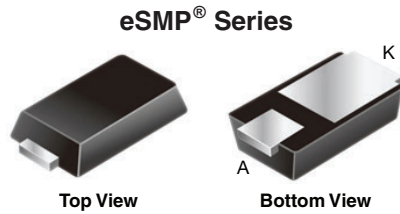


Surface-Mount ESD Capability Rectifier


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

- 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 ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted) | | | | | | |
|--|--|-----------------------------------|-------------|------|------|---------------|
| PARAMETER | TEST CONDITIONS | | SYMBOL | TYP. | MAX. | UNIT |
| Max. instantaneous forward voltage | $I_F = 0.5\text{ A}$ | $T_A = 25\text{ }^\circ\text{C}$ | $V_F^{(1)}$ | 0.99 | - | V |
| | $I_F = 1.0\text{ A}$ | | | 1.09 | 1.2 | |
| | $I_F = 0.5\text{ A}$ | $T_A = 125\text{ }^\circ\text{C}$ | | 0.88 | - | |
| | $I_F = 1.0\text{ A}$ | | | 0.99 | 1.05 | |
| Max. reverse current | Rated V_R | $T_A = 25\text{ }^\circ\text{C}$ | $I_R^{(2)}$ | - | 1.0 | μA |
| | | $T_A = 125\text{ }^\circ\text{C}$ | | 6.0 | 50 | |
| Typical reverse recovery time | $I_F = 0.5\text{ A}, I_R = 1.0\text{ A}, I_{rr} = 0.25\text{ A}$ | | 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 ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted) | | | | |
|---|--------------------------|--------|--------|--------------------|
| PARAMETER | SYMBOL | MSQ1PG | MSQ1PJ | UNIT |
| Typical thermal resistance | $R_{\theta JA}^{(1)(2)}$ | 110 | | $^\circ\text{C/W}$ |
| | $R_{\theta JM}^{(2)}$ | 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 ($T_A = 25\text{ }^\circ\text{C}$, 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 °C unless otherwise noted)

