

RoHS 10TPSMB Series



Agency Approvals

AGENCY	AGENCY FILE NUMBER

**Maximum Ratings and Thermal Characteristics
(T_A=25°C unless otherwise noted)**

Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation by 10x1000µs test waveform (Fig.1) (Note 1), (Note 2)	P _{PPM}	1000	W
Steady State Power Dissipation on infinite heat sink at T _A =50°C	P _{MAV}	5.0	W
Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 3)	I _{FSM}	100	A
Maximum Instantaneous Forward Voltage at 50A for Unidirectional only	V _F	3.5	V
Operating Junction and Storage Temperature Range	T _J , T _{STG}	-65 to 175	°C
Typical Thermal Resistance Junction to Terminal	R _{uJT}	20	°C/W
Typical Thermal Resistance Junction to Ambient	R _{uJA}	100	°C/W

Notes:

1. Non-repetitive current pulse, per Fig. 3 and derated above T_A = 25°C per Fig. 2.
2. Mounted on copper pad area of 0.2x0.2" (5X5mm) per Fig. 5.
3. Measured on 8.3ms single half sine wave or equivalent square wave, duty cycle=4 per minute maximum.

Description

The 10TPSMB Series is packaged in a highly reliable industry standard DO-214AA surface mount package and is designed to provide precision overvoltage protection for sensitive electronics.

Features

- RoHS compliant
- For surface mounted applications in order to optimize board space
- Low profile package
- Built-in strain relief
- Typical maximum temperature coefficient $\Delta V_{BR} = 0.1\% \times V_{BR} @ 25^\circ\text{C}$
- Glass passivated chip junction
- 1000W peak pulse capability at 10x1000µs waveform, repetition rate (duty cycles):0.01 %
- Fast response time: typically less than 1.0ps from 0 Volts to BV min
- Excellent clamping capability
- Low incremental surge resistance
- Typical I_R less than 1µA above 13V
- High temperature soldering guaranteed: 260°C/40 seconds at terminals
- Plastic package has Underwriters Laboratory Flammability classification 94V-O
- Matte Tin Lead-free plated
- Available in breakdown Voltage from 6.8V to 160V specially designed for automotive applications
- Offers High-Surge rating in compact package: bridges the gap between 600W and 1.5KW.

Applications

Designed to protect sensitive electronics which operate within an automotive system, such as:

- Sound Systems
- Satellite Navigation
- Climate Control
- Engine Management
- Stability Control
- ABS, Etc.

Electrical Characteristics ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Part Number (Uni)	Part Number (Bi)	Marking		Breakdown Voltage V_{BR} (Volts) @ I_T		Test Current I_T (mA)	Reverse Stand off Voltage V_R (Volts)	Maximum Reverse Leakage I_R @ V_R (μA)	$T_J=150^{\circ}\text{C}$ Max. Reverse Leakage I_R @ V_R (μA)	Maximum Peak Pulse Current I_{PP} (A)	Maximum Clamping Voltage V_C @ I_{PP} (V)	Agency Approval 
		UNI	BI	MIN	MAX							
10TPSMB12A	10TPSMB12CA	P12A	P12C	11.4	12.6	1.0	10.2	2.0	7.5	59.9	16.7	
10TPSMB13A	10TPSMB13CA	P13A	P13C	12.4	13.7	1.0	11.1	2.0	7.5	54.9	18.2	
10TPSMB15A	10TPSMB15CA	P15A	P15C	14.3	15.8	1.0	12.8	1.0	7.5	47.2	21.2	
10TPSMB16A	10TPSMB16CA	P16A	P16C	15.2	16.8	1.0	13.6	1.0	7.5	44.4	22.5	
10TPSMB18A	10TPSMB18CA	P18A	P18C	17.1	18.9	1.0	15.3	1.0	7.5	39.2	25.2	
10TPSMB20A	10TPSMB20CA	P20A	P20C	19.0	21.0	1.0	17.1	1.0	7.5	36.1	27.7	
10TPSMB22A	10TPSMB22CA	P22A	P22C	20.9	23.1	1.0	18.8	1.0	7.5	32.7	30.6	
10TPSMB24A	10TPSMB24CA	P24A	P24C	22.8	25.2	1.0	20.5	1.0	7.5	30.1	33.2	
10TPSMB27A	10TPSMB27CA	P27A	P27C	25.7	28.4	1.0	23.1	1.0	7.5	26.7	37.5	
10TPSMB30A	10TPSMB30CA	P30A	P30C	28.5	31.5	1.0	25.6	1.0	7.5	24.2	41.4	
10TPSMB33A	10TPSMB33CA	P33A	P33C	31.4	34.7	1.0	28.2	1.0	7.5	21.9	45.7	
10TPSMB36A	10TPSMB36CA	P36A	P36C	34.2	37.8	1.0	30.8	1.0	7.5	20.0	49.9	
10TPSMB39A	10TPSMB39CA	P39A	P39C	37.1	41.0	1.0	33.3	1.0	7.5	18.6	53.9	
10TPSMB43A	10TPSMB43CA	P43A	P43C	40.9	45.2	1.0	36.8	1.0	7.5	16.9	59.3	
10TPSMB47A	10TPSMB47CA	P47A	P47C	44.7	49.4	1.0	40.2	1.0	7.5	15.4	64.8	

