

TCTO Series

Conductive Polymer Chip Capacitors (Large Capacitance)



FEATURES

- Ta-polymer technology
- High ripple capability
- High CV
- Surge robust
- Undertab LF
-

APPLICATIONS

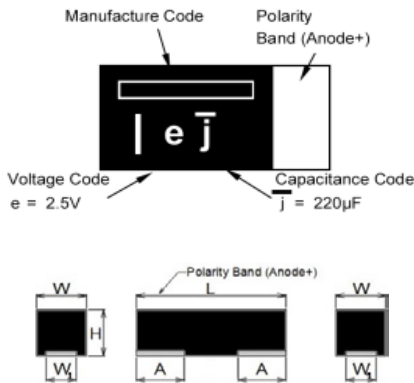
- DC/DC
- Industrial
- Computers
- Telecom
- IoT
- Home applications



LEAD-FREE
LEAD-FREE COMPATIBLE
COMPONENT



MARKING



CASE DIMENSIONS:

millimeters (inches)

| Code | EIA Code | EIA Metric | L±0.20 (0.008) | W±0.20 (0.008) | H±0.20 (0.008) | W1±0.20 (0.008) | A±0.20 (0.008) |
|------|----------|------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| A | 1206 | 3216-18 | 3.20 (0.126) | 1.60 (0.063) | 1.60 (0.063) | 1.20 (0.047) | 0.80 (0.031) |
| AL | 1206 | 3216-12 | 3.20 (0.126) | 1.60 (0.063) | 1.10±0.10 (0.043±0.004) | 1.20 (0.047) | 0.80 (0.031) |
| AS | 1206 | 3216-10 | 3.20 (0.126) | 1.60 (0.063) | 0.90±0.10 (0.035±0.004) | 1.20 (0.047) | 0.80 (0.031) |
| BL | 1210 | 3528-12 | 3.50 (0.138) | 2.80 (0.110) | 1.10±0.10 (0.043±0.004) | 2.00 (0.079) | 0.80 (0.031) |
| M | 0603 | 1608-09 | 1.60±0.10 (0.063±0.004) | 0.85±0.10 (0.033±0.004) | 0.80±0.10 (0.031±0.004) | 0.55±0.10 (0.022±0.004) | 0.50±0.10 (0.020±0.004) |
| P | 0805 | 2012-12 | 2.00 (0.079) | 1.25 (0.049) | 1.20 (0.047) max. | 0.85 (0.033) | 0.50 (0.020) |

HOW TO ORDER

TCTO

Type

P□

Case Size
See table above

1A

Rated DC Voltage
0E = 2.5Vdc
0G = 4Vdc
0J = 6.3Vdc
1A = 10Vdc
1C = 16Vdc
1E = 25Vdc
1V = 35Vdc

106

Capacitance Code
pF code: 1st two digits represent significant figures, 3rd digit represents multiplier (number of zeros to follow)

M

Tolerance
M = ±20%

8R

Packaging
8 = Tape width
R = Positive electrode on the side opposite to sprocket hole

- □□□

Discrimination code

TECHNICAL SPECIFICATIONS

| | |
|------------------------|--|
| Technical Data: | All technical data relate to an ambient temperature of +25°C |
| Capacitance Range: | 2.2µF to 330µF |
| Capacitance Tolerance: | ±20% |
| Leakage Current DCL: | Please see the ratings and part number reference table below |
| Temperature Range: | -55°C to +105°C |

Note: Conductive Polymer Capacitors are designed to operate within the limits of the environmental conditions specified for each series. If operated continuously at their maximum temperature and / or humidity limit, or beyond these limits, capacitors may exhibit a parametric shift in capacitance and increases in ESR. These changes may occur earlier if the specified environmental conditions are exceeded. Similarly, their normal operational time period will be significantly extended if their general duty cycle includes operation below maximum temperature within humidity controlled environments. Careful attention should be paid to maximum temperature with associated high humidity environments as well as voltage derating, ripple current and current surges.

Please reference the KYOCERA AVX Conductive Polymer Capacitor Guidelines for more information or contact factory for application assistance.



The Important Information/Disclaimer is incorporated in the catalog where these specifications came from or available online at www.kyocera-avx.com/disclaimer/ by reference and should be reviewed in full before placing any order.

