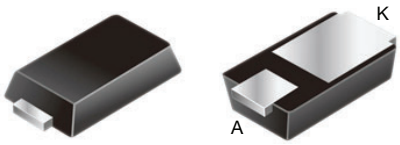
Surface-Mount ESD Capability Rectifier

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
- Low forward voltage drop, low leakage current
- ESD capability
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified available
  - Automotive ordering code: base P/NHM3
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

LINKS TO ADDITIONAL RESOURCES

3D Models

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	1.0 A
V_{RRM}	100 V, 200 V, 400 V, 600 V
I_{FSM}	18 A
V_F at I_F = 1.0 A (125 °C)	0.9 V
T_J max.	175 °C
Package	MicroSMP (DO-219AD)
Circuit configuration	Single

TYPICAL APPLICATIONS

General purpose, polarity protection, and rail-to-rail protection in commercial, industrial, and automotive applications.

MECHANICAL DATA

Case: MicroSMP (DO-219AD)
Molding compound meets UL 94 V-0 flammability rating
Base P/N-M3 - halogen-free and RoHS-compliant
Base P/NHM3 - halogen-free, RoHS-compliant, and AEC-Q101 qualified

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

Polarity: color band denotes the cathode end

MAXIMUM RATINGS (T_A = 25 °C unless otherwise noted)						
PARAMETER	**SYMBOL**	**MSX1PB**	**MSX1PD**	**MSX1PG**	**MSX1PJ**	**UNIT**
Device marking code		XB	XD	XG	XJ	
Maximum repetitive peak reverse voltage	V_{RRM}	100	200	400	600	V
Maximum average forward rectified current	$I_{F(AV)}$	1.0				A
Peak forward surge current 10 ms single half sine-wave superimposed on rated load	I_{FSM}	18				A
Operating junction and storage temperature range	T_J, T_{STG}	-55 to +175				°C

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ELECTRICAL CHARACTERISTICS (T_A = 25 °C unless otherwise noted)						
PARAMETER	**TEST CONDITIONS**		**SYMBOL**	**TYP.**	**MAX.**	**UNIT**
Maximum instantaneous forward voltage	I_F = 0.5 A	T_A = 25 °C	V_F (1)	0.93	-	V
	I_F = 1.0 A			1.0	1.1	
	I_F = 0.5 A	T_A = 125 °C		0.81	-	
	I_F = 1.0 A			0.9	0.98	
Maximum reverse current	Rated V_R	T_A = 25 °C	I_R (2)	-	1.0	µA
		T_A = 125 °C		4.1	50	
Typical reverse recovery time	I_F = 0.5 A, I_R = 1.0 A, I_{rr} = 0.25 A		t_{rr}	960	-	ns
Typical junction capacitance	4.0 V, 1 MHz		C_J	5	-	pF

Notes

(1) Pulse test: 300 µs pulse width, 1 % duty cycle

(2) Pulse test: pulse width ≤ 40 ms

THERMAL CHARACTERISTICS (T_A = 25 °C unless otherwise noted)						
PARAMETER	**SYMBOL**	**MSX1PB**	**MSX1PD**	**MSX1PG**	**MSX1PJ**	**UNIT**
Typical thermal resistance	$R_{\theta JA}$ (1)	110				°C/W
	$R_{\theta JL}$ (1)	30				

Note

(1) Thermal resistance from junction to ambient and junction to lead mounted on PCB with 5.0 mm x 5.0 mm copper pad areas. $R_{\theta JL}$ is measured at the terminal of cathode band

IMMUNITY TO ELECTRICAL STATIC 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
AEC-Q101-002	Machine model (contact mode)	C = 200 pF, R = 0 Ω		M4	> 400 V
JESD 22-A114	Human body model (contact mode)	C = 100 pF, R = 1.5 kΩ		3B	> 8 kV
JESD 22-A115	Machine model (contact mode)	C = 200 pF, R = 0 Ω		C	> 400 V
IEC 61000-4-2 (2)	Human body model (contact mode)	C = 150 pF, R = 330 Ω		4	> 8 kV
	Human body model (air-discharge mode) (1)	C = 150 pF, R = 330 Ω		4	> 15 kV
ISO 10605	Contact mode	C = 330 pF, R = 2 kΩ		-	20 kV typ.

