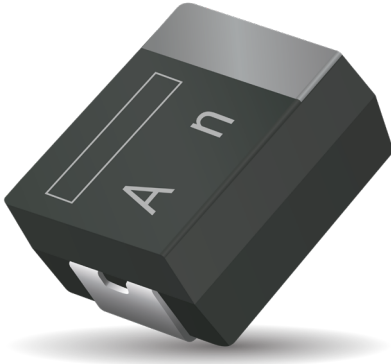


# TCO Series

## Conductive Polymer Chip Capacitors (Standard)



### FEATURES

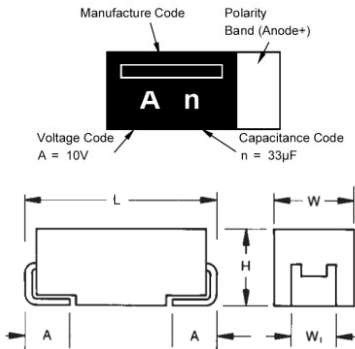
- Ta-polymer technology
- High ripple capability
- High CV
- Surge robust
- J-lead LF

### 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±0.30 (0.012)
B	1210	3528-21	3.50 (0.138)	2.80 (0.110)	1.90 (0.075)	1.90 (0.075)	0.80 (0.031)

### HOW TO ORDER

**TCO**

Type

**B**

Case Size  
See table  
above

**1A**

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

**336**

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:	15µF 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

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

Capacitance		Rated Voltage DC (V <sub>R</sub> ) @ 105°C					Cap Code
μF	Code	2.5V(e)	6.3V(j)	10V(A)	16V(C)	25V(E)	
15	156					100	e
22	226					90	j
33	336			150	100		n
47	476		150	150			s
100	107		35,45,150				ā
150	157		35,45,150				ē
220	227	35	35				j
330	337	35,45					n

Released ratings, (ESR ratings in mOhms)

Note: Voltage ratings are minimum values. KYOCERA AVX reserves the right to supply higher voltage 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>									
TCOB0E227M8R-EN1	B	220	2.5	105	55.0	8	35	1900	3
TCOB0E227M8R-EN2	B	220	2.5	105	55.0	8	35	1900	3
TCOB0E337M8R-EN1	B	330	2.5	105	82.5	15	35	1900	3
TCOB0E337M8R-EN2	B	330	2.5	105	82.5	15	35	1900	3
TCOB0E337M8R-ES1	B	330	2.5	105	82.5	15	45	1700	3
TCOB0E337M8R-ES2	B	330	2.5	105	82.5	15	45	1700	3
<b>6.3 Volt</b>									
TCOB0J476M8R	B	47	6.3	105	30.0	8	150	900	3
TCOB0J107M8R-EN1	B	100	6.3	105	63.0	8	35	1900	3
TCOB0J107M8R-EN2	B	100	6.3	105	63.0	8	35	1900	3
TCOB0J107M8R-ES1	B	100	6.3	105	63.0	8	45	1700	3
TCOB0J107M8R-ES2	B	100	6.3	105	63.0	8	45	1700	3
TCOB0J107M8R	B	100	6.3	105	63.0	8	150	900	3
TCOB0J157M8R-EN1	B	150	6.3	105	94.5	15	35	1900	3
TCOB0J157M8R-EN2	B	150	6.3	105	94.5	15	35	1900	3
TCOB0J157M8R-ES1	B	150	6.3	105	94.5	15	45	1700	3
TCOB0J157M8R-ES2	B	150	6.3	105	94.5	15	45	1700	3
TCOB0J157M8R	B	150	6.3	105	94.5	15	150	900	3
TCOB0J227M8R-EN1	B	220	6.3	105	139.0	15	35	1900	3
TCOB0J227M8R-EN2	B	220	6.3	105	139.0	15	35	1900	3
<b>10 Volt</b>									
TCOB1A336M8R	B	33	10	105	33.0	8	150	900	3
TCOB1A476M8R	B	47	10	105	47.0	8	150	900	3
<b>16 Volt</b>									
TCOB1C336M8R	B	33	16	105	159.0	10	100	1100	3
<b>25 Volt</b>									
TCOB1E156M8R	B	15	25	105	113.0	10	100	1100	3
TCOB1E156M8R-HB1	B	15	25	105	113.0	10	100	1100	3
TCOB1E226M8R-EB1	B	22	25	105	55.0	10	90	1200	3

Moisture Sensitivity Level (MSL) is defined according to J-STD-020.

All technical data relates to an ambient temperature of +25°C.

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.

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# TCO Series

## Conductive Polymer Chip Capacitors (Standard)

### QUALIFICATION TABLE

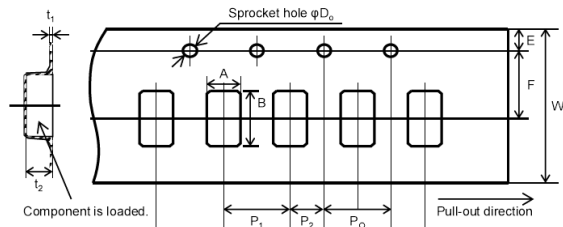
TEST	TCO series (Temperature range -55°C to +105°C)			
	Condition		Characteristics	
Endurance	Apply rated voltage (Ur) at 105°C for 1000hrs through a serial resistance of $\leq 3.0\Omega$ . Stabilize at room temperature for 24 hours before measuring.	Visual examination	no visible damage	
		DCL	2x initial limit	
		$\Delta C/C$	within $\pm 20\%$ of initial value	
		DF	1.5x initial limit	
Humidity	Store at $60\pm 2^\circ\text{C}$ , 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	1.5x initial limit	
		$\Delta C/C$	within $\pm 30/-20\%$ of initial value	
		DF	1.5x initial limit	
Temperature Stability	Step	Temperature $^\circ\text{C}$	Duration(min)	
	1	-55	15	
	2	+105	15	
Surge Voltage	Apply 1.3x rated voltage (Ur) at $85\pm 2^\circ\text{C}$ for 1000 cycles, 300sec charge and 30sec discharge resistance 1000 $\Omega$ .	Visual examination	no visible damage	
		DCL	initial limit	
		$\Delta C/C$	$\pm 20\%$ of initial limit	
		DF	initial limit	
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	
		$\Delta C/C$	within $\pm 5\%$ 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  $85^\circ\text{C}$  for 24 hours.

### PACKAGING SPECIFICATIONS

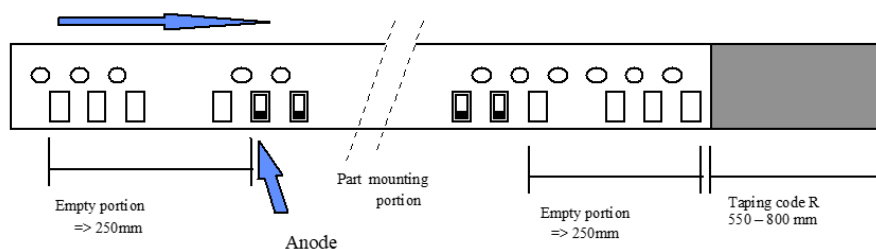


Unit (mm)

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 $\pm 0.10/0$	t1 $\pm 0.05$	t2 $\pm 0.10$	Standard packaging quantity
B	3.30	3.80	8.00	1.75	3.50	4.00	2.00	4.00	$\phi 1.50$	0.25	2.20	2,000 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).

Pull -out direction



End

Beginning

# TCO Series

## Conductive Polymer Chip Capacitors (Standard)

### REEL DIMENSIONS

