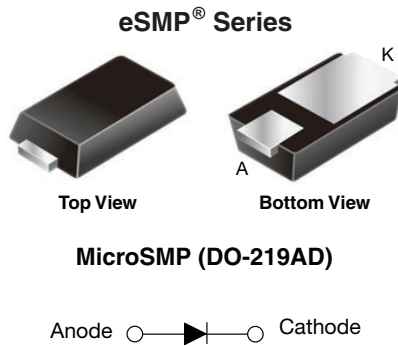




**THE DATASHEET OF  
MSE1PGHM3/89A**



## Surface-Mount ESD Capability Rectifier



### LINKS TO ADDITIONAL RESOURCES


[3D Models](#)

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	1.0 A
$V_{RRM}$	100 V, 200 V, 400 V, 600 V
$I_{FSM}$	20 A
$V_F$ at $I_F = 1.0$ A	0.925 V
$I_R$	1 $\mu$ A
$T_J$ max.	175 °C
Package	MicroSMP (DO-219AD)
Circuit configuration	Single

### 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](http://www.vishay.com/doc?99912)

 AUTOMOTIVE  
GRADE  
Available

**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

### TYPICAL APPLICATIONS

General purpose, polarity protection, and rail-to-rail protection in both consumer and automotive applications.

### 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

**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	MSE1PB	MSE1PD	MSE1PG	MSE1PJ	UNIT
Device marking code		SB	SD	SG	SJ	
Max. repetitive peak reverse voltage	$V_{RRM}$	100	200	400	600	V
Max. average forward rectified current (fig. 1)	$I_{F(AV)}$	1.0				A
Peak forward surge current 10 ms single half sine-wave superimposed on rated load	$I_{FSM}$	20				A
Operating junction and storage temperature range	$T_J, T_{STG}$	-55 to +175				°C



ELECTRICAL CHARACTERISTICS (T <sub>A</sub> = 25 °C, unless otherwise noted)						
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Max. instantaneous forward voltage	I <sub>F</sub> = 0.5 A	T <sub>A</sub> = 25 °C	V <sub>F</sub> <sup>(1)</sup>	0.940	-	V
	I <sub>F</sub> = 1.0 A			1.016	1.1	
	I <sub>F</sub> = 0.5 A	T <sub>A</sub> = 125 °C		0.834	-	
	I <sub>F</sub> = 1.0 A			0.925	0.98	
Max. reverse current	Rated V <sub>R</sub>	T <sub>A</sub> = 25 °C	I <sub>R</sub> <sup>(2)</sup>	-	1.0	μA
		T <sub>A</sub> = 125 °C		3.7	50	
Typical reverse recovery time	I <sub>F</sub> = 0.5 A, I <sub>R</sub> = 1.0 A, I <sub>rr</sub> = 0.25 A		t <sub>rr</sub>	780	-	ns
Typical junction capacitance	4.0 V, 1 MHz		C <sub>J</sub>	5	-	pF

**Notes**

- (1) Pulse test: 300 μs pulse width, 1 % duty cycle
- (2) Pulse test: Pulse width ≤ 40 ms

THERMAL CHARACTERISTICS (T <sub>A</sub> = 25 °C, unless otherwise noted)						
PARAMETER	SYMBOL	MSE1PB	MSE1PD	MSE1PG	MSE1PJ	UNIT
Typical thermal resistance	R <sub>θJA</sub> <sup>(1)</sup>	110				°C/W
	R <sub>θJL</sub> <sup>(1)</sup>	30				
	R <sub>θJC</sub> <sup>(1)</sup>	40				

**Note**

- (1) Thermal resistance from junction to ambient and junction to lead mounted on PCB with 6.0 mm x 6.0 mm copper pad areas. R<sub>θJL</sub> is measured at the terminal of cathode band.

