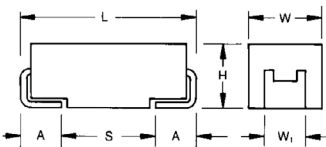


TCO Series
High Temperature Automotive Polymer Chip Capacitors

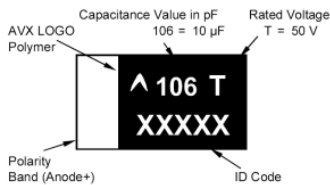


FEATURES

- Conductive Polymer Electrode
Benign Failure Mode Under Recommended Use Conditions
Robust Design for Automotive Applications
Meets Requirements of AEC-Q200
-55 to +150°C Operation Temperature
Humidity 85°C/85%RH, Vr, 1000 Hours
Basic Reliability 1%/1000hrs@85°C Vr with 60% Confidence Level
DCL 0.1 CV
3x reflow 260°C Compatible
100% Surge Current Tested



MARKING



APPLICATIONS

DC/DC converters, Telecommunication (coupling/decoupling), Industrial & special, Automotive (body electronics, cabin controls, infotainment, comfort, after market etc)
Not recommended for use of conductive polymer parts in high power applications. For more information please see AVX automotive application guide at avx.com (see the link: http://www.avx.com/docs/techinfo/ApplicationGuides/Automotive-Application-Guide.pdf), or contact manufacturer.

AVX's qualification of TCO capacitors meets requirements of AEC-Q200. TCO series is manufactured in an IATF 16949 certified facility.

CASE DIMENSIONS:

Table with 8 columns: 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) -0.20 (0.008), S Min. Rows include dimensions in millimeters and inches.

W1 dimension applies to the termination width for A dimensional area only.

HOW TO ORDER

Ordering code breakdown: TCO (Type), D (Case Size), 106 (Capacitance Code), M (Tolerance), 050 (Rated DC Voltage), # (Packaging), 0150 (ESR in mΩ), E (Additional Character).

TECHNICAL SPECIFICATIONS

Table with 2 columns: Technical Data and specifications. Rows include Capacitance Range (10 µF), Capacitance Tolerance (±20%), Leakage Current DCL (0.1CV), Temperature Range (-55°C to +150°C), and AEC-Q200 compliance.

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.



TCO Series

High Temperature Automotive Polymer Chip Capacitors



CAPACITANCE AND RATED VOLTAGE RANGE

(LETTER DENOTES CASE SIZE)

Capacitance		Rated Voltage DC (V _R) @ 105°C		
μF	Code	25V (E)	35V (V)	50V (T)
10	106			D(150)
15	156			
22	226			
33	336			

Released ratings, (ESR ratings in mOhms in parentheses)

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

RATINGS & PART NUMBER REFERENCE

AVX 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)					Humidity 85°C/85% RH, Vr (hrs)	MSL
								45°C	85°C	105°C	125°C	150°C		
50 Volt														
TCOD106M050#0150E	D	10	50	150	50	10	150	1225	857	551	306	184	1000	3

Moisture Sensivity 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 2.2 volts.

DCL is measured at rated voltage after 5 minutes.

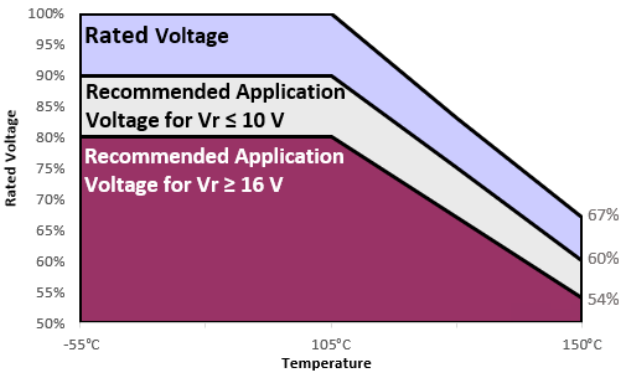
ESR allowed to move up to 1.25 times catalog limit post mounting.

For typical weight and composition see page 276.

RECOMMENDED DERATING FACTOR

Voltage and temperature derating as percentage of Vr

Rated voltage	Operating Temperature		
	≤85°C	105°C	150°C
≤10V	90%	90%	60%
≥16V	80%	80%	54%



