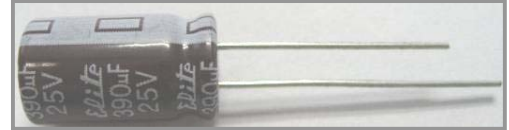


ALUMINUM ELECTROLYTIC CAPACITORS



ED Series

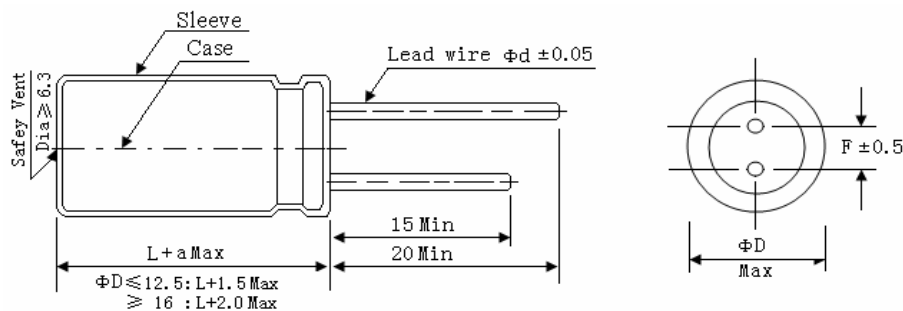
Suitable for use in high ripple current capability.
Miniaturized, Low E.S.R and low impedance



SPECIFICATIONS

| Item | Performance Characteristics | | | | | | | | | | | | | | | | | | |
|--|--|------------------------------|--|-----------------------------------|-------------------------------------|-----------------------------------|-------------------------------------|------------------------------|-------|-----------------|-------------------------|---------------------------|-------|------|------|-------------------------|-------|------|------|
| Category Temperature Range | -40 ~ +105°C | | | | | | | | | | | | | | | | | | |
| Working Voltage Range | 6.3 ~ 100Vdc | | | | | | | | | | | | | | | | | | |
| Capacitance Range | 10 ~ 10,000 μ F | | | | | | | | | | | | | | | | | | |
| Capacitance Tolerance | \pm 20% (at 25°C and 120Hz) | | | | | | | | | | | | | | | | | | |
| Dissipation Factor (tan δ) (at 25°C, 120Hz) | <table border="1"> <tr> <td>Rated Voltage (V)</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> <td>63</td> <td>100</td> </tr> <tr> <td>tanδ(Max)</td> <td>0.22</td> <td>0.19</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> <td>0.10</td> <td>0.09</td> <td>0.08</td> </tr> </table> | Rated Voltage (V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | tan δ (Max) | 0.22 | 0.19 | 0.16 | 0.14 | 0.12 | 0.10 | 0.09 | 0.08 |
| | Rated Voltage (V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | | | | | | | | | | |
| tan δ (Max) | 0.22 | 0.19 | 0.16 | 0.14 | 0.12 | 0.10 | 0.09 | 0.08 | | | | | | | | | | | |
| The above values should be increased by 0.02 for every additional 1000 μ F | | | | | | | | | | | | | | | | | | | |
| Leakage Current | I=0.01CV or 3 μ A, whichever is greater. I : Leakage current (μ A) C : Rated capacitance (μ F) V : Rated voltage (V) Impress the rated voltage for 2 minutes. | | | | | | | | | | | | | | | | | | |
| Endurance | The following requirements shall be satisfied when the capacitor are restored to 25°C after the rated voltage applied for 2,000~5,000 hours at 105°C. | | | | | | | | | | | | | | | | | | |
| | <table border="1"> <tr> <td>Capacitance change</td> <td>\cong \pm25% of the initial value</td> <td>Size</td> <td>Life time (hours)</td> </tr> <tr> <td>Dissipation factor(tanδ)</td> <td>\cong 200% of the specified value</td> <td>D\timesL ~ 8\times12</td> <td>2,000</td> </tr> <tr> <td>Leakage current</td> <td>\cong specified value</td> <td>8\times16 ~ 10Φ</td> <td>3,000</td> </tr> <tr> <td></td> <td></td> <td>12.5Φ ~ 18Φ</td> <td>5,000</td> </tr> </table> | Capacitance change | \cong \pm 25% of the initial value | Size | Life time (hours) | Dissipation factor(tan δ) | \cong 200% of the specified value | D \times L ~ 8 \times 12 | 2,000 | Leakage current | \cong specified value | 8 \times 16 ~ 10 Φ | 3,000 | | | 12.5 Φ ~ 18 Φ | 5,000 | | |
| Capacitance change | \cong \pm 25% of the initial value | Size | Life time (hours) | | | | | | | | | | | | | | | | |
| Dissipation factor(tan δ) | \cong 200% of the specified value | D \times L ~ 8 \times 12 | 2,000 | | | | | | | | | | | | | | | | |
| Leakage current | \cong specified value | 8 \times 16 ~ 10 Φ | 3,000 | | | | | | | | | | | | | | | | |
| | | 12.5 Φ ~ 18 Φ | 5,000 | | | | | | | | | | | | | | | | |
| Shelf Life | The following requirements shall be satisfied when the capacitor are restored to 25°C after exposing them for 500 hours at 105°C without voltage applied. | | | | | | | | | | | | | | | | | | |
| | <table border="1"> <tr> <td>Capacitance change</td> <td>\cong \pm25% of the initial value</td> </tr> <tr> <td>Dissipation factor(tanδ)</td> <td>\cong 200% of the specified value</td> </tr> <tr> <td>Leakage current</td> <td>\cong 200% of the specified value</td> </tr> </table> | Capacitance change | \cong \pm 25% of the initial value | Dissipation factor(tan δ) | \cong 200% of the specified value | Leakage current | \cong 200% of the specified value | | | | | | | | | | | | |
| Capacitance change | \cong \pm 25% of the initial value | | | | | | | | | | | | | | | | | | |
| Dissipation factor(tan δ) | \cong 200% of the specified value | | | | | | | | | | | | | | | | | | |
| Leakage current | \cong 200% of the specified value | | | | | | | | | | | | | | | | | | |
| Others | Conforms to JIS-C-5101-4 (1998), characteristic W. | | | | | | | | | | | | | | | | | | |