Notes:

1. V_{BR} measured after I_T applied for 300 μs , I_T = square wave pulse or equivalent.
2. Surge current waveform per 10 x 1000 μs exponential wave and derated per Fig. 2.
3. All terms and symbols are consistent with ANSI/IEEE C62.35.

Ratings and Characteristic Curves ($T_A=25^\circ\text{C}$ unless otherwise noted)

Figure 1 - Peak Pulse Power Rating Curve

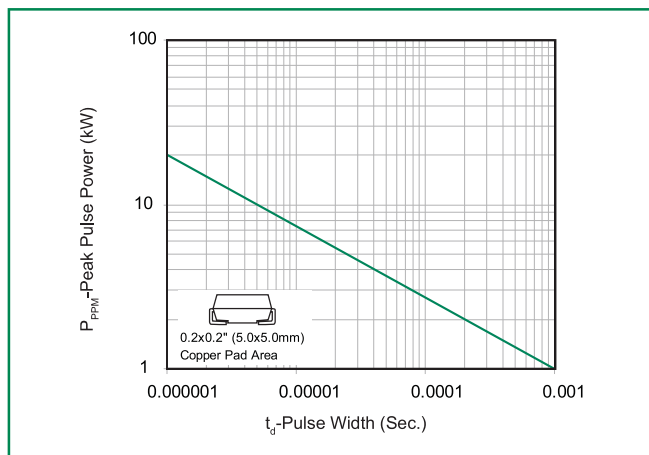


