

## SMD Type 200 W

### ■ Features

1. Glass passivated chip
2. 200W peak pulse power capability with a 10/1000  $\mu$ s waveform, repetitive 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. IEC-61000-4-2 ESD 30kV(Air), 30kV(Contact)
9. Halogen free and RoHS compliant
10. AEC Q101 qualified



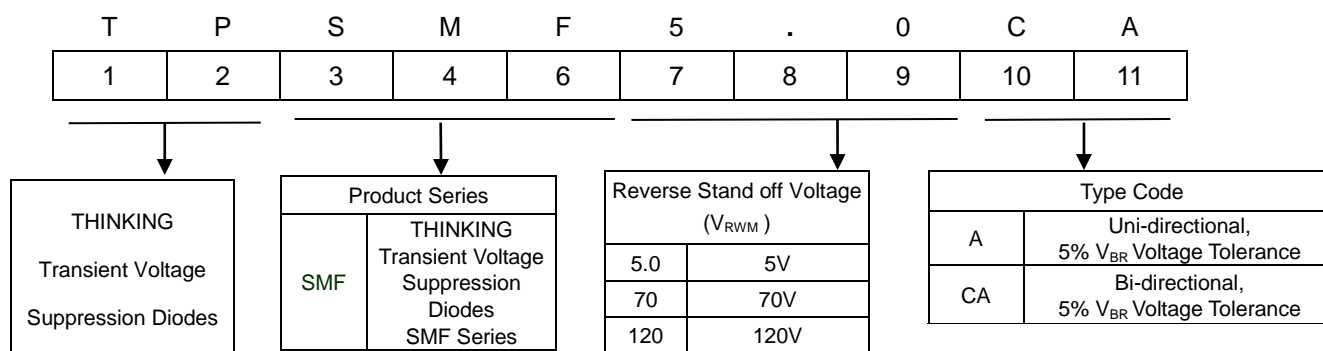
### ■ Recommended Applications

1. I/O interface
2. VCC BUS
3. Low frequency signal transmission line

### ■ Mechanical Data

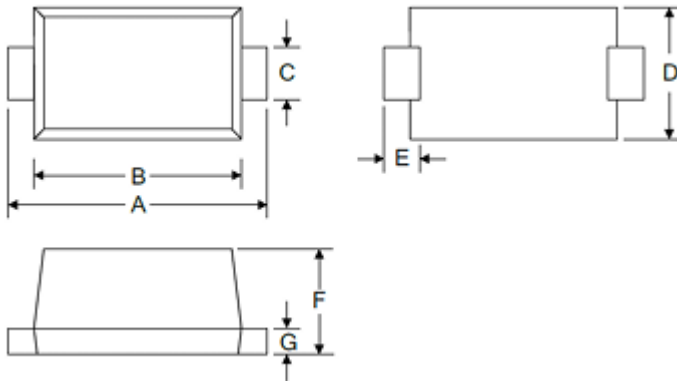
1. Case: SOD-123FL, molded plastic
2. Epoxy : UL 94V-0 rate flame retardant
3. Terminals: Solderable per MIL-STD-750, method 2026
4. Polarity: Color band denotes cathode end
5. Mounting Position: Any

### ■ Part Number Code

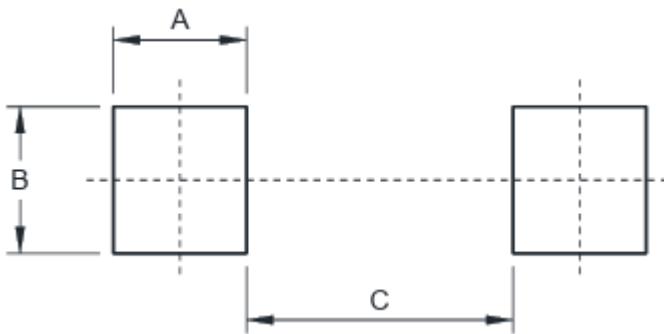


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### Structures and Dimensions



Symbol	Dimensions in millimeters	
	Min	Max
A	3.50	3.90
B	2.60	3.00
C	0.90	1.10
D	1.60	2.00
E	0.80 Typ.	
F	0.90	1.40
G	0.12	0.22



