

# TCB Series

## COTS-Plus Polymer Capacitor



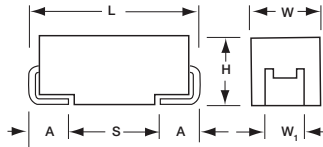
The TCB series is a COTS-Plus version of the professional grade TCR polymer series.

### FEATURES

- Robust design for long operation lifetime
- Statistical screening with Accelerated Ageing
- Surge testing level option
- Improved basic reliability 0.5%/1000hrs
- Humidity 85°C/85%RH, Vr, 500/1000 hours
- - 55 to +125°C operation temperature
- Shock and Vibration by MIL-STD-202
- DCL 0.1 CV
- 3x reflow 260°C compatible
- Benign failure mode under recommended use conditions



For RoHS compliant products, please select correct termination style.

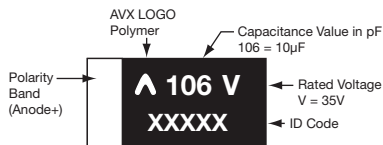


### APPLICATIONS

Long life time DC/DC converter applications in Telecommunications, Industrial, Avionics.

### MARKING

#### B, D, Y CASE



### CASE DIMENSIONS: millimeters (inches)

Code	EIA Code	EIA Metric	L±0.20 (0.008)	W+0.20 (0.008) -0.10 (0.004)	H+0.20 (0.008) -0.10 (0.004)	W <sub>1</sub> ±0.20 (0.008)	A+0.30 (0.012) -0.20 (0.008)	S Min.
B	1210	3528-21	3.50 (0.138)	2.80 (0.110)	1.90 (0.075)	2.20 (0.087)	0.80 (0.031)	1.40 (0.055)
D	2917	7343-31	7.30 (0.287)	4.30 (0.169)	2.90 (0.114)	2.40 (0.094)	1.30 (0.051)	4.40 (0.173)
Y	2917	7343-20	7.30 (0.287)	4.30 (0.169)	2.00 (0.079) max	2.40 (0.094)	1.30 (0.051)	4.40 (0.173)

W<sub>1</sub> dimension applies to the termination width for A dimensional area only.

### CAPACITANCE AND RATED VOLTAGE, V<sub>R</sub> (VOLTAGE CODE) RANGE (LETTER DENOTES CASE SIZE)

Capacitance		Rated Voltage							
µF	Code	2.5(e)	4V(G)	6.3V(J)	10V(A)	16V(C)	20V(D)	25V(E)	35V(V)
10	106								D(70)
15	156							D(70)	
22	226			B(70)	B(70)		D(70)		
33	336			B(70)	B(70)	D(70)	D(70)		
47	476			B(70)	B(70)	D(65)	D(70)		
68	686			B(70)	D(70)	D(70)			
100	107	B(70)	B(70)		D(55)				
150	157			D(40)	D(55)				
220	227		D(40), Y(40)	D(40)	D(35)				
330	337		D(40)	D(40)					
470	477		D(40)						

Released Ratings (ESR ratings in mOhms in parentheses)

Engineering samples – please contact AVX

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

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### HOW TO ORDER

#### AVX PART NUMBER:

TCB	D	107	M	010	C	R	S	Z	0	^	++	0
Type	Case Size	Capacitance Code	Tolerance	Rated DC Voltage	ESR	Packaging	Inspection Level	Reliability Grade	Qualification Level	Termination Finish	Surge Test Option	Additional Character
	See table on previous page	pF code: 1st two digits represent significant figures 3rd digit represents multiplier (number of zeros to follow)	M = ±20%	002 = 2.5Vdc 004 = 4Vdc 006 = 6.3Vdc 010 = 10Vdc 016 = 16Vdc 020 = 20Vdc 025 = 25Vdc 035 = 35Vdc	C = Std ESR L = Low ESR	R = 7" T&R	S = Standard Conformance	Z = Non-ER	0 = N/A	7 = 100% Tin H* = Sn/Pb Non RoHS	00 = Standard 23 = 10x Cycles, 25°C 24 = 10x Cycles, -55°C & +85°C	E = Black resin

\*Contact Manufacturer

### TECHNICAL SPECIFICATIONS

Technical Data:	All technical data relate to an ambient temperature of +25°C
Capacitance Range:	10µF to 470µF
Capacitance Tolerance:	±20%
Leakage Current DCL:	0.1CV
Temperature Range:	-55°C to +125°C
Basic Reliability:	0.5% per 1000 hours at 85°C, Vr with 0.1ΩV series impedance, 60% confidence level
Termination Finish:	Sn Plating or SnPb Plating (Non RoHS)

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 AVX Conductive Polymer Capacitor Guidelines for more information or contact factory for application assistance.

