

### FEATURES

- Low ESR Series of Robust MnO<sub>2</sub> Solid Electrolyte Capacitors
- 100% Surge Current Tested
- CV Range: 0.15-1500µF / 2.5-50V
- 14 Case Sizes Available
- Power Supply Applications



LEAD-FREE

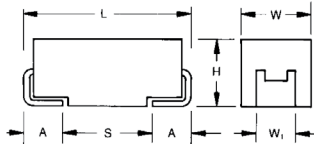
LEAD-FREE COMPATIBLE COMPONENT



SnPb termination option is not RoHS compliant.

### APPLICATIONS

- General Medium Power DC/DC Convertors



### CASE DIMENSIONS:

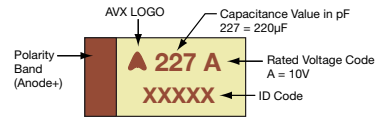
millimeters (inches)

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 <sub>1</sub> ±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 (0.122)	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)

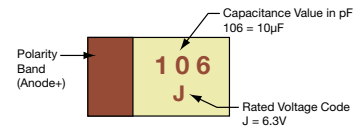
W<sub>1</sub> dimension applies to the termination width for A dimensional area only.

### 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	-
<b>Type</b>	<b>Case Size</b> See table above	<b>Capacitance Code</b> pF code: 1st two digits represent significant figures, 3rd digit represents multiplier (number of zeros to follow)	<b>Tolerance</b> K = ±10% M = ±20%	<b>Rated DC Voltage</b> 002 = 2.5Vdc 004 = 4Vdc 006 = 6.3Vdc 010 = 10Vdc 016 = 16Vdc 020 = 20Vdc 025 = 25Vdc 035 = 35Vdc 050 = 50Vdc	<b>Packaging</b> 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	<b>ESR in mΩ</b>	<b>Additional characters may be added for special requirements</b> V = Dry pack Option (selected ratings 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 <sub>R</sub> )	≤ +85°C:	2.5	4	6.3	10	16	20	25	35	50
Category Voltage (V <sub>C</sub> )	≤ +125°C:	1.7	2.7	4	7	10	13	17	23	33
Surge Voltage (V <sub>S</sub> )	≤ +85°C:	3.3	5.2	8	13	20	26	32	46	65
Surge Voltage (V <sub>S</sub> )	≤ +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 <sub>R</sub> 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 <sub>R</sub> ) 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(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) <sup>(M)</sup> , 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(100,150,200)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(300,500,900) 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(250,350,500,650) 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) F(150,200,400) 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) (Y250)	D(300), 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) T(500) <sup>(M)</sup> 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) <sup>(M)</sup> 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) <sup>(M)</sup> Y(100,150,200)	D(60,85,100,125,150) E(50,100), V(45,75) Y(200) <sup>(M)</sup>	V(80)	V(150) <sup>(M)</sup>		
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)	D(200) <sup>(M)</sup> E(50,100,150) 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) <sup>(M)</sup>				
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) <sup>(M)</sup> V(100) <sup>(M)</sup>					
1000	108	E(30,40) Y(100) <sup>(M)</sup>	E(40,60) V(25,35,40,50)	E(100) <sup>(M)</sup> , V(40,50) <sup>(M)</sup>						
1500	158	D(100) E(50) V(30,40) <sup>(M)</sup>	E(50,75) V(50,75) <sup>(M)</sup>							

Note for designers - for the highlighted ratings, higher voltage options are now available in the same case size and are recommended for new designs.

Engineering Samples - Please Contact AVX

Released ratings<sup>(M tolerance only)</sup> (ESR ratings in mOhms in parentheses)

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.



















