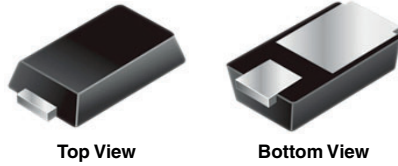




## Surface-Mount TRANSZORB® Transient Voltage Suppressors

### eSMP® Series



MicroSMP (DO-219AD)



### FEATURES

- Very low profile - typical height of 0.65 mm
- Ideal for automated placement
- Oxide planar chip junction
- Unidirectional polarity only
- Peak pulse power: 150 W (10/1000  $\mu$ s)
- 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
  - Automotive ordering code: base P/NHM3 for MSMP6.0A to MSMP8.0A
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



### LINKS TO ADDITIONAL RESOURCES



PRIMARY CHARACTERISTICS	
$V_{BR}$	6.67 V to 24.5 V
$V_{WM}$	6.0 V to 20 V
$P_{PPM}$ (10 x 1000 $\mu$ s)	150 W
$T_J$ max.	150 °C
Polarity	Unidirectional
Package	MicroSMP (DO-219AD)

### 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 (DO-219AD)

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 AEC-Q101 qualified, only available for MSMP6.0A to MSMP8.0A types

**Terminals:** matte tin plated leads, solderable per J-STD-002 and JESD 22-B102

M3 and HM3 suffix meets JESD 201 class 2 whisker test

#### Note

- MSMP8.5A to MSMP20A for industrial grade only

**Polarity:** color band denotes the cathode end

MAXIMUM RATINGS ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)			
PARAMETER	SYMBOL	VALUE	UNIT
Peak power dissipation with a 10/1000 $\mu$ s waveform (fig. 1)	$P_{PPM}^{(1)(2)}$	150	W
Peak pulse current with a 10/1000 $\mu$ s waveform	$I_{PPM}^{(1)}$	See next table	A
Power dissipation $T_M = 120\text{ }^\circ\text{C}$	$P_D^{(2)}$	1.0	W
Power dissipation $T_A = 25\text{ }^\circ\text{C}$	$P_D^{(3)}$	0.5	
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



ELECTRICAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted)													
DEVICE TYPE	DEVICE MARKING CODE	BREAKDOWN VOLTAGE V <sub>BR</sub> AT I <sub>T</sub> (1) (V)		TEST CURRENT I <sub>T</sub> (mA)	STAND-OFF VOLTAGE V <sub>WM</sub> (V)	MAXIMUM REVERSE LEAKAGE CURRENT I <sub>R</sub> AT V <sub>WM</sub> (μA)	MAXIMUM V <sub>C</sub> AT I <sub>PPM</sub>			R <sub>D</sub>	MAXIMUM V <sub>C</sub> AT I <sub>PPM</sub>		
		MIN.	MAX.				10/1000 μs				8/20 μs		
							V <sub>C</sub> (V)	I <sub>PPM</sub> (A)	R <sub>D</sub> (Ω)		V <sub>C</sub> (V)	I <sub>PPM</sub> (A)	R <sub>D</sub> (Ω)
MSMP6.0A	AG	6.67	7.37	10	6.0	200	10.3	14.6	0.201	13.7	73.0	0.087	
MSMP6.5A	AK	7.22	7.98	10	6.5	100	11.2	13.4	0.240	14.5	69.0	0.095	
MSMP7.0A	AM	7.78	8.60	10	7.0	50	12.0	12.5	0.272	15.7	63.7	0.111	
MSMP7.5A	AP	8.33	9.21	1.0	7.5	50	12.9	11.6	0.317	17.0	58.8	0.132	
MSMP8.0A	AR	8.89	9.83	1.0	8.0	20	13.6	11.0	0.342	18.2	54.9	0.152	
MSMP8.5A	AT	9.44	10.4	1.0	8.5	2.0	14.4	10.4	0.384	19.5	51.3	0.177	
MSMP9.0A	AV	10.0	11.1	1.0	9.0	2.0	15.4	9.7	0.441	20.6	48.6	0.195	
MSMP10A	AX	11.1	12.3	1.0	10	1.0	17.0	8.8	0.533	21.7	46.1	0.204	
MSMP11A	AZ	12.2	13.5	1.0	11	1.0	18.2	8.2	0.570	24.4	41.0	0.266	
MSMP12A	BE	13.3	14.7	1.0	12	1.0	19.9	7.5	0.690	25.3	39.5	0.268	
MSMP13A	BG	14.4	15.9	1.0	13	1.0	21.5	7.0	0.803	27.2	36.8	0.307	
MSMP14A	BK	15.6	17.2	1.0	14	1.0	23.2	6.5	0.928	29.5	33.9	0.364	
MSMP15A	BM	16.7	18.5	1.0	15	1.0	24.4	6.2	0.960	32.5	30.8	0.455	
MSMP16A	BP	17.8	19.7	1.0	16	1.0	26.0	5.8	1.092	34.7	28.8	0.520	
MSMP17A	BR	18.9	20.9	1.0	17	1.0	27.6	5.4	1.233	36.8	27.2	0.586	
MSMP18A	BT	20.0	22.1	1.0	18	1.0	29.2	5.1	1.382	39.3	25.4	0.676	
MSMP20A	BV	22.2	24.5	1.0	20	1.0	32.4	4.6	1.706	42.8	23.4	0.783	