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### RATINGS & PART NUMBER REFERENCE

AVX Part No.	Case Size	Capacitance (μF)	Rated Voltage (V)	Maximum Operating Temperature (°C)	DCL Max. (μA)	DF Max. (%)	ESR Max. @ 100kHz (mΩ)	100kHz RMS Current (mA)				MSL	Humidity 85°C/85%RH, Vr (hrs)
								45°C	85°C	105°C	125°C		
<b>2.5 Volt</b>													
TCBB107M002CRSZ0^++E	B	100	2.5	125	25	8	70	1300	900	600	300	3	1000
<b>4 Volt</b>													
TCBB107M004CRSZ0^++E	B	100	4	125	40	8	70	1300	900	600	300	3	1000
TCBD227M004CRSZ0^++E	D	220	4	125	88	8	40	2400	1700	1100	600	3	1000
TCBY227M004CRSZ0^++E	Y	220	4	125	88	8	40	2200	1500	1000	600	3	500
TCBD337M004CRSZ0^++E	D	330	4	125	132	8	40	2400	1700	1100	600	3	1000
TCBD477M004CRSZ0^++E	D	470	4	125	188	8	40	2400	1700	1100	600	3	1000
<b>6.3 Volt</b>													
TCBB226M006CRSZ0^++E	B	22	6.3	125	13	8	70	1300	900	600	300	3	1000
TCBB336M006CRSZ0^++E	B	33	6.3	125	19	8	70	1300	900	600	300	3	1000
TCBB476M006CRSZ0^++E	B	47	6.3	125	28	8	70	1300	900	600	300	3	1000
TCBB686M006CRSZ0^++E	B	68	6.3	125	40.8	8	70	1300	900	600	300	3	1000
TCBD157M006CRSZ0^++E	D	150	6.3	125	90	8	40	2400	1700	1100	600	3	1000
TCBD227M006CRSZ0^++E	D	220	6.3	125	132	8	40	2400	1700	1100	600	3	1000
TCBD337M006CRSZ0^++E	D	330	6.3	125	198	8	40	2400	1700	1100	600	3	1000
<b>10 Volt</b>													
TCBB226M010CRSZ0^++E	B	22	10	125	22	8	70	1300	900	600	300	3	1000
TCBB336M010CRSZ0^++E	B	33	10	125	33	8	70	1300	900	600	300	3	1000
TCBB476M010CRSZ0^++E	B	47	10	125	47	8	70	1300	900	600	300	3	1000
TCBD686M010CRSZ0^++E	D	68	10	125	68	8	70	1800	1300	800	500	3	1000
TCBD107M010CRSZ0^++E	D	100	10	125	100	8	55	2000	1400	900	500	3	1000
TCBD157M010CRSZ0^++E	D	150	10	125	150	8	55	2000	1400	900	500	3	1000
TCBD227M010CRSZ0^++E	D	220	10	125	220	8	35	2500	1800	1100	600	3	1000
<b>16 Volt</b>													
TCBD336M016CRSZ0^++E	D	33	16	125	52	8	70	1800	1300	800	500	3	1000
TCBD476M016CRSZ0^++E	D	47	16	125	75	8	65	1900	1300	900	500	3	1000
TCBD686M016CRSZ0^++E	D	68	16	125	109	8	70	1800	1300	800	500	3	1000
<b>20 Volt</b>													
TCBD226M020CRSZ0^++E	D	22	20	125	44	8	70	1800	1300	800	500	3	1000
TCBD336M020CRSZ0^++E	D	33	20	125	66	8	70	1800	1300	800	500	3	1000
TCBD476M020CRSZ0^++E	D	47	20	125	94	8	70	1800	1300	800	500	3	1000
<b>25 Volt</b>													
TCBD156M025CRSZ0^++E	D	15	25	125	37	8	70	1800	1300	800	500	3	1000
<b>35 Volt</b>													
TCBD106M035CRSZ0^++E	D	10	35	125	35	8	70	1800	1300	800	500	3	1000

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, 0.5V RMS with a maximum DC bias of 2.2 volts. DCL is measured at rated voltage after 5 minutes.

