Surface Mount TRANSZORB® Transient Voltage Suppressors

PRIMARY CHARACTERISTICS	
V_{WM}	3.3 V to 5.0 V
V_{BR}	4.1 V to 7.07 V
P_{PPM}	150 W
T_J max.	150 °C
Polarity	Uni-directional
Package	MicroSMP

FEATURES

AUTOMOTIVE GRADE Available

RoHS COMPLIANT HALOGEN FREE

- Very low profile - typical height of 0.65 mm
- Ideal for automated placement
- Oxide planar chip junction
- Uni-directional polarity only
- Peak pulse power: 150 W (10/1000 µs)
- ESD capability: **15 kV (air), 8 kV (contact)**
- Meets MSL level 1, per J-STD-020C, LF maximum peak of 260 °C
- AEC-Q101 qualified
- Not recommended for PCB bottom side wave mounting
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912

TYPICAL APPLICATIONS

Use in sensitive electronics protection against voltage transients induced by inductive load switching and lighting on ICs, MOSFET, signal lines of sensor units for protecting sensitive equipment against transient overvoltages.

MECHANICAL DATA

Case: MicroSMP
Molding compound meets UL 94 V-0 flammability rating
Base P/N-M3 - halogen-free, RoHS-compliant, and commercial grade
Base P/NHM3 - halogen-free, RoHS-compliant, and automotive grade

Terminals: Matte tin plated leads, solderable per J-STD-002 and JESD 22-B102
M3 suffix meets JESD 201 class 2 whisker test, HM3 suffix meets JESD 201 class 2 whisker test

Polarity: Color band denotes the cathode end

MAXIMUM RATINGS (T_A = 25 °C unless otherwise noted)				
PARAMETER		**SYMBOL**	**VALUE**	**UNIT**
Peak power dissipation with a 10/1000 µs waveform (fig. 1)		P_{PPM} (1)(2)	150	W
Peak pulse current with a 10/1000 µs waveform		I_{PPM} (1)	See next table	A
Power dissipation	T_M = 120 °C	P_D (2)	1.0	W
Power dissipation	T_A = 25 °C	P_D (3)	0.5	W
Operating junction and storage temperature range		T_J, T_{STG}	- 55 to + 150	°C

Notes
(1) Non-repetitive current pulse, per fig. 1
(2) Mounted on 6.0 mm x 6.0 mm copper pads to each terminal
(3) Mounted on minimum recommended pad layout

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ELECTRICAL CHARACTERISTICS (T_A = 25 °C unless otherwise noted)												
DEVICE TYPE	DEVICE MARKING CODE	BREAKDOWN VOLTAGE V_{BR} AT I_T (1) (V)		TEST CURRENT I_T (mA)	STAND-OFF VOLTAGE V_{WM} (V)	MAXIMUM REVERSE LEAKAGE CURRENT I_R AT V_{WM} (µA)	MAXIMUM V_C AT I_{PPM}		R_D	MAXIMUM V_C AT I_{PPM}		R_D
							10/1000 µs			8/20 µs		
		MIN.	MAX.				V_C (V)	I_{PPM} (A)	R_D (Ω)	V_C (V)	I_{PPM} (A)	R_D (Ω)
MSP3V3	KC	4.10	5.10	1.0	3.3	200	7.6	19.7	0.127	11.5	87	0.074
MSP5.0A	AE	6.40	7.07	10	5.0	100	9.2	16.3	0.131	13.4	75	0.085

Notes

- To calculate maximum clamping voltage at surge current uses the following formula: $V_{CL\ max.} = R_D \times I_{PP} + V_{BR\ max.}$

(1) Pulse test: $t_p \leq 50$ ms

THERMAL CHARACTERISTICS (T_A = 25 °C unless otherwise noted)			
PARAMETER	SYMBOL	VALUE	UNIT
Typical thermal resistance	$R_{\theta JA}$ (1)	250	°C/W
	$R_{\theta JM}$ (2)	30	

Notes

(1) Free air, mounted on recommended PCB 1 oz. pad area; thermal resistance $R_{\theta JA}$ - junction to ambient

(2) Units mounted on PCB with 6.0 mm x 6.0 mm copper pad areas; $R_{\theta JM}$ - junction to mount