IMMUNITY TO ELECTRICAL STATIC 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
AEC-Q101-002	Machine model (contact mode)	C = 200 pF, R = 0 Ω		M4	> 400 V
JESD22-A114	Human body model (contact mode)	C = 100 pF, R = 1.5 kΩ		3B	> 8 kV
JESD22-A115	Machine model (contact mode)	C = 200 pF, R = 0 Ω		C	> 400 V
IEC 61000-4-2 <sup>(2)</sup>	Human body model (contact mode)	C = 150 pF, R = 330 Ω		4	> 8 kV
	Human body model (air-discharge mode) <sup>(1)</sup>	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
MSE1PJ-M3/89A	0.006	89A	4500	7" diameter plastic tape and reel
MSE1PJHM3/89A <sup>(1)</sup>	0.006	89A	4500	7" diameter plastic tape and reel
MSE1PGHM3/I <sup>(1)</sup>	0.006	I	16 000	13" diameter plastic tape and reel

**Note**

- (1) AEC-Q101 qualified

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

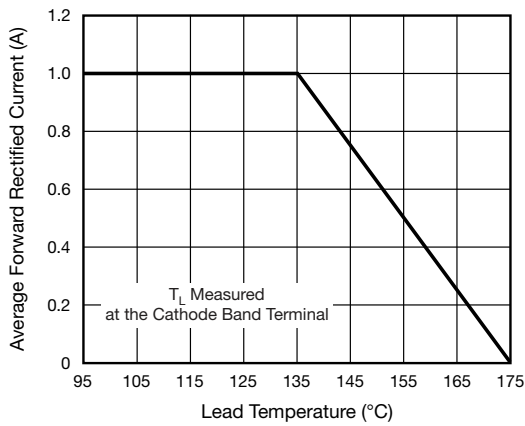


Fig. 1 - Forward Current Derating Curve

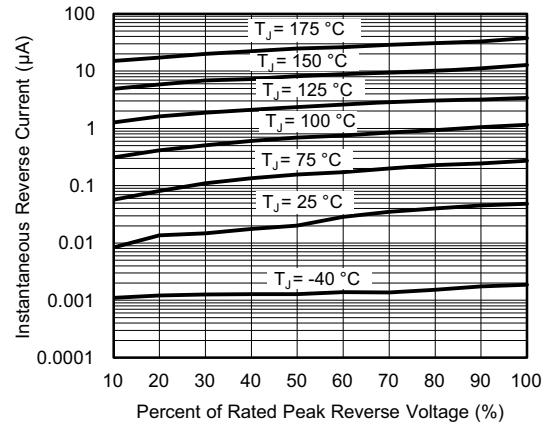


Fig. 4 - Typical Reverse Leakage Characteristics

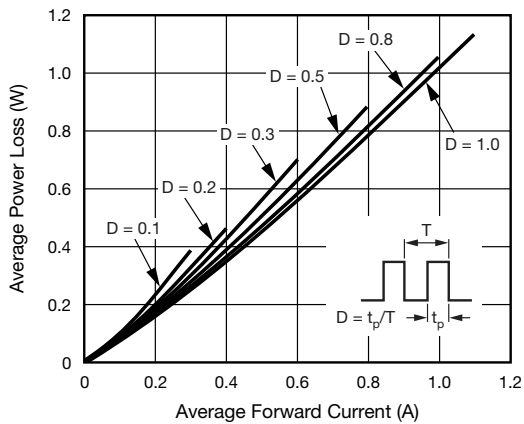


Fig. 2 - Forward Power Loss Characteristics

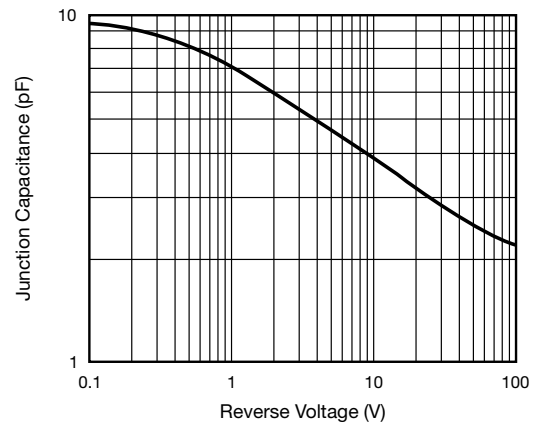


Fig. 5 - Typical Junction Capacitance

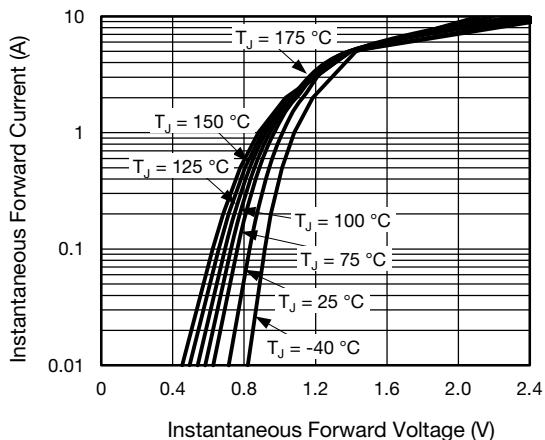


Fig. 3 - Typical Instantaneous Forward Characteristics

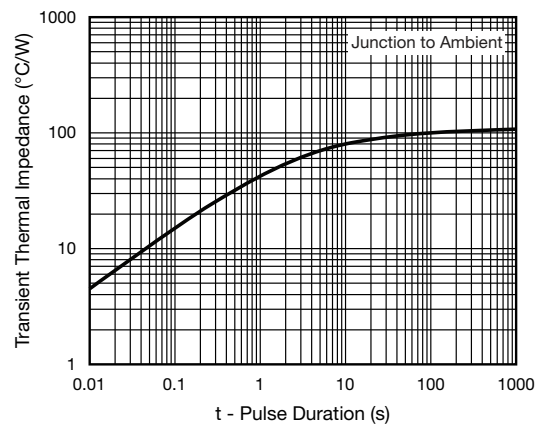
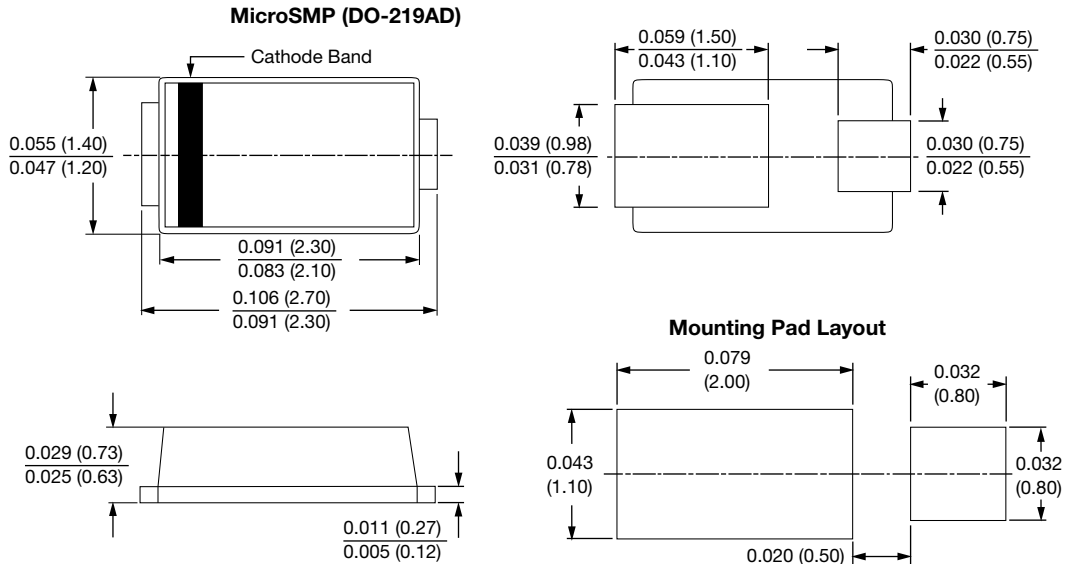


Fig. 6 - Typical Transient Thermal Impedance



## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)





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