

TPS Series

Low ESR



FEATURES

- Low ESR series of robust MnO₂ solid electrolyte capacitors
- CV range: 0.15-1500µF / 2.5-50V
- 14 case sizes available
- Power supply applications



LEAD-FREE

LEAD-FREE COMPATIBLE COMPONENT



RoHS COMPLIANT

SnPb termination option is not RoHS compliant.

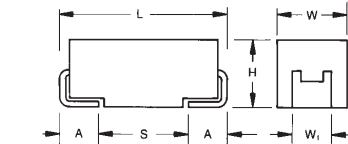
APPLICATIONS

- General medium power DC/DC convertors

CASE DIMENSIONS: millimeters (inches)

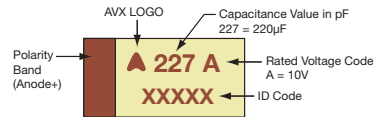
Code	EIA Code	EIA Metric	L±0.20 (0.008)	W+0.20 (0.008) -0.10 (0.004)	H+0.20 (0.008) -0.10 (0.004)	W ₁ ±0.20 (0.008)	A+0.30 (0.012) -0.20 (0.008)	S Min.
A	1206	3216-18	3.20 (0.126)	1.60 (0.063)	1.60 (0.063)	1.20 (0.047)	0.80 (0.031)	1.10 (0.043)
B	1210	3528-21	3.50 (0.138)	2.80 (0.110)	1.90 (0.075)	2.20 (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)
F	2312	6032-20	6.00 (0.236)	3.20 (0.126)	2.00 (0.079) max.	2.20 (0.087)	1.30 (0.051)	2.90 (0.114)
P	0805	2012-15	2.05 (0.081)	1.35 (0.053)	1.50 (0.059) max.	1.00±0.10 (0.039±0.004)	0.50 (0.020)	0.85 (0.033)
R	0805	2012-12	2.05 (0.081)	1.30 (0.051)	1.20 (0.047) max.	1.00±0.10 (0.039±0.004)	0.50 (0.020)	0.85 (0.033)
S	1206	3216-12	3.20 (0.126)	1.60 (0.063)	1.20 (0.047) max.	1.20 (0.047)	0.80 (0.031)	1.10 (0.043)
T	1210	3528-12	3.50 (0.138)	2.80 (0.110)	1.20 (0.047) max.	2.20 (0.087)	0.80 (0.031)	1.40 (0.055)
V	2924	7361-38	7.30 (0.287)	6.10 (0.240)	3.55 (0.140)	3.10 (0.120)	1.30 (0.051)	4.40 (0.173)
W	2312	6032-15	6.00 (0.236)	3.20 (0.126)	1.50 (0.059) max.	2.20 (0.087)	1.30 (0.051)	2.90 (0.114)
X	2917	7343-15	7.30 (0.287)	4.30 (0.169)	1.50 (0.059) max.	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)

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

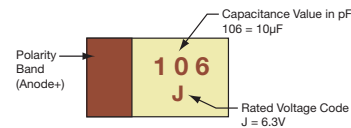


MARKING

A, B, C, D, E, F, S, T, V, W, X, Y CASE



P, R CASE



HOW TO ORDER

TPS	C	107	M	010	R	0100	-
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 K = ±10% 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	Packaging R = Pure Tin 7" Reel S = Pure Tin 13" Reel A = Gold Plating 7" Reel B = Gold Plating 13" Reel H = Tin Lead 7" Reel (Contact Manufacturer) K = Tin Lead 13" Reel (Contact Manufacturer) H, K = Non RoHS	ESR in mΩ	Additional characters may be added for special requirements V = Dry pack Option (selected codes only)

TECHNICAL SPECIFICATIONS

Technical Data:	All technical data relate to an ambient temperature of +25°C									
Capacitance Range:	0.15 µF to 1500 µF									
Capacitance Tolerance:	±10%; ±20%									
Rated Voltage (V _R)	≤ +85°C:	2.5	4	6.3	10	16	20	25	35	50
Category Voltage (V _C)	≤ +125°C:	1.7	2.7	4	7	10	13	17	23	33
Surge Voltage (V _S)	≤ +85°C:	3.3	5.2	8	13	20	26	32	46	65
Surge Voltage (V _S)	≤ +125°C:	2.2	3.4	5	8	13	16	20	28	40
Temperature Range:	-55°C to +125°C									
Environmental Classification:	55/125/56 (IEC 68-2)									
Reliability:	1% per 1000 hours at 85°C, V _R with 0.1Ω/V series impedance, 60% confidence level									
Termination Finished:	Sn Plating (standard), Gold and SnPb Plating upon request									
	For AEC-Q200 availability, please contact AVX									