TDS-PTNO-0047 | Rev 2

- POLYMER, TANTALUM AND NIOBIUM OXIDE CAPACITORS -

TCTO Series

Conductive Polymer Chip Capacitors (Large Capacitance)



CAPACITANCE AND RATED VOLTAGE RANGE (LETTER DENOTES CASE SIZE)

| Capacitance | | Rated Voltage DC (V _R) @ 85°C, @ 105°C (BL case) | | | | | | | Cap Code |
|-------------|------|--|---------|------------------------|------------------------|--------|---------|---------|----------|
| μF | Code | 2.5(e) | 4V(g) | 6.3V(j) | 10V(A) | 16V(C) | 25V(E) | 35V(V) | |
| 2.2 | 225 | | | | 500(M) | | | | J |
| 3.3 | 335 | | | | 500(M) | | | | N |
| 4.7 | 475 | | | | 500(M) | | | | S |
| 6.8 | 685 | | | | | | | 150(BL) | W |
| 10 | 106 | | | | 300(P) | | | 200(BL) | a |
| 15 | 156 | | | | | | 100(BL) | | e |
| 22 | 226 | | | | 200(AL) | 200(A) | 100(BL) | | j |
| 33 | 336 | | | | 150(AS) | 70(BL) | | | n |
| 47 | 476 | | 100(P) | 70(AL),200(AL),200(AS) | 200(A),100(AS) 100(BL) | 70(BL) | | | s |
| 100 | 107 | | 200(AL) | 45(A),70(AS),45(BL) | 45(BL) | | | | ā |
| 150 | 157 | | | 200(A),25(BL),35(BL) | | | | | ē |
| 220 | 227 | 35(BL) | | | | | | | ĵ |
| 330 | 337 | 20(BL) | | | | | | | ñ |

Released ratings (ESR ratings in mOhms)

Note: Voltage ratings are minimum values. KYOCERA AVX reserves the right to supply higher ratings in the same case size, to the same reliability standards.

RATINGS & PART NUMBER REFERENCE

| Part No. | Case Size | Capacitance (μF) | Rated Voltage (V) | Maximum Operating Temp. (°C) | DCL Max. (μA) | DF Max. (%) | ESR Max. @100kHz (mΩ) | 100kHz RMS Current (mA) 45°C | MSL |
|--------------------|-----------|------------------|-------------------|------------------------------|---------------|-------------|-----------------------|------------------------------|-----|
| 2.5 Volt | | | | | | | | | |
| TCTOBL0E227M8R-ZN1 | BL | 220 | 2.5 | 105 | 55.0 | 8 | 35 | 1700 | 3 |
| TCTOBL0E337M8R-2A1 | BL | 330 | 2.5 | 105 | 82.5 | 15 | 20 | 2200 | 3 |
| 4 Volt | | | | | | | | | |
| TCTOP0G476M8R-ZBR | P | 47 | 4 | 105 | 18.8 | 15 | 100 | 671 | 3 |
| TCTOAL0G107M8R | AL | 100 | 4 | 105 | 40.0 | 10 | 200 | 775 | 3 |
| 6.3 Volt | | | | | | | | | |
| TCTOAL0J476M8R-ZW1 | AL | 47 | 6.3 | 105 | 29.7 | 10 | 70 | 926 | 3 |
| TCTOAL0J476M8R | AL | 47 | 6.3 | 105 | 29.7 | 10 | 200 | 548 | 3 |
| TCTOA0J476M8R | AS | 47 | 6.3 | 105 | 29.7 | 10 | 200 | 548 | 3 |
| TCTOA0J107M8R-ZS1 | A | 100 | 6.3 | 105 | 63.0 | 15 | 45 | 1500 | 3 |
| TCTOAS0J107M8R-ZW1 | AS | 100 | 6.3 | 105 | 63.0 | 15 | 70 | 1134 | 3 |
| TCTOBL0J107M8R-ZS1 | BL | 100 | 6.3 | 105 | 63.0 | 8 | 45 | 1500 | 3 |
| TCTOA0J157M8R | A | 150 | 6.3 | 105 | 94.5 | 15 | 200 | 592 | 3 |
| TCTOBL0J157M8R-ZK1 | BL | 150 | 6.3 | 105 | 94.5 | 15 | 25 | 2000 | 3 |
| TCTOBL0J157M8R-ZN1 | BL | 150 | 6.3 | 105 | 94.5 | 15 | 35 | 1700 | 3 |
| 10 Volt | | | | | | | | | |
| TCTOM1A225M8R | M | 2.2 | 10 | 105 | 2.2 | 6 | 500 | 264 | 3 |
| TCTOM1A335M8R | M | 3.3 | 10 | 105 | 3.3 | 6 | 500 | 264 | 3 |
| TCTOM1A475M8R | M | 4.7 | 10 | 105 | 4.7 | 6 | 500 | 264 | 3 |
| TCTOP1A106M8R | P | 10 | 10 | 105 | 10.0 | 15 | 300 | 387 | 3 |
| TCTOAL1A226M8R | AL | 22 | 10 | 105 | 22.0 | 6 | 200 | 548 | 3 |
| TCTOAS1A336M8R-ZF1 | AS | 33 | 10 | 105 | 33.0 | 10 | 150 | 633 | 3 |
| TCTOA1A476M8R | A | 47 | 10 | 105 | 47.0 | 10 | 200 | 592 | 3 |
| TCTOAS1A476M8R-ZB1 | AS | 47 | 10 | 105 | 47.0 | 15 | 100 | 775 | 3 |
| TCTOBL1A476M8R-ZB1 | BL | 47 | 10 | 105 | 47.0 | 8 | 100 | 1000 | 3 |
| TCTOBL1A107M8R-ZS1 | BL | 100 | 10 | 105 | 100.0 | 10 | 45 | 1500 | 3 |
| 16 Volt | | | | | | | | | |
| TCTOA1C226M8R-ZD1 | A | 22 | 16 | 105 | 35.2 | 10 | 200 | 592 | 3 |
| TCTOBL1C336M8R-ZW1 | BL | 33 | 16 | 105 | 52.8 | 10 | 70 | 1200 | 3 |
| TCTOBL1C476M8R-ZW1 | BL | 47 | 16 | 105 | 75.2 | 10 | 70 | 1200 | 3 |