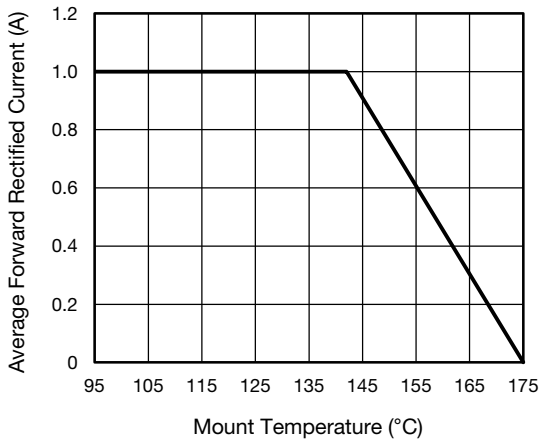


Fig. 1 - Forward Current Derating Curve

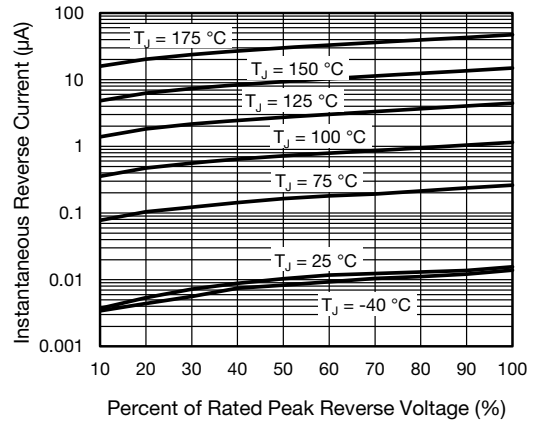


Fig. 4 - Typical Reverse Leakage Characteristics

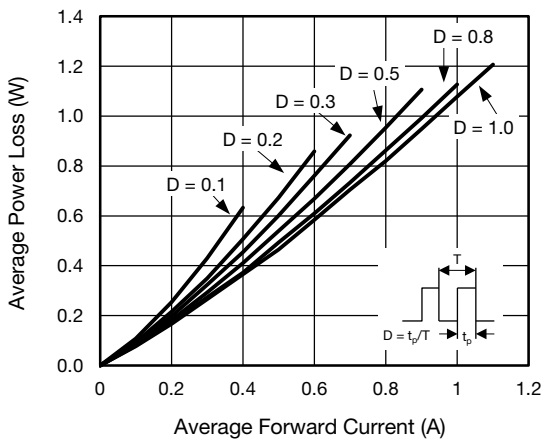


Fig. 2 - Forward Power Loss Characteristics

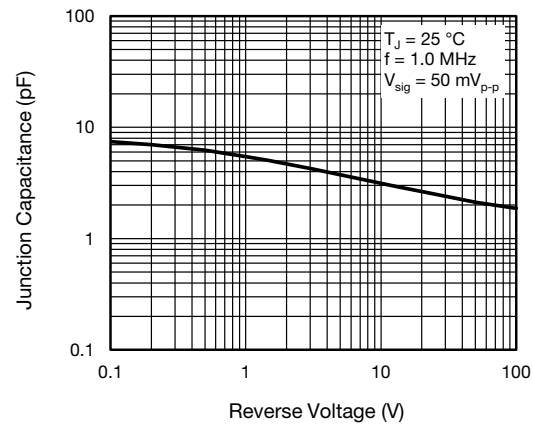


Fig. 5 - Typical Junction Capacitance

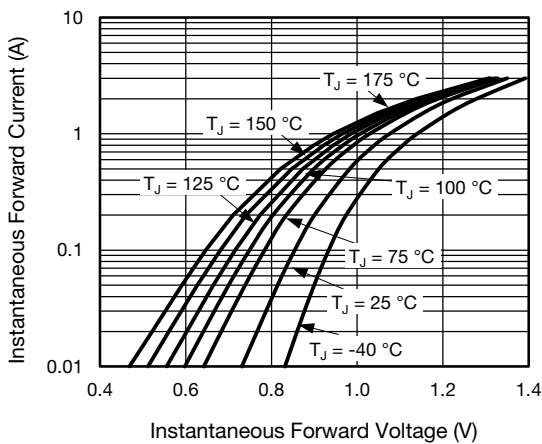


Fig. 3 - Typical Instantaneous Forward Characteristics

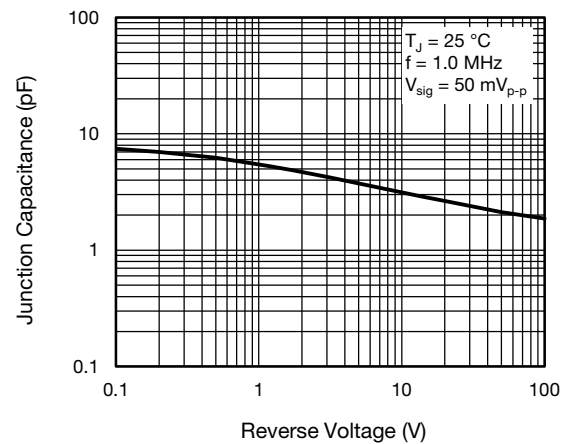


Fig. 6 - Typical Transient Thermal Impedance

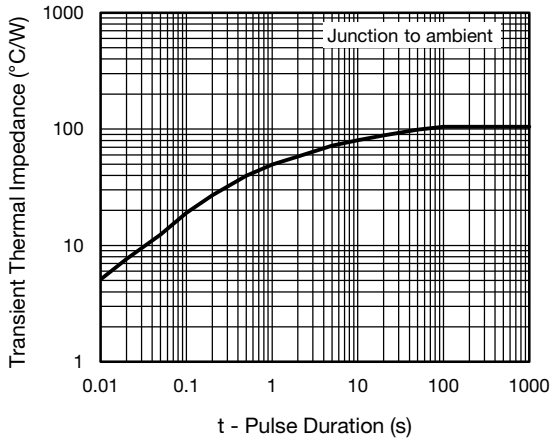
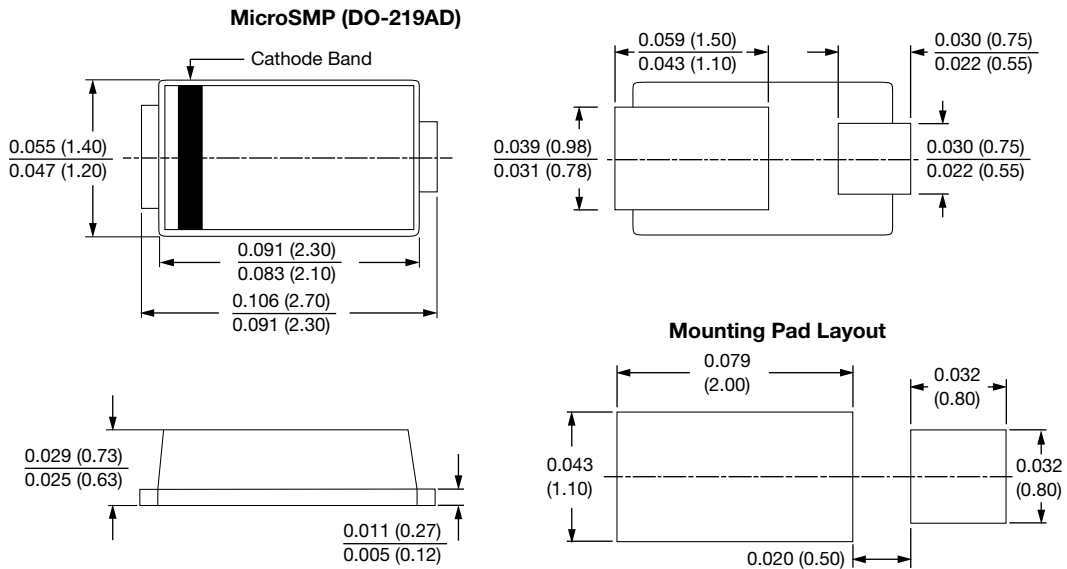


Fig. 7 - Thermal Resistance

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)





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