Symbol	Unit (mm)	Unit (inch)
A	1.0	0.039
B	1.1	0.043
C	2.0	0.079

### Maximum Rating ( $T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Peak power dissipation with a 10/1000 $\mu\text{s}$ waveform (Note 1,2)	$P_{PPM}$	200	W
Peak pulse current with 10/1000 $\mu\text{s}$ waveform (Note 1)	$I_{PPM}$	See next table	A
Peak forward surge current, 8.3ms single half sine wave on rated load (Note 3)	$I_{FSM}$	20	A
Power dissipation on infinite heatsink at $T_L=50^\circ\text{C}$	$P_D$	1.0	W
Typical thermal resistance junction to ambient	$R_{\theta JA}$	220	$^\circ\text{C/W}$
Typical thermal resistance junction to lead	$R_{\theta JL}$	100	$^\circ\text{C/W}$
Operating junction and storage temperature range	$T_J, T_{STG}$	-55~+150	$^\circ\text{C}$

Notes : (1) Non-repetitive current pulse, per Fig. 3 and derated above  $T_A=25^\circ\text{C}$  per Fig. 2

(2) Mounted on 5.0 x 5.0mm copper pad 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

# TVS Diode: TPSMF Series



## SMD Type 200 W

### ■ Electrical Characteristics (T<sub>A</sub>=25°C unless otherwise noted)

Part No. (Uni)	Part No. (Bi)	Reverse Stand off Voltage	Breakage Voltage VBR @ IT		Test Current IT( mA )	Maximum Clamping Voltage VC @ Ipp	Maximum Peak Pulse Current Ipp(A)	Maximum Reverse Leakage IR @VRWM	Marking Code	
			VRWM ( V )	Min( V )					Max( V )	Uni
TPSMF5.0A	TPSMF5.0CA	5	6.4	7	10	9.2	21.8	800	AE	WE
TPSMF6.0A	TPSMF6.0CA	6	6.7	7.4	10	10.3	19.4	800	AG	WG
TPSMF6.5A	TPSMF6.5CA	6.5	7.2	8	10	11.2	17.9	500	AK	WK
TPSMF7.0A	TPSMF7.0CA	7	7.8	8.6	10	12	16.7	200	AM	WM
TPSMF7.5A	TPSMF7.5CA	7.5	8.3	9.2	1	12.9	15.5	100	AP	WP
TPSMF8.0A	TPSMF8.0CA	8	8.9	9.8	1	13.6	14.7	50	AR	WR
TPSMF8.5A	TPSMF8.5CA	8.5	9.4	10.4	1	14.4	13.9	10	AT	WT
TPSMF9.0A	TPSMF9.0CA	9	10	11	1	15.4	13	5	AV	WV
TPSMF10A	TPSMF10CA	10	11.1	12.3	1	17	11.8	5	AX	WX
TPSMF11A	TPSMF11CA	11	12.2	13.5	1	18.2	11	1	AZ	WZ
TPSMF12A	TPSMF12CA	12	13.3	14.7	1	19.9	10.1	1	BE	XE
TPSMF13A	TPSMF13CA	13	14.4	15.9	1	21.5	9.3	1	BG	XG
TPSMF14A	TPSMF14CA	14	15.6	17.2	1	23.2	8.6	1	BK	XK
TPSMF15A	TPSMF15CA	15	16.7	18.5	1	24.4	8.2	1	BM	XM
TPSMF16A	TPSMF16CA	16	17.8	19.7	1	26	7.7	1	BP	4XP
TPSMF17A	TPSMF17CA	17	18.9	20.9	1	27.6	7.3	1	BR	XR
TPSMF18A	TPSMF18CA	18	20	22.1	1	29.2	6.9	1	BT	XT
TPSMF20A	TPSMF20CA	20	22.2	24.5	1	32.4	6.2	1	BV	XV
TPSMF22A	TPSMF22CA	22	24.4	26.9	1	35.5	5.7	1	BX	XX
TPSMF24A	TPSMF24CA	24	26.7	29.5	1	38.9	5.2	1	BZ	XZ
TPSMF26A	TPSMF26CA	26	28.9	31.9	1	42.1	4.8	1	CE	YE
TPSMF28A	TPSMF28CA	28	31.1	34.4	1	45.4	4.4	1	CG	YG
TPSMF30A	TPSMF30CA	30	33.3	36.8	1	48.4	4.2	1	CK	YK
TPSMF33A	TPSMF33CA	33	36.7	40.6	1	53.3	3.8	1	CM	YM
TPSMF36A	TPSMF36CA	36	40	44.2	1	58.1	3.5	1	CP	YP
TPSMF40A	TPSMF40CA	40	44.4	49.1	1	64.5	3.1	1	CR	YR
TPSMF43A	TPSMF43CA	43	47.8	52.8	1	69.4	2.9	1	CT	YT
TPSMF45A	TPSMF45CA	45	50	55.3	1	72.7	2.8	1	CV	YV