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**
MSX1PJ-M3/89A	0.006	89A	4500	7" diameter plastic tape and reel
MSX1PJHM3/89A (1)	0.006	89A	4500	7" diameter plastic tape and reel

Note

(1) AEC-Q101 qualified

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RATINGS AND CHARACTERISTICS CURVES (T_A = 25 °C unless otherwise noted)

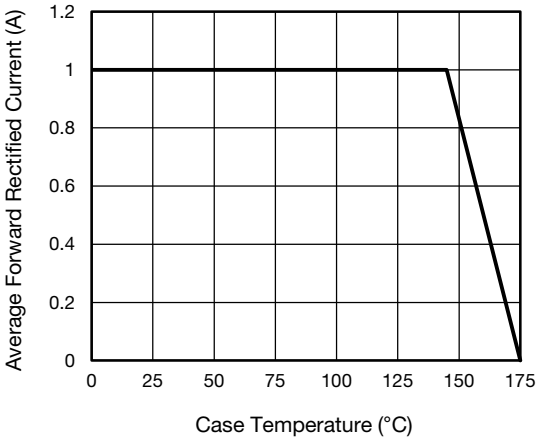

Fig. 1 - Maximum Forward Current Derating Curve

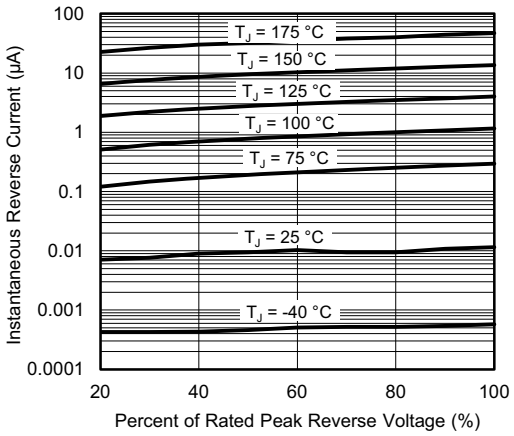

Fig. 4 - Typical Reverse Leakage Characteristics

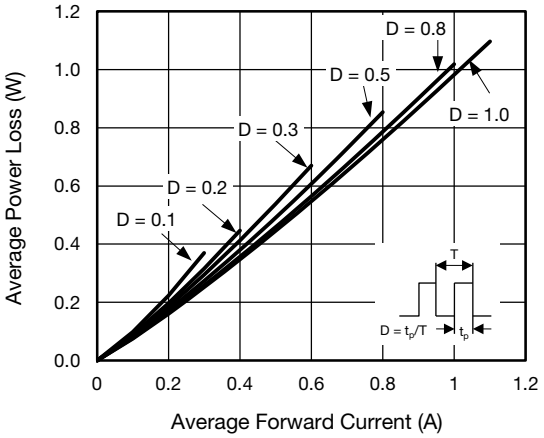

