

Miniature Aluminum Electrolytic Capacitors

SE-K [For General]

105°C Single-Ended Lead Aluminum Electrolytic Capacitors Rated Voltage up to 450V



DESCRIPTION

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

Very high volumetric efficiency

Ideally suited for general purpose applications, coupling, 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 | 1.45 |
| 6.3~100V 100~680μF | 1.00 | 1.10 | 1.15 | 1.25 |
| 6.3~110V 1000~22000μF | 1.00 | 1.05 | 1.10 | 1.15 |
| 160~450V ALL Cap(μF) | 1.00 | 1.05 | 1.10 | 1.50 |

ELECTRICAL CHARACTERISTICS

Operating Temperature Range : -40 ~ +105°C / -40 ~ +105°C / 25 ~ +105°C

Rated Voltage Range : 6.3 ~ 100V / 160 ~ 250V / 350 ~ 450V

Rated Capacitance Range : 0.47 ~ 15000μF / 0.47 ~ 470μF / 0.47 ~ 150μF

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

Leakage Current (μA) : $I = 0.01CV (\mu A) + 3\mu A / 0.03CV (\mu A) + 10\mu A$ 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. (%) : | 26 | 22 | 18 | 16 | 14 | 12 | 10 | 15 | 20 |

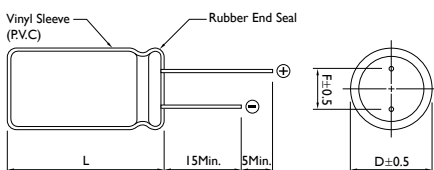
Endurance : After the rated voltage has been applied at 105°C for 1000 hours. The capacitors shall meet the following requirements.

- (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

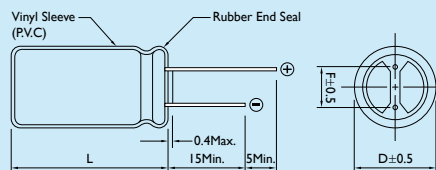
Shelf Life : After leaving capacitors under no load at 105°C for 500 hours, the capacitors shall meet the same requirements as Endurance.

DIAGRAM OF DIMENSIONS

Dimensions: mm



Rubber Stand-off



$L \leq 16 L + 1.5\text{Max.}$

$I > 16 L + 2\text{Max.}$

$D\phi = 8 \ \& \ 10 L + 2.5\text{Max.}$

$D\phi < 20 D\phi + 0.5$

$D\phi \geq 20 D\phi + 1$

| D ϕ | F | d ϕ |
|----------|------|-----------|
| 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 | 0.8 (1.0) |

