

Miniature Aluminum Electrolytic Capacitors

SE-K [For General]

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

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 applying rated voltage for 1000 hours at 105°C. 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 requirement as Endurance.



DESCRIPTION

Lower-cost capacitors expressly intended for high density printed circuit board.

Very High Volumetric Efficiency.

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

Feature High CV Product with Moderate Cost.

MULTIPLIER FOR RIPPLE CURRENT

Frequency Coefficient

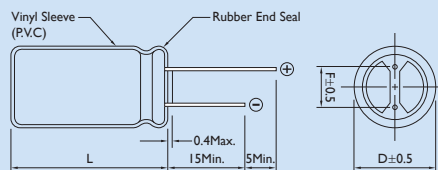
| FREQUENCY (Hz) | 120 | 300 | 1K | 10K~100K |
|-----------------------|------|------|------|----------|
| 6.3~100V Below~68μF | 1.00 | 1.20 | 1.30 | 1.45 |
| 6.3~100V 100~680μF | 1.00 | 1.10 | 1.15 | 1.25 |
| 6.3~110V 1000~22000μF | 1.00 | 1.05 | 1.10 | 1.15 |
| 160~450V ALL Cap(μF) | 1.00 | 1.05 | 1.10 | 1.50 |

DIAGRAM OF DIMENSIONS

Dimensions: mm

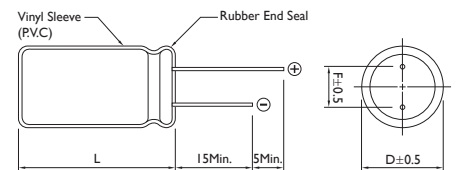
| Dø | F | dø |
|------|------|-----------|
| 5.0 | 2.0 | 0.5 |
| 6.3 | 2.5 | |
| 8.0 | 3.5 | 0.6 |
| 10.0 | 5.0 | |
| 12.0 | | |
| 13.0 | | |
| 16.0 | 7.5 | 0.8 |
| 18.0 | | |
| 22.0 | 10.0 | 0.8 (1.0) |

Rubber Stand-off



$L \leq 16 L + 1.5\text{Max.}$
 $L > 16 L + 2\text{Max.}$
 $D\phi = 8 \ \& \ 10 L + 2.5\text{Max.}$

$D\phi < 20 D\phi + 0.5$
 $D\phi \geq 20 D\phi + 1$





CASE SIZE & PERMISSIBLE RIPPLE CURRENT OF STANDARD PRODUCTS

D x 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 | |
| 0.47 | | | | | | | | | | | 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 | 100 | 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) | | 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 | 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 |
| | | | | | | | | | | | | | 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 × 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 × 11 | 10 | 5 × 11 | 12 | 5 × 11 | 14 | 5 × 11 | 14 | 5 × 11 | 14 | 6.3 × 11 | 14 | 6.3 × 11 | 14 |
| 1.0 | 5 × 11 | 15 | 5 × 11 | 17 | 5 × 11 | 19 | 6.3 × 11 | 19 | 6.3 × 11 | 20 | 6.3 × 11 | 16 | 8 × 11 | 20 |
| | | | | | | | | | | | 8 × 11 | 20 | | |
| 2.2 | 5 × 11 | 22 | 6.3 × 11 | 25 | 6.3 × 11 | 22 | 6.3 × 11 | 23 | 8 × 11 | 35 | 8 × 11 | 28 | 10 × 12 | 35 |
| | | | | | 8 × 11 | 28 | 8 × 11 | 29 | | | 10 × 12 | 35 | | |
| 3.3 | 5 × 11 | 29 | 6.3 × 11 | 30 | 6.3 × 11 | 32 | 8 × 11 | 33 | 8 × 11 | 37 | 8 × 11 | 38 | 10 × 15 | 54 |
| | | | 8 × 11 | 36 | 8 × 11 | 40 | 10 × 12 | 42 | 10 × 12 | 47 | 10 × 12 | 50 | | |
| 4.7 | 5 × 11 | 37 | 6.3 × 11 | 34 | 8 × 11 | 40 | 8 × 11 | 41 | 8 × 11 | 37 | 8 × 11 | 40 | 10 × 15 | 60 |
| | | | 8 × 11 | 43 | 10 × 12 | 50 | 10 × 12 | 52 | 10 × 12 | 47 | 8 × 15 | 45 | | |
| | | | | | | | | | 10 × 15 | 55 | 10 × 12 | 49 | | |
| | | | | | | | | | | | 10 × 15 | 57 | | |
| 6.8 | 5 × 11 | 46 | 10 × 12 | 54 | 10 × 12 | 60 | 8 × 15 | 57 | 10 × 15 | 65 | 10 × 15 | 60 | 10 × 19.5 | 80 |
| | | | | | | | 10 × 12 | 62 | | | 10 × 19.5 | 72 | | |
| 10 | 5 × 11 | 55 | 8 × 11 | 56 | 10 × 12 | 69 | 10 × 15 | 88 | 10 × 15 | 95 | 10 × 15 | 65 | 10 × 19.5 | 70 |
| | 6.3 × 11 | 65 | 10 × 12 | 70 | 10 × 15 | 80 | 10 × 19.5 | 90 | | | 10 × 19.5 | 77 | 13 × 20 | 85 |
| | | | | | | | | | | | 13 × 20 | 97 | 13 × 25 | 100 |
| 15 | 8 × 11 | 82 | 10 × 15 | 90 | 10 × 15 | 110 | 10 × 15 | 120 | 10 × 19.5 | 140 | 10 × 19.5 | 100 | 16 × 25 | 160 |
| | | | | | | | | | | | 13 × 20 | 125 | | |
| | | | | | | | | | | | 13 × 25 | 150 | | |
| 22 | 8 × 11 | 115 | 8 × 20 | 125 | 10 × 15 | 140 | 10 × 19.5 | 155 | 13 × 20 | 165 | 13 × 20 | 150 | 13 × 25 | 125 |
| | | | 10 × 15 | 130 | | | | | | | 13 × 25 | 175 | 16 × 25 | 150 |
| | | | | | | | | | | | | | 16 × 32 | 180 |
| 33 | 8 × 11 | 120 | 10 × 19.5 | 180 | 10 × 19.5 | 190 | 13 × 20 | 170 | 13 × 25 | 220 | 13 × 25 | 190 | 16 × 25 | 190 |
| | 10 × 12 | 160 | | | | | 13 × 25 | 200 | | | 16 × 20 | 195 | 16 × 36 | 240 |
| | | | | | | | | | | | 16 × 25 | 230 | | |
| 47 | 10 × 12 | 180 | 13 × 20 | 270 | 13 × 20 | 240 | 13 × 25 | 330 | 16 × 25 | 340 | 16 × 25 | 280 | 16 × 36 | 300 |
| | 10 × 15 | 210 | | | 13 × 25 | 290 | | | | | 16 × 32 | 315 | 18 × 40 | 360 |
| | | | | | | | | | | | 16 × 36 | 350 | | |
| | | | | | | | | | | | 18 × 20 | 275 | | |
| | | | | | | | | | | | 18 × 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 W V (SURGE VOLTAGE W V) | | | | | | | | | | | | | |
|-----------|---------------------------------------|--------|-----------|--------|-----------|---------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|
| | 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 | 22 x 40 | 450 |
| | | | 16 x 25 | 400 | 16 x 25 | 410 | | | | | 18 x 32 | 430 | | |
| | | | | | | | | | | | 18 x 36 | 480 | | |
| 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