IMMUNITY TO STATIC ELECTRICAL DISCHARGE TO THE FOLLOWING STANDARDS (T_A = 25 °C unless otherwise noted)					
STANDARD	TEST TYPE	TEST CONDITIONS	SYMBOL	CLASS	VALUE
AEC-Q101-001	Human body model (contact mode)	C = 100 pF, R = 1.5 kΩ	V_C	H3B	> 8 kV
IEC 61000-4-2 (2)	Human body model (air discharge mode) (1)	C = 150 pF, R = 330 Ω		4	> 15 kV

Notes

(1) Immunity to IEC 61000-4-2 air discharge mode has a typical performance > 30 kV

(2) System ESD standard

ORDERING INFORMATION (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
MSP3V3-M3/89A	0.006	89A	4500	7" diameter plastic tape and reel
MSP3V3HM3/89A (1)	0.006	89A	4500	7" diameter plastic tape and reel
MSP5.0A-M3/89A	0.006	89A	4500	7" diameter plastic tape and reel
MSP5.0AHM3/89A (1)	0.006	89A	4500	7" diameter plastic tape and reel

Note

(1) Automotive grade

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RATINGS AND CHARACTERISTICS CURVES

(T_A = 25 °C unless otherwise noted)

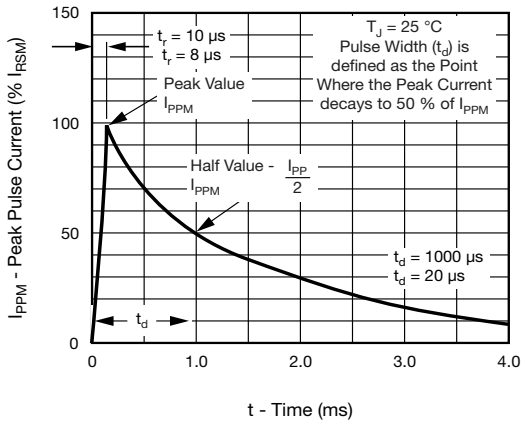

Fig. 1 - Pulse Waveform

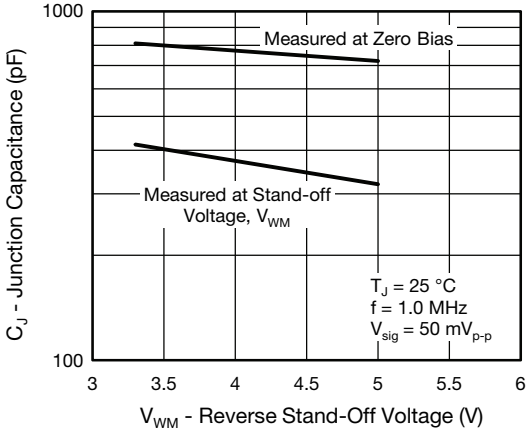

Fig. 4 - Typical Junction Capacitance

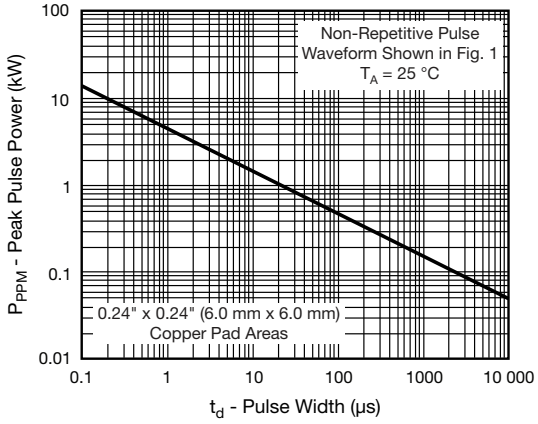

Fig. 2 - Peak Pulse Power Rating Curve

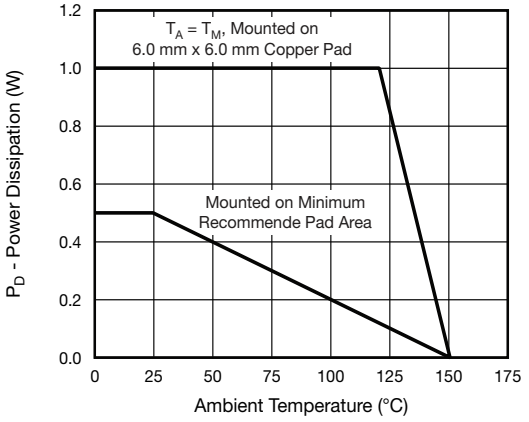

Fig. 5 - Power Dissipation Derating Curve

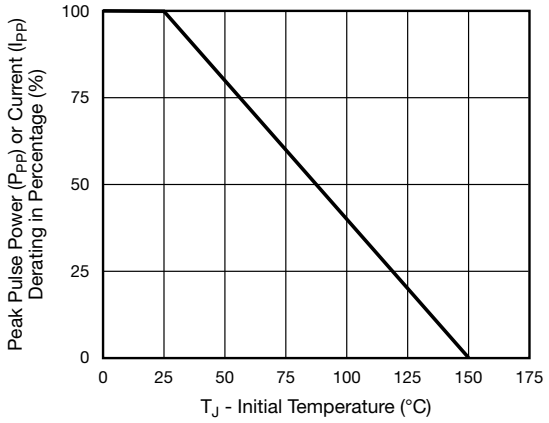

Fig. 3 - Pulse Power or Current vs. Initial Junction Temperature

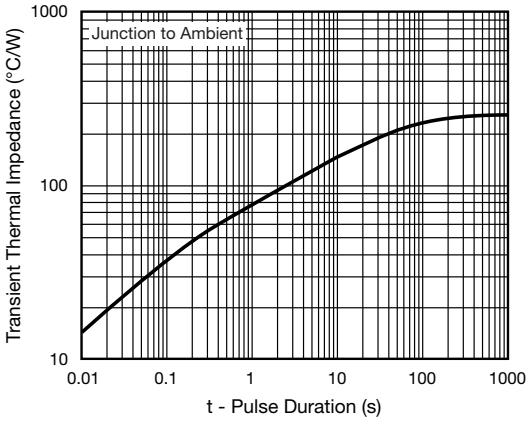

Fig. 6 - Typical Transient Thermal Impedance

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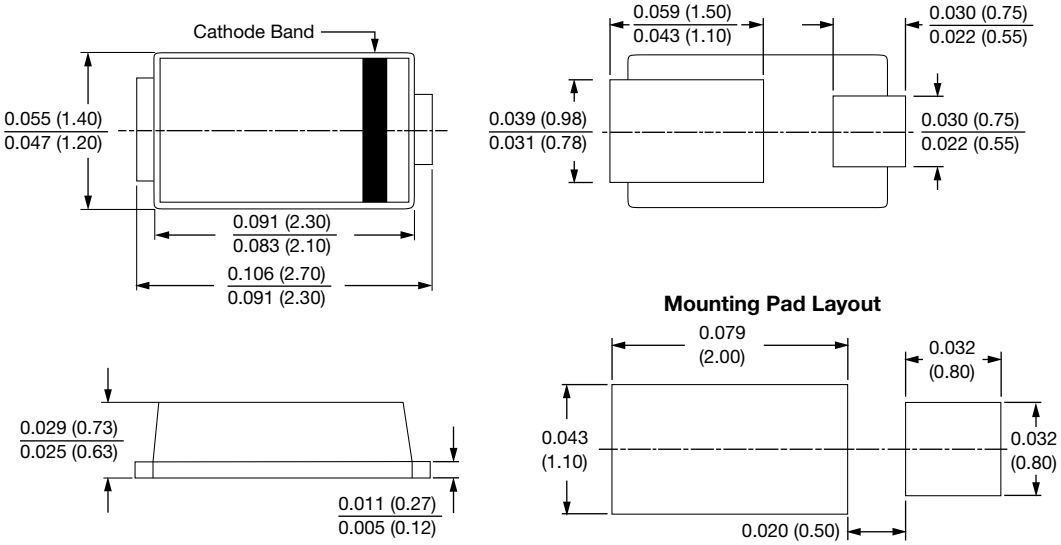
PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

MicroSMP



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