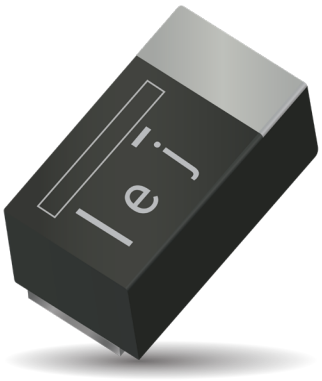
TCTO Series

Conductive Polymer Chip Capacitors (Large Capacitance)



FEATURES

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

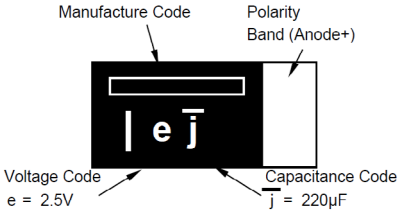
LEAD-FREE
LEAD-FREE COMPATIBLE COMPONENT

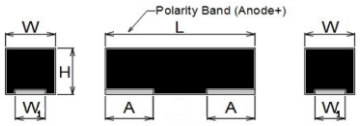
RoHS COMPLIANT

APPLICATIONS

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

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	P□	1A	106	M	8R	-	□□□
Type	**Case Size** See table above	**Rated DC Voltage** 0E = 2.5Vdc 0G = 4Vdc 0J = 6.3Vdc 1A = 10Vdc 1C = 16Vdc 1E = 25Vdc 1V = 35Vdc	**Capacitance Code** pF code: 1st two digits represent significant figures, 3rd digit represents multiplier (number of zeros to follow)	**Tolerance** M = ±20%	**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 +25ºC
Capacitance Range:	2.2µF to 330µF
Capacitance Tolerance:	±20%
Leakage Current DCL:	Please see the ratings and part number reference table below
Temperature Range:	-55ºC 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.

Downloaded from Arrow.com.

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(A),55(AS),70(AS),45(BL)	45(BL)				ā
150	157			200(A),25(BL),35(BL)					ē
220	227	35(BL)							j̄
330	337	20(BL)							n̄

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
TCTOAL0J476M8R-02	AL	47	6.3	105	29.7	10	200	548	3
TCTOAS0J476M8R	AS	47	6.3	105	29.7	10	200	548	3
TCTOA0J107M8R-ZS1	A	100	6.3	105	63.0	15	45	1500	3
TCTOA0J107M8R-ZS2	A	100	6.3	105	63.0	15	45	1500	3
TCTOA0J107M8R-ZW1	A	100	6.3	105	63.0	15	70	1000	3
TCTOA0J107M8R-ZW2	A	100	6.3	105	63.0	15	70	1000	3
TCTOAS0J107M8R-ZU1	AS	100	6.3	105	63.0	15	55	1000	3
TCTOAS0J107M8R-ZW1	AS	100	6.3	105	63.0	15	70	1134	3
TCTOAS0J107M8R-ZW2	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-ZK6	BL	150	6.3	105	84.5	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
TCTOM1A225M8R-02	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	8	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
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

Downloaded from Arrow.com.

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
35 Volt									
TCTOBL1V685M8R-ZF1	BL	6.8	35	105	47.6	10	150	800	3
TCTOBL1V685M8R-ZF5	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.

