TCR Series

Professional Tantalum Chip Capacitor with Conductive Polymer Electrode

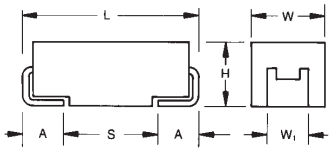
FEATURES

- 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

RoHS COMPLIANT

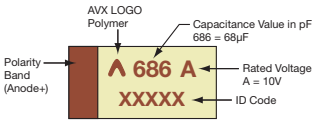
APPLICATIONS

- 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	D	476	M	016	#	0070	J
Type	**Case Size** See table above	**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** 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)	**ESR in mΩ**	**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.

QUALIFICATION TABLE

<table>
<tr><th rowspan="2">TEST</th><th colspan="4">TCR series (Temperature range -55ºC to +105ºC)</th></tr>
<tr><th colspan="2">Condition</th><th colspan="2">Characteristics</th></tr>
<tr><td>Endurance</td><td colspan="2">Determine after application of rated voltage for 2000 +48/-0 hours at 85±2ºC and then leaving 1-2 hours at room temperature. Also determine after application of 105ºC temperature, rated voltage for 2000 +48/-0 hours and then leaving 1-2 hours at room temperature. Power supply impedance to be ≤0.1Ω/V.</td><td>Visual examination
DCL
ΔC/C
DF
ESR</td><td>no visible damage
1.25 x initial limit
within +20/-30% of initial value
1.5 x initial limit
2 x initial limit</td></tr>
<tr><td>Storage Life</td><td colspan="2">105ºC, 0V, 2000h</td><td>Visual examination
DCL
ΔC/C
DF
ESR</td><td>no visible damage
1.25 x initial limit
within ±20% of initial value
1.5 x initial limit
2 x initial limit</td></tr>
<tr><td>Humidity</td><td colspan="2">Determine after storage without applied voltage at 65±2ºC and 95±2% relative humidity for 500 hours and then recovery 1-2 hours at room temperature.</td><td>Visual examination
DCL
ΔC/C
DF
ESR</td><td>no visible damage
3 x initial limit
within +30/-20% of initial value
1.5 x initial limit
2 x initial limit</td></tr>
<tr><td>Biased Humidity</td><td colspan="2">Determine after leaving for 120 hours at 85±2ºC, 85% relative humidity and rated voltage and then recovery 1-2 hours at room temperature.</td><td>Visual examination
DCL
ΔC/C
DF
ESR</td><td>no visible damage
3 x initial limit
within +30/-20% of initial value
1.5 x initial limit
2 x initial limit</td></tr>
<tr><td>Temperature Stability</td><td colspan="2"><table><tr><th>Step</th><th>Temperature°C</th><th>Duration(min)</th></tr><tr><td>1</td><td>+20±2</td><td>15</td></tr><tr><td>2</td><td>-55+0/-3</td><td>15</td></tr><tr><td>3</td><td>+20±2</td><td>15</td></tr><tr><td>4</td><td>+85+3/-0</td><td>15</td></tr><tr><td>5</td><td>+105+3/-0</td><td>15</td></tr><tr><td>6</td><td>+20±2</td><td>15</td></tr></table></td><td colspan="2"><table><tr><th></th><th>+20ºC</th><th>-55ºC</th><th>+20ºC</th><th>+85ºC</th><th>+105ºC</th><th>+20ºC</th></tr><tr><td>DCL</td><td>IL*</td><td>n/a</td><td>IL*</td><td>10 x IL*</td><td>12.5 x IL*</td><td>IL*</td></tr><tr><td>ΔC/C</td><td>n/a</td><td>+0/-20%</td><td>±5%</td><td>+20/-0%</td><td>+30/-0%</td><td>±5%</td></tr><tr><td>DF</td><td>IL*</td><td>1.5 x IL*</td><td>IL*</td><td>1.5 x IL*</td><td>2 x IL*</td><td>IL*</td></tr></table></td></tr>
<tr><td>Surge Voltage</td><td colspan="2">Test temperature: 105ºC+3/0ºC
Test voltage: Rated voltage at 105ºC
Surge voltage: 1.3 x rated voltage at 105ºC
Series protection resistance 1000±100Ω
Discharge resistance: 1000Ω
Number of cycles: 1000x
Cycle duration: 6 min; 30 sec charge,
5 min 30 sec discharge</td><td>Visual examination
DCL
ΔC/C
DF</td><td>no visible damage
initial limit
within +20/-30% of initial value
1.25 x initial limit</td></tr>
</table>

*Initial Limit

Общество с ограниченной ответственностью «МосЧип» ИНН 7719860671 / КПП 771901001
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