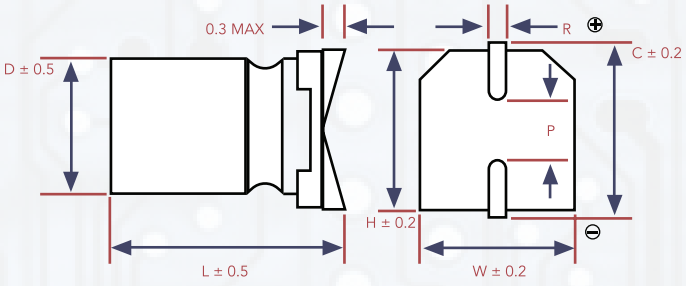
# SMD POLYMER ALUMINUM SOLID ELECTROLYTIC CAPACITOR
# - CCQ SERIES -


## FEATURES

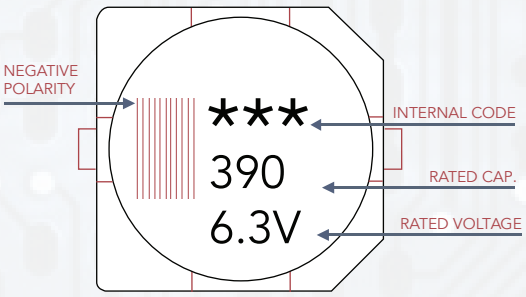
- Low ESR, High ripple current, long life, miniaturized
- SMD type: lead free reflow soldering condition at 260°C peak correspondence
- 5000 hours at 105°C.

## CONSTRUCTION AND DIMENSIONS




| øD | W | H | C | R | P |
|---|---|---|---|---|---|
| 5 | 5.3 | 5.3 | 5.9 | 0.5~0.8 | 1.4 |
| 6.3 | 6.5 | 6.5 | 7.2 | 0.5~0.8 | 2.2 |
| 8 | 8.3 | 8.3 | 9.0 | 0.7~1.1 | 3.1 |
| 10 | 10.3 | 10.3 | 11.0 | 0.7~1.1 | 4.5 |

## MARKING




## PART NUMBERING

| CCQ | 1C | 470 | M | 6.3 x 7 | — | R |
|---|---|---|---|---|---|---|
| SERIES NAME | RATED VOLTAGE | CAPACITANCE | TOLERANCE | CASE SIZE | | PACKAGE TYPE |

Series is represented by a three/four digit code

OE - 2.5V 1V - 35V
OG - 4V 1H - 50V
OJ - 6.3V 1J - 63V
1A - 10V 1K - 80V
1C - 16V 2A - 100V
1E - 25V

470 - 47µF
101 - 100µF
471 - 470µF
102 - 1000µF

3x5.3 8x7.0
4x5.3 8x10.0
4x5.7 8x12.0
5x5.3 10x7.7
5x5.7 10x8.0
6.3x5.3 10x9.9
6.3x5.7 10x10.0
6.3x5.9 10x12.7
6.3x6.0 10x13.0
6.3x7.0 12.5x13.5
6.3x7.7 12.5x16.0
8x6.5 16x16.5
8x6.7

R - Tape and reel

## SPECIFICATIONS

| ITEM | SPECIFICATION | | | |
|---|---|---|---|---|
| Category Temperature Range (°C) | -55°C ~ +105°C | | | |
| Rated Voltage Range (V) | 2.5V ~ 100V.DC | | | |
| Capacitance Tolerance (+20°C, 120Hz) | ±20%<br>Less than or equal to the specified value. After 2 minutes application of rated Voltage at 20°C | | | |
| Leakage Current | 2.5V ~ 25V | | 35V ~ 100V | |
| | 1≤0.2CV or 500 µA whichever is greater | | 1≤0.1CV or 299 µA whichever is greater | |
| Dissipation Factor | Rated Voltage | 2.5V ~ 6.3V | 10V ~ 100V | (20°C, 120Hz) |
| | Tan δ (MAX) | 0.08 | 0.12 | |
| Low Temperature Characteristics (Max. Impedance Ration) | Z(-25°C) / Z(+20°C) | ≤1.25 | (100KHz) | |
| | Z(-55°C) / Z(+20°C) | ≤1.25 | | |

Cal-Chip Electronics Inc.
59 Steamwhistle Drive, Ivyland, PA 18974 | p. 215.942.8900 | www.calchip.com | quotes@calchip.com