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 | |
| 0.47 | | | | | | | | | | | 5 x 11 | 7 | 5 x 11 | 8 | |
| 0.68 | | | | | | | | | | | 5 x 11 | 7 | | | |
| 1.0 | | | | | | | | | | | 5 x 11 | 12 | 5 x 11 | 13 | |
| 2.2 | | | | | | | | | | | 5 x 11 | 18 | 5 x 11 | 20 | |
| 3.3 | | | | | | | | | | | 5 x 11 | 25 | 5 x 11 | 27 | |
| 4.7 | | | | | | | 5 x 11 | 20 | 5 x 11 | 25 | 5 x 11 | 30 | 5 x 11 | 34 | |
| 6.8 | | | | | | | 5 x 11 | 25 | 5 x 11 | 30 | 5 x 11 | 32 | 5 x 11 | 37 | |
| 10 | | | | | 5 x 11 | 25 | 5 x 11 | 30 | 5 x 11 | 40 | 5 x 11 | 50 | 5 x 11 | 55 | |
| 15 | | | | | 5 x 11 | 40 | 5 x 11 | 45 | 5 x 11 | 50 | 5 x 11 | 60 | 5 x 11 | 65 | |
| 22 | | | 5 x 11 | 45 | 5 x 11 | 55 | 5 x 11 | 60 | 5 x 11 | 65 | 5 x 11 | 75 | 5 x 11 | 75 | |
| | | | | | | | | | | | | | 6.3 x 11 | 90 | |
| 33 | | | 5 x 11 | 60 | 5 x 11 | 70 | 5 x 11 | 75 | 5 x 11 | 85 | 6.3 x 11 | 105 | 6.3 x 11 | 110 | |
| | | | | | | | | | | | | | 8 x 11 | 120 | |
| 47 | 5 x 11 | 60 | 5 x 11 | 75 | 5 x 11 | 85 | 5 x 11 | 90 | 5 x 11 | 95 | 6.3 x 11 | 105 | 6.3 x 11 | 128 | |
| | | | | | | 6.3 x 11 | 97 | | | 6.3 x 11 | 115 | 8 x 11 | 125 | 8 x 11 | 155 |
| 68 | 5 x 11 | 75 | 5 x 11 | 80 | 5 x 11 | 100 | 6.3 x 11 | 125 | 8 x 11 | 130 | 8 x 11 | 159 | 10 x 12 | 198 | |
| 100 | 5 x 11 | 100 | 5 x 11 | 110 | 5 x 11 | 110 | 6.3 x 11 | 145 | 6.3 x 11 | 150 | 8 x 11 | 160 | 8 x 15 | 230 | |
| | | | 6.3 x 11 | 135 | 6.3 x 11 | 135 | 8 x 11 | 160 | 8 x 11 | 190 | 10 x 12 | 210 | 10 x 12 | 260 | |
| 150 | 5 x 11 | 120 | 5 x 11 | 110 | 8 x 11 | 180 | 8 x 11 | 200 | 10 x 12 | 240 | 10 x 12 | 289 | 10 x 15 | 330 | |
| | | | 6.3 x 11 | 130 | | | | | | | | | | | |
| 220 | 5 x 11 | 140 | 5 x 11 | 150 | 6.3 x 11 | 180 | 8 x 11 | 200 | 8 x 11 | 230 | 10 x 12 | 340 | 10 x 15 | 400 | |
| | 6.3 x 11 | 165 | 6.3 x 11 | 180 | 8 x 11 | 235 | 10 x 12 | 250 | 8 x 15 | 280 | 10 x 15 | 400 | 10 x 19.5 | 460 | |
| | | | | | | | | | 10 x 12 | 315 | | | | | |
| 270 | | | 8 x 11 | 210 | | | | | | | | | | | |
| 330 | 6.3 x 11 | 160 | 6.3 x 11 | 205 | 8 x 11 | 285 | 8 x 11 | 265 | 8 x 15 | 345 | 10 x 15 | 450 | 10 x 19.5 | 520 | |
| | 8 x 11 | 200 | 8 x 11 | 255 | | | 8 x 15 | 320 | 8 x 20 | 420 | 10 x 19.5 | 535 | 13 x 20 | 650 | |
| | | | | | | | 10 x 12 | 355 | 10 x 12 | 380 | | | | | |
| | | | | | | | | | 10 x 15 | 440 | | | | | |
| 470 | 6.3 x 11 | 220 | 6.3 x 11 | 245 | 8 x 11 | 310 | 8 x 15 | 365 | 10 x 15 | 415 | 10 x 19.5 | 580 | 13 x 20 | 700 | |
| | 8 x 11 | 280 | 8 x 11 | 305 | 8 x 15 | 360 | 10 x 12 | 400 | 10 x 19.5 | 490 | 13 x 20 | 730 | 13 x 25 | 800 | |
| | | | | | 10 x 12 | 395 | 10 x 15 | 470 | 13 x 20 | 580 | | | | | |
| 560 | | | | | | | | | 10 x 30 | 600 | | | | | |

