Transient Voltage Suppression Diodes: TP1.5SMC Series

SMD Type 1500 W

■ Features

1. Glass passivated chip
2. 1500W peak pulse power capability at 10/1000μs waveform, repetition rate (duty cycle): 0.01%
3. Excellent clamping capability
4. Very fast response time
5. Low clamping voltage
6. Low leakage current
7. Meets MSL level 1, per J-STD-020 LF maximum peak of 260°C
8. Halogen free and RoHS compliant
9. AEC-Q101 qualified

■ Recommended Applications

1. I/O interface
2. AC/DC power supply
3. Low frequency signal transmission line

■ Mechanical Data

1. Case: DO-214AB (SMC), molded plastic meets
2. Epoxy：UL 94V-0 rate flame retardant
3. Terminal: Solderable per MIL-STD-750, Method 2026
4. Polarity: Color band denotes cathode end
5. Mounting Position: Any

■ Part Number Code

T	P	S	M	C	6	.	8	C	A
1	2	6	7	8			9	10	11

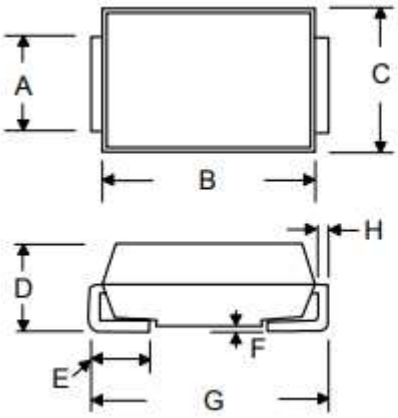
THINKING
Transient Voltage Suppression Diodes

Product Series	
SMC	THINKING Transient Voltage Suppression Diodes SMC Series

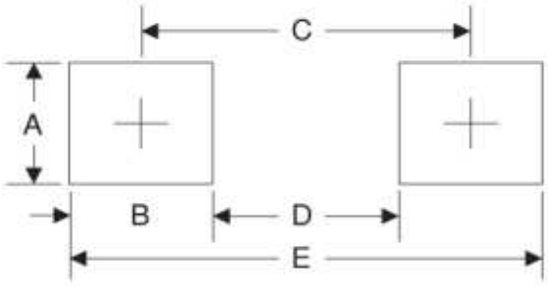
Breakdown Voltage (V_{BR})	
6.8	6.8V
75	75V
120	120V

Type Code	
A	Uni-directional, 5% V_{BR} Voltage Tolerance
CA	Bi-directional, 5% V_{BR} Voltage Tolerance

■ Structures and Dimensions



Symbol	Dimensions in millimeters	
	Min	Max
A	2.90	3.20
B	6.60	7.11
C	5.59	6.22
D	2.06	2.62
E	0.76	1.52
F	-	0.20
G	7.75	8.13
H	0.15	0.31



Symbol	Unit (mm)	Unit (inch)
A	3.30	0.130
B	2.50	0.098
C	6.80	0.268
D	4.40	0.173
E	9.40	0.370

■ Maximum Rating (T_A=25℃ unless otherwise noted)

Parameter	Symbol	Value	Unit
Peak power dissipation with a 10/1000μs waveform (Note 1,2)	P_{PPM}	1500	W
Peak pulse current with 10/1000 μs waveform (Note 1)	I_{PPM}	See next table	A
Peak forward surge current, 8.3 ms single half sine-wave (Note 3)	I_{FSM}	200	A
Power dissipation on infinite heatsink at TL=75°C	PD	6.5	W
Typical thermal resistance junction to ambient	RθJA	75	°C/W
Typical thermal resistance junction to lead	RθJL	15	°C/W
Operating junction and storage temperature range	T_J, T_{STG}	-55~+150	ºC

Notes : (1) Non-repetitive current pulse, per Fig. 3 and derated above TA=25℃ per Fig. 2

