

TPS Series



Low ESR

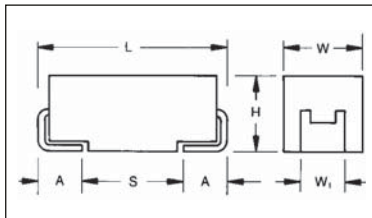


- Low ESR series of robust MnO₂ solid electrolyte capacitors
- CV range: 0.15-1500µF / 2.5-50V
- 14 case sizes available
- Power supply applications



SnPb termination option is not RoHS compliant.

CASE DIMENSIONS: millimeters (inches)



For part marking see page 132

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 _± 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.

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, VR (VOLTAGE CODE) 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)	B(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(900,1200,2500)	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(300,500,700)
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)*, S(900) T(1000,2000)	A(1000), B(500,800) C(500), T(800,1000) W(500,800)	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(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)	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)	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)	D(125,150,250) E(80,100,125)	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)	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) ^M 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) ^M , 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(60,100,125,150) V(100), Y(100,150)	D(60,65,100,150) E(40,60,60,100) 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)						
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.

Released codes ^(M tolerance only)

Engineering samples - please contact manufacturer

*Codes under development - subject to change

ESR limits quoted in brackets (milliohms)

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)	DCL (µA) Max.	DF % Max.	ESR Max. (mΩ) @100kHz	MSL	100kHz RMS Current (A)			100kHz RMS Voltage (V)		
								25°C	85°C	125°C	25°C	85°C	125°C
TPSD156*035#0100	D	15	35	5.3	6	100	1	1.225	1.102	0.490	0.122	0.110	0.049
TPSD156*035#0300	D	15	35	5.3	6	300	1	0.707	0.636	0.283	0.212	0.191	0.085
TPSY156*035#0250	Y	15	35	5.3	6	250	1 ¹⁾	0.707	0.636	0.283	0.177	0.159	0.071
TPSD226*035#0125	D	22	35	7.7	6	125	1	1.095	0.986	0.438	0.137	0.123	0.055
TPSD226*035#0200	D	22	35	7.7	6	200	1	0.866	0.779	0.346	0.173	0.156	0.069
TPSD226*035#0300	D	22	35	7.7	6	300	1	0.707	0.636	0.283	0.212	0.191	0.085
TPSD226*035#0400	D	22	35	7.7	6	400	1	0.612	0.551	0.245	0.245	0.220	0.098
TPSE226*035#0125	E	22	35	7.7	6	125	1 ¹⁾	1.149	1.034	0.460	0.144	0.129	0.057
TPSE226*035#0200	E	22	35	7.7	6	200	1 ¹⁾	0.908	0.817	0.363	0.182	0.163	0.073
TPSE226*035#0300	E	22	35	7.7	6	300	1 ¹⁾	0.742	0.667	0.297	0.222	0.200	0.089
TPSY226*035#0200	Y	22	35	7.7	6	200	1 ¹⁾	0.791	0.712	0.316	0.158	0.142	0.063
TPSD336*035#0200	D	33	35	11.6	6	200	1	0.866	0.779	0.346	0.173	0.156	0.069
TPSD336*035#0300	D	33	35	11.6	6	300	1	0.707	0.636	0.283	0.212	0.191	0.085
TPSE336*035#0100	E	33	35	11.6	6	100	1 ¹⁾	1.285	1.156	0.514	0.128	0.116	0.051
TPSE336*035#0250	E	33	35	11.6	6	250	1 ¹⁾	0.812	0.731	0.325	0.203	0.183	0.081
TPSE336*035#0300	E	33	35	11.6	6	300	1 ¹⁾	0.742	0.667	0.297	0.222	0.200	0.089