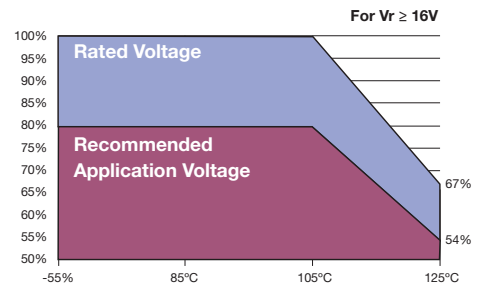
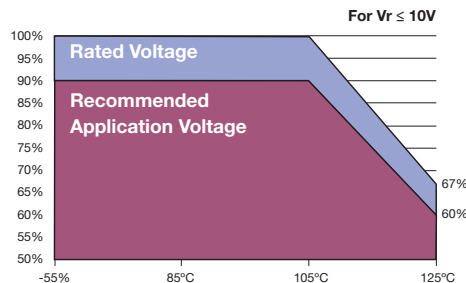
ESR allowed to move up to 1.25 times catalog limit post mounting.

**NOTE: AVX reserves the rights to supply higher voltage rating or tighter tolerance part in the same case size, to the same reliability standards.**

### RECOMMENDED DERATING FACTOR

Voltage and temperature derating as percentage of Vr.

Rated voltage	Operating Temperature		
	≤85°C	105°C	125°C
≤10V	90%	90%	60%
≥16V	80%	80%	54%



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### QUALIFICATION TABLE

TEST	TCB series (Temperature range -55°C to +125°C)									
	Condition			Characteristics						
<b>Endurance</b>	Determine after application of rated voltage for 2000 +48/-0 hours at 105±2°C. Also determine after application of 125°C temperature, 2/3 rated voltage for 2000 +48/-0 hours. After test leaving 1-2 hours at room temperature. Power supply impedance to be ≤ 0.1Ω/V.			Visual examination	no visible damage					
				DCL	1.25 x initial limit					
				ΔC/C	within +10/-20% of initial value					
				DF	initial limit					
				ESR	2 x initial limit					
<b>Storage Life</b>	125°C, 0V, 2000h			Visual examination	no visible damage					
				DCL	2 x initial limit					
				ΔC/C	within +10/-20% of initial value					
				DF	initial limit					
				ESR	2 x initial limit					
<b>Biased Humidity</b>	Determine after leaving for 500 or 1000 hours at 85±2°C, 85% relative humidity and rated voltage and then recovery 1-2 hours at room temperature.			Visual examination	no visible damage					
				DCL	3 x initial limit					
				ΔC/C	within +35/-5% of initial value					
				DF	initial limit					
				ESR	2 x initial limit					
<b>Temperature Stability</b>	Step	Temperature°C	Duration (min)							
	1	+20±2	15	+20°C	-55°C	+20°C	+85°C	+125°C	+20°C	
	2	-55+0/-3	15	DCL	IL*	n/a	IL*	10 x IL*	12.5 x IL*	IL*
	3	+20±2	15							
	4	+85+3/-0	15	ΔC/C	n/a	+0/-20%	±5%	+20/-0%	+30/-0%	±5%
	5	+125+3/-0	15	DF	IL*	1.5 x IL*	IL*	1.5 x IL*	2 x IL*	IL*
	6	+20±2	15							
<b>Surge Voltage</b>	Test temperature: 125°C+3/0°C Surge voltage: 1.3 x 2/3 rated voltage Charge/Discharge resistance: 1000±100Ω Number of cycles: 1000x Cycle duration: 6min; 30 sec charge, 5min 30 sec discharge			Visual examination	no visible damage					
				DCL	initial limit					
				ΔC/C	within +5/-20% of initial value					
				DF	initial limit					
				ESR	1.25 x initial Limit					
<b>Mechanical Shock/Vibration</b>	MIL-STD-202, Method 213, Condition I, 100 G peak MIL-STD-202, Method 204, Condition D, 10 Hz to 2,000 Hz, 20 G peak			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 manufacturer.  
Initial measurement max. 1hr after the removal from dry pack or after pretreatment at 85°C for 24 hours.