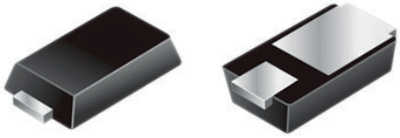
Surface-Mount TRANSZORB® Transient Voltage Suppressors

eSMP® Series



Top View Bottom View

MicroSMP (DO-219AD)

Cathode ○—▶|—○ Anode

LINKS TO ADDITIONAL RESOURCES

3D Models

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

FEATURES

AUTOMOTIVE GRADE

RoHS COMPLIANT

HALOGEN FREE

- 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 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
  - 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

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 °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	
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 °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)
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: $t_p \leq 50$ 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: $V_{CL\ max.} = R_D \times I_{PP} + V_{BR\ max.}$

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
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 °C unless otherwise noted)

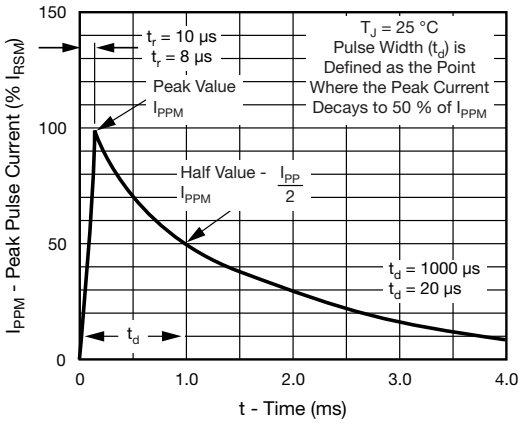


Fig. 1 - Pulse Waveform

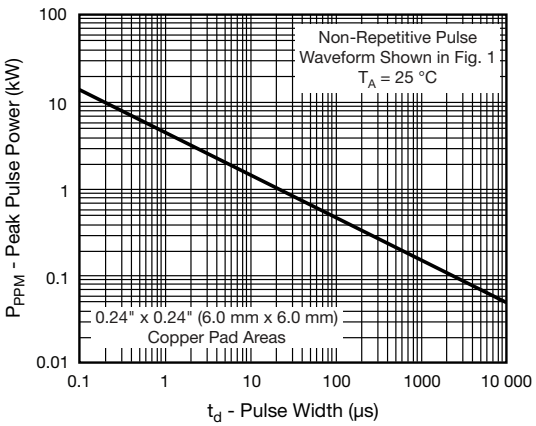


Fig. 2 - Peak Pulse Power Rating Curve

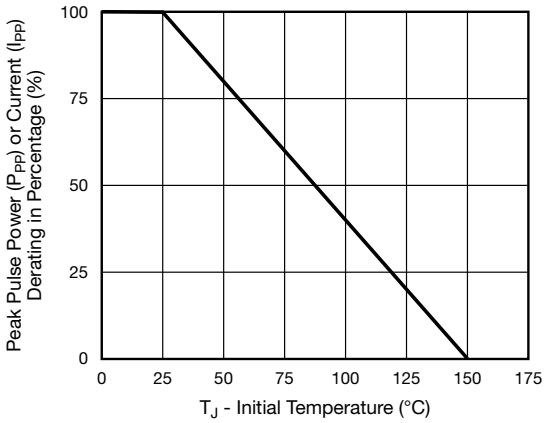


Fig. 3 - Pulse Power or Current vs. Initial Junction Temperature

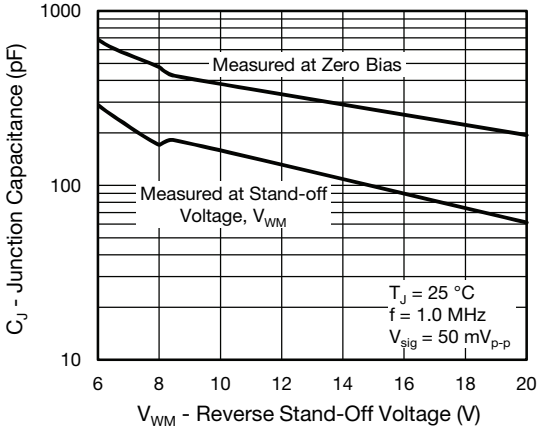


Fig. 4 - Typical Junction Capacitance

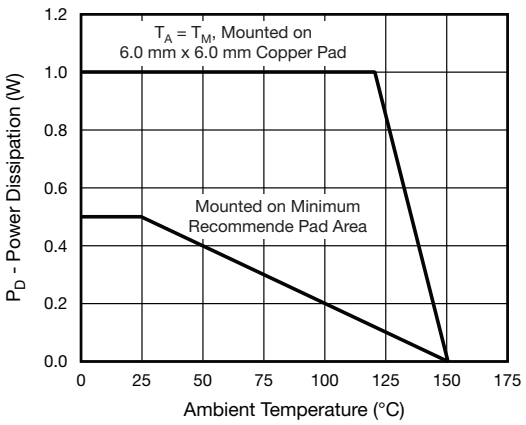


Fig. 5 - Power Dissipation Derating Curve

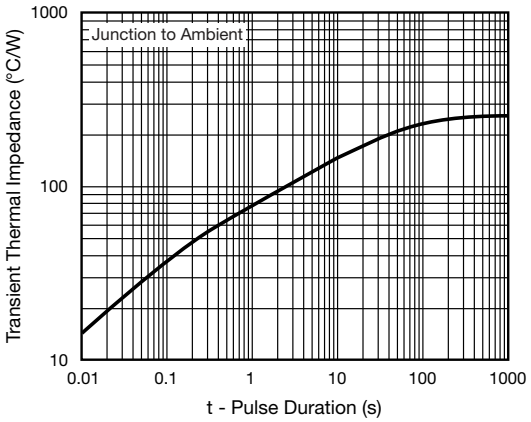
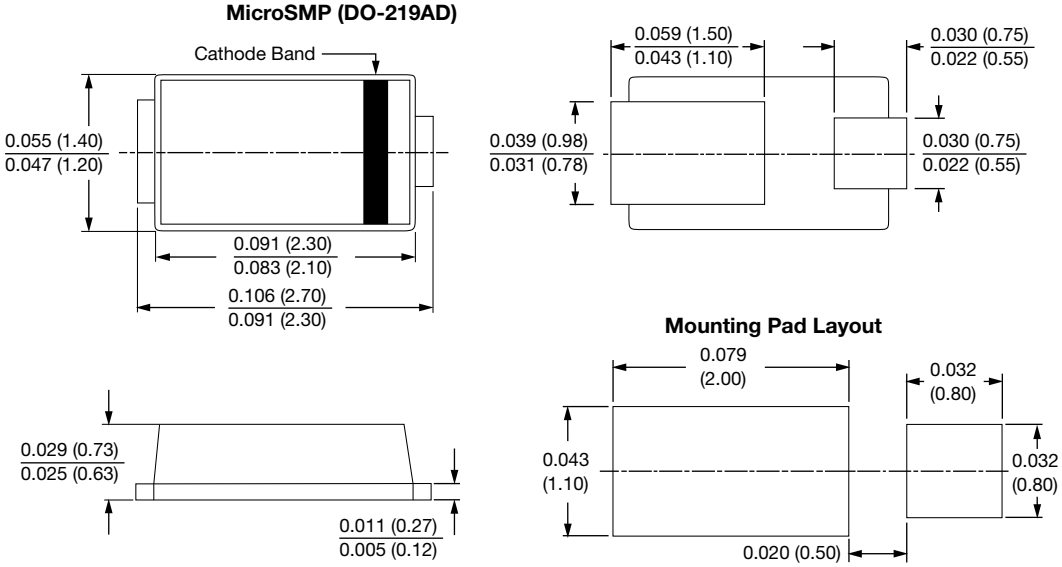


Fig. 6 - Typical Transient Thermal Impedance

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

MicroSMP (DO-219AD)



Mounting Pad Layout

Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, “Vishay”), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.