



Surface Mount TRANSZORB® Transient Voltage Suppressors

eSMP® Series



Top View

Bottom View

MicroSMP (DO-219AD)



FEATURES

- 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 μ s)
- ESD capability: **15 kV (air), 8 kV (contact)**
- Meets MSL level 1, per J-STD-020C, LF maximum peak of 260 °C
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE

DESIGN SUPPORT TOOLS

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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

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

M3 suffix meets JESD 201 class 2 whisker test

Polarity: color band denotes the cathode end

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

MAXIMUM RATINGS ($T_A = 25$ °C unless otherwise noted)				
PARAMETER		SYMBOL	VALUE	UNIT
Peak power dissipation with a 10/1000 μ s waveform (fig. 1)		$P_{PPM}^{(1)(2)}$	150	W
Peak pulse current with a 10/1000 μ s 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	
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 ($T_A = 25\text{ }^\circ\text{C}$ 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
		MIN.	MAX.				10/1000 μs				8/20 μs			
							V_C (V)	I_{PPM} (A)	R_D (Ω)		V_C (V)	I_{PPM} (A)	R_D (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: $t_p \leq 50\text{ ms}$
(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: $V_{CL\text{ max.}} = R_D \times I_{PP} + V_{BR\text{ max.}}$

THERMAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)			
PARAMETER	SYMBOL	VALUE	UNIT
Typical thermal resistance	$R_{\theta JA}$ ⁽¹⁾	250	$^\circ\text{C/W}$
	$R_{\theta JM}$ ⁽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 ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)					
STANDARD	TEST TYPE	TEST CONDITIONS	SYMBOL	CLASS	VALUE
AEC-Q101-001	Human body model (contact mode)	$C = 100\text{ pF}$, $R = 1.5\text{ k}\Omega$	V_C	H3B	> 8 kV
IEC 61000-4-2 ⁽²⁾	Human body model (air discharge mode) ⁽¹⁾	$C = 150\text{ pF}$, $R = 330\text{ }\Omega$		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	0.006	89A	4500	7" diameter plastic tape and reel



