

FEATURES

- Low impedance characteristics
- Case sizes are smaller than conventional general-purpose capacitors, with very high performance
- Can size larger than 9mm diameter has safety vents on rubber end seal



CHARACTERISTICS

| Item | Characteristics | | | | | | | | | | | | | |
|---|--|--|------|------|------|------|------|------|------|------|------|------|------|----|
| Operating Temperature Range | -40°C ~ +85°C | | | | | | | | | | | | | |
| Capacitance Tolerance | ±20% at 120Hz, 20°C | | | | | | | | | | | | | |
| Leakage Current | ≤100V | I = 0.01CWV or 3μA whichever is greater after 2 minutes of applied rated DC working voltage at 20°C Where: C = rated capacitance in μF; WV = rated DC working voltage | | | | | | | | | | | | |
| | >100V | CWV ≤ 1000 μF: I = 0.03 CWV + 15uA; C = rated capacitance in uF CWV ≥ 1000 μF: I = 0.02 CWV + 25uA; WV = rated DC working voltage in V | | | | | | | | | | | | |
| Dissipation Factor (Tan δ, at 20°C 120Hz) | Working voltage (WV) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | 160 | 250 | 350 | 450 | |
| | Tan δ | 0.23 | 0.20 | 0.16 | 0.14 | 0.12 | 0.10 | 0.09 | 0.08 | 0.12 | 0.17 | 0.20 | 0.25 | |
| For capacitors whose capacitance exceeds 1,000μF, the specification of tan δ is increased by 0.02 for every addition of 1,000μF | | | | | | | | | | | | | | |
| Surge Voltage | Working voltage (WV) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | 160 | 250 | 350 | 450 | |
| | Surge voltage (SV) | 8 | 13 | 20 | 32 | 44 | 63 | 79 | 125 | 200 | 300 | 400 | 500 | |
| Low Temperature Characteristics (Imp. ratio @ 120Hz) | Working voltage (WV) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | 160 | 250 | 350 | 450 | |
| | Z(-25°C)/Z(+20°C) | ∅D<16 | 6 | 4 | 3 | 3 | 2 | 2 | 2 | 2 | 3 | 8 | 12 | 16 |
| | | ∅D≥16 | 8 | 6 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 8 | 12 | 16 |
| | Z(-40°C)/Z(+20°C) | ∅D<16 | 10 | 8 | 6 | 6 | 4 | 3 | 3 | 3 | 4 | 8 | 10 | 10 |
| ∅D≥16 | | 18 | 16 | 12 | 10 | 8 | 8 | 6 | 6 | 4 | 8 | 10 | 10 | |
| Load Test | When returned to +20°C after 2,000 hours application of working voltage at +85°C, the capacitor will meet the following limits: Capacitance change is ≤ ±20% of initial value; tan δ is < 200% of specified value; leakage current is within specified value | | | | | | | | | | | | | |
| Shelf Life Test | When returned to +20°C after 1,000 hours at +85°C with no voltage applied, the capacitor will meet the following limits: Capacitance change is ≤ ±20% of initial value; tan δ is < 200% of specified value; leakage current is within specified value | | | | | | | | | | | | | |

PART NUMBERING SYSTEM

| | | | | | | | | |
|--------|---|---|-------------------------|---|---|----------------------------------|---|---|
| X | R | L | 1 | 6 | V | 1 | 0 | 0 |
| Series | | | Voltage Actual Value | | | Capacitance (μF) Actual Value | | |

RIPPLE CURRENT AND FREQUENCY MULTIPLIERS

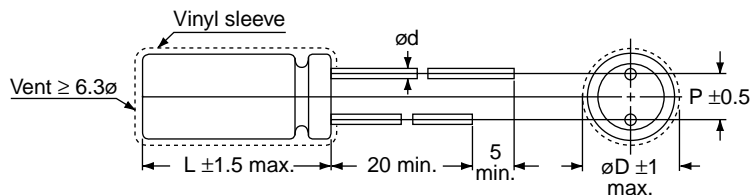
| Capacitance (μF) | Frequency (Hz) | | | | |
|------------------|----------------|-----|------|------|------|
| | 60 (50) | 120 | 500 | 1K | ≥10K |
| <100 | 0.70 | 1.0 | 1.30 | 1.40 | 1.50 |
| 100 ~ 1000 | 0.75 | 1.0 | 1.20 | 1.30 | 1.35 |
| >1000 | 0.80 | 1.0 | 1.10 | 1.12 | 1.15 |