### 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)	100kHz RMS Current (A)			MSL
										25°C	85°C	125°C	
TPSE336*035#0100	E	33	35	85	23	125	11.6	6	100	1.285	1.156	0.514	1 <sup>1)</sup>
TPSE336*035#0250	E	33	35	85	23	125	11.6	6	250	0.812	0.731	0.325	1 <sup>1)</sup>
TPSE336*035#0300	E	33	35	85	23	125	11.6	6	300	0.742	0.667	0.297	1 <sup>1)</sup>
TPSV336*035#0200	V	33	35	85	23	125	11.6	6	200	1.118	1.006	0.447	1 <sup>1)</sup>
TPSD476*035#0300V	D	47	35	85	23	125	16.5	6	300	0.707	0.636	0.283	3
TPSE476*035#0200	E	47	35	85	23	125	16.5	6	200	0.908	0.817	0.363	1 <sup>1)</sup>
TPSE476*035#0250	E	47	35	85	23	125	16.5	6	250	0.812	0.731	0.325	1 <sup>1)</sup>
TPSV476*035#0150	V	47	35	85	23	125	16.5	6	150	1.291	1.162	0.516	1 <sup>1)</sup>
TPSV476*035#0200	V	47	35	85	23	125	16.5	6	200	1.118	1.006	0.447	1 <sup>1)</sup>
TPSV686*035#0150	V	68	35	85	23	125	23.8	6	150	1.291	1.162	0.516	1 <sup>1)</sup>
TPSV686*035#0200	V	68	35	85	23	125	23.8	6	200	1.118	1.006	0.447	1 <sup>1)</sup>
50 Volt @ 85°C													
TPSA154*050#9000	A	0.15	50	85	33	125	0.5	4	9000	0.091	0.082	0.037	1
TPSA224*050#7000	A	0.22	50	85	33	125	0.5	4	7000	0.104	0.093	0.041	1
TPSA334*050#7000	A	0.33	50	85	33	125	0.5	4	7000	0.104	0.093	0.041	1
TPSA474*050#6500	A	0.47	50	85	33	125	0.5	4	6500	0.107	0.097	0.043	1
TPSB474*050#6000	B	0.47	50	85	33	125	0.5	4	6000	0.119	0.107	0.048	1
TPSC474*050#2300	C	0.47	50	85	33	125	0.5	4	2300	0.219	0.197	0.087	1
TPSB684*050#4000	B	0.68	50	85	33	125	0.5	4	4000	0.146	0.131	0.058	1
TPSB105*050#3000	B	1	50	85	33	125	0.5	6	3000	0.168	0.151	0.067	1
TPSC105*050#2500	C	1	50	85	33	125	0.5	4	2500	0.210	0.189	0.084	1
TPSC155*050#1500	C	1.5	50	85	33	125	0.8	6	1500	0.271	0.244	0.108	1
TPSC155*050#2000	C	1.5	50	85	33	125	0.8	6	2000	0.235	0.211	0.094	1
TPSC225*050#1500	C	2.2	50	85	33	125	1.1	8	1500	0.271	0.244	0.108	1
TPSD225*050#1200	D	2.2	50	85	33	125	1.1	6	1200	0.354	0.318	0.141	1
TPSC335*050#1000	C	3.3	50	85	33	125	1.6	6	1000	0.332	0.298	0.133	1
TPSD335*050#0800	D	3.3	50	85	33	125	1.7	6	800	0.433	0.390	0.173	1
TPSC475*050#0800	C	4.7	50	85	33	125	2.4	6	800	0.371	0.334	0.148	1
TPSD475*050#0250	D	4.7	50	85	33	125	2.4	6	250	0.775	0.697	0.310	1
TPSD475*050#0300	D	4.7	50	85	33	125	2.4	6	300	0.707	0.636	0.283	1
TPSD475*050#0500	D	4.7	50	85	33	125	2.4	6	500	0.548	0.493	0.219	1
TPSD475*050#0700	D	4.7	50	85	33	125	2.4	6	700	0.463	0.417	0.185	1
TPSX475*050#0500V	X	4.7	50	85	33	125	2.4	6	500	0.447	0.402	0.179	3
TPSD685*050#0200	D	6.8	50	85	33	125	3.4	6	200	0.866	0.779	0.346	1
TPSD685*050#0300	D	6.8	50	85	33	125	3.4	6	300	0.707	0.636	0.283	1
TPSD685*050#0500	D	6.8	50	85	33	125	3.4	6	500	0.548	0.493	0.219	1
TPSD685*050#0600	D	6.8	50	85	33	125	3.4	6	600	0.500	0.450	0.200	1
TPSD106*050#0500	D	10	50	85	33	125	5	6	500	0.548	0.493	0.219	1
TPSE106*050#0250	E	10	50	85	33	125	5	6	250	0.812	0.731	0.325	1 <sup>1)</sup>
TPSE106*050#0300	E	10	50	85	33	125	5	6	300	0.742	0.667	0.297	1 <sup>1)</sup>
TPSE106*050#0400	E	10	50	85	33	125	5	6	400	0.642	0.578	0.257	1 <sup>1)</sup>
TPSE106*050#0500	E	10	50	85	33	125	5	6	500	0.574	0.517	0.230	1 <sup>1)</sup>
TPSE156*050#0250	E	15	50	85	33	125	7.5	6	250	0.812	0.731	0.325	1 <sup>1)</sup>
TPSV156*050#0250	V	15	50	85	33	125	7.5	6	250	1.000	0.900	0.400	1 <sup>1)</sup>

1<sup>1)</sup> -Dry pack option (see How to order) is 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 274.

