

SK [For General]

85°C Single-Ended Lead Aluminum Electrolytic Capacitors

Miniature Aluminum Electrolytic Capacitors

ELECTRICAL CHARACTERISTICS

Operating Temperature Range : -40 ~ +85°C / -25 ~ +85°C

Rated Voltage Range : 6.3 ~ 100V / 160 ~ 450V

Rated Capacitance Range : 0.1 ~ 22000µF / 0.47 ~ 470µF

Capacitance Tolerance : -20 ~ +20% at 120Hz, 20°C

DC Leakage Current (µA) : I = 0.01CV (µA) or 3µA / I = 0.03CV (µA) + 10µA whichever is greater.
(After Rated Voltage Applied for 2 Minutes)

Dissipation Factor

| | | | | | | | | | | |
|-----------|-----|----|----|----|----|----|----|-----|-----------|-----------|
| WV (V): | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | 160 ~ 250 | 350 ~ 450 |
| D.F (%) : | 24 | 20 | 16 | 14 | 12 | 10 | 10 | 10 | 20 | 24 |

For capacitors whose capacitance exceeds 1000µF. The value of DF(%) is increased by 2% for every addition of 1000µF.

Endurance : After the rated voltage has been applied at 85°C for 2000 hours, the capacitors shall meet following requirements.

- (a) Capacitance Change : Within 20% of Initial Value
- (b) Dissipation Factor : 200% or Less of Initial Specified Value
- (c) Leakage Current : Initial Specified Value or Less

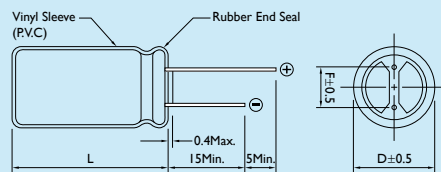
Shelf Life : After have been placed at 85°C without voltage applied for 1000 hours the capacitors shall meet following requirements.

- (a) Capacitance Change : Within 20% of Initial Value
- (b) Dissipation Factor : 200% or Less of Initial Specified Value
- (c) Leakage Current : Initial Specified Value or Less

DIAGRAM OF DIMENSIONS

| Dø | F | dø |
|------|------|------|
| 4.0 | 1.5 | 0.45 |
| 5.0 | 2.0 | 0.5 |
| 6.3 | 2.5 | |
| 8.0 | 3.5 | 0.6 |
| 10.0 | 5.0 | |
| 12.0 | | |
| 13.0 | | |
| 16.0 | 7.5 | 0.8 |
| 18.0 | | |
| 22.0 | 10.0 | |

Rubber Stand-off



L ≤ 16 L + 1.5Max.
L > 16 L + 2Max.
Dø = 8 & 10 L + 2.5Max.
Dø < 20 Dø + 0.5
Dø ≥ 20 Dø + 1



DESCRIPTION

Lower-cost capacitors suitable for high density printed circuit boards.

Very high volumetric efficiency

Ideally suited for general purpose applications, decoupling bypass, and filtering circuit in entertainment electronics.

Featuring high CV products with moderate cost

MULTIPLIER FOR RIPPLE CURRENT

Frequency Coefficient

| FREQUENCY (Hz) | 120 | 300 | 1K | 10K-100K |
|-----------------------|------|------|------|----------|
| 6.3~100V Below~68µF | 1.00 | 1.20 | 1.30 | 1.50 |
| 6.3~100V 100~680µF | 1.00 | 1.10 | 1.15 | 1.20 |
| 6.3~110V 1000~22000µF | 1.00 | 1.05 | 1.10 | 1.15 |
| 160~450V Below~220µF | 1.00 | 1.25 | 1.40 | 1.40 |
| 160~450V 220µF Above | 1.00 | 1.10 | 1.13 | 1.13 |