(2) Mounted on copper pad area of 8.0 x 8.0mm to each terminal

(3) Measured on 8.3ms single half sine wave or equivalent square wave for unidirectional device only, duty cycle=4 per minute maximum

Transient Voltage Suppression Diodes: TP1.5SMC Series

SMD Type 1500 W

■ Electrical Characteristics (T_A=25℃ unless otherwise noted)

Part No. (Uni)	Part No. (Bi)	Reverse Stand off Voltage	Breakage Voltage VBR @ IT		Test Current	Maximum Clamping Voltage VC @ Ipp	Maximum Peak Pulse Current	Maximum Reverse Leakage IR @VRWM	Marking Code	
		VRWM (V)	Min(V)	Max(V)	IT(mA)	VC(V)	Ipp(A)	IR(μA)	Uni	Bi
TP1.5SMC6.8A	TP1.5SMC6.8CA	5.8	6.45	7.14	10	10.5	144.8	1000	6V8A	6V8C
TP1.5SMC7.5A	TP1.5SMC7.5CA	6.4	7.13	7.88	10	11.3	134.5	500	7V5A	7V5C
TP1.5SMC8.2A	TP1.5SMC8.2CA	7.02	7.79	8.61	10	12.1	125.6	200	8V2A	8V2C
TP1.5SMC9.1A	TP1.5SMC9.1CA	7.78	8.65	9.55	1	13.4	113.4	50	9V1A	9V1C
TP1.5SMC10A	TP1.5SMC10CA	8.55	9.5	10.5	1	14.5	104.8	10	10A	10C
TP1.5SMC11A	TP1.5SMC11CA	9.4	10.5	11.6	1	15.6	97.4	5	11A	11C
TP1.5SMC12A	TP1.5SMC12CA	10.2	11.4	12.6	1	16.7	91	5	12A	12C
TP1.5SMC13A	TP1.5SMC13CA	11.1	12.4	13.7	1	18.2	83.5	5	13A	13C
TP1.5SMC15A	TP1.5SMC15CA	12.8	14.3	15.8	1	21.2	71.7	1	15A	15C
TP1.5SMC16A	TP1.5SMC16CA	13.6	15.2	16.8	1	22.5	67.6	1	16A	16C
TP1.5SMC18A	TP1.5SMC18CA	15.3	17.1	18.9	1	25.2	60.3	1	18A	18C
TP1.5SMC20A	TP1.5SMC20CA	17.1	19	21	1	27.7	54.9	1	20A	20C
TP1.5SMC22A	TP1.5SMC22CA	18.8	20.9	23.1	1	30.6	49.7	1	22A	22C
TP1.5SMC24A	TP1.5SMC24CA	20.5	22.8	25.2	1	33.2	45.8	1	24A	24C
TP1.5SMC27A	TP1.5SMC27CA	23.1	25.7	28.4	1	37.5	40.5	1	27A	27C
TP1.5SMC30A	TP1.5SMC30CA	25.6	28.5	31.5	1	41.4	36.7	1	30A	30C
TP1.5SMC33A	TP1.5SMC33CA	28.2	31.4	34.7	1	45.7	33.3	1	33A	33C
TP1.5SMC36A	TP1.5SMC36CA	30.8	34.2	37.8	1	49.9	30.5	1	36A	36C
TP1.5SMC39A	TP1.5SMC39CA	33.3	37.1	41	1	53.9	28.2	1	39A	39C
TP1.5SMC43A	TP1.5SMC43CA	36.8	40.9	45.2	1	59.3	25.6	1	43A	43C
TP1.5SMC47A	TP1.5SMC47CA	40.2	44.7	49.4	1	64.8	23.5	1	47A	47C
TP1.5SMC51A	TP1.5SMC51CA	43.6	48.5	53.6	1	70.1	21.7	1	51A	51C
TP1.5SMC56A	TP1.5SMC56CA	47.8	53.2	58.8	1	77	18.7	1	56A	56C
TP1.5SMC62A	TP1.5SMC62CA	53	58.9	65.1	1	85	17.9	1	62A	62C
TP1.5SMC68A	TP1.5SMC68CA	58.1	64.6	71.4	1	92	16.5	1	68A	68C
TP1.5SMC75A	TP1.5SMC75CA	64.1	71.3	78.8	1	103	14.8	1	75A	75C
TP1.5SMC82A	TP1.5SMC82CA	70.1	77.9	86.1	1	113	13.5	1	82A	82C
TP1.5SMC91A	TP1.5SMC91CA	77.8	86.5	95.5	1	125	12.2	1	91A	91C
TP1.5SMC100A	TP1.5SMC100CA	85.5	95	105	1	137	11.1	1	100A	100C