# TVS Diode: TPSMF Series



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Part No. (Uni)	Part No. (Bi)	Reverse Stand off Voltage	Breakage Voltage VBR @ IT		Test Current IT ( mA )	Maximum Clamping Voltage VC @ Ipp	Maximum Peak Pulse Current Ipp(A)	Maximum Reverse Leakage IR @VRWM	Marking Code	
			VRWM ( V )	Min( V )					Max( V )	Uni
TPSMF48A	TPSMF48CA	48	53.3	58.9	1	77.4	2.6	1	CX	YX
TPSMF51A	TPSMF51CA	51	56.7	62.7	1	82.4	2.5	1	CZ	YZ
TPSMF54A	TPSMF54CA	54	60	66.3	1	87.1	2.3	1	RE	ZE
TPSMF58A	TPSMF58CA	58	64.4	71.2	1	93.6	2.3	1	RG	ZG
TPSMF60A	TPSMF60CA	60	66.7	73.7	1	96.8	2.1	1	RK	ZK
TPSMF64A	TPSMF64CA	64	71.1	78.6	1	103	2	1	RM	ZM
TPSMF70A	TPSMF70CA	70	77.8	86	1	113	1.8	1	RP	ZP
TPSMF75A	TPSMF75CA	75	83.3	92.1	1	121	1.7	1	RR	ZR
TPSMF78A	TPSMF78CA	78	86.7	95.8	1	126	1.6	1	RT	ZT
TPSMF85A	TPSMF85CA	85	94.4	104	1	137	1.5	1	RV	ZV
TPSMF90A	TPSMF90CA	90	100	111	1	146	1.4	1	RX	ZX
TPSMF100A	TPSMF100CA	100	111	123	1	162	1.3	1	RZ	ZZ
TPSMF110A	TPSMF110CA	110	122	135	1	177	1.2	1	SE	VE
TPSMF120A	TPSMF120CA	120	133	147	1	193	1.1	1	SG	VG
TPSMF130A	TPSMF130CA	130	144	159	1	209	1	1	SK	VK
TPSMF150A	TPSMF150CA	150	167	185	1	243	0.8	1	SM	VM
TPSMF160A	TPSMF160CA	160	178	197	1	259	0.8	1	SP	VP
TPSMF170A	TPSMF170CA	170	189	209	1	275	0.8	1	SR	VR
TPSMF180A	TPSMF180CA	180	201	222	1	292	0.7	1	ST	VT
TPSMF200A	TPSMF200CA	200	224	247	1	324	0.6	1	SV	VV