Temperature Coefficient

| TEMPERATURE (°C) | 50 | 70 | 85 |
|------------------|------|------|------|
| FACTOR | 1.30 | 1.15 | 1.00 |

Dimensions: mm



CASE SIZE & PERMISSIBLE RIPPLE CURRENT OF STANDARD PRODUCTS

D × L: mm

| CAP. (μF) | RATED VOLTAGE WV (SURGE VOLTAGE WV) | | | | | | | | | | | | | | |
|-----------|-------------------------------------|------|-----------------|------|-----------------|------|-----------------|------|-----------------|---------|-----------------|----------|-----------------|--------|-----|
| | 6.3 (8) SIZE | | 10 (13) SIZE | | 16 (20) SIZE | | 25 (32) SIZE | | 35 (44) SIZE | | 50 (63) SIZE | | 63 (79) SIZE | | |
| | SIZE | SIZE | SIZE | SIZE | SIZE | SIZE | SIZE | SIZE | SIZE | SIZE | SIZE | SIZE | SIZE | SIZE | |
| 0.10 | | | | | | | | | | | 5 × 11 | 1 | | | |
| 0.22 | | | | | | | | | | | 5 × 11 | 2 | | | |
| 0.33 | | | | | | | | | | | 5 × 11 | 3 | 5 × 11 | 3 | |
| 0.47 | | | | | | | | | | | 5 × 11 | 5 | 5 × 11 | 5 | |
| 0.68 | | | | | | | | | | | 5 × 11 | 7 | | | |
| 1.0 | | | 5 × 11 | 10 | 5 × 11 | 10 | | | | | 5 × 11 | 10 | 5 × 11 | 10 | |
| 2.2 | | | 5 × 11 | 20 | | | | | | | 5 × 11 | 23 | 5 × 11 | 29 | |
| 3.3 | | | | | | | | | | | 5 × 11 | 35 | 5 × 11 | 40 | |
| 4.7 | | | 5 × 11 | 20 | 5 × 11 | 25 | 5 × 11 | 30 | 5 × 11 | 35 | 5 × 11 | 40 | 5 × 11 | 45 | |
| 6.8 | | | | | | | | | | | 5 × 11 | 50 | | | |
| 10 | | | 5 × 11 | 35 | 5 × 11 | 40 | 5 × 11 | 50 | 5 × 11 | 60 | 5 × 11 | 65 | 5 × 11 | 70 | |
| 15 | | | | | 5 × 11 | 50 | | | | | 5 × 11 | 80 | | | |
| 22 | 5 × 11 | 35 | 5 × 11 | 55 | 5 × 11 | 75 | 5 × 11 | 90 | 5 × 11 | 95 | 5 × 11 | 100 | 5 × 11 | 95 | |
| | | | | | | | | | | | | | 6.3 × 11 | 115 | |
| 33 | 5 × 11 | 55 | 5 × 11 | 80 | 5 × 11 | 110 | 5 × 11 | 115 | 5 × 11 | 120 | 5 × 11 | 105 | 6.3 × 11 | 130 | |
| | | | | | | | | | | | | 6.3 × 11 | 125 | 8 × 11 | 140 |
| 47 | 5 × 11 | 75 | 5 × 11 | 95 | 5 × 11 | 130 | 5 × 11 | 135 | 5 × 11 | 120 | 6.3 × 11 | 140 | 6.3 × 11 | 160 | |
| | | | | | | | 6.3 × 11 | 135 | 6.3 × 11 | 140 | 8 × 11 | 150 | 8 × 11 | 190 | |
| 68 | | | | | 5 × 11 | 150 | 6.3 × 11 | 145 | 8 × 11 | 180 | | | | | |
| 100 | 5 × 11 | 130 | 5 × 11 | 180 | 5 × 11 | 165 | 6.3 × 11 | 160 | 6.3 × 11 | 185 | 8 × 11 | 230 | 10 × 12 | 300 | |
| | | | | | 6.3 × 11 | 185 | 8 × 11 | 200 | 8 × 11 | 230 | 10 × 12 | 250 | 10 × 15 | 300 | |
| 150 | | | | | 6.3 × 11 | 205 | | | | | | | | | |
| 220 | 5 × 11 | 200 | 5 × 11 | 215 | 6.3 × 11 | 260 | 8 × 11 | 290 | 8 × 11 | 290 | 10 × 12 | 380 | 10 × 15 | 410 | |
| | 6.3 × 11 | 240 | 6.3 × 11 | 250 | 8 × 11 | 320 | 10 × 12 | 340 | 10 × 12 | 370 | 10 × 15 | 440 | 10 × 19.5 | 490 | |
| | | | | | | | | | | 10 × 15 | 370 | | | | |
| 330 | 6.3 × 11 | 260 | 6.3 × 11 | 265 | 6.3 × 11 | 290 | 8 × 11 | 315 | 8 × 15 | 386 | 10 × 15 | 490 | 10 × 19.5 | 540 | |
| | 8 × 11 | 300 | 8 × 11 | 330 | 8 × 11 | 360 | 8 × 15 | 380 | 10 × 12 | 420 | 10 × 19.5 | 580 | 13 × 20 | 680 | |
| | | | | | | | 10 × 12 | 420 | 10 × 15 | 490 | 13 × 13 | 530 | | | |
| 470 | 6.3 × 11 | 330 | 6.3 × 11 | 320 | 8 × 11 | 400 | 8 × 15 | 420 | 10 × 15 | 430 | 10 × 19.5 | 610 | 13 × 20 | 755 | |
| | 8 × 11 | 380 | 8 × 11 | 400 | 10 × 12 | 470 | 10 × 12 | 460 | 10 × 19.5 | 510 | 13 × 20 | 760 | 13 × 25 | 880 | |
| | | | | | | | 10 × 15 | 540 | 13 × 20 | 640 | | | 16 × 25 | 880 | |