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

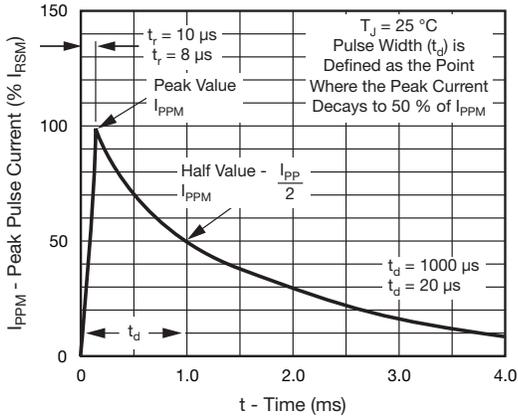


Fig. 1 - Pulse Waveform

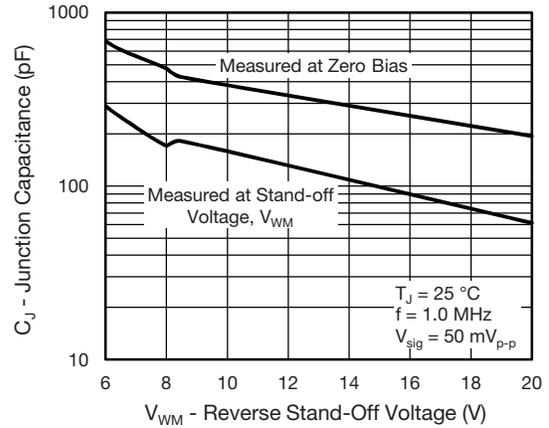


Fig. 4 - Typical Junction Capacitance

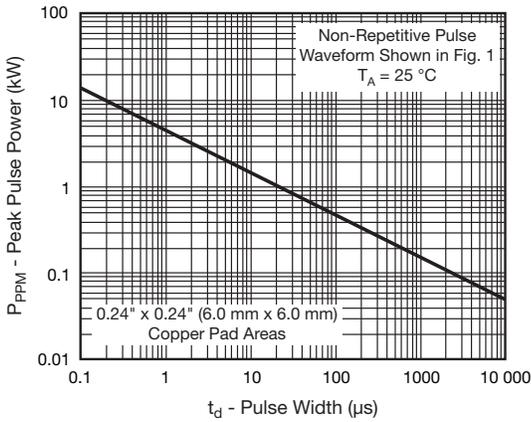


Fig. 2 - Peak Pulse Power Rating Curve

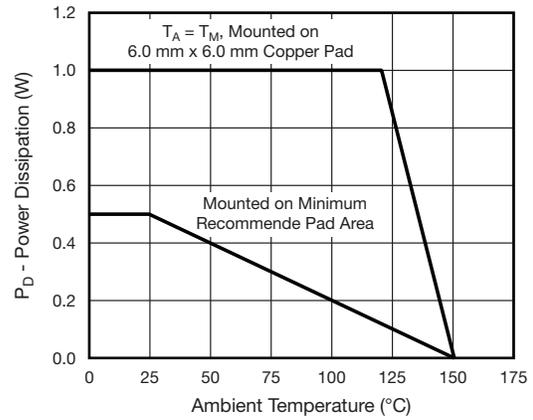


Fig. 5 - Power Dissipation Derating Curve

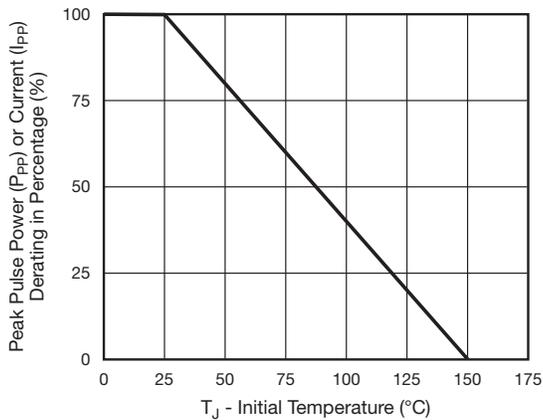


Fig. 3 - Pulse Power or Current vs. Initial Junction Temperature

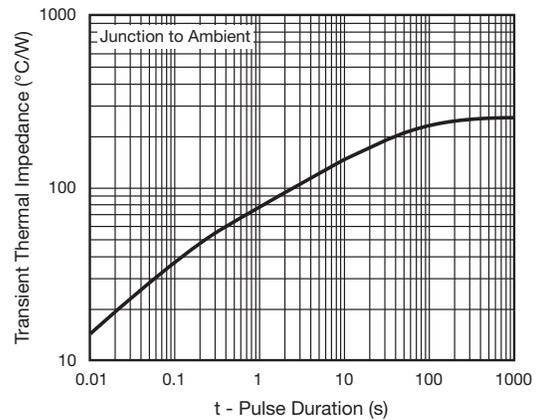
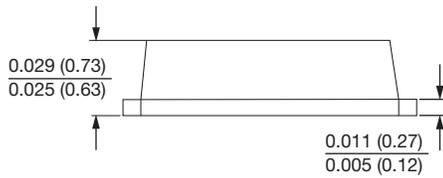
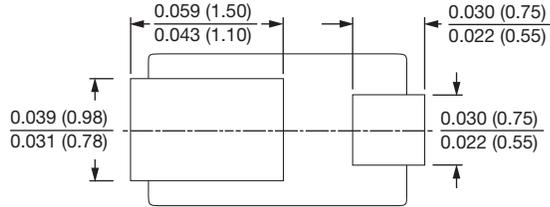
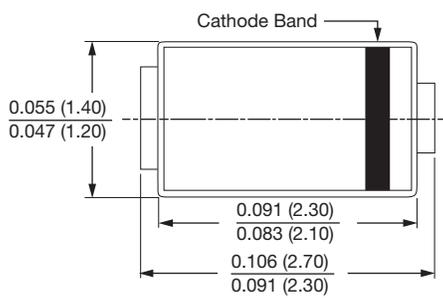


Fig. 6 - Typical Transient Thermal Impedance

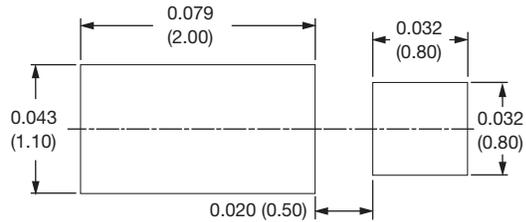


PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

MicroSMP (DO-219AD)



Mounting Pad Layout





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