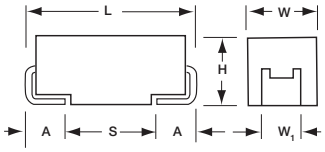
TCB SERIES

COTS-Plus Polymer Capacitor



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

LEAD-FREE
LEAD-FREE COMPATIBLE COMPONENT

RoHS COMPLIANT

For RoHS compliant products, please select correct termination style.

FEATURES

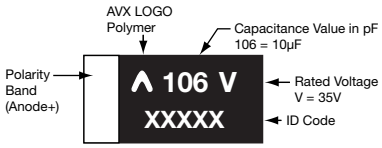
- Robust design for long operation lifetime
- Statistical screening with Accelerated Ageing
- Surge testing level option
- Improved basic reliability 0.5%/1000hrs
- Humidity 85°C/85%RH, Vr, 500/1000 hours
- - 55 to +125°C operation temperature
- Shock and Vibration by MIL-STD-202
- DCL 0.1 CV
- 3x reflow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

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_1±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_1 dimension applies to the termination width for A dimensional area only.								

CAPACITANCE AND RATED VOLTAGE, V_R (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)	50V(T)
10	106						B(150)		D(70)	D(120)
15	156					B(90)	B(150)	D(70)		
22	226			B(70)	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

TCB SERIES

COTS-Plus Polymer Capacitor

HOW TO ORDER

AVX PART NUMBER:

TCB	D	107	M	010	C	R	S	Z	0	^	++	E
Type	**Case Size** See table on previous page	**Capacitance Code** pF code: 1st two digits represent significant figures 3rd digit represents multiplier (number of zeros to follow)	**Tolerance** M = ±20%	**Rated DC Voltage** 002 = 2.5Vdc 004 = 4Vdc 006 = 6.3Vdc 010 = 10Vdc 016 = 16Vdc 020 = 20Vdc 025 = 25Vdc 035 = 35Vdc 050 = 50Vdc	**ESR** C = Std ESR L = Low ESR	**Packaging** R = 7" T&R	**Inspection Level** S = Standard Conformance	**Reliability Grade** Z = Non-ER	**Qualification Level** 0 = N/A	**Termination Finish** 7 = 100% Tin H* = Sn/Pb Non RoHS *Contact Manufacturer	**Surge Test Option** 00 = Standard 23 = 10x Cycles, 25°C 24 = 10x Cycles, -55ºC & +85ºC	**Additional Character** E = Black resin

TECHNICAL SPECIFICATIONS

Technical Data:	All technical data relate to an ambient temperature of +25ºC
Capacitance Range:	10µF to 470µF
Capacitance Tolerance:	±20%
Leakage Current DCL:	0.1CV
Temperature Range:	-55ºC to +125°C
Basic Reliability:	0.5% per 1000 hours at 85ºC, Vr with 0.1Ω 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.