Note: I_r Ripple Current: (mA/rms) 85°C, 120Hz

CASE SIZE & PERMISSIBLE RIPPLE CURRENT OF STANDARD PRODUCTS

D x L: mm

| CAP. (μF) | RATED VOLTAGE WV (SURGE VOLTAGE WV) | | | | | | | | | | | | | | | |
|-----------|-------------------------------------|--------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|---------|--------|---------|--------|---------|------|
| | 6.3 (8) | | 10 (13) | | 16 (20) | | 25 (32) | | 35 (44) | | 50 (63) | | 63 (79) | | | |
| | SIZE | RIPPLE | SIZE | RIPPLE | SIZE | RIPPLE | SIZE | RIPPLE | SIZE | RIPPLE | SIZE | RIPPLE | SIZE | RIPPLE | | |
| 680 | 8 x 11 | 410 | 10 x 12 | 460 | 10 x 12 | 510 | 10 x 15 | 540 | 13 x 20 | 705 | | | 13 x 25 | 965 | | |
| | | | | | 10 x 15 | 565 | 10 x 19.5 | 595 | 13 x 25 | 780 | | | 16 x 25 | 1085 | | |
| 1000 | 8 x 11 | 460 | 10 x 12 | 580 | 10 x 12 | 530 | 10 x 19.5 | 760 | 10 x 19.5 | 770 | 13 x 25 | 1100 | 16 x 25 | 1310 | | |
| | | | | | 10 x 15 | 630 | 10 x 15 | 630 | 12 x 16 | 760 | 13 x 20 | 950 | 16 x 25 | 1350 | 16 x 32 | 1550 |
| | | | | | 10 x 19.5 | 790 | 13 x 16 | 760 | 13 x 25 | 1100 | | | | | | |
| | | | | | | | 13 x 20 | 950 | | | | | | | | |
| 1200 | 10 x 12 | 620 | 10 x 15 | 754 | | | | | | | | | | | | |
| 1500 | | | 10 x 19.5 | 700 | 13 x 16 | 825 | | | 16 x 25 | 1240 | | | | | | |
| 2200 | 10 x 19.5 | 840 | 10 x 19.5 | 880 | 10 x 19.5 | 925 | 13 x 20 | 1100 | 16 x 25 | 1600 | 16 x 36 | 1850 | 18 x 40 | 2200 | | |
| | 13 x 20 | 1050 | 13 x 20 | 1100 | 13 x 20 | 1100 | 13 x 25 | 1300 | 16 x 32 | 1800 | 18 x 36 | 2090 | 22 x 35 | 2200 | | |
| | | | | | 13 x 25 | 1350 | 16 x 25 | 1550 | | | | | 22 x 40 | 2200 | | |
| | | | | | | | 18 x 20 | 1550 | | | | | | | | |
| 3300 | 10 x 19.5 | 1000 | 13 x 20 | 1250 | 13 x 20 | 1200 | 16 x 25 | 1660 | 16 x 36 | 1970 | 18 x 36 | 2170 | 22 x 40 | 2500 | | |
| | 13 x 20 | 1250 | 13 x 25 | 1400 | 13 x 25 | 1400 | 16 x 32 | 1950 | 18 x 36 | 2220 | 18 x 40 | 2400 | | | | |
| | | | | | 16 x 25 | 1700 | | | | | | | | | | |
| 4700 | 13 x 20 | 1300 | 13 x 25 | 1500 | 13 x 40 | 1882 | 16 x 32 | 1950 | 16 x 36 | 2136 | 18 x 50 | 2350 | | | | |
| | 13 x 25 | 1437 | 16 x 25 | 1800 | 16 x 25 | 1800 | 18 x 36 | 2360 | 18 x 36 | 2400 | 22 x 35 | 2240 | | | | |
| | 16 x 25 | 1700 | | | 16 x 32 | 2100 | | | | | 22 x 40 | 2500 | | | | |
| 6800 | 16 x 25 | 1900 | 16 x 25 | 1900 | 16 x 32 | 1980 | 18 x 36 | 2550 | 18 x 40 | 2200 | | | | | | |
| | | | 16 x 32 | 2150 | 16 x 36 | 2200 | | | 22 x 40 | 2600 | | | | | | |
| | | | | | 18 x 36 | 2500 | | | | | | | | | | |
| 10000 | 16 x 25 | 1900 | 16 x 36 | 2225 | 18 x 36 | 2700 | 22 x 40 | 2800 | | | | | | | | |
| | 16 x 32 | 2250 | 18 x 36 | 2500 | | | | | | | | | | | | |
| 15000 | 16 x 36 | 2500 | 18 x 36 | 2950 | 22 x 40 | 3150 | 22 x 40 | 3200 | | | | | | | | |
| | 18 x 36 | 2880 | | | | | | | | | | | | | | |
| 22000 | 18 x 40 | 3650 | 22 x 40 | 3700 | 22 x 40 | 3800 | | | | | | | | | | |