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## SPECIFICATIONS

| ITEM | SPECIFICATION | |
|---|---|---|
| Endurance | The specifications listed below shall be satisfied when the capacitors are restored to 20°C after application of rated voltage for 5000 hours at 105°C. | |
| | Appearance | No Significant Damage |
| | Capacitance Change | ≤±20% of the initial value |
| | D.F. (Tan δ) | ≤150% of the specified value |
| | ESR | ≤150% of the specified value |
| | Leakage Current | ≤The Specified Value |
| Damp Heat (Steady State) | The specifications listed below shall be satisfied when the capacitors are restored to 20°C after application of rated voltage for 1000 hours at 60°C, 90%~95% RH | |
| | Appearance | No Significant Damage |
| | Capacitance Change | ≤±20% of the initial value |
| | D.F. (Tan δ) | ≤150% of the specified value |
| | ESR | ≤150% of the specified value |
| | Leakage Current | ≤The Specified Value |
| Surge Voltage | Surge Voltage = Rated Voltage x 1.15 (V)<br>The capacitors shall be subjected to 1000 cycles each consisting of charge with surge voltages specified at 105°C for 30 seconds through a protective resistor (Rc=1kΩ) and discharge for 5 minutes 30 seconds. | |
| | Appearance | No Significant Damage |
| | Capacitance Change | ≤±20% of the initial value |
| | D.F. (Tan δ) | ≤150% of the specified value |
| | ESR | ≤150% of the specified value |
| | Leakage Current | ≤The Specified Value |
| Resistance to Soldering Heat | Measurement for solder temperature profile shall be made at the capacitor top and the terminal. | |
| | Capacitance Change | ≤±10% of the initial value |
| | D.F. (Tan δ) | ≤130% of the specified value |
| | ESR | ≤130% of the specified value |
| | Leakage Current | ≤The Specified Value |

## RATED RIPPLE CURRENT COEFFICIENT

| FREQUENCY | 120Hz ≤ f < 1KHz | 1KHz ≤ f < 10KHz | 10KHz ≤ f < 100KHz | 100KHz ≤ f < 500KHz |
|---|---|---|---|---|
| COEFFICIENT | 0.05 | 0.30 | 0.70 | 1.00 |

## STANDARD RATINGS

| RATED VOLTAGE | RATED CAPACITANCE (μF) | CASE SIZE ØDxL (mm) | ESR (mΩ) AT 20°C, 100KHz | LEAKAGE CURRENT (μF) | RATED RIPPLE CURRENT (mArms /105°C/100kHz) |
|---|---|---|---|---|---|
| 2.5 | 470 | 6.3 x 9 | 18 | 500 | 4100 |
| | 560 | 6.3 x 9 | 18 | 500 | 4100 |
| | 680 | 6.3 x 9 | 18 | 500 | 4100 |
| | 820 | 6.3 x 9 | 18 | 500 | 4100 |
| 4 | 560 | 6.3 x 9 | 18 | 500 | 4100 |
| | 680 | 6.3 x 9 | 18 | 544 | 4100 |
| | 820 | 6.3 x 9 | 18 | 656 | 4100 |
| | 1000 | 6.3 x 9 | 18 | 800 | 4100 |
| | 1200 | 6.3 x 9 | 18 | 960 | 4100 |
| 6.3 | 220 | 6.3 x 7 | 30 | 500 | 3500 |
| | 330 | 6.3 x 7 | 25 | 500 | 3500 |
| | 470 | 6.3 x 7 | 25 | 592 | 3500 |
| | 560 | 6.3 x 7 | 25 | 706 | 3500 |
| | 680 | 6.3 x 9 | 18 | 857 | 3800 |
| | 820 | 6.3 x 9 | 18 | 1033 | 3800 |
| | 1000 | 8 x 9.8 | 15 | 1260 | 4100 |
| | 1500 | 10 x 13.6 | 15 | 1890 | 4800 |