CAPACITANCE AND RATED VOLTAGE RANGE (LETTER DENOTES CASE SIZE)

Capacitance		Rated Voltage DC (V _R) to 85°C								
µF	Code	2.5V (e)	4V (G)	6.3V (J)	10V (A)	16V (C)	20V (D)	25V (E)	35V (V)	50V (T)
0.15	154									A(9000)
0.22	224								A(6000)	A(7000)
0.33	334								A(6000)	A(7000)
0.47	474							A(7000)	A(6000) B(4000)	A(6500), B(6000) C(2300)
0.68	684							A(6000)	A(6000)	B(4000)
1.0	105				R(9000)	A(6200)	A(3000), R(6000) S(6000), T(2000)	A(4000) R(2500,4000)	A(3000) B(2000)	A(3000) C(2500)
1.5	155						A(3000)	A(3000) B(1800)	A(3000) B(2500)	C(1500,2000)
2.2	225			R(7000)	A(1800)	A(1800,3500) T(2000)	A(3000), B(1700)	A(2500) B(1300)	A(1500), B(750), 1500,2000, C(1000)	C(1500) D(1200)
3.3	335			A(2100)	T(1500)	A(3500), B(2500)	A(2500) B(1300)	A(1000,1500) B(750,1500,2000)	B(1000) C(700)	C(1000) D(800)
4.7	475			S(4000)	A(1400), B(1400) R(3000,5000)	A(2000) B(800,1500)	A(1800) B(750,1000)	B(700,900,1500) C(700)	B(700,1500) C(600), D(700)	C(800) D(250,300,500,700) X(500)
6.8	685			A(1800)	A(1800), B(1300) T(1800)	A(1500) B(600,1200)	A(1000) B(600,1000) C(700)	B(700) C(500,600,700)	C(350) D(150,400,500)	D(200, 300, 500,600)
10	106		R(3000)	A(1500), B(1500) R(1000,1500,3000) T(1000)	A(900,1800), B(1000) P(2000) ^M , S(900) T(1000,2000)	A(1000), B(500,800) C(500), T(800,1000) W(500,600)	B(500,1000) C(500,700) W(250, 500)	B(1800) C(300,500) D(500)	C(600) D(125,300) E(200), Y(250)	D(500) E(250,300, 400,500)
15	156			A(700,1500)	A(1000) B(450,600), C(700) T(1200)	B(500,800) C(300,700)	B(500) C(400,450)	C(220,300) D(100,300)	C(350,450) D(100,300) Y(250)	E(250) V(250)
22	226			A(500,900) B(375,600) C(500), S(900)	A(900) B(400,500,700) C(300), T(800)	B(400,600) C(150,250,300,375) D(700), W(500)	B(400,600) C(100,150,400) D(200,300)	C(275,400) D(100,200,300) F(300)	D(125,200,300,400) E(125,200,300) Y(200)	
33	336			A(600) B(250,350,450,600) T(800)	A(700) B(250,425,500,650) C(150,375,500) W(350)	B(350,500) C(100,150,225,300) D(200), W(140,175, 250,400,500) Y(300,400)	C(300) D(100,200)	C(400) D(100,200,300) E(100,175, 200,300) Y(200)	D(200,300) E(100,250,300) V(200)	
47	476		A(500)	A(800) B(250,350,500) C(300), T(1200)	B(250,350,500,650) C(200,350) D(100,300) W(125,150,250)	C(110,350) D(80,100,150,200) W(200) X(180), Y(250)	D(75,100,200) E(70,125,150, 200,250) X(200)	D(125,150,250) E(80,100,125) Y(250)	E(200,250) V(150,200)	
68	686			B(250,350,500) C(150,200) W(110,125,250)	B(600) C(80,100,200,300) D(100,150), W(100,150) Y(100,200)	C(125,200) D(70,100,150) F(200), X(150) Y(150,200,250)	D(70,150, 200,300) E(125,150,200) Y(200)	D(150,200,300) E(125,200) V(80,95,150,200)	V(150,200)	
100	107	B(200)	B(200,250, 350,500) W(100)	B(250,400) C(75,150), D(300) W(100,150) Y(100)	B(400) C(75,100,150,200) D(50,65,80,100,125, 150), E(125) W(150) X(85,150,200) Y(100,150,200)	C(200) D(60,100,125,150) E(55,100,125,150) F(150,200) ^M Y(100,150,200)	D(85,100,150) E(100,150,200) V(60,85,100,200)	E(150), V(100)		
150	157	B(150)	B(250) C(70,80)	C(50,90,150,200,250) D(50,125), Y(40,50)	C(150), D(50,85,100), E(100), F(200), X(100) ^M Y(100,150,200)	D(60,85,100,125,150) E(100), V(45,75) Y(200) ^M	V(80)	V(150) ^M		
220	227	B(150, 200,600) D(45)	D(40,50,100) Y(40,50,75)	C(70,100,125,250) D(50,100,125) E(100), F(200) Y(100,150)	D(40,50,100,150) E(50,60,70,100, 125,150) Y(100,150,200)	E(100,150) V(50,75,100,150)				
330	337	Y(40)	C(100) D(35,45,100) F(200) X(100)	C(80,100) D(45,50,70,100) E(50,100,125,150) V(100), Y(75,100,150)	D(50,65,100,150) E(40,50,60,100) V(40,60,100)	E(200) ^M				
470	477	D(35) F(200) Y(100)	D(45,100) E(35,45,100)	D(45,60,100,200) E(45,50,60,100,200) V(40,55,100), Y(150)	E(45,50,60,100,200) V(40,60,100)					
680	687	D(35,50) E(35,50) Y(100)	D(45,60,100) E(40,60,100)	E(45,60,100) V(35,40,50)	E(150) ^M V(100) ^M					
1000	108	E(30,40) Y(100) ^M	E(40,60) V(25,35,40,50)	E(100) ^M , V(40,50) ^M						
1500	158	D(100) E(50) V(30,40) ^M	E(50,75) V(50,75) ^M							