RIPPLE CURRENT AND TEMPERATURE MULTIPLIERS

| Temperature (°C) | <50 | 70 | 85 |
|------------------|------|-----|-----|
| Multiplier | 1.78 | 1.4 | 1.0 |



■ DIMENSIONS AND PERMISSIBLE RIPPLE CURRENT



Lead Spacing and Diameter (mm)

| ϕD | 5 | 6.3 | 8 | 10 | 13 | 16 | 18 | 22 | 25 |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|------|
| P | 2.0 | 2.5 | 3.5 | 5.0 | 5.0 | 7.5 | 7.5 | 10 | 12.5 |
| ϕd | 0.5 | 0.5 | 0.5 | 0.6 | 0.6 | 0.8 | 0.8 | 1.0 | 1.0 |

| Value (μF) | Working Voltage (WV); Dimensions: $\phi D \times L$ (mm); Ripple Current: mA/RMS @ 120Hz, 85°C | | | | | | | | | | | | | |
|-------------------|--|------|-------------------|------|-------------------|------|-------------------|------|-------------------|------|-------------------|------|-------------------|------|
| | 10 | | 16 | | 25 | | 35 | | 50 | | 63 | | 100 | |
| | $\phi D \times L$ | mA | $\phi D \times L$ | mA | $\phi D \times L$ | mA | $\phi D \times L$ | mA | $\phi D \times L$ | mA | $\phi D \times L$ | mA | $\phi D \times L$ | mA |
| .10 | | | | | | | | | 5 x 11 | 1.5 | 5 x 11 | 3.0 | 5 x 11 | 3.0 |
| .22 | | | | | | | | | 5 x 11 | 3.5 | 5 x 11 | 4.5 | 5 x 11 | 5.8 |
| .33 | | | | | | | | | 5 x 11 | 5.0 | 5 x 11 | 7.5 | 5 x 11 | 8.8 |
| .47 | | | | | 5 x 11 | 6.0 | | | 5 x 11 | 7.0 | 5 x 11 | 9.5 | 5 x 11 | 12 |
| 1.0 | | | | | 5 x 11 | 10 | | | 5 x 11 | 15 | 5 x 11 | 17 | 5 x 11 | 22 |
| 2.2 | | | 5 x 11 | 20 | 5 x 11 | 16 | | | 5 x 11 | 29 | 5 x 11 | 28 | 5 x 11 | 33 |
| 3.3 | | | 5 x 11 | 30 | 5 x 11 | 25 | | | 5 x 11 | 35 | 5 x 11 | 34 | 5 x 11 | 40 |
| 4.7 | | | 5 x 11 | 41 | 5 x 11 | 31 | 5 x 11 | 40 | 5 x 11 | 42 | 5 x 11 | 45 | 5 x 11 | 48 |
| 10 | 5 x 11 | 54 | 5 x 11 | 49 | 5 x 11 | 54 | 5 x 11 | 58 | 5 x 11 | 65 | 5 x 11 | 70 | 6.3 x 11 | 80 |
| 22 | 5 x 11 | 70 | 5 x 11 | 75 | 5 x 11 | 80 | 5 x 11 | 87 | 5 x 11 | 95 | 6.3 x 11 | 115 | 8 x 11.5 | 135 |
| 33 | 5 x 11 | 84 | 5 x 11 | 90 | 5 x 11 | 97 | 6.3 x 11 | 115 | 6.3 x 11 | 136 | 8 x 11.5 | 150 | 10 x 16 | 195 |
| 47 | 5 x 11 | 100 | 5 x 11 | 110 | 5 x 11 | 115 | 6.3 x 11 | 145 | 6.3 x 11 | 165 | 8 x 11.5 | 190 | 10 x 16 | 255 |
| 100 | 5 x 11 | 145 | 6.3 x 11 | 180 | 6.3 x 11 | 190 | 8 x 11.5 | 240 | 8 x 11.5 | 260 | 10 x 12 | 320 | 10 x 20 | 370 |
| 220 | 6.3 x 11 | 250 | 8 x 11.5 | 300 | 8 x 11.5 | 320 | 10 x 12 | 420 | 10 x 16 | 490 | 10 x 20 | 565 | 13 x 25 | 675 |
| 330 | 8 x 11.5 | 350 | 8 x 11.5 | 370 | 10 x 12.5 | 470 | 10 x 16 | 570 | 13 x 20 | 635 | 13 x 20 | 765 | 16 x 32 | 972 |
| 470 | 8 x 11.5 | 415 | 10 x 12.5 | 520 | 10 x 16 | 620 | 10 x 16 | 740 | 13 x 20 | 860 | 16 x 25 | 1050 | 18 x 36 | 1135 |
| 1000 | 10 x 12.5 | 650 | 10 x 16 | 785 | 13 x 20 | 1090 | 13 x 20 | 1145 | 16 x 25 | 1530 | 16 x 25 | 1700 | 22 x 40 | 2600 |
| 2200 | 13 x 20 | 1240 | 13 x 20 | 1295 | 16 x 25 | 1660 | 16 x 32 | 1890 | 18 x 40 | 2231 | 18 x 40 | 2385 | | |
| 3300 | 13 x 20 | 1420 | 16 x 25 | 1840 | 16 x 32 | 2070 | 18 x 36 | 2430 | 22 x 40 | 2785 | 22 x 40 | 3000 | | |
| 4700 | 16 x 25 | 1980 | 16 x 32 | 2260 | 18 x 36 | 2520 | 18 x 36 | 2700 | 25 x 40 | 3300 | 25 x 40 | 3560 | | |
| 6800 | 16 x 25 | 2220 | 16 x 32 | 2520 | 18 x 36 | 2880 | 22 x 41 | 2900 | | | | | | |
| 10000 | 18 x 36 | 2880 | 18 x 36 | 3080 | 22 x 40 | 3440 | | | | | | | | |