Note: I. Ripple Current: (mA/rms) 85°C, 120Hz



CASE SIZE & PERMISSIBLE RIPPLE CURRENT OF STANDARD PRODUCTS

D x L: mm

| CAP. (μF) | RATED VOLTAGE WV (SURGE VOLTAGE WV) | | | | | | | | | | | | | |
|-----------|-------------------------------------|--------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|
| | 100 (125) | | 160 (200) | | 200 (250) | | 250 (300) | | 350 (400) | | 400 (450) | | 450 (500) | |
| | SIZE | RIPPLE | SIZE | RIPPLE | SIZE | RIPPLE | SIZE | RIPPLE | SIZE | RIPPLE | SIZE | RIPPLE | SIZE | RIPPLE |
| 0.22 | 5 x 11 | 5 | | | | | | | | | | | | |
| 0.47 | 5 x 11 | 10 | 5 x 11 | 12 | 5 x 11 | 14 | 5 x 11 | 14 | 5 x 11 | 14 | 6.3 x 11 | 14 | 6.3 x 11 | 14 |
| 1.0 | 5 x 11 | 21 | 5 x 11 | 17 | 5 x 11 | 19 | 5 x 11 | 17 | 6.3 x 11 | 19 | 6.3 x 11 | 16 | 6.3 x 11 | 15 |
| | | | 6.3 x 11 | 17 | | | 6.3 x 11 | 19 | | | 8 x 11 | 19 | 8 x 11 | 19 |
| 2.2 | 5 x 11 | 30 | 6.3 x 11 | 26 | 6.3 x 11 | 22 | 6.3 x 11 | 24 | 8 x 11 | 33 | 8 x 11 | 26 | 10 x 12 | 33 |
| | | | | | 8 x 11 | 27 | 8 x 11 | 30 | 10 x 12 | 33 | 10 x 12 | 33 | | |
| 3.3 | 5 x 11 | 45 | 6.3 x 11 | 30 | 6.3 x 11 | 30 | 8 x 11 | 30 | 8 x 11 | 33 | 10 x 12 | 40 | 10 x 15 | 42 |
| | | | 8 x 11 | 35 | 8 x 11 | 37 | 10 x 12 | 38 | 10 x 12 | 39 | | | | |
| 4.7 | 5 x 11 | 50 | 6.3 x 11 | 32 | 8 x 11 | 36 | 8 x 11 | 36 | 8 x 11 | 36 | 10 x 15 | 45 | 10 x 15 | 50 |
| | | | 8 x 11 | 40 | 10 x 12 | 45 | 10 x 12 | 45 | 10 x 12 | 39 | | | 10 x 19.5 | 50 |
| | | | | | | | | | 10 x 15 | 45 | | | | |
| 6.8 | 5 x 11 | 55 | | | | | 8 x 11 | 40 | | | | | 10 x 15 | 50 |
| | | | | | | | 10 x 12 | 50 | | | | | 10 x 19.5 | 50 |
| 10 | 5 x 11 | 65 | 8 x 11 | 50 | 10 x 12 | 57 | 10 x 15 | 70 | 10 x 15 | 70 | 10 x 15 | 50 | 13 x 20 | 60 |
| | | | 6.3 x 11 | 75 | 10 x 12 | 65 | 10 x 15 | 70 | 10 x 19.5 | 70 | 13 x 20 | 70 | 10 x 19.5 | 56 |
| | | | | | 10 x 15 | 65 | | | | | 13 x 20 | 70 | | |
| 15 | 8 x 11 | 93 | | | | | 10 x 19.5 | 75 | 10 x 19.5 | 90 | | | 13 x 20 | 93 |
| | | | | | | | 13 x 20 | 90 | | | | | | |
| 22 | 6.3 x 11 | 105 | 10 x 15 | 110 | 10 x 15 | 120 | 10 x 19.5 | 130 | 13 x 20 | 130 | 13 x 20 | 100 | 16 x 20 | 100 |
| | 8 x 11 | 130 | 10 x 19.5 | 110 | | | | | | | 13 x 25 | 110 | 16 x 25 | 110 |
| | | | | | | | | | | | 16 x 25 | 130 | 16 x 32 | 130 |
| 33 | 8 x 11 | 140 | 10 x 19.5 | 150 | 10 x 19.5 | 160 | 13 x 20 | 140 | 13 x 25 | 170 | 13 x 25 | 140 | 16 x 25 | 145 |
| | 10 x 12 | 170 | | | | | 13 x 25 | 160 | 16 x 25 | 170 | 16 x 20 | 145 | 16 x 32 | 160 |
| | | | | | | | | | | | 16 x 25 | 170 | 16 x 36 | 180 |
| 47 | 10 x 12 | 190 | 12 x 16 | 145 | 13 x 20 | 160 | 13 x 20 | 180 | 16 x 25 | 220 | 16 x 25 | 180 | 18 x 36 | 200 |
| | 10 x 15 | 230 | 12 x 25 | 180 | 13 x 25 | 190 | 13 x 25 | 210 | | | 16 x 32 | 220 | 18 x 40 | 230 |
| | | | 13 x 20 | 180 | | | 16 x 25 | 210 | | | 16 x 36 | 220 | | |
| 68 | 10 x 15 | 280 | | | 13 x 25 | 230 | | | | | 18 x 25 | 236 | 18 x 32 | 265 |
| 100 | 10 x 19.5 | 400 | 13 x 25 | 250 | 16 x 25 | 330 | 16 x 32 | 310 | 16 x 36 | 320 | 16 x 36 | 320 | 22 x 40 | 370 |
| | | | 16 x 25 | 300 | | | | | 18 x 36 | 360 | 18 x 36 | 360 | | |