Fig. 2 - Average Power Loss Characteristics

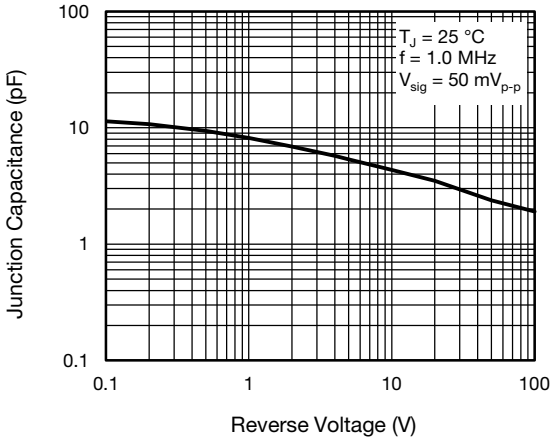

Fig. 5 - Typical Junction Capacitance

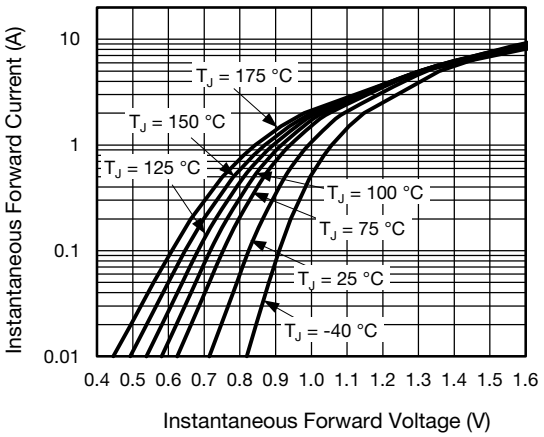

Fig. 3 - Typical Instantaneous Forward Characteristics

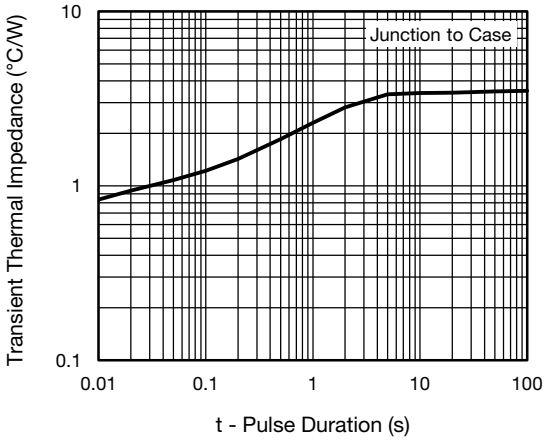

Fig. 6 - Typical Transient Thermal Impedance

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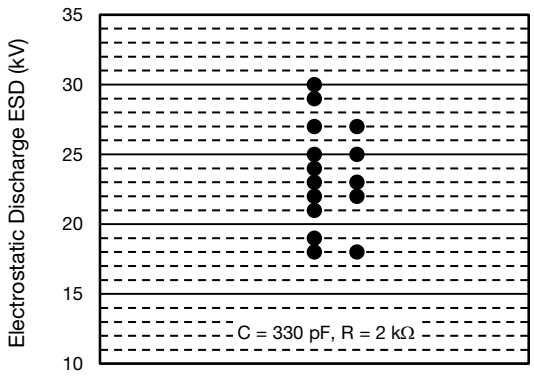
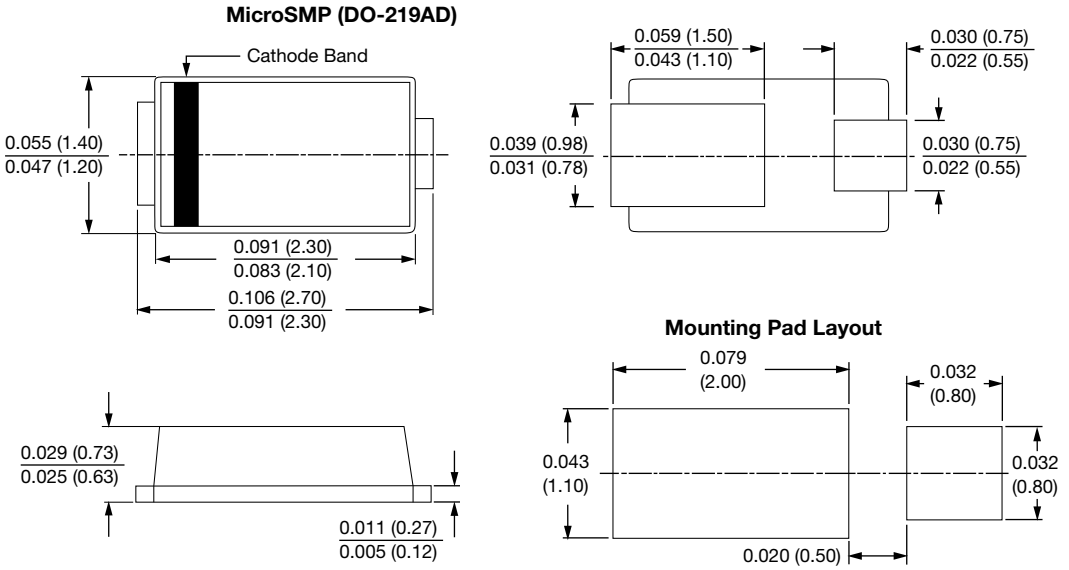


Fig. 7 - ESD Dispersion Map

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)



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