■ Electrical Characteristics (T_A=25℃ unless otherwise noted)

Part No. (Uni)	Part No. (Bi)	Reverse Stand off Voltage	Breakage Voltage VBR @ IT		Test Current	Maximum Clamping Voltage VC @ Ipp	Maximum Peak Pulse Current	Maximum Reverse Leakage IR @VRWM	Marking Code	
		VRWM (V)	Min(V)	Max(V)	IT(mA)	VC(V)	Ipp(A)	IR(μA)	Uni	Bi
TP1.5SMC110A	TP1.5SMC110CA	94	105	116	1	152	10	1	110A	110C
TP1.5SMC120A	TP1.5SMC120CA	102	114	126	1	165	9.2	1	120A	120C
TP1.5SMC130A	TP1.5SMC130CA	111	124	137	1	179	8.5	1	130A	130C
TP1.5SMC150A	TP1.5SMC150CA	128	143	158	1	207	7.3	1	150A	150C
TP1.5SMC160A	TP1.5SMC160CA	136	152	168	1	219	6.9	1	160A	160C
TP1.5SMC170A	TP1.5SMC170CA	145	162	179	1	234	6.5	1	170A	170C
TP1.5SMC180A	TP1.5SMC180CA	154	171	189	1	246	6.2	1	180A	180C
TP1.5SMC200A	TP1.5SMC200CA	171	190	210	1	274	5.5	1	200A	200C
TP1.5SMC220A	TP1.5SMC220CA	185	209	231	1	328	4.6	1	220A	220C
TP1.5SMC250A	TP1.5SMC250CA	214	237	263	1	344	4.4	1	250A	250C
TP1.5SMC300A	TP1.5SMC300CA	256	285	315	1	414	3.7	1	300A	300C
TP1.5SMC350A	TP1.5SMC350CA	300	333	368	1	482	3.2	1	350A	350C
TP1.5SMC400A	TP1.5SMC400CA	342	380	420	1	548	2.8	1	400A	400C
TP1.5SMC440A	TP1.5SMC440CA	376	418	462	1	602	2.5	1	440A	440C
TP1.5SMC480A	TP1.5SMC480CA	408	456	504	1	658	2.3	1	480A	480C
TP1.5SMC510A	TP1.5SMC510CA	434	485	535	1	698	2.1	1	510A	510C
TP1.5SMC530A	TP1.5SMC530CA	450	503	556	1	725	2.1	1	530A	530C
TP1.5SMC540A	TP1.5SMC540CA	459	513	567	1	740	2	1	540A	540C

■ Rate and Characteristic Curve (T_A=25℃ unless otherwise noted)