TPSV336*035#0200	V	33	35	11.6	6	200	1 ¹⁾	1.118	1.006	0.447	0.224	0.201	0.089
TPSE476*035#0200	E	47	35	16.5	6	200	1 ¹⁾	0.908	0.817	0.363	0.182	0.163	0.073
TPSE476*035#0250	E	47	35	16.5	6	250	1 ¹⁾	0.812	0.731	0.325	0.203	0.183	0.081
TPSV476*035#0150	V	47	35	16.5	6	150	1 ¹⁾	1.291	1.162	0.516	0.194	0.174	0.077
TPSV476*035#0200	V	47	35	16.5	6	200	1 ¹⁾	1.118	1.006	0.447	0.224	0.201	0.089
TPSV686*035#0150	V	68	35	23.8	6	150	1 ¹⁾	1.291	1.162	0.516	0.194	0.174	0.077
TPSV686*035#0200	V	68	35	23.8	6	200	1 ¹⁾	1.118	1.006	0.447	0.224	0.201	0.089
50 Volt @ 85°C (33 Volt @ 125°C)													
TPSA154*050#9000	A	0.15	50	0.5	4	9000	1	0.091	0.082	0.037	0.822	0.739	0.329
TPSA224*050#7000	A	0.22	50	0.5	4	7000	1	0.104	0.093	0.041	0.725	0.652	0.290
TPSA334*050#7000	A	0.33	50	0.5	4	7000	1	0.104	0.093	0.041	0.725	0.652	0.290
TPSA474*050#6500	A	0.47	50	0.5	4	6500	1	0.107	0.097	0.043	0.698	0.628	0.279
TPSB474*050#6000	B	0.47	50	0.5	4	6000	1	0.119	0.107	0.048	0.714	0.643	0.286
TPSC474*050#2300	C	0.47	50	0.5	4	2300	1	0.219	0.197	0.087	0.503	0.453	0.201
TPSB684*050#4000	B	0.68	50	0.5	4	4000	1	0.146	0.131	0.058	0.583	0.525	0.233
TPSB105*050#3000	B	1	50	0.5	6	3000	1	0.168	0.151	0.067	0.505	0.454	0.202
TPSC105*050#2500	C	1	50	0.5	4	2500	1	0.210	0.189	0.084	0.524	0.472	0.210
TPSC155*050#1500	C	1.5	50	0.8	6	1500	1	0.271	0.244	0.108	0.406	0.366	0.162
TPSC155*050#2000	C	1.5	50	0.8	6	2000	1	0.235	0.211	0.094	0.469	0.422	0.188
TPSC225*050#1500	C	2.2	50	1.1	8	1500	1	0.271	0.244	0.108	0.406	0.366	0.162
TPSD225*050#1200	D	2.2	50	1.1	6	1200	1	0.354	0.318	0.141	0.424	0.382	0.170
TPSC335*050#1000	C	3.3	50	1.6	6	1000	1	0.332	0.298	0.133	0.332	0.298	0.133
TPSD335*050#0800	D	3.3	50	1.7	6	800	1	0.433	0.390	0.173	0.346	0.312	0.139
TPSC475*050#0800	C	4.7	50	2.4	6	800	1	0.371	0.334	0.148	0.297	0.267	0.119
TPSD475*050#0300	D	4.7	50	2.4	6	300	1	0.707	0.636	0.283	0.212	0.191	0.085
TPSD475*050#0500	D	4.7	50	2.4	6	500	1	0.548	0.493	0.219	0.274	0.246	0.110
TPSD475*050#0700	D	4.7	50	2.4	6	700	1	0.463	0.417	0.185	0.324	0.292	0.130
TPSD685*050#0200	D	6.8	50	3.4	6	200	1	0.866	0.779	0.346	0.173	0.156	0.069
TPSD685*050#0300	D	6.8	50	3.4	6	300	1	0.707	0.636	0.283	0.212	0.191	0.085
TPSD685*050#0500	D	6.8	50	3.4	6	500	1	0.548	0.493	0.219	0.274	0.246	0.110
TPSD685*050#0600	D	6.8	50	3.4	6	600	1	0.500	0.450	0.200	0.300	0.270	0.120
TPSD106*050#0500	D	10	50	5	6	500	1	0.548	0.493	0.219	0.274	0.246	0.110
TPSE106*050#0250	E	10	50	5	6	250	1 ¹⁾	0.812	0.731	0.325	0.203	0.183	0.081
TPSE106*050#0300	E	10	50	5	6	300	1 ¹⁾	0.742	0.667	0.297	0.222	0.200	0.089
TPSE106*050#0400	E	10	50	5	6	400	1 ¹⁾	0.642	0.578	0.257	0.257	0.231	0.103
TPSE106*050#0500	E	10	50	5	6	500	1 ¹⁾	0.574	0.517	0.230	0.287	0.259	0.115
TPSE156*050#0250	E	15	50	7.5	6	250	1 ¹⁾	0.812	0.731	0.325	0.203	0.183	0.081
TPSV156*050#0250	V	15	50	7.5	6	250	1 ¹⁾	1.000	0.900	0.400	0.250	0.225	0.100

¹⁾ Dry pack option (see How to order) recommended for reduction of stress during soldering. Dry pack parts should be treated as MSL 3.

Moisture Sensitivity Level (MSL) is defined according to J-STD-020.

For AEC-Q200 availability, please contact AVX.