Not recommended for new designs, higher voltage or smaller case size substitution are offered.

Available Ratings (^M tolerance only), (ESR ratings in mOhms in brackets)

Engineering samples - please contact manufacturer

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)	Category Voltage (V)	Category Temperature (°C)	DCL Max. (µA)	DF Max. (%)	ESR Max. @ 100kHz (mΩ)	MSL	100kHz RMS Current (A)		
											25°C	85°C	125°C
TPSV686*035#0150	V	68	35	85	23	125	23.8	6	150	1 ¹⁾	1.291	1.162	0.516
TPSV686*035#0200	V	68	35	85	23	125	23.8	6	200	1 ¹⁾	1.118	1.006	0.447
50 Volt @ 85°C													
TPSA154*050#9000	A	0.15	50	85	33	125	0.5	4	9000	1	0.091	0.082	0.037
TPSA224*050#7000	A	0.22	50	85	33	125	0.5	4	7000	1	0.104	0.093	0.041
TPSA334*050#7000	A	0.33	50	85	33	125	0.5	4	7000	1	0.104	0.093	0.041
TPSA474*050#6500	A	0.47	50	85	33	125	0.5	4	6500	1	0.107	0.097	0.043
TPSB474*050#6000	B	0.47	50	85	33	125	0.5	4	6000	1	0.119	0.107	0.048
TPSC474*050#2300	C	0.47	50	85	33	125	0.5	4	2300	1	0.219	0.197	0.087
TPSB684*050#4000	B	0.68	50	85	33	125	0.5	4	4000	1	0.146	0.131	0.058
TPSB105*050#3000	B	1	50	85	33	125	0.5	6	3000	1	0.168	0.151	0.067
TPSC105*050#2500	C	1	50	85	33	125	0.5	4	2500	1	0.210	0.189	0.084
TPSC155*050#1500	C	1.5	50	85	33	125	0.8	6	1500	1	0.271	0.244	0.108
TPSC155*050#2000	C	1.5	50	85	33	125	0.8	6	2000	1	0.235	0.211	0.094
TPSC225*050#1500	C	2.2	50	85	33	125	1.1	8	1500	1	0.271	0.244	0.108
TPSD225*050#1200	D	2.2	50	85	33	125	1.1	6	1200	1	0.354	0.318	0.141
TPSC335*050#1000	C	3.3	50	85	33	125	1.6	6	1000	1	0.332	0.298	0.133
TPSD335*050#0800	D	3.3	50	85	33	125	1.7	6	800	1	0.433	0.390	0.173
TPSC475*050#0800	C	4.7	50	85	33	125	2.4	6	800	1	0.371	0.334	0.148
TPSD475*050#0250	D	4.7	50	85	33	125	2.4	6	250	1	0.775	0.697	0.310
TPSD475*050#0300	D	4.7	50	85	33	125	2.4	6	300	1	0.707	0.636	0.283
TPSD475*050#0500	D	4.7	50	85	33	125	2.4	6	500	1	0.548	0.493	0.219
TPSD475*050#0700	D	4.7	50	85	33	125	2.4	6	700	1	0.463	0.417	0.185
TPSX475*050#0500V	X	4.7	50	85	33	125	2.4	6	500	3	0.447	0.402	0.179
TPSD685*050#0200	D	6.8	50	85	33	125	3.4	6	200	1	0.866	0.779	0.346
TPSD685*050#0300	D	6.8	50	85	33	125	3.4	6	300	1	0.707	0.636	0.283
TPSD685*050#0500	D	6.8	50	85	33	125	3.4	6	500	1	0.548	0.493	0.219
