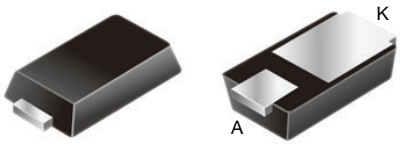
Surface-Mount ESD Capability Rectifier

eSMP® Series



Top View Bottom View

MicroSMP (DO-219AD)

LINKS TO ADDITIONAL RESOURCES

3D Models

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

FEATURES

AUTOMOTIVE GRADE Available

- 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

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 meet JESD 201 class 2 whisker test

Polarity: color band denotes the cathode end

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 ≤ 40 ms

THERMAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)				
PARAMETER	**SYMBOL**	**MSQ1PG**	**MSQ1PJ**	**UNIT**
Typical thermal resistance	$R_{\theta JA}$ (1)(2)	110		°C/W
	$R_{\theta JM}$ (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 °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

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**
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 °C unless otherwise noted)

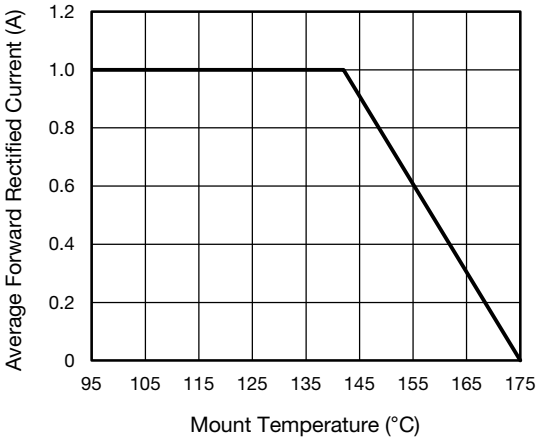


Fig. 1 - Forward Current Derating Curve

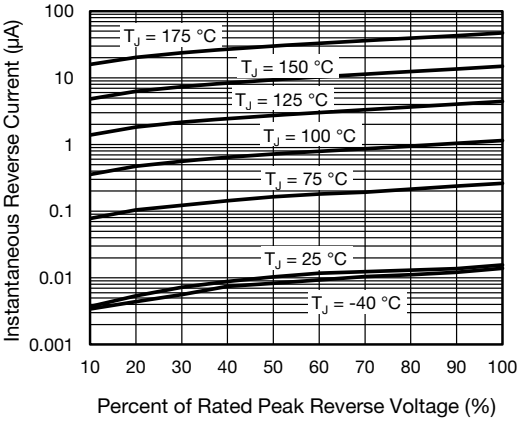


Fig. 4 - Typical Reverse Leakage Characteristics

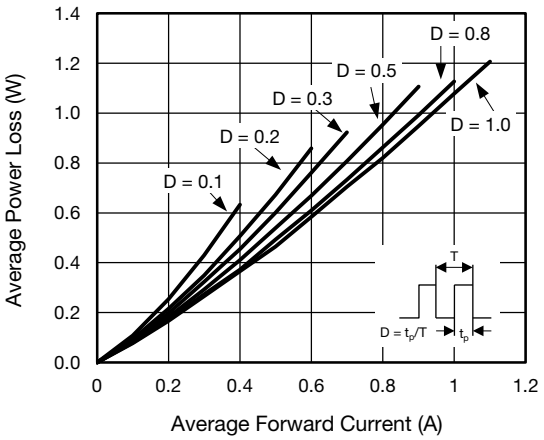


Fig. 2 - Forward Power Loss Characteristics

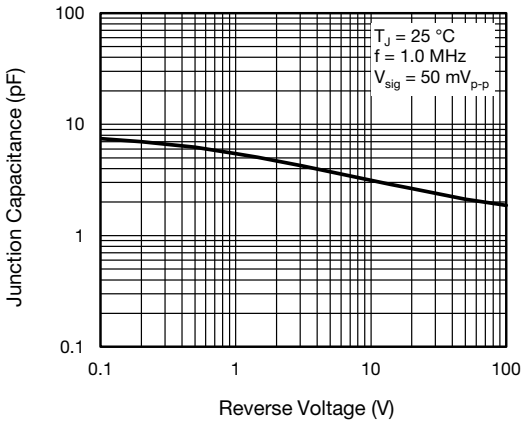


Fig. 5 - Typical Junction Capacitance

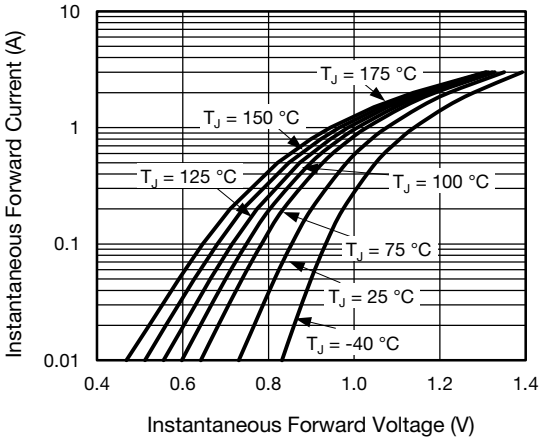


Fig. 3 - Typical Instantaneous Forward Characteristics

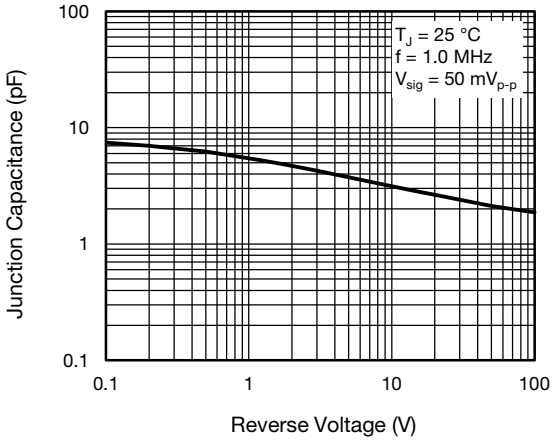


Fig. 6 - Typical Transient Thermal Impedance

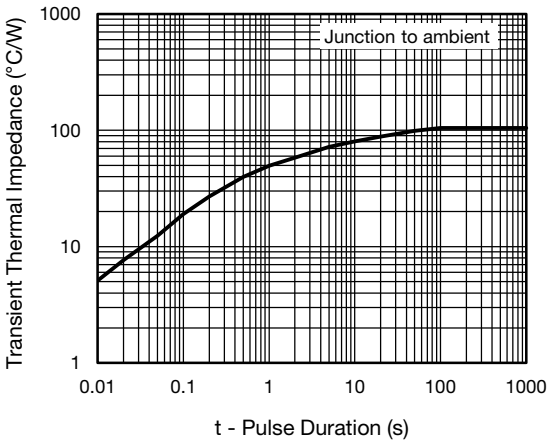
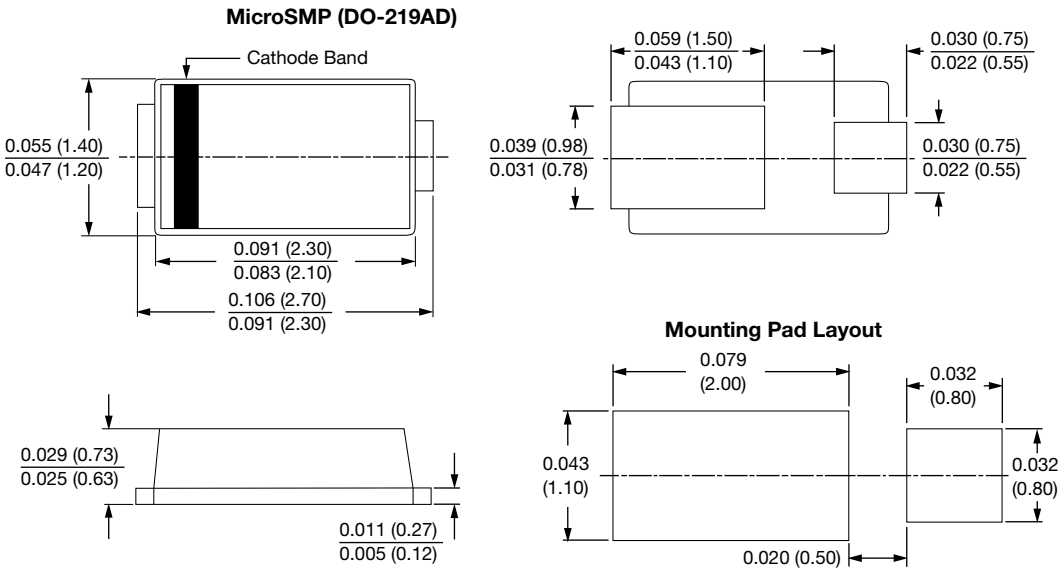


Fig. 7 - Thermal Resistance

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)



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