Note: I. Ripple Current: (mA/rms) 105°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) SIZE RIPPLE | | 10 (13) SIZE RIPPLE | | 16 (20) SIZE RIPPLE | | 25 (32) SIZE RIPPLE | | 35 (44) SIZE RIPPLE | | 50 (63) SIZE RIPPLE | | 63 (79) SIZE RIPPLE | |
| 680 | 8 x 11 | 255 | 8 x 11 | 335 | 10 x 12 | 455 | 10 x 15 | 540 | 10 x 19.5 | 600 | 13 x 25 | 860 | 13 x 25 | 840 |
| | 10 x 12 | 320 | 8 x 15 | 385 | 10 x 15 | 530 | 10 x 19.5 | 650 | 13 x 20 | 730 | | | 16 x 25 | 1000 |
| | | | 10 x 12 | 420 | | | | | | | | | | |
| 1000 | 8 x 11 | 370 | 8 x 11 | 390 | 8 x 20 | 600 | 10 x 19.5 | 680 | 13 x 20 | 850 | 13 x 25 | 930 | 16 x 25 | 1020 |
| | 10 x 12 | 470 | 8 x 15 | 450 | 10 x 15 | 590 | 13 x 20 | 855 | 13 x 25 | 995 | 16 x 25 | 1110 | 16 x 32 | 1200 |
| | | | 10 x 12 | 490 | 10 x 19.5 | 700 | | | | | | | | |
| | | | 10 x 15 | 570 | | | | | | | | | | |
| 1500 | 10 x 15 | 600 | 10 x 19.5 | 750 | 10 x 19.5 | 680 | 13 x 25 | 1020 | 13 x 25 | 935 | 16 x 32 | 1350 | 16 x 32 | 1300 |
| | | | | | | | 13 x 20 | 860 | 16 x 25 | 1110 | | | 16 x 36 | 1450 |
| 2200 | 10 x 19.5 | 740 | 10 x 19.5 | 800 | 10 x 25 | 895 | 13 x 25 | 1030 | 16 x 25 | 1230 | 16 x 36 | 1360 | 18 x 36 | 1455 |
| | 13 x 20 | 930 | 13 x 20 | 1010 | 12 x 25 | 1040 | 16 x 25 | 1230 | 16 x 32 | 1450 | 18 x 36 | 1530 | | |
| | | | | | 13 x 20 | 990 | | | | | | | | |
| | | | | | 13 x 25 | 1150 | | | | | | | | |
| 3300 | 10 x 19.5 | 880 | 10 x 25 | 950 | 13 x 25 | 1140 | 13 x 25 | 1035 | 16 x 36 | 1470 | 18 x 36 | 1540 | | |
| | 13 x 20 | 1100 | 10 x 30 | 1090 | 16 x 25 | 1350 | 16 x 25 | 1230 | 18 x 36 | 1660 | 18 x 40 | 1700 | | |
| | | | 13 x 20 | 1050 | | | 16 x 32 | 1450 | | | | | | |
| | | | 13 x 25 | 1220 | | | | | | | | | | |
| 4700 | 13 x 25 | 1100 | 13 x 25 | 1190 | 16 x 25 | 1330 | 16 x 32 | 1420 | 18 x 36 | 1580 | 22 x 35 | 1900 | | |
| | 16 x 25 | 1320 | 16 x 25 | 1410 | 16 x 32 | 1560 | 18 x 36 | 1690 | 18 x 40 | 1750 | | | | |
| 6800 | 13 x 25 | 1250 | 16 x 25 | 1370 | 16 x 32 | 1400 | 18 x 36 | 1850 | 18 x 40 | 1600 | | | | |
| | 16 x 25 | 1490 | 16 x 32 | 1610 | 16 x 36 | 1590 | | | 22 x 40 | 1885 | | | | |
| | | | | | 16 x 40 | 1670 | | | | | | | | |
| | | | | | 18 x 32 | 1600 | | | | | | | | |
| | | | | | 18 x 36 | 1790 | | | | | | | | |
| 10000 | 16 x 25 | 1560 | 16 x 36 | 1760 | 18 x 36 | 2100 | | | | | | | | |
| | 16 x 32 | 1830 | 18 x 36 | 1980 | | | | | | | | | | |
| 15000 | 18 x 36 | 2280 | 18 x 40 | 1960 | | | | | | | | | | |