TCTO Series

Conductive Polymer Chip Capacitors (Large Capacitance)



RATINGS & PART NUMBER REFERENCE

| Part No. | Case Size | Capacitance (μF) | Rated Voltage (V) | Maximum Operating Temp. (°C) | DCL Max. (μA) | DF Max. (%) | ESR Max. @100kHz (mΩ) | 100kHz RMS Current (mA) 45°C | MSL |
|--------------------|-----------|------------------|-------------------|------------------------------|---------------|-------------|-----------------------|------------------------------|-----|
| 25 Volt | | | | | | | | | |
| TCTOBL1E156M8R-ZB1 | BL | 15 | 25 | 105 | 75.0 | 10 | 100 | 1000 | 3 |
| TCTOBL1E226M8R-ZB1 | BL | 22 | 25 | 105 | 110.0 | 10 | 100 | 1000 | 3 |
| 35 Volt | | | | | | | | | |
| TCTOBL1V685M8R-ZF1 | BL | 6.8 | 35 | 105 | 47.6 | 10 | 150 | 800 | 3 |
| TCTOBL1V106M8R-ZD1 | BL | 10 | 35 | 105 | 70.0 | 10 | 200 | 200 | 3 |

Moisture Sensitivity Level (MSL) is defined according to J-STD-020.
All technical data relates to an ambient temperature of +25C.

Capacitance and DF are measured at 120Hz, 0.5RMS with DC bias of 1.5 volts.
DCL is measured at rated voltage after 5 minutes.
ESR allowed to move up to 1.25 times catalog limit post mounting.

NOTE: KYOCERA AVX reserves the rights to supply higher voltage rating in the same case size, to the same reliability standards.