Notes

- (1) Pulse test: t<sub>p</sub> ≤ 50 ms
- (2) Surge current waveform per Fig. 1 and derate per Fig. 3
- (3) To calculate maximum clamping voltage at surge current uses the following formula: V<sub>CL max.</sub> = R<sub>D</sub> × I<sub>PP</sub> + V<sub>BR max.</sub>

THERMAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted)			
PARAMETER	SYMBOL	VALUE	UNIT
Typical thermal resistance	R <sub>θJA</sub> (1)	250	°C/W
	R <sub>θJM</sub> (2)	30	

Notes

- (1) Free air, mounted on recommended PCB 1 oz. pad area; thermal resistance R<sub>θJA</sub> - junction to ambient
- (2) Units mounted on PCB with 6.0 mm x 6.0 mm copper pad areas; R<sub>θJM</sub> - junction to mount

IMMUNITY TO STATIC ELECTRICAL DISCHARGE TO THE FOLLOWING STANDARDS (T <sub>A</sub> = 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 <sub>C</sub>	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
MSMP6.0A-M3/89A (1)	0.006	89A	4500	7" diameter plastic tape and reel
MSMP6.0AHM3/H (2)	0.006	H	4500	7" diameter plastic tape and reel

Note

- (1) Available for MSMP6.0A to MSMP20A
- (2) AEC-Q101 qualified, is available for MSMP6.0A to MSMP8.0A only