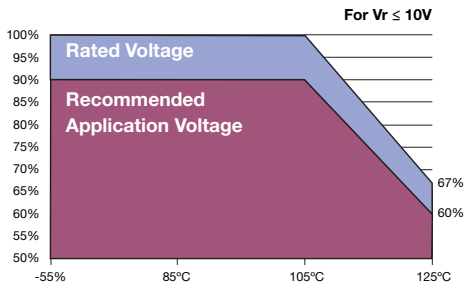
RATINGS & PART NUMBER REFERENCE

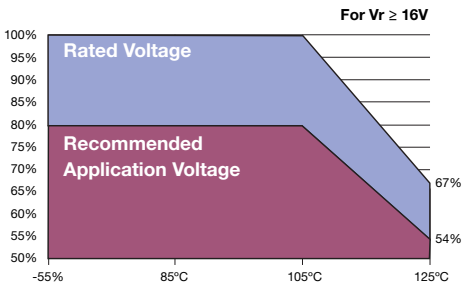
AVX Part No.	Case Size	Capacitance (µF)	Rated Voltage (V)	Maximum Operating Temperature (°C)	DCL Max. (µA)	DF Max. (%)	ESR Max. @ 100kHz (mΩ)	100kHz RMS Current (mA)				MSL	Humidity 85°C/ 85%RH, Vr (hrs)
								45°C	85°C	105°C	125°C		
2.5 Volt													
TCBB107M002CRSZ0^++E	B	100	2.5	125	25	8	70	1300	900	600	300	3	1000
4 Volt													
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
6.3 Volt													
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
10 Volt													
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
16 Volt													
TCBB156M016CRSZ0^++E	B	15	16	125	24	8	90	1200	800	500	300	3	1000
TCBB226M016CRSZ0^++E	B	22	16	125	35.2	8	70	1300	900	600	300	3	1000
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
20 Volt													
TCBB106M020CRSZ0^++E	B	10	20	125	20	8	150	900	600	400	200	3	1000
TCBB156M020CRSZ0^++E	B	15	20	125	30	8	150	900	600	400	200	3	1000
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
25 Volt													
TCBD156M025CRSZ0^++E	D	15	25	125	37	8	70	1800	1300	800	500	3	1000
35 Volt													
TCBD106M035CRSZ0^++E	D	10	35	125	35	8	70	1800	1300	800	500	3	1000
50 Volt													
TCBD106M050CRSZ0^++E	D	10	50	125	50	10	120	1400	1000	600	400	3	1000

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%





QUALIFICATION TABLE

TEST	TCB series (Temperature range -55°C to +125°C)											
	Condition			Characteristics								
Endurance	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							
Storage Life	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							
Biased Humidity	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							
Temperature Stability	**Step**	**Temperature°C**	**Duration (min)**		**+20°C**	**-55°C**	**+20°C**	**+85°C**	**+125°C**	**+20°C**		
	1	+20±2	15	**DCL**	IL*	n/a	IL*	10 x IL*	12.5 x IL*	IL*		
	2	-55+0/-3	15									
	3	+20±2	15	**ΔC/C**	n/a	+0/-20%	±5%	+20/-0%	+30/-0%	±5%		
	4	+85+3/-0	15									
	5	+125+3/-0	15	**DF**	IL*	1.5 x IL* I	IL*	1.5 x IL*	2 x IL*	IL*		
	6	+20±2	15									
Surge Voltage	Test temperature: 125°C+3/0°C Surge voltage: 1.3 x2/3 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							
Mechanical Shock/Vibration	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.

IMPORTANT INFORMATION/DISCLAIMER

All product specifications, statements, information and data (collectively, the "Information") in this datasheet or made available on the website are subject to change. The customer is responsible for checking and verifying the extent to which the Information contained in this publication is applicable to an order at the time the order is placed. All Information given herein is believed to be accurate and reliable, but it is presented without guarantee, warranty, or responsibility of any kind, expressed or implied.

Statements of suitability for certain applications are based on AVX's knowledge of typical operating conditions for such applications, but are not intended to constitute and AVX specifically disclaims any warranty concerning suitability for a specific customer application or use.

ANY USE OF PRODUCT OUTSIDE OF SPECIFICATIONS OR ANY STORAGE OR INSTALLATION INCONSISTENT WITH PRODUCT GUIDANCE VOIDS ANY WARRANTY.

The Information is intended for use only by customers who have the requisite experience and capability to determine the correct products for their application. Any technical advice inferred from this Information or otherwise provided by AVX with reference to the use of AVX's products is given without regard, and AVX assumes no obligation or liability for the advice given or results obtained.

Although AVX designs and manufactures its products to the most stringent quality and safety standards, given the current state of the art, isolated component failures may still occur. Accordingly, customer applications which require a high degree of reliability or safety should employ suitable designs or other safeguards (such as installation of protective circuitry or redundancies) in order to ensure that the failure of an electrical component does not result in a risk of personal injury or property damage.

Unless specifically agreed to in writing, AVX has not tested or certified its products, services or deliverables for use in high risk applications including medical life support, medical device, direct physical patient contact, water treatment, nuclear facilities, weapon systems, mass and air transportation control, flammable environments, or any other potentially life critical uses. Customer understands and agrees that AVX makes no assurances that the products, services or deliverables are suitable for any high-risk uses. Under no circumstances does AVX warrant or guarantee suitability for any customer design or manufacturing process.

Although all product–related warnings, cautions and notes must be observed, the customer should not assume that all safety measures are indicted or that other measures may not be required.