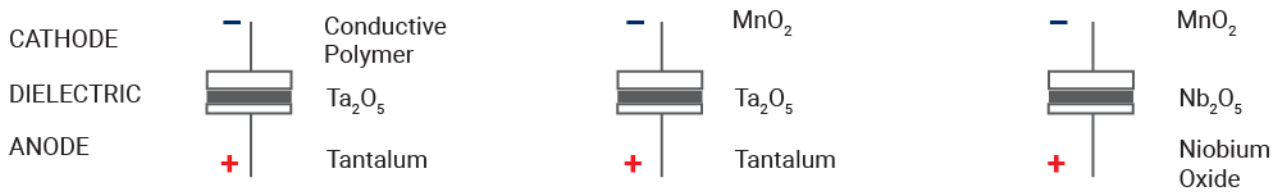
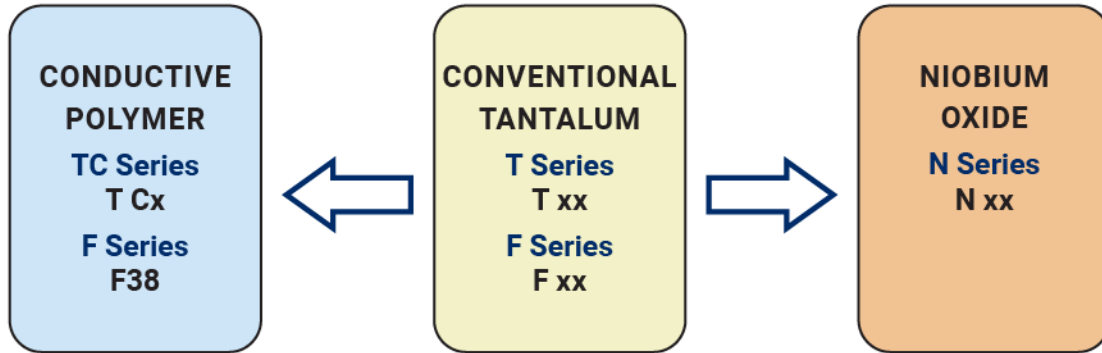
**NOTE: AVX reserves the right to supply higher voltage ratings or tighter tolerance part in the same case size, to the same reliability standards.**

### QUALIFICATION TABLE

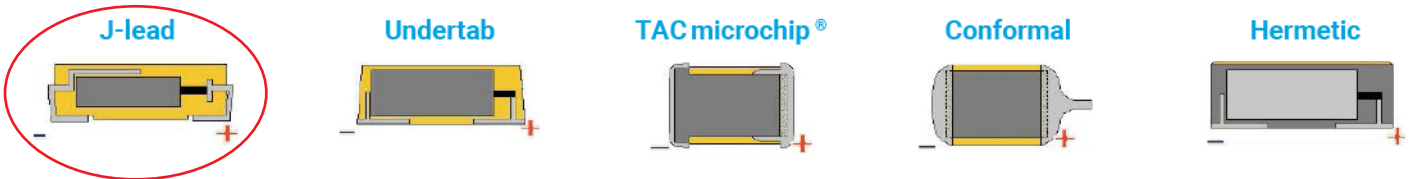
TEST	TPS series (Temperature range -55°C to +125°C)										
	Condition			Characteristics							
<b>Endurance</b>	Apply rated voltage (Ur) at 85°C and / or category voltage (Uc) at 125°C for 2000 hours through a circuit impedance of $\leq 0.1\Omega/V$ . Stabilize at room temperature for 1-2 hours before measuring.			Visual examination	no visible damage						
				DCL	1.5 x initial limit						
				$\Delta C/C$	within $\pm 10\%$ of initial value						
				DF	initial limit						
				ESR	1.25 x initial limit						
<b>Humidity</b>	Store at 65°C and 95% relative humidity for 500 hours, with no applied voltage. Stabilize at room temperature and humidity for 1-2 hours before measuring.			Visual examination	no visible damage						
				DCL	1.5 x initial limit						
				$\Delta C/C$	within $\pm 10\%$ of initial value						
				DF	1.2 x initial limit						
				ESR	1.25 x initial limit						
<b>Temperature Stability</b>	Step	Temperature°C	Duration(min)		+20°C	-55°C	+20°C	+85°C	+125°C	+20°C	
	1	+20	15	DCL	IL*	n/a	IL*	10 x IL*	12.5 x IL*	IL*	
	2	-55	15	$\Delta C/C$	n/a	+0/-10%	$\pm 5\%$	+10/-0%	+12/-0%	$\pm 5\%$	
	3	+20	15	DF	IL*	1.5 x IL*	IL*	1.5 x IL*	2 x IL*	IL*	
	4	+85	15	ESR	1.25 x IL*	2.5 x IL*	1.25 x IL*	1.25 x IL*	1.25 x IL*	1.25 x IL*	
	5	+125	15								
6	+20	15									
<b>Surge Voltage</b>	Apply 1.3x category voltage (Uc) at 125°C for 1000 cycles of duration 6 min (30 sec charge, 5 min 30 sec discharge) through a charge / discharge resistance of 1000 $\Omega$			Visual examination	no visible damage						
				DCL	initial limit						
				$\Delta C/C$	within $\pm 5\%$ of initial value						
				DF	initial limit						
				ESR	1.25 x initial limit						
<b>Mechanical Shock</b>	MIL-STD-202, Method 213, Condition C			Visual examination	no visible damage						
				DCL	initial limit						
				$\Delta C/C$	within $\pm 5\%$ of initial value						
				DF	initial limit						
				ESR	initial limit						
<b>Vibration</b>	MIL-STD-202, Method 204, Condition D			Visual examination	no visible damage						
				DCL	initial limit						
				$\Delta C/C$	within $\pm 5\%$ of initial value						
				DF	initial limit						
				ESR	initial limit						

\*Initial Limit

### AVX SOLID ELECTROLYTIC CAPACITOR ROADMAP



### FIVE CAPACITOR CONSTRUCTION STYLES



### SERIES LINE UP : CONVENTIONAL SMD MnO<sub>2</sub>

