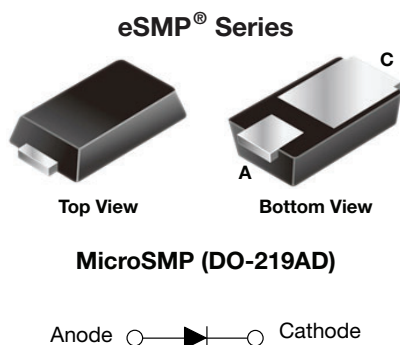


Surface-Mount ESD Capability Rectifier



RoHS
COMPLIANT
HALOGEN
FREE

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
- Meet 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

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 meet JESD 201 class 2 whisker test

Polarity: color band denotes the cathode end

LINKS TO ADDITIONAL RESOURCES



PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	1.0 A
V_{RRM}	400 V, 600 V
I_{FSM}	15 A
V_F at $I_F = 1.0$ A	0.99 V
T_J max.	175 °C
Package	MicroSMP (DO-219AD)
Circuit configuration	Single

MAXIMUM RATINGS ($T_A = 25$ °C, unless otherwise noted)				
PARAMETER	SYMBOL	MSQ1PG	MSQ1PJ	UNIT
Device marking code		QG	QJ	
Max. repetitive peak reverse voltage	V_{RRM}	400	600	V
Max. average forward rectified current (fig. 1)	$I_{F(AV)}$	1.0		A
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load	I_{FSM}	15		A
Operating junction and storage temperature range	T_J, T_{STG}	-55 to +175		°C



ELECTRICAL CHARACTERISTICS (T _A = 25 °C, unless otherwise noted)						
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Max. instantaneous forward voltage	I _F = 0.5 A	T _A = 25 °C	V _F ⁽¹⁾	0.99	-	V
	I _F = 1.0 A			1.09	1.2	
	I _F = 0.5 A	T _A = 125 °C		0.88	-	
	I _F = 1.0 A			0.99	1.05	
Max. reverse current	Rated V _R	T _A = 25 °C	I _R ⁽²⁾	-	1.0	μA
		T _A = 125 °C		6.0	50	
Typical reverse recovery time	I _F = 0.5 A, I _R = 1.0 A, I _{rr} = 0.25 A		t _{rr}	650	-	ns
Typical junction capacitance	4.0 V, 1 MHz		C _J	4	-	pF

Notes

- (1) Pulse test: 300 μs pulse width, 1 % duty cycle
 (2) Pulse test: Pulse width $\leq 40\text{ ms}$

THERMAL CHARACTERISTICS (T _A = 25 °C, unless otherwise noted)				
PARAMETER	SYMBOL	MSQ1PG	MSQ1PJ	UNIT
Typical thermal resistance	R _{θJA} ⁽¹⁾⁽²⁾	110		°C/W
	R _{θJM} ⁽²⁾	30		

Notes

- (1) The heat generated must be less than the thermal conductivity from junction to ambient: $dP_D/dT_J < 1/R_{\theta JA}$
 (2) Thermal resistance $R_{\theta JA}$ – junction to ambient and $R_{\theta JM}$ – mounted on PCB with 6.0 mm x 6.0 mm copper pad areas.

IMMUNITY TO ELECTRICAL STATIC 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	$> 8\text{ kV}$
AEC-Q101-002	Machine model (contact mode)	$C = 200\text{ pF}$, $R = 0\text{ }\Omega$		M4	$> 400\text{ V}$
JESD 22-A114	Human body model (contact mode)	$C = 100\text{ pF}$, $R = 1.5\text{ k}\Omega$		3B	$> 8\text{ kV}$
JESD 22-A115	Machine model (contact mode)	$C = 200\text{ pF}$, $R = 0\text{ }\Omega$		C	$> 400\text{ V}$
IEC 61000-4-2 ⁽²⁾	Human body model (contact mode)	$C = 150\text{ pF}$, $R = 330\text{ }\Omega$		4	$> 8\text{ kV}$
	Human body model (air-discharge mode) ⁽¹⁾	$C = 150\text{ pF}$, $R = 330\text{ }\Omega$		4	$> 15\text{ kV}$

Notes

- (1) Immunity to IEC 61000-4-2 air discharge mode has a typical performance $> 30\text{ kV}$
 (2) System ESD standard

ORDERING INFORMATION (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
MSQ1PJ-M3/H	0.006	H	4500	7" diameter plastic tape and reel
MSQ1PJHM3/H ⁽¹⁾	0.006	H	4500	7" diameter plastic tape and reel

Note

- (1) AEC-Q101

qualified

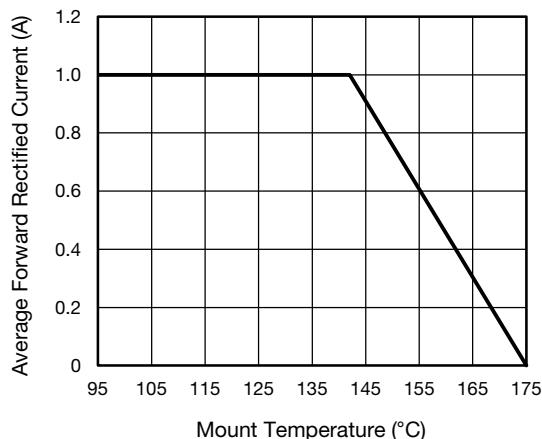
RATINGS AND CHARACTERISTICS CURVES ($T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)