QUALIFICATION TABLE

| TEST | TCTO series (Temperature range -55°C to +105°C) | | | | | |
|-----------------------|---|---------------|---------------|--------------------|---|---|
| | Condition | | | Characteristics | | |
| Endurance | Apply rated voltage (Ur) at 85°C (A, AL, AS, M, P case) or 105°C (BL case) for 1000hrs through a serial resistance of ≤3.0Ω. Stabilize at room temperature for 24 hours before measuring. | | | Visual examination | no visible damage | |
| | | | | DCL | 4x initial limit (A, AL, AS, M, P case), 2x (BL case) | |
| | | | | ΔC/C | within ±20% of initial value | |
| | | | | DF | 3x initial limit (A, AL, AS, M, P case), 1.5x (BL case) | |
| Humidity | Store at 40±2°C (A, AL, AS, M, P case) or 60±2°C (BL case), 90-95% relative humidity for 500+ 12/0 hours. Stabilize at room temperature and humidity for 24 hours before measuring. | | | Visual examination | no visible damage | |
| | | | | DCL | 3x initial limit (A, AL, AS, M, P case), 1.5x (BL case) | |
| | | | | ΔC/C | within +30/-20% of initial value | |
| | | | | DF | 3x initial limit (A, AL, AS, M, P case), 1.5x (BL case) | |
| Temperature Stability | Step | Temperature°C | Duration(min) | -55°C | +105°C | |
| | 1 | -55 | 15 | DCL | n/a | 10xIL* |
| | 2 | +105 | 15 | ΔC/C | 0/-20% | +50/0% (A, AL, AS, M, P case) +80/0% (BL case) |
| | | | | | | |
| Surge Voltage | Apply 1.3x rated voltage (Ur) at 85±2°C for 1000 cycles, 300sec charge and 30sec discharge resistance 1000Ω. | | | Visual examination | no visible damage | |
| | | | | DCL | 2x initial limit (A, AL, AS, M, P case), 1.5x (BL case) | |
| | | | | ΔC/C | ±20% of initial limit | |
| | | | | DF | 2x initial limit (A, AL, AS, M, P case), 1.5x (BL case) | |
| Vibration | 4.17 JIS C 5101-1 Frequency: 10 to 55 to 10Hz/min. Amplitude: 1.5mm Time: 2hours each in X and Y directions | | | Visual examination | no visible damage | |
| | | | | DCL | initial limit | |
| | | | | ΔC/C | within ± 5% of initial value | |
| | | | | DF | initial limit | |

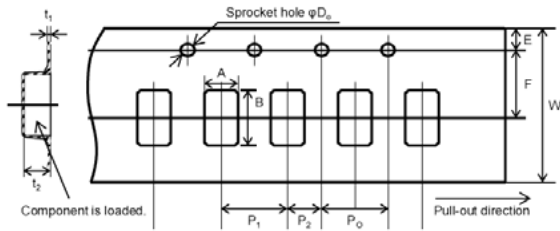
*Initial Limit

For use outside of recommended conditions and special request, please contact KYOCERA AVX.
Initial measurement max. 1hr after the removal from dry pack or after pretreatment at 85°C for 24 hours.

TCTO Series

Conductive Polymer Chip Capacitors (Large Capacitance)

PACKAGING SPECIFICATIONS



Unit (mm)

| Case | A±0.10 | B±0.10 | W±0.20 | E±0.10 | F±0.05 | P1±0.10 | P2±0.05 | PO±0.10 | DO+0.10/0 | t1±0.05 | t2±0.10 | Standard Packaging quantity |
|------|--------|--------|--------|--------|--------|---------|---------|---------|------------|---------|-----------|-----------------------------|
| A | 1.90 | 3.50 | 8.00 | 1.75 | 3.50 | 4.00 | 2.00 | 4.00 | φ1.50 | 0.25 | 1.90 | 2,000 pcs |
| AL | 1.90 | 3.50 | 8.00 | 1.75 | 3.50 | 4.00 | 2.00 | 4.00 | φ1.55±0.05 | 0.25 | 1.30±0.05 | 3,000 pcs |
| AS | 2.05 | 3.65 | 8.00 | 1.75 | 3.50 | 4.00 | 2.00 | 4.00 | φ1.50 | 0.25 | 1.10 | 3,000 pcs |
| BL | 3.20 | 3.80 | 8.00 | 1.75 | 3.50 | 4.00 | 2.00 | 4.00 | φ1.55±0.05 | 0.25 | 1.40 | 3,000 pcs |
| M | 1.00 | 1.85 | 8.00 | 1.75 | 3.50 | 4.00 | 2.00 | 4.00 | φ1.50 | 0.20 | 1.00 | 4,000 pcs |
| P | 1.55 | 2.30 | 8.00 | 1.75 | 3.50 | 4.00 | 2.00 | 4.00 | φ1.55±0.05 | 0.25 | 1.32 | 3,000 pcs |

REEL DIMENSIONS

