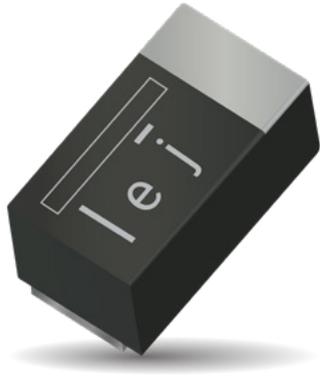


# TCTO Series

## 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

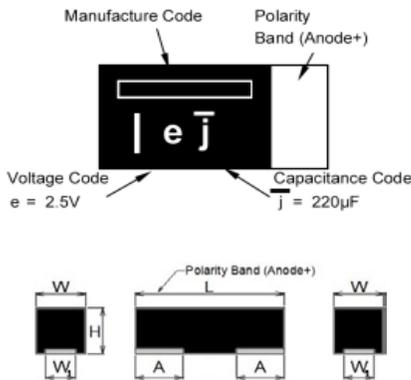


LEAD-FREE  
LEAD-FREE COMPATIBLE  
COMPONENT



RoHS  
COMPLIANT

### 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.

# TCTO Series

## Conductive Polymer Chip Capacitors (Large Capacitance)



### CAPACITANCE AND RATED VOLTAGE RANGE (LETTER DENOTES CASE SIZE)

Capacitance		Rated Voltage DC (V <sub>R</sub> ) @ 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
<b>2.5 Volt</b>									
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
<b>4 Volt</b>									
TCTOP0G476M8R-ZBR	P	47	4	105	18.8	15	100	671	3
TCTOAL0G107M8R	AL	100	4	105	40.0	10	200	775	3
<b>6.3 Volt</b>									
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
<b>10 Volt</b>									
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
<b>16 Volt</b>									
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
<b>25 Volt</b>									
TCTOBL1E156M8R-ZB1	BL	15	25	105	75.0	10	100	1000	3
TCTOBL1E226M8R-ZB1	BL	22	25	105	110.0	10	100	1000	3
<b>35 Volt</b>									
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	Apply rated voltage (Ur) 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)			
	1	-55	15	DCL	-55°C n/a +105°C	
	2	+105	15			
				ΔC/C	0/-20%	+50/0% (A, AL, AS, M, P case) +80/0% (BL case)
				DF	IL*	IL*
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	

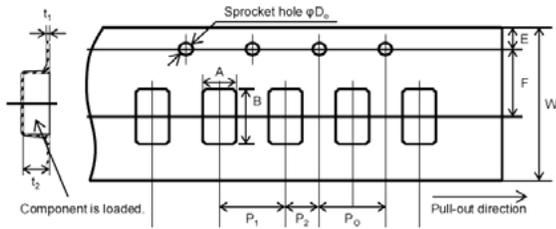
\*Initial Limit

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 $\pm$ 0.10	B $\pm$ 0.10	W $\pm$ 0.20	E $\pm$ 0.10	F $\pm$ 0.05	P1 $\pm$ 0.10	P2 $\pm$ 0.05	PO $\pm$ 0.10	DO+0.10/0	t1 $\pm$ 0.05	t2 $\pm$ 0.10	Standard Packaging quantity
A	1.90	3.50	8.00	1.75	3.50	4.00	2.00	4.00	$\phi$ 1.50	0.25	1.90	2,000 pcs
AS	2.05	3.65	8.00	1.75	3.50	4.00	2.00	4.00	$\phi$ 1.50	0.25	1.10	3,000 pcs
BL	3.20	3.80	8.00	1.75	3.50	4.00	2.00	4.00	$\phi$ 1.55 $\pm$ 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	$\phi$ 1.50	0.20	1.00	4,000 pcs
P	1.55	2.30	8.00	1.75	3.50	4.00	2.00	4.00	$\phi$ 1.55 $\pm$ 0.05	0.25	1.32	3,000 pcs

### REEL DIMENSIONS