### ■ Rate and Characteristic Curve ( $T_A=25^\circ\text{C}$ unless otherwise noted)

Fig.1 - Peak Pulse Power Rating Curve

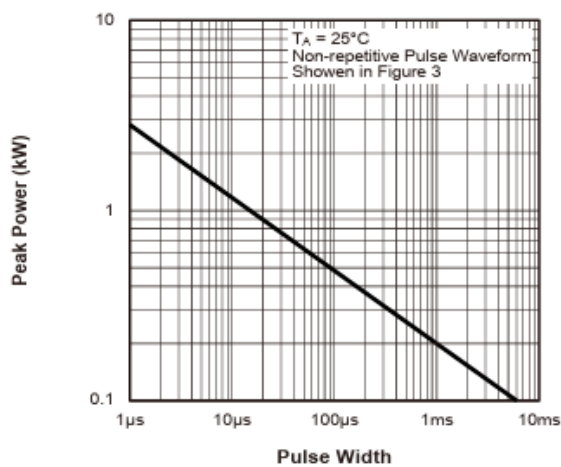


Fig.2 - Pulse Derating Curve

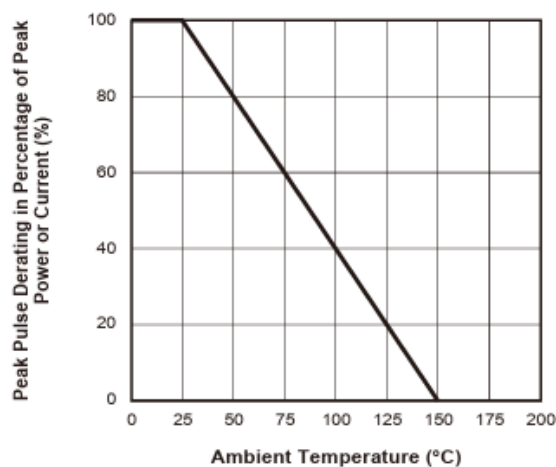


Fig.3 - Pulse Waveform

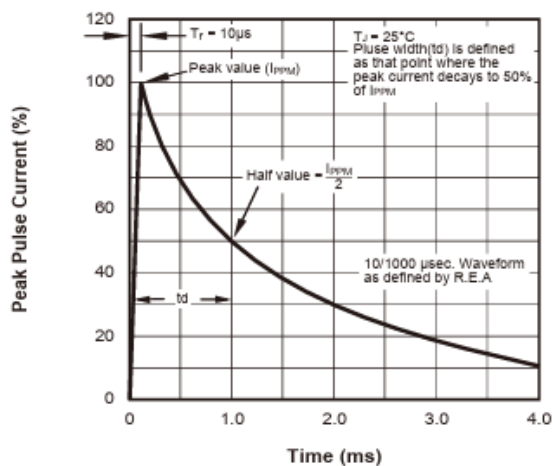
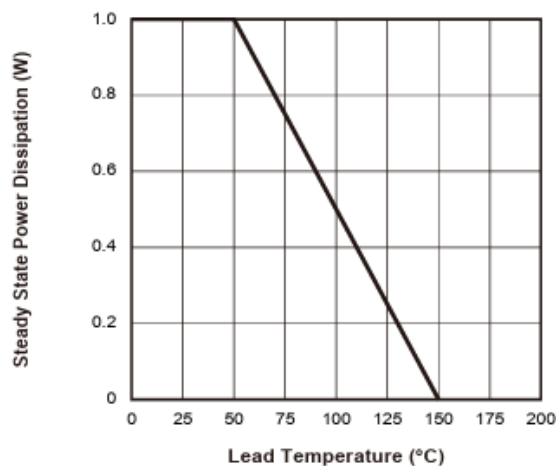
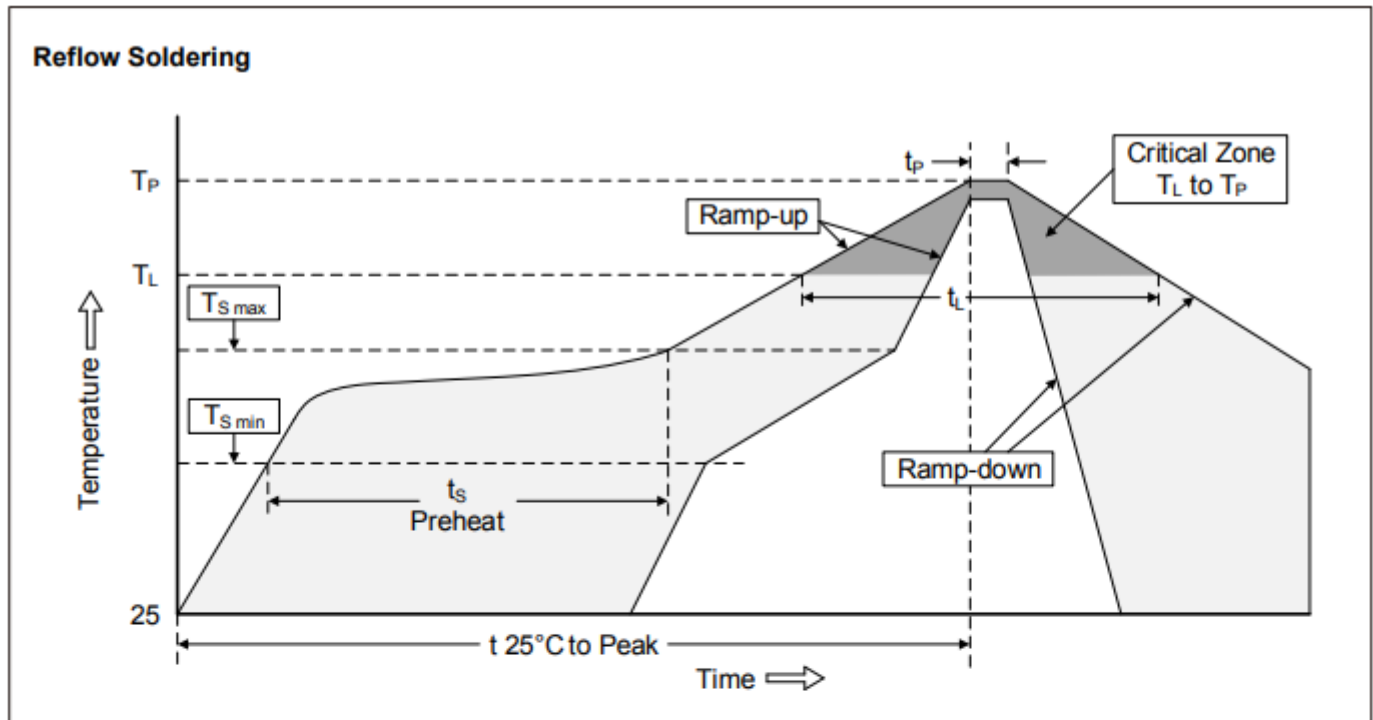