| Value (μF) | Working Voltage (WV); Dimensions: $\phi D \times L$ (mm); Ripple Current: mA/RMS @ 120Hz, 85°C | | | | | | | |
|-------------------|--|------|-------------------|------|-------------------|-----|-------------------|-----|
| | 160 | | 250 | | 350 | | 450 | |
| | $\phi D \times L$ | mA | $\phi D \times L$ | mA | $\phi D \times L$ | mA | $\phi D \times L$ | mA |
| .47 | 5 x 11 | 13 | 8 x 11.5 | 21 | 8 x 11.5 | 21 | 10 x 12.5 | 26 |
| 1.0 | 5 x 11 | 20 | 8 x 11.5 | 32 | 8 x 11.5 | 32 | 10 x 12.5 | 38 |
| 2.2 | 6.3 x 11 | 34 | 8 x 11.5 | 49 | 10 x 16 | 63 | 10 x 16 | 63 |
| 3.3 | 8 x 11.5 | 50 | 10 x 12.5 | 70 | 10 x 16 | 78 | 10 x 20 | 86 |
| 4.7 | 8 x 11.5 | 60 | 10 x 16 | 93 | 10 x 20 | 103 | 13 x 20 | 120 |
| 10 | 10 x 16 | 115 | 10 x 20 | 150 | 13 x 20 | 174 | 13 x 25 | 192 |
| 22 | 13 x 20 | 216 | 13 x 20 | 255 | 13 x 25 | 282 | 16 x 25 | 354 |
| 33 | 13 x 20 | 270 | 13 x 25 | 348 | 16 x 32 | 438 | 18 x 36 | 426 |
| 47 | 13 x 25 | 354 | 16 x 25 | 468 | 16 x 36 | 500 | 18 x 40 | 555 |
| 100 | 16 x 25 | 582 | 18 x 40 | 822 | 18 x 40 | 685 | 22 x 45 | 750 |
| 220 | 18 x 36 | 900 | 22 x 40 | 1134 | | | | |
| 330 | 18 x 40 | 1010 | | | | | | |