DIMENSIONS (mm)



| | | | | | | | | |
|----------|--------------------|-----|-----|-----|-------------|------------------|--------------------|-----|
| Φ D | 5 | 6.3 | 8 | 10 | 12.5 L < 35 | 12.5 L \geq 35 | 16 | 18 |
| Φ D | Φ D + 0.5 Max | | | | | | Φ D + 1.0 Max | |
| Φ d | 0.5 | 0.5 | 0.6 | 0.6 | 0.6 | 0.8 | 0.8 | 0.8 |
| F | 2.0 | 2.5 | 3.5 | 5.0 | 5.0 | | 7.5 | 7.5 |

ALUMINUM ELECTROLYTIC CAPACITORS



ED Series

Case size & Permissible rated ripple current:

| Nominal capacitance (uF) | 6.3V | | | | 10V | | | |
|--------------------------|---------------------|----------------------------|-----------------------------|--|---------------------|----------------------------|-----------------------------|--|
| | Case size DΦ×L (mm) | Max impd. @25°C 100kHz (Ω) | Max impd. @-10°C 100kHz (Ω) | Max. Rated ripple current @105°C 100kHz (mA rms) | Case size DΦ×L (mm) | Max impd. @25°C 100kHz (Ω) | Max impd. @-10°C 100kHz (Ω) | Max. Rated ripple current @105°C 100kHz (mA rms) |
| 100 | 5×11 | 0.65 | 3.6 | 155 | 5×11 | 0.58 | 2.3 | 210 |
| 220 | 6.3×11 | 0.40 | 1.6 | 255 | 6.3×11 | 0.22 | 0.87 | 340 |
| 330 | 6.3×11 | 0.22 | 0.87 | 340 | 8×12 | 0.21 | 0.85 | 410 |
| 470 | 8×12 | 0.18 | 0.80 | 400 | 8×12 | 0.13 | 0.52 | 640 |
| 560 | 8×12 | 0.17 | 0.75 | 460 | 8×16 | 0.12 | 0.48 | 675 |
| 680 | 8×12 | 0.13 | 0.52 | 640 | 8×16 | 0.087 | 0.35 | 840 |
| 820 | 8×16 | 0.095 | 0.48 | 730 | 8×20 | 0.085 | 0.33 | 875 |
| 1000 | 8×16 | 0.087 | 0.35 | 840 | 10×16 | 0.060 | 0.24 | 1210 |
| 1200 | 8×20 | 0.069 | 0.27 | 1050 | 10×20 | 0.046 | 0.18 | 1400 |
| 1500 | 10×20 | 0.046 | 0.18 | 1400 | 10×20 | 0.045 | 0.18 | 1440 |
| 2200 | 10×20 | 0.045 | 0.18 | 1440 | 12.5×20 | 0.035 | 0.12 | 1900 |
| 2700 | 10×25 | 0.042 | 0.17 | 1700 | 12.5×20 | 0.034 | 0.11 | 1945 |
| 3300 | 12.5×20 | 0.035 | 0.12 | 1900 | 12.5×25 | 0.027 | 0.089 | 2230 |
| 3900 | 12.5×25 | 0.027 | 0.089 | 2230 | 12.5×30 | 0.024 | 0.078 | 2650 |
| 4700 | 12.5×30 | 0.024 | 0.078 | 2650 | 12.5×35 | 0.020 | 0.065 | 2880 |
| 5600 | 12.5×35 | 0.020 | 0.065 | 2880 | 12.5×35 | 0.019 | 0.060 | 2930 |