Fig. 1 - Forward Current Derating Curve

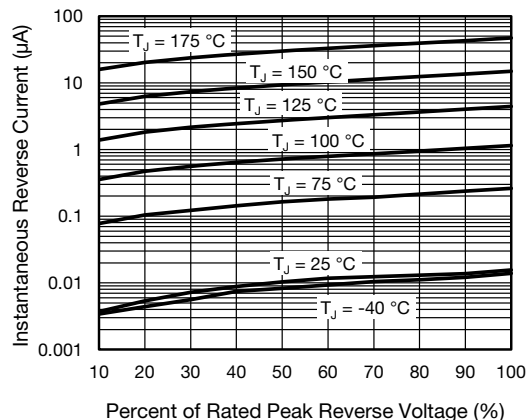


Fig. 4 - Typical Reverse Leakage Characteristics

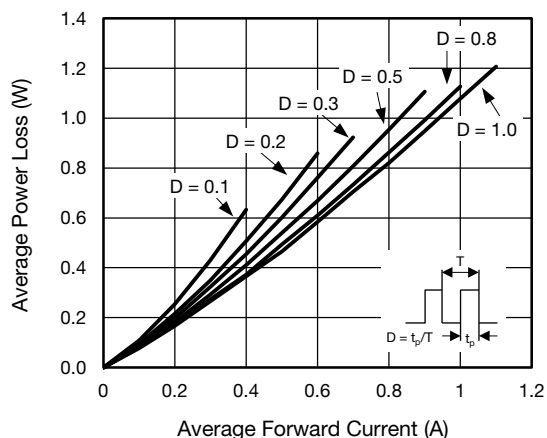


Fig. 2 - Forward Power Loss Characteristics

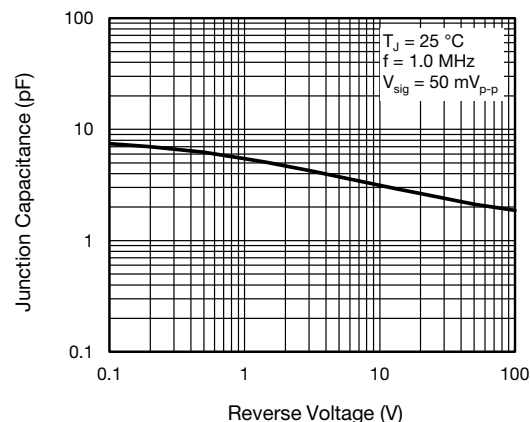


Fig. 5 - Typical Junction Capacitance

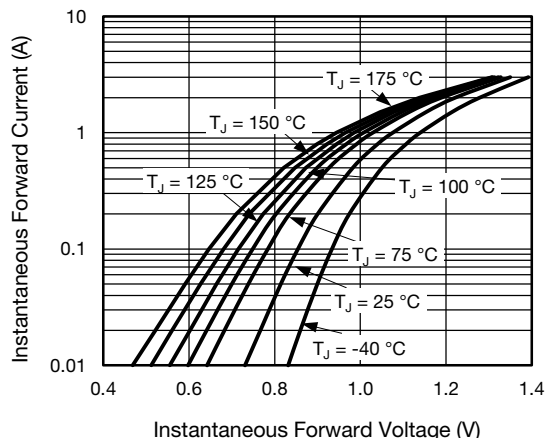


Fig. 3 - Typical Instantaneous Forward Characteristics

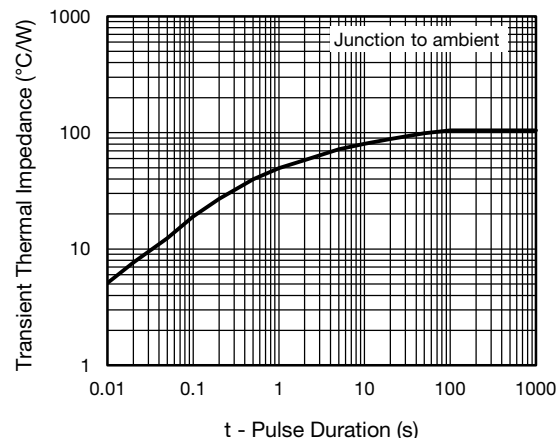
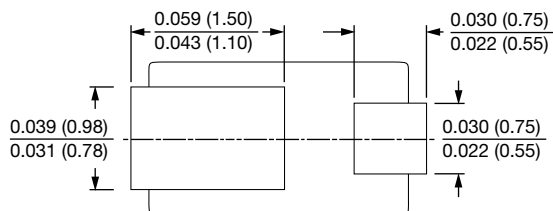
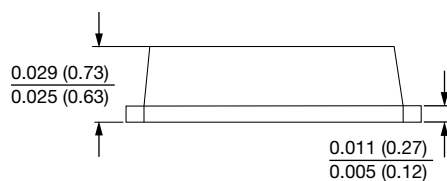
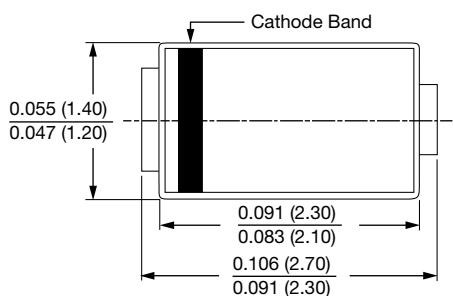


Fig. 6 - Typical Transient Thermal Impedance

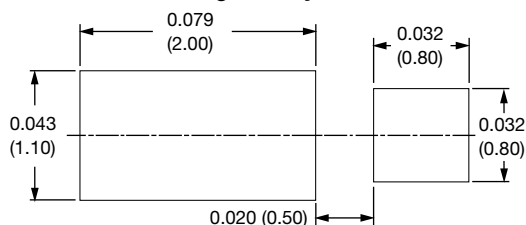


PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

MicroSMP (DO-219AD)



Mounting Pad Layout





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