Note: I. Ripple Current: (mA/rms) 105°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 |
| 0.47 | 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 | 15 | 5 x 11 | 17 | 5 x 11 | 19 | 6.3 x 11 | 19 | 6.3 x 11 | 20 | 6.3 x 11 | 16 | 8 x 11 | 20 |
| | | | | | | | | | | | 8 x 11 | 20 | | |
| 2.2 | 5 x 11 | 22 | 6.3 x 11 | 25 | 6.3 x 11 | 22 | 6.3 x 11 | 23 | 8 x 11 | 35 | 8 x 11 | 28 | 10 x 12 | 35 |
| | | | | | 8 x 11 | 28 | 8 x 11 | 29 | | | 10 x 12 | 35 | | |
| 3.3 | 5 x 11 | 29 | 6.3 x 11 | 30 | 6.3 x 11 | 32 | 8 x 11 | 33 | 8 x 11 | 37 | 8 x 11 | 38 | 10 x 15 | 54 |
| | | | 8 x 11 | 36 | 8 x 11 | 40 | 10 x 12 | 42 | 10 x 12 | 47 | 10 x 12 | 50 | | |
| 4.7 | 5 x 11 | 37 | 6.3 x 11 | 34 | 8 x 11 | 40 | 8 x 11 | 41 | 8 x 11 | 37 | 8 x 11 | 40 | 10 x 15 | 60 |
| | | | 8 x 11 | 43 | 10 x 12 | 50 | 10 x 12 | 52 | 10 x 12 | 47 | 8 x 15 | 45 | | |
| | | | | | | | | | 10 x 15 | 55 | 10 x 12 | 49 | | |
| | | | | | | | | | | | 10 x 15 | 57 | | |
| 6.8 | 5 x 11 | 46 | 10 x 12 | 54 | 10 x 12 | 60 | 8 x 15 | 57 | 10 x 15 | 65 | 10 x 15 | 60 | 10 x 19.5 | 70 |
| | | | | | | | 10 x 12 | 62 | | | 10 x 19.5 | 72 | | |
| 10 | 5 x 11 | 55 | 8 x 11 | 56 | 10 x 12 | 69 | 10 x 15 | 88 | 10 x 15 | 95 | 10 x 15 | 65 | 10 x 19.5 | 75 |
| | 6.3 x 11 | 65 | 10 x 12 | 70 | 10 x 15 | 80 | 10 x 19.5 | 90 | | | 10 x 19.5 | 77 | 13 x 20 | 85 |
| | | | | | | | | | | | 13 x 20 | 97 | 13 x 25 | 100 |
| 15 | 8 x 11 | 82 | 10 x 15 | 90 | 10 x 15 | 110 | 10 x 15 | 120 | 10 x 19.5 | 140 | 10 x 19.5 | 100 | 16 x 25 | 160 |
| | | | | | | | | | | | 13 x 20 | 125 | | |
| | | | | | | | | | | | 13 x 25 | 150 | | |
| 22 | 8 x 11 | 115 | 8 x 20 | 125 | 10 x 15 | 140 | 10 x 19.5 | 155 | 13 x 20 | 165 | 13 x 20 | 150 | 13 x 25 | 125 |
| | | | 10 x 15 | 130 | | | | | | | 13 x 25 | 175 | 16 x 25 | 150 |
| | | | | | | | | | | | | | 16 x 32 | 180 |
| 33 | 8 x 11 | 120 | 10 x 19.5 | 180 | 10 x 19.5 | 190 | 13 x 20 | 170 | 13 x 25 | 220 | 13 x 25 | 190 | 16 x 25 | 190 |
| | 10 x 12 | 160 | | | | | 13 x 25 | 200 | | | 16 x 20 | 195 | 16 x 36 | 240 |
| | | | | | | | | | | | 16 x 25 | 230 | | |
| 47 | 10 x 12 | 180 | 13 x 20 | 270 | 13 x 20 | 240 | 13 x 25 | 330 | 16 x 25 | 340 | 16 x 25 | 280 | 16 x 36 | 300 |
| | 10 x 15 | 210 | | | 13 x 25 | 290 | | | | | 16 x 32 | 315 | 18 x 40 | 360 |
| | | | | | | | | | | | 16 x 36 | 350 | | |
| | | | | | | | | | | | 18 x 20 | 275 | | |
| | | | | | | | | | | | 18 x 25 | 300 | | |

Note: I. Ripple Current: (mA/rms) 105°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 |
| 68 | 10 x 15 | 241 | 13 x 25 | 300 | 13 x 25 | 330 | 16 x 25 | 350 | 16 x 32 | 370 | 16 x 32 | 320 | 18 x 32 | 305 |
| | | | | | | | | | | | 16 x 36 | 335 | 22 x 40 | 400 |
| | | | | | | | | | | | 18 x 25 | 305 | | |
| | | | | | | | | | | | | 18 x 36 | 380 | |
| 100 | 10 x 19.5 | 385 | 13 x 25 | 330 | 13 x 25 | 340 | 16 x 32 | 430 | 18 x 36 | 460 | 16 x 36 | 425 | 18 x 36 | 380 |
| | | | 16 x 25 | 400 | 16 x 25 | 410 | | | 18 x 32 | 430 | 18 x 40 | 400 | | |
| | | | | | | | | | 18 x 36 | 480 | 22 x 40 | 450 | | |
| 120 | | | | | | | | | | 18 x 36 | 480 | | | |
| 150 | 13 x 25 | 414 | 16 x 32 | 435 | 16 x 32 | 400 | 18 x 40 | 460 | 22 x 40 | 480 | 22 x 40 | 450 | | |
| | | | | | 16 x 36 | 450 | | | | | | | | |
| 180 | | | | | | | | | | | 18 x 40 | 350 | | |
| 220 | 13 x 25 | 590 | 16 x 32 | 550 | 18 x 32 | 520 | 22 x 40 | 680 | | | | | | |
| | | | 16 x 36 | 620 | 18 x 36 | 580 | | | | | | | | |
| | | | | | 18 x 40 | 650 | | | | | | | | |
| 330 | 13 x 25 | 600 | 18 x 36 | 770 | 18 x 36 | 705 | | | | | | | | |
| | 16 x 25 | 720 | 18 x 40 | 850 | 18 x 40 | 780 | | | | | | | | |
| | | | | | 22 x 40 | 920 | | | | | | | | |
| 470 | 16 x 25 | 740 | 22 x 40 | 980 | | | | | | | | | | |
| | 16 x 32 | 875 | | | | | | | | | | | | |
| 680 | 16 x 36 | 1200 | | | | | | | | | | | | |
| 1000 | 18 x 40 | 1340 | | | | | | | | | | | | |
| | 22 x 40 | 1500 | | | | | | | | | | | | |

Note: I. Ripple Current: (mA/rms) 105°C, 120Hz

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