| 6800 | 12.5×35 | 0.019 | 0.060 | 2930 | 16×32 | 0.017 | 0.050 | 3450 |
| 8200 | 16×32 | 0.017 | 0.050 | 3450 | 16×36 | 0.015 | 0.044 | 3610 |
| 10000 | 16×36 | 0.015 | 0.044 | 3610 | 16×40 | 0.013 | 0.038 | 4080 |

| Nominal capacitance (uF) | 16V | | | | 25V | | | |
|--------------------------|---------------------|----------------------------|-----------------------------|--|---------------------|----------------------------|-----------------------------|--|
| | Case size DΦ×L (mm) | Max impd. @25°C 100kHz (Ω) | Max impd. @-10°C 100kHz (Ω) | Max. Rated ripple current @105°C 100kHz (mA rms) | Case size DΦ×L (mm) | Max impd. @25°C 100kHz (Ω) | Max impd. @-10°C 100kHz (Ω) | Max. Rated ripple current @105°C 100kHz (mA rms) |
| 47 | 5×11 | 0.80 | 2.8 | 120 | 5×11 | 0.58 | 2.3 | 210 |
| 68 | 6.3×11 | 0.56 | 2.2 | 220 | 6.3×11 | 0.36 | 1.8 | 230 |
| 100 | 6.3×11 | 0.52 | 1.5 | 255 | 6.3×11 | 0.22 | 0.87 | 340 |
| 150 | 8×12 | 0.21 | 0.86 | 350 | 8×12 | 0.20 | 0.69 | 405 |
| 220 | 8×12 | 0.20 | 0.79 | 405 | 8×12 | 0.13 | 0.52 | 640 |
| 330 | 8×12 | 0.13 | 0.52 | 640 | 8×16 | 0.087 | 0.35 | 840 |
| 470 | 8×16 | 0.087 | 0.35 | 840 | 10×16 | 0.060 | 0.24 | 1210 |
| 560 | 8×20 | 0.085 | 0.34 | 865 | 10×20 | 0.058 | 0.23 | 1220 |
| 680 | 8×20 | 0.069 | 0.27 | 1050 | 10×20 | 0.046 | 0.18 | 1400 |
| 820 | 10×20 | 0.058 | 0.23 | 1220 | 10×20 | 0.042 | 0.17 | 1450 |
| 1000 | 10×20 | 0.046 | 0.18 | 1400 | 12.5×20 | 0.035 | 0.12 | 1900 |
| 1200 | 10×25 | 0.042 | 0.17 | 1650 | 12.5×25 | 0.034 | 0.11 | 1936 |
| 1500 | 12.5×20 | 0.035 | 0.12 | 1900 | 12.5×25 | 0.027 | 0.089 | 2230 |
| 2200 | 12.5×25 | 0.027 | 0.089 | 2230 | 12.5×35 | 0.020 | 0.065 | 2880 |
| 2700 | 12.5×30 | 0.024 | 0.078 | 2650 | 12.5×35 | 0.019 | 0.060 | 2930 |
| 3300 | 12.5×35 | 0.020 | 0.065 | 2880 | 16×32 | 0.017 | 0.050 | 3450 |
| 3900 | 12.5×40 | 0.017 | 0.056 | 3350 | 16×36 | 0.015 | 0.044 | 3610 |
| 4700 | 16×32 | 0.017 | 0.050 | 3450 | 16×40 | 0.013 | 0.038 | 4080 |
| 5600 | 16×36 | 0.015 | 0.044 | 3610 | | | | |
| 6800 | 16×40 | 0.013 | 0.038 | 4080 | | | | |