Fig.1 - Peak Pulse Power Rating Curve

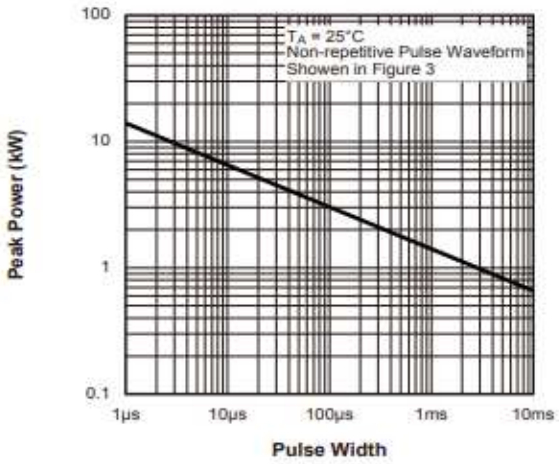


Fig.2 - Pulse Derating Curve

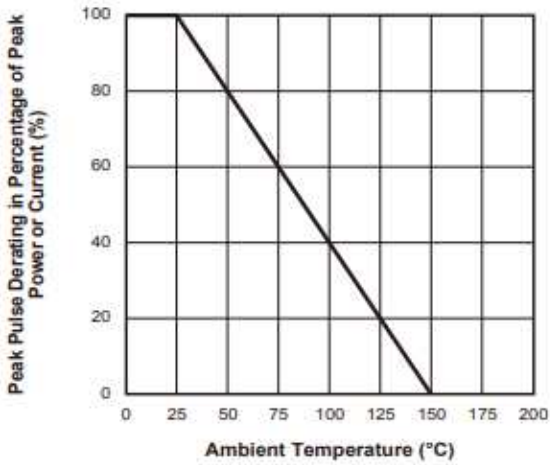


Fig.3 - Pulse Waveform

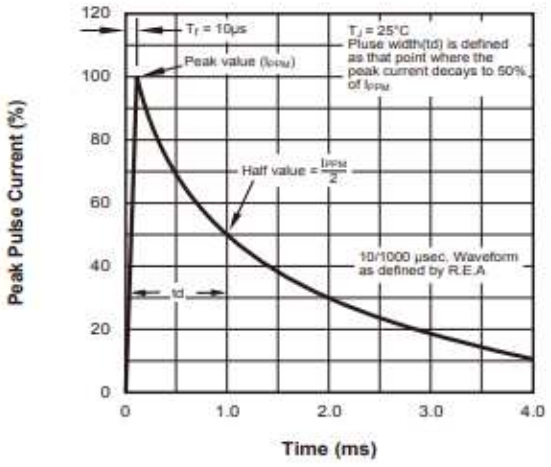
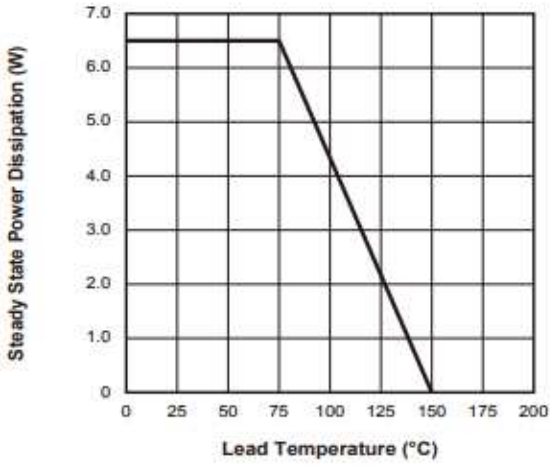
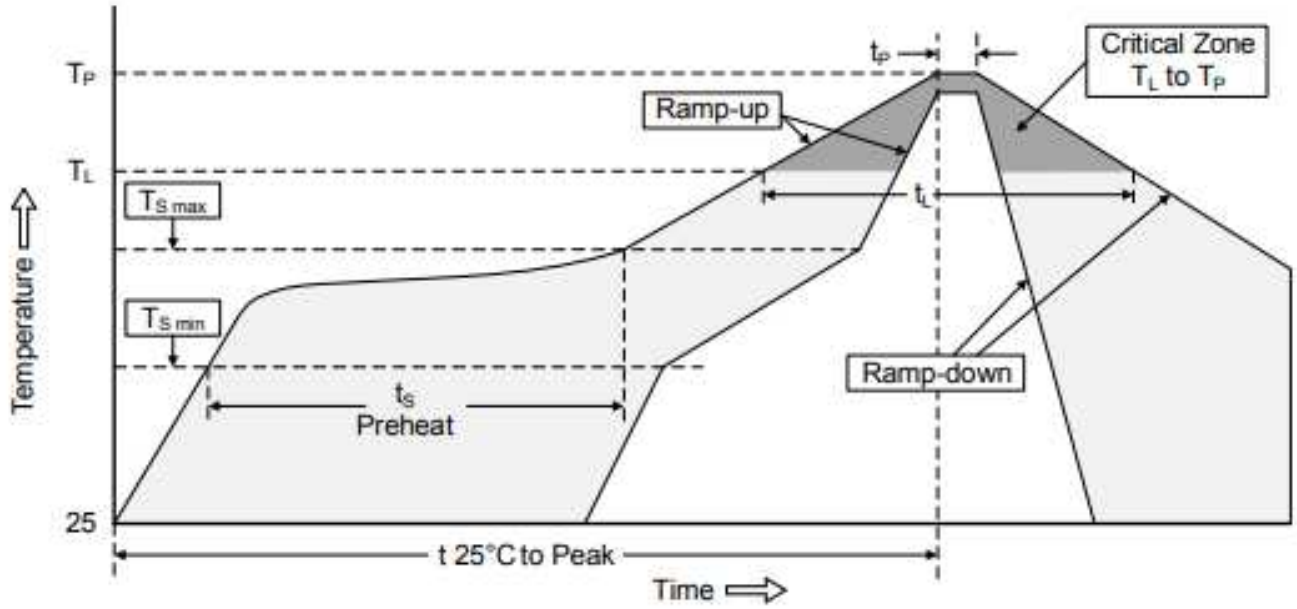


