIMENSIONS (mm)



| ΦD | 6.3 | 8 | 10 | 12.5 L< 35 | 12.5 ≥ 35 | 16 |
|----|--------------|-----|-----|--|-----------|-------------|
| ΦD | ΦD + 0.5 Max | | | | | |
| Φd | 0.5 | 0.6 | 0.6 | 0.6 | 0.8 | 0.8 |
| F | 2.5 | 3.5 | 5.0 | 5.0 | | 7.5 |
| a | L + 1.5 Max | | | $\leq 35 L + 1.5 \text{ Max}$ $\geq 40 L + 2.0 \text{ Max}$ | | L + 1.5 Max |

◆ PART NUMBER SYSTEM(Example : 16V 470μF)



TL Series

◆ Case size & Permissible rated ripple current: (mA rms) at 125°C / 120Hz

| uF \ Vdc | 10 | | 16 | | 25 | |
|----------|---------|-----|---------|-----|---------|------|
| | ΦD × L | RC | ΦD × L | RC | ΦD × L | RC |
| 22 | | | | | 6.3×11 | 100 |
| 33 | | | 6.3×11 | 90 | 8×11.5 | 115 |
| 47 | 6.3×11 | 90 | 6.3×11 | 100 | 8×11.5 | 130 |
| 100 | 6.3×11 | 130 | 8×11.5 | 155 | 8×11.5 | 250 |
| 220 | 8×11.5 | 242 | 10×12.5 | 348 | 10×12.5 | 472 |
| 330 | 10×12.5 | 335 | 10×16 | 405 | 10×16 | 690 |
| 470 | 10×16 | 440 | 10×20 | 550 | 10×20 | 875 |
| 1000 | 10×20 | 800 | 12.5×20 | 900 | 12.5×25 | 1050 |

| uF \ Vdc | 35 | | 50 | |
|----------|---------|------|---------|------|
| | ΦD × L | RC | ΦD × L | RC |
| 22 | 8×11.5 | 130 | 8×11.5 | 185 |
| 33 | 8×11.5 | 155 | 8×11.5 | 210 |
| 47 | 8×11.5 | 170 | 8×15 | 245 |
| 100 | 10×12.5 | 272 | 10×16 | 480 |
| 220 | 10×16 | 565 | 10×20 | 810 |
| 330 | 10×20 | 733 | 10×25 | 1085 |
| 470 | 12.5×20 | 895 | 12.5×25 | 1210 |
| 1000 | 16×25 | 1137 | 16×30 | 1470 |

◆ RIPPLE CURRENT MULTIPLIERS

Frequency Multipliers

| Vdc | Cap(uF) | Frequency (Hz) | | | |
|---------|-----------|----------------|------|------|------|
| | | 50/60 | 120 | 1K | ≥10K |
| 10 ~ 50 | <100 | 0.75 | 1.00 | 1.57 | 2.00 |
| | 100 ~ 470 | 0.80 | 1.00 | 1.34 | 1.50 |
| | >470 | 0.85 | 1.00 | 1.10 | 1.15 |