ALUMINUM ELECTROLYTIC CAPACITORS



ED Series

Case size & Permissible rated ripple current:

| Nominal capacitance (uF) | 35V | | | | 50V | | | |
|--------------------------|---------------------|----------------------------|-----------------------------|--|---------------------|----------------------------|----------------------------|--|
| | Case size DΦ×L (mm) | Max impd. @25°C 100kHz (Ω) | Max impd. @-10°C 100kHz (Ω) | Max. Rated ripple current @105°C 100kHz (mA rms) | Case size DΦ×L (mm) | Max impd. @25°C 100kHz (Ω) | Max impd @-10°C 100kHz (Ω) | Max. Rated ripple current @105°C 100kHz (mA rms) |
| 10 | 5×11 | 1.5 | 3.8 | 100 | 5×11 | 1.45 | 3.5 | 105 |
| 22 | 5×11 | 0.75 | 3.2 | 160 | 5×11 | 0.7 | 2.8 | 180 |
| 33 | 5×11 | 0.58 | 2.3 | 210 | 6.3×11 | 0.48 | 1.70 | 215 |
| 47 | 6.3×11 | 0.49 | 1.8 | 215 | 6.3×11 | 0.40 | 1.60 | 220 |
| 68 | 8×12 | 0.21 | 0.87 | 350 | 8×12 | 0.28 | 1.10 | 355 |
| 100 | 8×12 | 0.20 | 0.85 | 405 | 8×12 | 0.17 | 0.68 | 555 |
| 150 | 8×12 | 0.13 | 0.52 | 640 | 8×16 | 0.12 | 0.48 | 730 |
| 220 | 8×16 | 0.087 | 0.35 | 840 | 10×16 | 0.084 | 0.34 | 1050 |
| 330 | 10×16 | 0.060 | 0.24 | 1210 | 10×25 | 0.055 | 0.22 | 1440 |
| 470 | 10×20 | 0.046 | 0.18 | 1400 | 12.5×20 | 0.045 | 0.15 | 1660 |
| 560 | 10×25 | 0.042 | 0.17 | 1650 | 12.5×25 | 0.034 | 0.11 | 1950 |
| 680 | 10×30 | 0.031 | 0.12 | 1910 | 12.5×30 | 0.030 | 0.10 | 2310 |
| 820 | 12.5×25 | 0.030 | 0.11 | 1938 | 12.5×35 | 0.025 | 0.083 | 2510 |
| 1000 | 12.5×25 | 0.027 | 0.089 | 2230 | 16×25 | 0.025 | 0.075 | 2555 |
| 1200 | 12.5×30 | 0.024 | 0.078 | 2650 | 16×32 | 0.022 | 0.066 | 3010 |
| 1500 | 12.5×35 | 0.020 | 0.065 | 2880 | 16×36 | 0.019 | 0.057 | 3150 |
| 2200 | 16×32 | 0.017 | 0.050 | 3450 | 18×36 | 0.017 | 0.046 | 3680 |
| 2700 | 16×36 | 0.015 | 0.044 | 3610 | 18×40 | 0.014 | 0.038 | 3800 |
| 3300 | 16×40 | 0.013 | 0.038 | 4080 | | | | |
| 3900 | 18×40 | 0.012 | 0.032 | 4280 | | | | |