Note: I. Ripple Current: (mA/rms) 85°C, 120Hz

CASE SIZE & PERMISSIBLE RIPPLE CURRENT OF STANDARD PRODUCTS

D x L: mm

| CAP. (μF) | RATED VOLTAGE WV (SURGE VOLTAGE WV) | | | | | | | | | | | | | |
|-----------|-------------------------------------|--------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|
| | 100 (125) | | 160 (200) | | 200 (250) | | 250 (300) | | 350 (400) | | 400 (450) | | 450 (500) | |
| | SIZE | RIPPLE | SIZE | RIPPLE | SIZE | RIPPLE | SIZE | RIPPLE | SIZE | RIPPLE | SIZE | RIPPLE | SIZE | RIPPLE |
| 150 | 13 x 20 | 500 | | | | | 18 x 40 | 410 | | | | | | |
| 220 | 13 x 25 | 710 | 16 x 32 | 450 | 18 x 25 | 485 | 18 x 36 | 540 | | | 18 x 40 | 800 | | |
| | | | 16 x 36 | 510 | 18 x 32 | 540 | 18 x 40 | 600 | | | | | | |
| | | | | | 18 x 36 | 600 | | | | | | | | |
| 330 | 13 x 25 | 720 | 18 x 36 | 540 | 16 x 40 | 710 | | | | | | | | |
| | | | | | 16 x 25 | 860 | 18 x 40 | 600 | 16 x 45 | 750 | | | | |
| | | | | | | | 18 x 32 | 685 | | | | | | |
| | | | | | | | 18 x 36 | 725 | | | | | | |
| | | | | | | | 18 x 40 | 800 | | | | | | |
| 470 | 13 x 40 | 1100 | 22 x 40 | 900 | 18 x 40 | 750 | | | | | | | | |
| | 16 x 25 | 1100 | | | 22 x 35 | 1000 | | | | | | | | |
| | 16 x 32 | 1100 | | | | | | | | | | | | |
| 680 | 16 x 36 | 1260 | | | | | | | | | | | | |
| 1000 | 18 x 40 | 1350 | | | | | | | | | | | | |
| | 22 x 35 | 1680 | | | | | | | | | | | | |
| 2200 | 22 x 40 | 2300 | | | | | | | | | | | | |

Note: I. Ripple Current: (mA/rms) 85°C, 120Hz