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## STANDARD RATINGS

| RATED VOLTAGE | RATED CAPACITANCE (µF) | CASE SIZE ØDxL (mm) | ESR (mΩ) AT 20°C, 100KHz | LEAKAGE CURRENT (µF) | RATED RIPPLE CURRENT (mArms /105°C/100kHz) |
|---|---|---|---|---|---|
| 10 | 220 | 6.3 x 7 | 30 | 500 | 2650 |
| | 330 | 6.3 x 7 | 30 | 660 | 2650 |
| | 470 | 6.3 x 7 | 30 | 940 | 2700 |
| | 560 | 6.3 x 9 | 20 | 1120 | 2900 |
| | 680 | 8 x 9.8 | 18 | 1360 | 3500 |
| | 820 | 8 x 12.6 | 18 | 1640 | 4100 |
| | | 10 x 10.5 | 15 | 1640 | 4100 |
| | 1000 | 8 x 12.6 | 18 | 2000 | 4100 |
| | 1500 | 10 x 13.6 | 15 | 2000 | 4500 |
| 16 | 47 | 6.3 x 7 | 50 | 500 | 2100 |
| | 68 | 6.3 x 7 | 40 | 500 | 2100 |
| | 100 | 6.3 x 7 | 40 | 500 | 2100 |
| | 220 | 6.3 x 7 | 30 | 704 | 2100 |
| | | 8 x 9.8 | 25 | 704 | 2690 |
| | 330 | 6.3 x 7 | 30 | 1056 | 2260 |
| | | 8 x 9.8 | 25 | 1056 | 2900 |
| | | 8 x 12.6 | 20 | 1056 | 3500 |
| | 470 | 8 x 9.8 | 25 | 1504 | 2900 |
| | | 8 x 12.6 | 20 | 1504 | 3500 |
| | 680 | 8 x 12.6 | 20 | 2176 | 3500 |
| | 820 | 8 x 12.6 | 20 | 2624 | 3500 |
| | 1000 | 8 x 12.6 | 20 | 3200 | 3500 |
| | 1500 | 10 x 13.6 | 15 | 4800 | 4100 |
| 25 | 47 | 6.3 x 7 | 50 | 500 | 1950 |
| | 100 | 6.3 x 7 | 45 | 500 | 1950 |
| | | 6.3 x 9 | 40 | 500 | 2100 |
| | 220 | 6.3 x 9 | 40 | 1100 | 2100 |
| | | 8 x 9.8 | 30 | 1100 | 2690 |
| | 270 | 6.3 x 10 | 35 | 1350 | 2400 |
| | 330 | 8 x 9.8 | 30 | 1650 | 2690 |
| | 470 | 8 x 12.6 | 25 | 2350 | 3100 |
| | | 10 x 10.5 | 30 | 2350 | 3100 |
| | 680 | 8 x 12.6 | 25 | 3400 | 3100 |
| | | 10 x 13.6 | 20 | 3400 | 3800 |
| | 820 | 10 x 13.6 | 20 | 4100 | 3800 |
| | 1000 | 10 x 13.6 | 20 | 5000 | 3800 |
| 35 | 47 | 6.3 x 7 | 80 | 299 | 1410 |
| | 100 | 6.3 x 7 | 80 | 350 | 1516 |
| | | 6.3 x 9 | 80 | 350 | 1950 |
| | | 8 x 9.8 | 50 | 350 | 2450 |
| | 150 | 6.3 x 10 | 70 | 525 | 2100 |
| | 220 | 8 x 9.8 | 50 | 770 | 2450 |
| | | 8 x 12.6 | 50 | 770 | 2910 |
| | 330 | 8 x 12.6 | 50 | 1155 | 2910 |
| | | 10 x 13.6 | 40 | 1155 | 3640 |
| | 470 | 10 x 13.6 | 40 | 1155 | 3640 |
| 50 | 22 | 6.3 x 9 | 100 | 299 | 850 |
| | 33 | 6.3 x 9 | 100 | 299 | 850 |
| | 47 | 6.3 x 9 | 80 | 299 | 920 |
| | | 8 x 9.8 | 60 | 299 | 1200 |
| | | 8 x 12.6 | 60 | 299 | 1500 |
| | 100 | 8 x 9.8 | 60 | 500 | 1320 |
| | | 8 x 12.6 | 60 | 500 | 1550 |
| | | 10 x 13.6 | 55 | 500 | 2100 |
| | 150 | 8 x 12.6 | 60 | 750 | 1550 |
| | 220 | 10 x 13.6 | 55 | 1100 | 2100 |
| 63 | 10 | 6.3 x 9 | 110 | 299 | 750 |
| | 22 | 6.3 x 9 | 110 | 299 | 750 |
| | 33 | 6.3 x 9 | 100 | 299 | 820 |
| | | 8 x 9.8 | 60 | 299 | 1100 |
| | 47 | 8 x 9.8 | 60 | 299 | 1100 |
| | | 8 x 12.6 | 60 | 299 | 1300 |
| | 82 | 8 x 12.6 | 60 | 517 | 1550 |
| | 100 | 8 x 12.6 | 60 | 630 | 1550 |
| | | 10 x 13.6 | 55 | 630 | 1800 |
| | 150 | 10 x 13.6 | 55 | 945 | 1800 |

## STANDARD RATINGS

| RATED VOLTAGE | RATED CAPACITANCE (µF) | CASE SIZE ØDxL (mm) | ESR (mΩ) AT 20°C, 100KHz | LEAKAGE CURRENT (µF) | RATED RIPPLE CURRENT (mArms /105°C/100kHz) |
|---|---|---|---|---|---|
| 80 | 10 | 6.3 x 9 | 120 | 299 | 550 |
| | 22 | 6.3 x 9 | 120 | 299 | 600 |
| | | 8 x 9.8 | 70 | 299 | 950 |
| | 33 | 8 x 9.8 | 70 | 299 | 950 |
| | | 8 x 12.6 | 70 | 299 | 1300 |
| | 47 | 8 x 12.6 | 70 | 376 | 1300 |
| | 56 | 8 x 12.6 | 70 | 448 | 1400 |
| | 68 | 10 x 13.6 | 50 | 544 | 1750 |
| | 100 | 10 x 13.6 | 50 | 800 | 1750 |
| 100 | 10 | 6.3 x 9 | 120 | 299 | 550 |
| | 22 | 8 x 9.8 | 80 | 299 | 950 |
| | | 8 x 12.6 | 70 | 299 | 1300 |
| | 33 | 8 x 12.6 | 70 | 330 | 1300 |
| | 47 | 10 x 13.6 | 50 | 470 | 1700 |
| | 68 | 10 x 13.6 | 50 | 680 | 1750 |

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