| Nominal capacitance (uF) | 63V | | | | 100V | | | |
|--------------------------|---------------------|---------------------------|----------------------------|--|---------------------|---------------------------|----------------------------|--|
| | Case size DΦ×L (mm) | Max impd @25°C 100kHz (Ω) | Max impd @-10°C 100kHz (Ω) | Max. Rated ripple current @105°C 100kHz (mA rms) | Case size DΦ×L (mm) | Max impd @25°C 100kHz (Ω) | Max impd @-10°C 100kHz (Ω) | Max. Rated ripple current @105°C 100kHz (mA rms) |
| 10 | 5×11 | 2.85 | 9.3 | 30 | 6.3×11 | 2.2 | 9.3 | 60 |
| 22 | 6.3×11 | 1.85 | 7.2 | 60 | 8×12 | 1.1 | 5.0 | 120 |
| 33 | 6.3×11 | 1.20 | 5.0 | 115 | 8×16 | 0.62 | 2.8 | 242 |
| 47 | 8×12 | 1.0 | 4.5 | 170 | 10×12 | 0.43 | 1.8 | 288 |
| 68 | 8×12 | 0.61 | 2.5 | 245 | 10×16 | 0.31 | 1.5 | 357 |
| 100 | 8×16 | 0.43 | 1.9 | 305 | 10×25 | 0.20 | 0.84 | 531 |
| 220 | 10×20 | 0.21 | 0.92 | 470 | 12.5×30 | 0.10 | 0.42 | 905 |
| 330 | 12.5×25 | 0.12 | 0.45 | 784 | 12.5×40 | 0.071 | 0.30 | 1180 |
| 470 | 12.5×30 | 0.10 | 0.42 | 905 | 16×36 | 0.045 | 0.17 | 1790 |
| 560 | 12.5×35 | 0.083 | 0.35 | 1050 | 16×40 | 0.04 | 0.15 | 2020 |
| 680 | 12.5×40 | 0.071 | 0.30 | 1180 | 18×36 | 0.04 | 0.15 | 1790 |
| 820 | 16×32 | 0.054 | 0.20 | 1570 | 18×40 | 0.036 | 0.13 | 2330 |
| 1000 | 16×36 | 0.045 | 0.17 | 1790 | | | | |
| 1200 | 16×40 | 0.040 | 0.15 | 2020 | | | | |
| 1500 | 18×40 | 0.036 | 0.13 | 2330 | | | | |

RIPPLE CURRENT MULTIPLIERS

Frequency Multipliers

| Vdc | Cap.(uF) | Frequency (Hz) | | | |
|-----------|--------------|----------------|------|------|------|
| | | 120 | 1K | 10K | 100K |
| 6.3 ~ 100 | 10 ~ 68 | 0.30 | 0.65 | 0.85 | 1.00 |
| | 82 ~ 220 | 0.50 | 0.70 | 0.90 | 1.00 |
| | 330 ~ 820 | 0.60 | 0.75 | 0.95 | 1.00 |
| | 1000 ~ 10000 | 0.70 | 0.80 | 0.98 | 1.00 |