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 126.

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.

TPS Automotive Range



Low ESR - Automotive Product Range

TPS AUTOMOTIVE RANGE CAPACITANCE AND RATED VOLTAGE, V_R (VOLTAGE CODE) RANGE (LETTER DENOTES CASE SIZE)

Capacitance		Rated Voltage DC (V_R) to 85°C						
μF	Code	6.3V (J)	10V (A)	16V (C)	20V (D)	25V (E)	35V (V)	50V (T)
0.15	154							
0.22	224							A(7000)
0.33	334						A(6000)	A(7000)
0.47	474					A(7000)	A(6000)	A(6500), B(6000)
0.68	684					A(6000)	A(6000)	B(4000)
1.0	105			A(6200)	A(3000)	A(4000)	A(3000), B(2000)	B(3000), C(2500)
1.5	155				A(3000)	A(3000)	A(3000), B(2500)	C(1500,2000)
2.2	225		A(1800)	A(1800,3500)	A(3000), B(1700)	A(2500), B(900,1200,2500)	B(750,1500,2000), C(1000)	C(1500), D(1200)
3.3	335	A(2100)		A(3500), B(2500)	A(2500), B(1300)	B(750,1500,2000)	B(1000), C(700)	C(1000), D(800)
4.7	475		A(1400), B(1400)	A(2000), B(800,1500)	A(1800), B(750,1000)	B(700,900), C(700)	B(700,1500), C(600), D(700)	C(800), D(500,700)
6.8	685		A(1800), B(1300)	A(1500), B(600,1200)	B(600,1000), C(700)	B(700), C(500,600,700)	C(350), D(400,500)	D(500,600)
10	106	A(1500), B(1500)	A(900,1800), B(1000)	A(1000), B(500,800), C(500)	B(500,1000), C(500,700)	C(300,500), D(500)	C(600), D(300)	D(500), E(250,300,400,500)
15	156	A(700,1500)	A(1000), B(450,600), C(700)	B(500,800), C(700)	B(500), C(400,450)	C(220,300), D(300)	D(300)	
22	226	A(500,900), B(375,600), C(500)	A(900), B(400,500,700), C(300)	B(400,600), C(300,375), D(700)	C(400), D(200,300)	C(275,400), D(200,300)	D(200,300,400), E(200,300)	
33	336	A(600), B(250,350,450,600)	B(250,425,500,650), C(375,500)	C(225,300), D(200)	C(300), D(200)	D(200,300)	E(250,300)	
47	476	B(250,350,500), C(300)	B(250,350,500,650), C(200,350), D(300)	C(350), D(200)	D(200)	D(125,150,250), E(125)		
68	686	B(250,350,500), C(150,200)	C(200,300), D(150)	C(200), D(150)	D(150,200,300), E(125,150,200)			
100	107	C(150), D(300)	C(150,200), D(100,125,150)	D(100,125,150), E(100,125,150)	E(100,150,200)			
150	157	C(150,200,250), D(125)	D(85,100), E(100)	E(100)				
220	227	D(100,125)	D(100,150), E(70,100,125,150)					
330	337	D(70,100), E(100,125,150)	E(50,60,100)					
470	477	D(45,60,100,200), E(45,50,60,100,200)						
680	687	E(45,60,100)						

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

Released codes

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

HOW TO ORDER

TPS	C	107	M	010	T	0150
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 = $\pm 10\%$ M = $\pm 20\%$	Rated DC Voltage 006 = 6.3Vdc 010 = 10Vdc 016 = 16Vdc 020 = 20Vdc 025 = 25Vdc 035 = 35Vdc 050 = 50Vdc	Packaging T = Automotive Lead Free 7" Reel U = Automotive Lead Free 13" Reel	ESR in mΩ

TECHNICAL SPECIFICATIONS

Technical Data:

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

Capacitance Range:	0.22 μF to 680 μF								
Capacitance Tolerance:	$\pm 10\%$; $\pm 20\%$								
Rated Voltage (V_R)	$\leq +85^\circ\text{C}$:	6.3	10	16	20	25	35	50	
Category Voltage (V_C)	$\leq +125^\circ\text{C}$:	4	7	10	13	17	23	33	
Surge Voltage (V_S)	$\leq +85^\circ\text{C}$:	8	13	20	26	32	46	65	
Surge Voltage (V_S)	$\leq +125^\circ\text{C}$:	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 0.1 Ω /V series impedance, 60% confidence level								
Termination Finished:	Sn Plating (standard), Gold and SnPb Plating upon request								
	Meets requirements of AEC-Q200								