Fig.4 - Steady State Power Derating Curve



### IR-reflow soldering profile

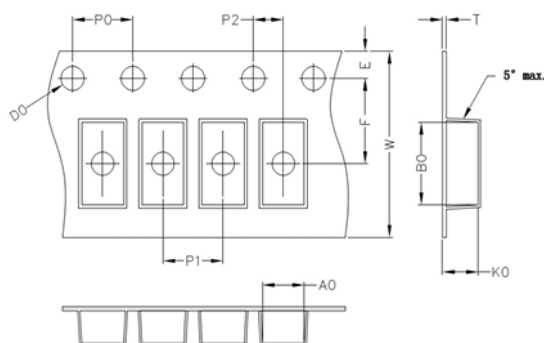


#### Recommended Conditions

Profile Feature	Pb-Free Assembly
Average ramp-up rate ( $T_L$ to $T_P$ )	3°C/second max.
Preheat	
-Temperature Min ( $T_{S\ min}$ )	150°C
-Temperature Max ( $T_{S\ max}$ )	200°C
-Time (min to max) ( $t_s$ )	60-180 seconds
$T_{S\ max}$ to $T_L$	
-Ramp-up Rate	3°C/second max.
Time maintained above:	
-Temperature ( $T_L$ )	217°C
-Time ( $t_L$ )	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.

## SMD Type 200 W

### ■ Packaging



Symbol	A0	B0	K0	D0	E	F
Unit (mm)	2.15±0.1	3.95±0.1	13.5±0.1	1.5±0.1	1.75±0.1	3.5±0.1
Symbol	P0	P1	P2	T	W	
Unit (mm)	4.0±0.1	4.0±0.1	2.0±0.1	0.25±0.1	8.0±0.3	

### ■ Quantity

Series Type	Packaging option	Base quantity	Packaging specification
TPSMF	Tape and reel	3000/reel	EIA STD RS-481

### ■ Warehouse Storage Conditions of product

- Storage Condition:
  1. Storage Temperature:  $\leq 25^{\circ}\text{C}$
  2. Relative Humidity: 50%~80%RH
  3. Keep away from corrosive atmosphere and sunlight.
- Period of Storage: 1 year.