Fig.4 - Steady State Power Derating Curve



IR-reflow soldering profile

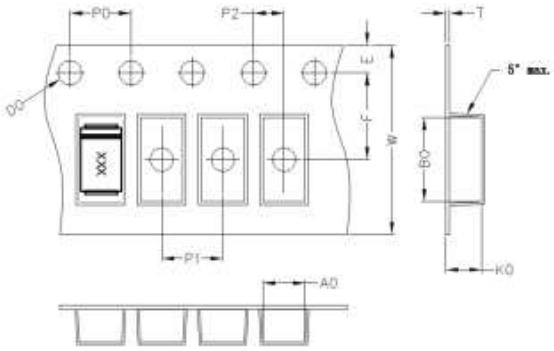
Reflow Soldering



Recommended Conditions

Profile Feature	Pb-Free Assembly
Average ramp-up rate (T_L to T_P)	3°C/second max.
Preheat -Temperature Min ($T_{S\,min}$) -Temperature Max ($T_{S\,max}$) -Time (min to max) (t_S)	 150°C 200°C 60-180 seconds
$T_{S\,max}$ to T_L -Ramp-up Rate	 3°C/second max.
Time maintained above: -Temperature (T_L) -Time (t_L)	 217°C 60-150 seconds
Peak Temperature (T_P)	260°C
Time within 5°C of actual Peak Temperature (t_P)	20-40 seconds
Ramp-down Rate	6°C/second max.
Time 25°C to Peak Temperature	8 minutes max.

■ Packaging



A0	B0	K0	D0	E	F
6.05	8.31	2.54	1.55	1.75	7.50
P0	P1	P2	T	W	Tolerance
4.0	8.0	2.0	0.25	16	0.1

■ Quantity

Series Type	Packaging option	Base quantity	Packaging specification
TP1.5SMC	Tape and reel	3000/reel	EIA STD RS-481

■ Warehouse Storage Conditions of product

● Storage Condition:

1. Storage Temperature: ≤25℃
2. Relative Humidity: 50%~80%RH
3. Keep away from corrosive atmosphere and sunlight.

● Period of Storage: 1 year.