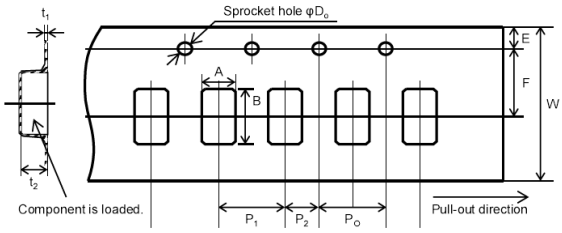
QUALIFICATION TABLE

<table>
<tr><th rowspan="2">TEST</th><th colspan="4">TCTO series (Temperature range -55°C to +105°C)</th></tr>
<tr><th colspan="2">Condition</th><th colspan="2">Characteristics</th></tr>
<tr><td rowspan="4">Endurance</td><td colspan="2" rowspan="4">Apply rated voltage (Ur) at 85°C (A, AL, AS, M, P case) or 105°C (BL case) for 1000hrs through a serial resistence of ≤3.0Ω.</td><td>Visual examination</td><td>no visible damage</td></tr>
<tr><td>DCL</td><td>4x initial limit (A, AL, AS, M, P case), 2x (BL case)</td></tr>
<tr><td>ΔC/C</td><td>within ±20% of initial value</td></tr>
<tr><td>DF</td><td>3x initial limit (A, AL, AS, M, P case), 1.5x (BL case)</td></tr>
<tr><td rowspan="4">Humidity</td><td colspan="2" rowspan="4">Store at 40±2°C (A, AL, AS, M, P case) or 60±2°C (BL case), 90-95% relative humidity for 500 hours.</td><td>Visual examination</td><td>no visible damage</td></tr>
<tr><td>DCL</td><td>3x initial limit (A, AL, AS, M, P case), 1.5x (BL case)</td></tr>
<tr><td>ΔC/C</td><td>within +30/-20% of initial value</td></tr>
<tr><td>DF</td><td>3x initial limit (A, AL, AS, M, P case), 1.5x (BL case)</td></tr>
<tr><td rowspan="5">Temperature Stability</td><td colspan="2" rowspan="5">Step | Temperature°C | Duration(min)
1 | -55 | 15
2 | +105 | 15</td><td></td><td>-55°C</td><td>+105°C</td></tr>
<tr><td>DCL</td><td>n/a</td><td>10xIL*</td></tr>
<tr><td>ΔC/C</td><td>0/-20%</td><td>+50/0% (A, AL, AS, M, P case)
+80/0% (BL case)</td></tr>
<tr><td>DF</td><td>IL*</td><td>IL*</td></tr>
<tr><td></td></tr>
<tr><td rowspan="4">Surge Voltage</td><td colspan="2" rowspan="4">Apply 1.3x rated voltage (Ur) at 85±2°C for 1000 cycles, duration 6 min (30 sec charge, 5 min 30 sec discharge) through a charge /discharge resistance of 1000Ω.</td><td>Visual examination</td><td colspan="2">no visible damage</td></tr>
<tr><td>DCL</td><td colspan="2">2x initial limit (A, AL, AS, M, P case), 1.5x (BL case)</td></tr>
<tr><td>ΔC/C</td><td colspan="2">±20% of initial limit</td></tr>
<tr><td>DF</td><td colspan="2">2x initial limit (A, AL, AS, M, P case), 1.5x (BL case)</td></tr>
<tr><td rowspan="4">Vibration</td><td colspan="2" rowspan="4">4.17 JIS C 5101-1
Frequency: 10 to 55 to 10Hz/min.
Amplitude: 1.5mm
Time: 2hours each in X and Y directions</td><td>Visual examination</td><td colspan="2">no visible damage</td></tr>
<tr><td>DCL</td><td colspan="2">initial limit</td></tr>
<tr><td>ΔC/C</td><td colspan="2">within ± 5% of initial value</td></tr>
<tr><td>DF</td><td colspan="2">initial limit</td></tr>
</table>

*Initial Limit
For use outside of recommended conditions and special request, please contact KYOCERA AVX.

Downloaded from Arrow.com.

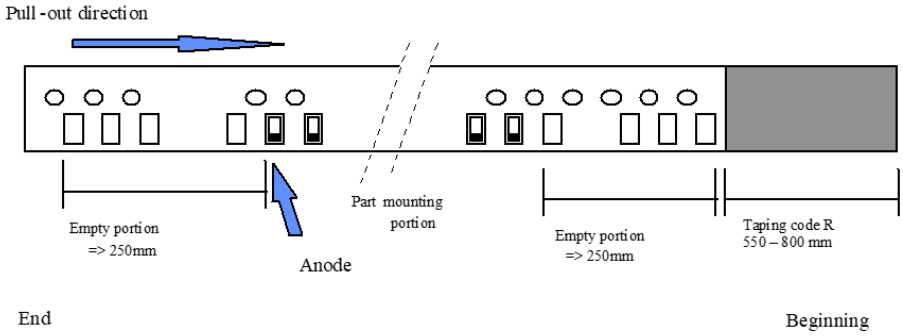
PACKAGING SPECIFICATIONS



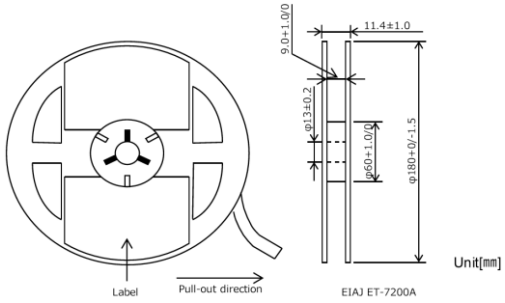
Unit (mm)

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

Polarity of parts: as indicated in the drawing below, the anodes (+) are at the right with respect to the direction of the tape pull out (on the opposite side to the feeding holes).



REEL DIMENSIONS



Downloaded from Arrow.com.