TCO Series

High Temperature Automotive Polymer Chip Capacitors

QUALIFICATION TABLE

TEST	TCO series (Temperature range -55°C to 150°C)										
	Condition			Characteristics							
Endurance	Apply rated voltage (Ur) at 105°C for 2000hrs and 2/3 rated voltage (Ur) at 150°C for 1000 hours through a circuit impedance of ≤0.1Ω/V. Stabilize at room temperature for 1-2 hours before measuring.			Visual examination	no visible damage						
				DCL	2 x initial limit						
				ΔC/C	within +10/-20% of initial value						
				DF	2 x initial limit						
				ESR	2 x initial limit						
Storage Life	Store at 150°C, no voltage applied, for 1000 hours. Stabilize at room temperature for 1-2 hours before measuring.			Visual examination	no visible damage						
				DCL	2x initial limit						
				ΔC/C	within +10/-20% of initial value						
				DF	2 x initial limit						
				ESR	2 x initial limit						
Biased Humidity	Apply rated voltage (Ur) at 85°C, 85% relative humidity for 1000 hours. Stabilize at room temperature and humidity for 1-2 hours before measuring.			Visual examination	no visible damage						
				DCL	2 x initial limit						
				ΔC/C	within +35/-5% of initial value						
				DF	1.5 x initial limit						
				ESR	2 x initial limit						
Temperature Stability	Step	Temperature°C	Duration(min)		+20°C	-55°C	+20°C	+105°C	+150°C	+20°C	
	1	+20	15								
	2	-55	15	DCL	IL*	n/a	IL*	10 x IL*	12.5 x IL*	IL*	
	3	+20	15								
	4	+105	15	ΔC/C	n/a	±20%	±5%	±20%	±30%	±5%	
	5	+150	15								
	6	+20	15	DF	IL*	IL*	IL*	1.5 x IL*	1.5 x IL*	IL*	
Surge Voltage	Apply 1.3x 2/3x rated voltage (Ur) at 150°C for 1000 cycles, charge / discharge resistance 33Ω.			Visual examination	no visible damage						
				DCL	initial limit						
				ΔC/C	within +10/-20% of initial value for Vr ≤ 10V within +20/-30% of initial value for Vr ≥ 16V						
				DF	initial limit for Vr ≤ 10V 1.25x initial limit for Vr ≥ 16V						
				ESR	1.25 x initial limit						
Mechanical Shock	MIL-STD-202, Method 213, Condition F			Visual examination	no visible damage						
				DCL	initial limit						
				ΔC/C	within ±10% of initial value						
				DF	initial limit						
				ESR	1.25 x initial limit						
Vibration	MIL-STD-202, Method 204, Condition D			Visual examination	no visible damage						
				DCL	initial limit						
				ΔC/C	within ±10% of initial value						
				DF	initial limit						
				ESR	1.25 x initial limit						

*Initial Limit

For use outside of recommended conditions and special request, please contact AVX.

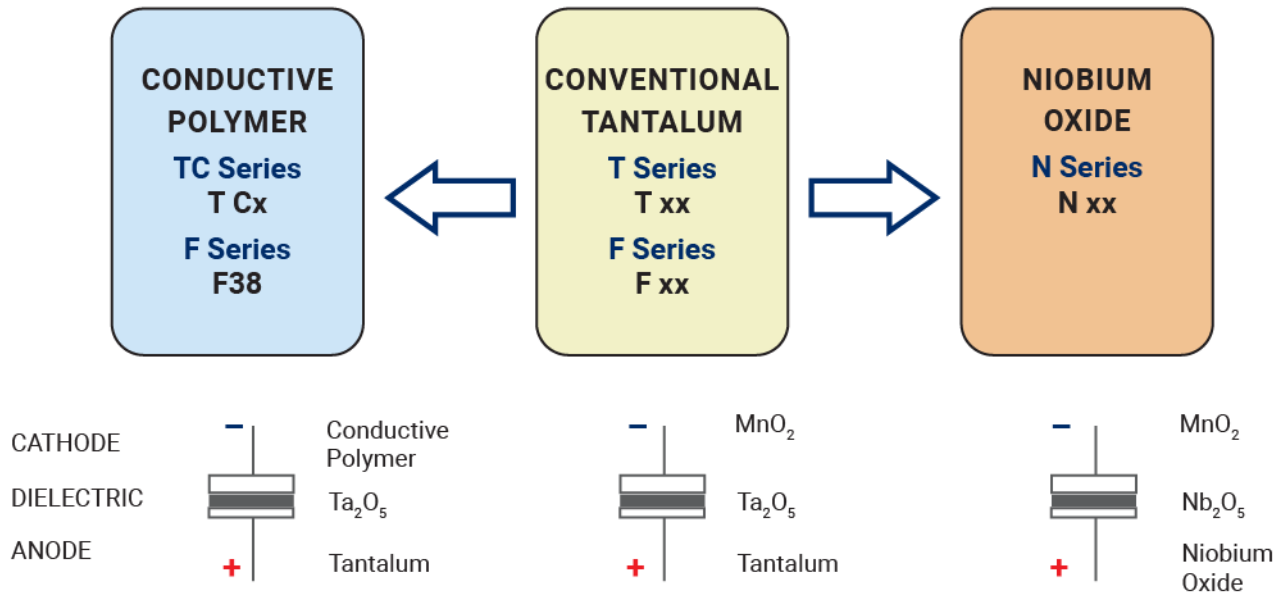
Initial measurement max. 1hr after the removal from dry pack or after pretreatment at 85°C for 24 hours.

TCO Series

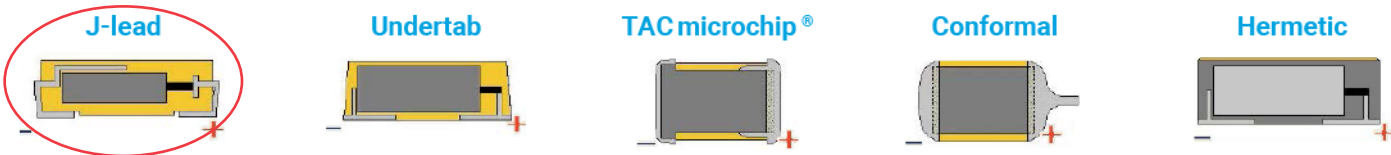
High Temperature Automotive Polymer Chip Capacitors



SOLID ELECTROLYTIC CAPACITOR ROADMAP



FIVE CAPACITOR CONSTRUCTION STYLES



SERIES LINE UP : Conductive Polymer