Figure 2 - Pulse Derating Curve

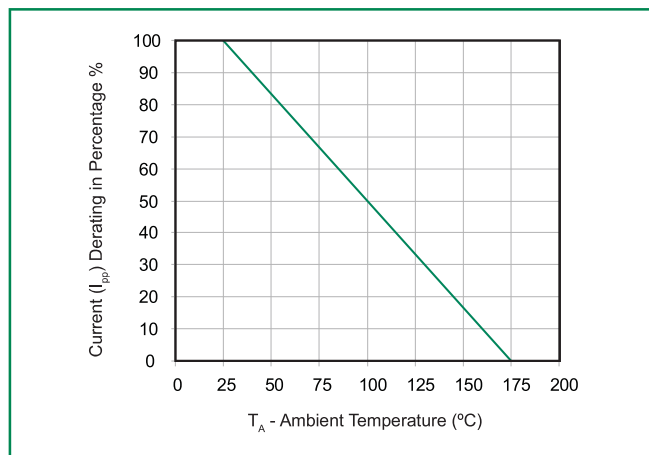


Figure 3 - Pulse Waveform

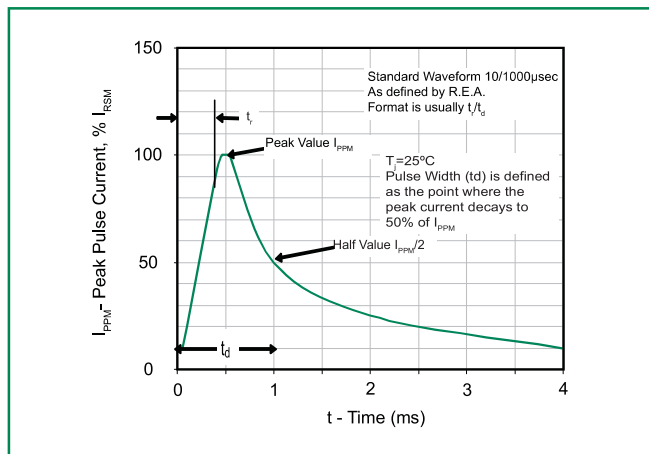


Figure 4 - Typical Junction Capacitance

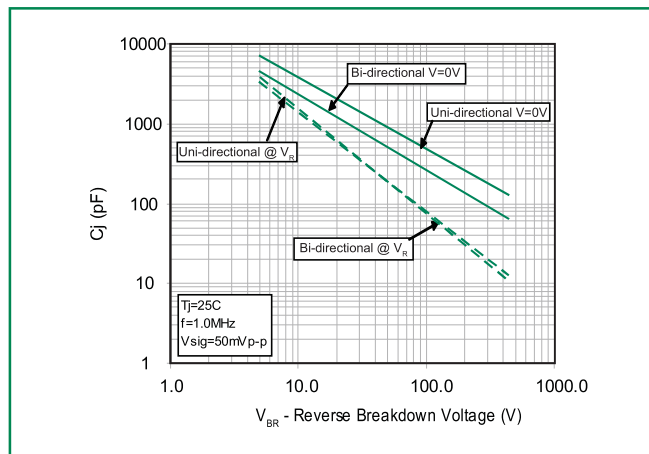


Figure 5 - Steady State Power Derating Curve

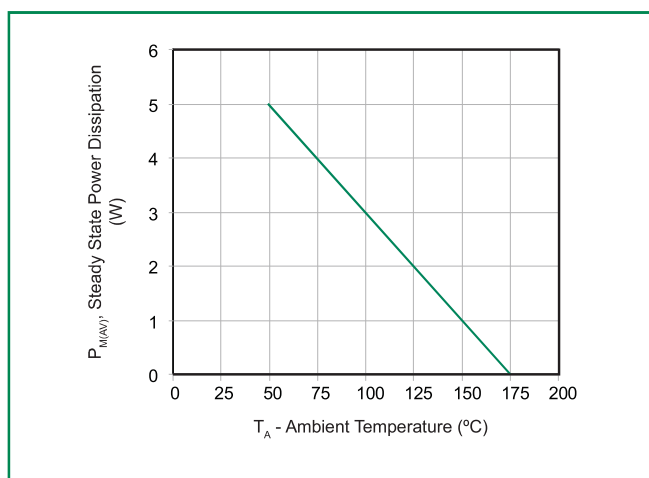
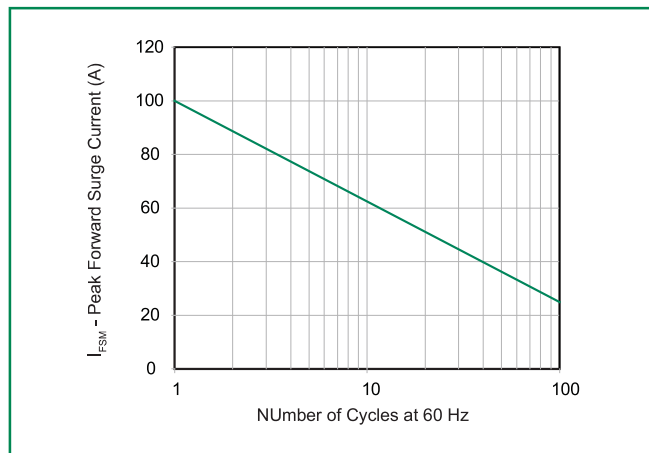
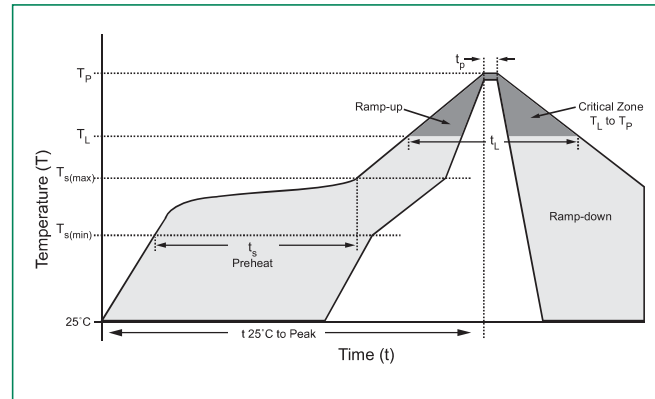