**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^\circ\text{C}$  unless otherwise noted)

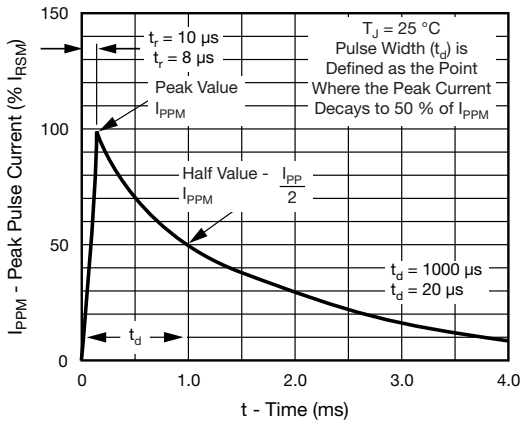


Fig. 1 - Pulse Waveform

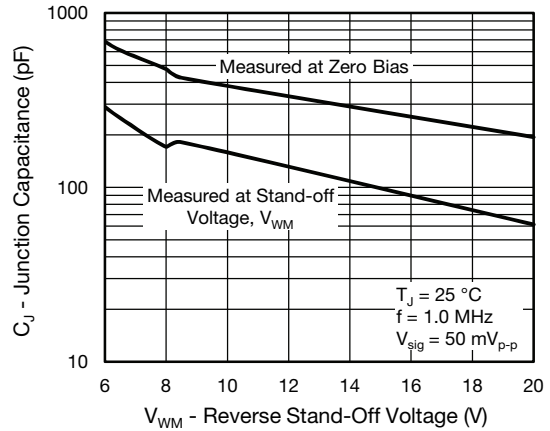


Fig. 4 - Typical Junction Capacitance

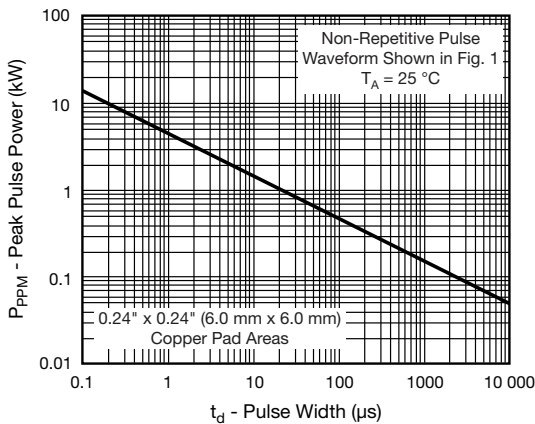


Fig. 2 - Peak Pulse Power Rating Curve

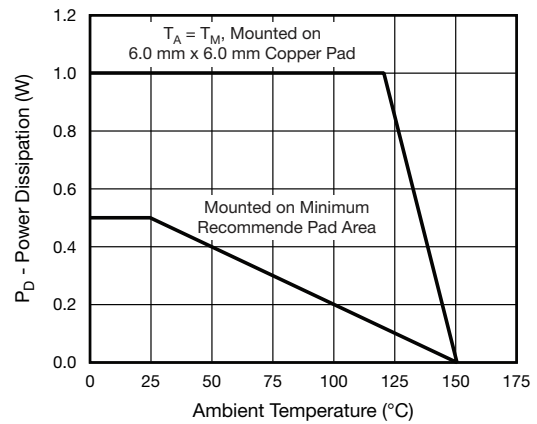


Fig. 5 - Power Dissipation Derating Curve

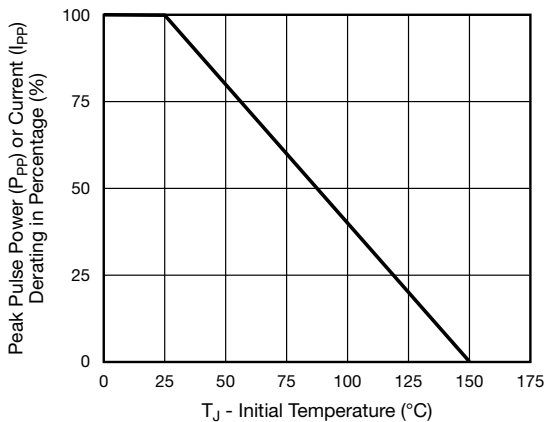


Fig. 3 - Pulse Power or Current vs. Initial Junction Temperature

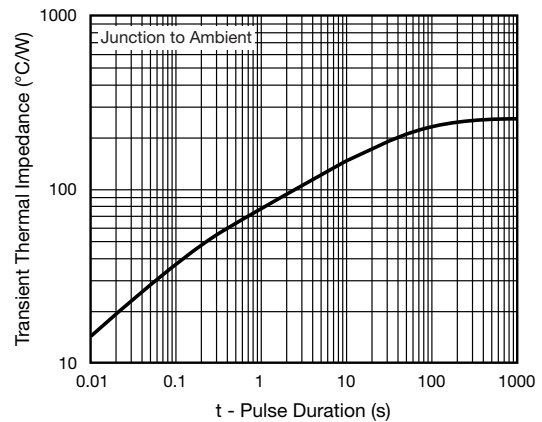
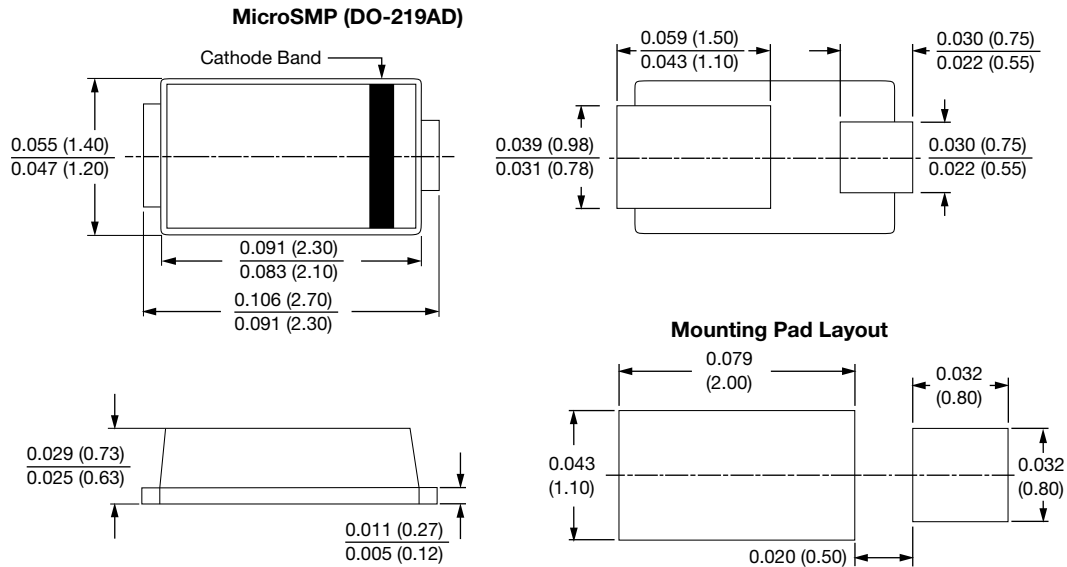


Fig. 6 - Typical Transient Thermal Impedance



### PACKAGE OUTLINE DIMENSIONS in inches (millimeters)





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