TPSD685*050#0600	D	6.8	50	85	33	125	3.4	6	600	1	0.500	0.450	0.200
TPSD106*050#0500	D	10	50	85	33	125	5	6	500	1	0.548	0.493	0.219
TPSE106*050#0250	E	10	50	85	33	125	5	6	250	1 ¹⁾	0.812	0.731	0.325
TPSE106*050#0300	E	10	50	85	33	125	5	6	300	1 ¹⁾	0.742	0.667	0.297
TPSE106*050#0400	E	10	50	85	33	125	5	6	400	1 ¹⁾	0.642	0.578	0.257
TPSE106*050#0500	E	10	50	85	33	125	5	6	500	1 ¹⁾	0.574	0.517	0.230
TPSE156*050#0250	E	15	50	85	33	125	7.5	6	250	1 ¹⁾	0.812	0.731	0.325
TPSV156*050#0250	V	15	50	85	33	125	7.5	6	250	1 ¹⁾	1.000	0.900	0.400

1¹⁾ - Dry pack option (see How to order) recommended for reduction of stress during soldering. Dry pack parts should be treated as MSL 3.

For AEC-Q200 availability, please contact AVX.

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.

The EIA & CECC standards for low ESR Solid Tantalum Capacitors allow an ESR movement to 1.25 times catalogue limit post mounting.

For typical weight and composition see page 223.

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

TEST	TPS series (Temperature range -55°C to +125°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 of 125°C temperature, category voltage for 2000 +48/-0 hours and then leaving 1-2 hours at room temperature. Power supply impedance to be ≤0.1Ω/V.			Visual examination	no visible damage				
				DCL	1.5 x initial limit				
				ΔC/C	within ±10% of initial value				
				DF	initial limit				
				ESR	1.25 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	1.5 x initial limit				
				ΔC/C	within ±10% of initial value				
				DF	1.2 x initial limit				
				ESR	1.25 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	IL*	n/a	IL*	10 x IL*	12.5 x IL*	IL*
	2	-55+0/-3	15	ΔC/C	n/a				
	3	+20±2	15	DF	IL*	1.5 x IL*	IL*	1.5 x IL*	2 x IL*
	4	+85+3/-0	15	ESR	1.25 x IL*	2.5 x IL*	1.25 x IL*	1.25 x IL*	1.25 x IL*
	5	+125+3/-0	15						
	6	+20±2	15						
Surge Voltage	Test temperature: 125°C±3/0°C Test voltage: Category voltage at 125°C Surge voltage: 1.3 x category voltage at 125°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				
				ΔC/C	within ±5% of initial value				
				DF	initial limit				
				ESR	1.25 x initial limit				

*Initial Limit