

TCR Series



Professional Tantalum Chip Capacitor with Conductive Polymer Electrode



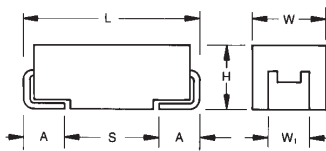
FEATURES

- Conductive polymer electrode reduces ignition failure mode
- Robust design for long operation lifetime
- AVX maverick part control Q-process with statistical screening
- Improved basic reliability 0.5%/1000hrs
- 85°C/85r.h. 120 hours
- -55 to +105°C operation temperature
- DCL 0.1 CxV, 0.05CV on selected codes
- 3x reflow 260°C compatible
- Low ESR



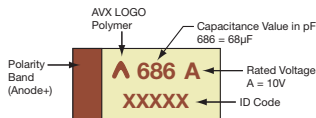
APPLICATIONS

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



MARKING

B, C, D, E 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)
C	2312	6032-28	6.00 (0.236)	3.20 (0.126)	2.60 (0.102)	2.20 (0.087)	1.30 (0.051)	2.90 (0.114)
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)
E	2917	7343-43	7.30 (0.287)	4.30 (0.169)	4.10 (0.162)	2.40 (0.094)	1.30 (0.051)	4.40 (0.173)

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

*Codes under development

HOW TO ORDER

TCR

Type

D

Case Size
See table above

476

Capacitance Code
pF code: 1st two digits represent significant figures, 3rd digit represents multiplier (number of zeros to follow)

M

Tolerance
M = ±20%

016

Rated DC Voltage
010 = 10Vdc
016 = 16Vdc

#

Packaging
R = Pure Tin 7" Reel
S = Pure Tin 13" Reel
H = Tin Lead 7" Reel (contact manufacturer)
K = Tin Lead 13" Reel (contact manufacturer)

0070

ESR in mΩ

J

DCL
J = 0.1CV
G = 0.05CV*

* selected codes

TECHNICAL SPECIFICATIONS

Technical Data:

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

Capacitance Range: 0.47 µF to 100 µF

Capacitance Tolerance: ±20%

Leakage Current DCL: (J) 0.1CV, (G) 0.05CV on selected codes

Rated Voltage (V _R)	≤ +105°C:	10	16	20	25	35	50	63
Surge Voltage (V _S)	≤ +85°C:	13	21	26	33	46	65	82
Surge Voltage (V _S)	≤ +105°C:	10	16	20	25	35	50	63

Temperature Range: -55°C to +105°C

Reliability: 0.5% per 1000 hours at 85°C, V_R with 0.1Ω/V series impedance, 60% confidence level



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CAPACITANCE AND RATED VOLTAGE RANGE (LETTER DENOTES CASE SIZE)

Capacitance		Rated Voltage DC (V _R) to 105°C						
μF	Code	10V (A)	16V (C)	20V (D)	25V (E)	35V (V)	50V (T)	63V (J)
0.47	474							B(400)*
0.68	684						B(400)*	B(300)*
1	105						B(300)*	
1.5	155					B(250)*		
2.2	225					B(250)*		C(200)*
3.3	335					B(250)*	C(200)*	C(200)*
4.7	475					C(200)*	D(150)*	
6.8	685					C(200)*		
10	106				B(200)*	C(200)*		
15	156	B(300)*	B(300)*					
22	226	B(300)*	B(200)*		D(100)*			
33	336	B(200)*			D(100)*			
47	476		D(70)	D(70)*				
68	686	D(70)	D(70)*					
100	107	D(70)*						

Available Ratings, (ESR ratings in mOhms in brackets)

Engineering samples - please contact manufacturer

*Codes under development – subject to change

Note: Voltage ratings are minimum values. AVX reserves the right to supply higher 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)	Rated Temperature (°C)	DCL (μA) Max	DF % Max	ESR Max (mΩ) @100kHz	MSL	100kHz RMS Current (mA)			
									25°C	85°C	105°C	125°C
10 Volt to 105°C												
TCRD686M010#0070J	D	68	10	105	68	6	70	3	1800	1300	800	-
16 Volt to 105°C												
TCRD476M016#0070J	D	47	16	105	75	6	70	3	1800	1300	800	-

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 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 216.

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



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QUALIFICATION TABLE

TEST	TCR series (Temperature range -55°C to +105°C)										
	Condition			Characteristics							
Endurance	Determine after application of rated voltage for 2000 +48/-0 hours at 85±2°C and then leaving 1-2 hours at room temperature. Also determine after application of 105°C temperature, rated voltage for 2000 +48/-0 hours and then leaving 1-2 hours at room temperature. Power supply impedance to be $0.1\Omega/V$.			Visual examination	no visible damage						
				DCL	1.25 x initial limit						
				$\Delta C/C$	within +20/-30% of initial value						
				DF	1.5 x initial limit						
				ESR	2 x initial limit						
Storage Life	105°C, 0V, 2000h			Visual examination	no visible damage						
				DCL	1.25 x initial limit						
				$\Delta C/C$	within ±20% of initial value						
				DF	1.5 x initial limit						
				ESR	2 x initial limit						
Humidity	Determine after storage without applied voltage at 65±2°C and 95±2% relative humidity for 500 hours and then recovery 1-2 hours at room temperature.			Visual examination	no visible damage						
				DCL	3 x initial limit						
				$\Delta C/C$	within +30/-20% of initial value						
				DF	1.5 x initial limit						
				ESR	2 x initial limit						
Biased Humidity	Determine after leaving for 120 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						
				$\Delta C/C$	within +30/-20% 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	+85°C	+105°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		$\Delta C/C$	n/a	+0/-20%	±5%	+20/-0%	+30/-0%	±5%
	3	+20±2	15			DF	IL*	1.5 x IL*	IL*	1.5 x IL*	2 x IL*
	4	+85+3/-0	15								
	5	+105+3/-0	15								
	6	+20±2	15								
Surge Voltage	Test temperature: 105°C±3/0°C Test voltage: Rated voltage at 105°C Surge voltage: 1.3 x rated voltage at 105°C Series protection resistance 1000±100Ω Discharge resistance: 1000Ω Number of cycles: 1000x Cycle duration: 6 min; 30 sec charge, 5 min 30 sec discharge			Visual examination	no visible damage						
				DCL	initial limit						
				$\Delta C/C$	within +20/-30% of initial value						
				DF	1.25 x initial limit						

*Initial Limit



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