Figure 6 - Maximum Non-Repetitive Peak Forward Surge Current for Uni-Directional Only



Soldering Parameters

Reflow Condition		Lead-free assembly
Pre Heat	- Temperature Min ($T_{s(min)}$)	150°C
	- Temperature Max ($T_{s(max)}$)	200°C
	- Time (min to max) (t_s)	60 – 180 secs
Average ramp up rate (Liquidus Temp (T_L) to peak		3°C/second max
$T_{s(max)}$ to T_L - Ramp-up Rate		3°C/second max
Reflow	- Temperature (T_L) (Liquidus)	217°C
	- Time (min to max) (t_s)	60 – 150 seconds
Peak Temperature (T_p)		260 ^{+0/-5} °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 (T_p)		8 minutes Max.
Do not exceed		280°C



Physical Specifications

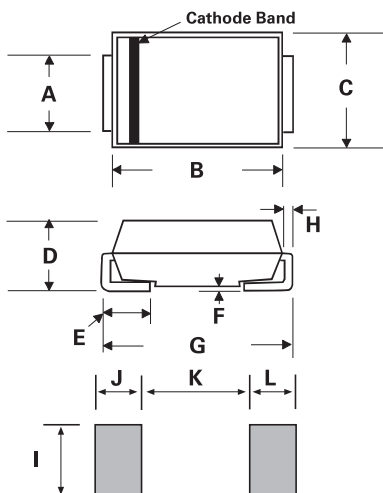
Weight	0.003 ounce, 0.093 grams
Case	JEDEC DO214AA. Molded plastic body over glass passivated junction
Polarity	Color band denotes cathode except Bidirectional.
Terminal	Matte Tin-plated leads, Solderable per JESD22-B102D

Environmental Specifications

Temperature Cycle	JESD22-A104
Pressure Cooker	JESD 22-A102
High Temp. Storage	JESD22-A103
HTRB	JESD22-A108
Thermal Shock	JESD22-A106

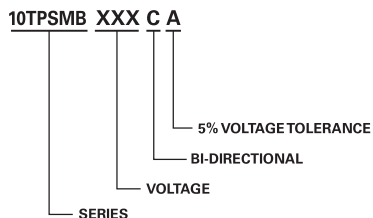
Dimensions

DO-214AA (SMB J-Bend)

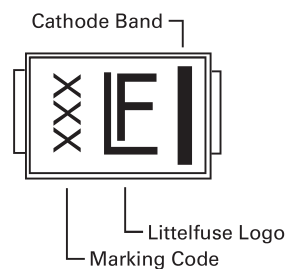


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.077	0.086	1.950	2.200
B	0.160	0.180	4.060	4.570
C	0.130	0.155	3.300	3.940
D	0.084	0.096	2.130	2.440
E	0.030	0.060	0.760	1.520
F	-	0.008	-	0.203
G	0.205	0.220	5.210	5.590
H	0.006	0.012	0.152	0.305
I	0.088	-	2.260	-
J	0.085	-	2.160	-
K	-	0.107	-	2.740
L	0.085	-	2.160	-

Part Numbering System



Part Marking System



Packaging

Part number	Component Package	Quantity	Packaging Option	Packaging Specification
10TPSMBxxxXX	DO-214AA	3000	Tape & Reel – 12mm/13" tape	EIA STD RS-481