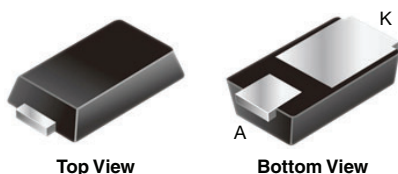


## Surface-Mount ESD Capability Rectifier

### eSMP® Series



Top View

Bottom View

### MicroSMP (DO-219AD)

Anode  Cathode

### 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** ( $T_A = 25\text{ }^{\circ}\text{C}$ , unless otherwise noted)

| PARAMETER                          | TEST CONDITIONS                                                        | SYMBOL      | TYP.  | MAX. | UNIT          |
|------------------------------------|------------------------------------------------------------------------|-------------|-------|------|---------------|
| Max. instantaneous forward voltage | $I_F = 0.5\text{ A}$                                                   | $V_F^{(1)}$ | 0.940 | -    | V             |
|                                    | $I_F = 1.0\text{ A}$                                                   |             | 1.016 | 1.1  |               |
|                                    | $I_F = 0.5\text{ A}$                                                   |             | 0.834 | -    |               |
|                                    | $I_F = 1.0\text{ A}$                                                   |             | 0.925 | 0.98 |               |
| Max. reverse current               | Rated $V_R$                                                            | $I_R^{(2)}$ | -     | 1.0  | $\mu\text{A}$ |
|                                    |                                                                        |             | 3.7   | 50   |               |
| Typical reverse recovery time      | $I_F = 0.5\text{ A}$ , $I_R = 1.0\text{ A}$ , $t_{rr} = 0.25\text{ A}$ | $t_{rr}$    | 780   | -    | ns            |
| Typical junction capacitance       | 4.0 V, 1 MHz                                                           | $C_J$       | 5     | -    | pF            |

**Notes**(1) Pulse test: 300  $\mu\text{s}$  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                | MSE1PB | MSE1PD | MSE1PG | MSE1PJ | UNIT                 |
|----------------------------|-----------------------|--------|--------|--------|--------|----------------------|
| Typical thermal resistance | $R_{\theta JA}^{(1)}$ | 110    |        |        |        | $^{\circ}\text{C/W}$ |
|                            | $R_{\theta JL}^{(1)}$ | 30     |        |        |        |                      |
|                            | $R_{\theta JC}^{(1)}$ | 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.  $R_{\theta JL}$  is measured at the terminal of cathode band.**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    | $> 400\text{ V}$ |
| JESD22-A114                  | Human body model (contact mode)                      | $C = 100\text{ pF}$ , $R = 1.5\text{ k}\Omega$ |        | 3B    | $> 8\text{ kV}$  |
| JESD22-A115                  | Machine model (contact mode)                         | $C = 200\text{ pF}$ , $R = 0\text{ }\Omega$    |        | C     | $> 400\text{ V}$ |
| IEC 61000-4-2 <sup>(2)</sup> | Human body model (contact mode)                      | $C = 150\text{ pF}$ , $R = 330\text{ }\Omega$  |        | 4     | $> 8\text{ kV}$  |
|                              | Human body model (air-discharge mode) <sup>(1)</sup> | $C = 150\text{ pF}$ , $R = 330\text{ }\Omega$  |        | 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                      |
|------------------------------|-----------------|------------------------|---------------|------------------------------------|
| 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)

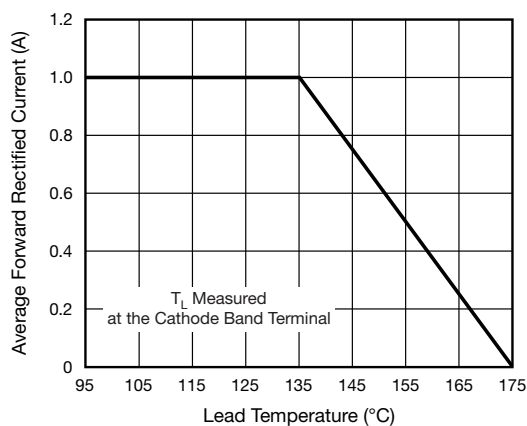


Fig. 1 - Forward Current Derating Curve

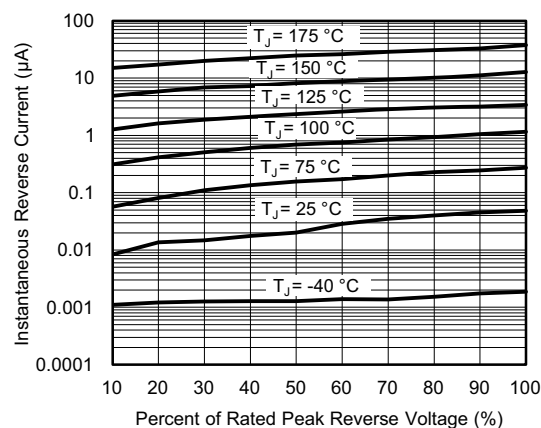


Fig. 4 - Typical Reverse Leakage Characteristics

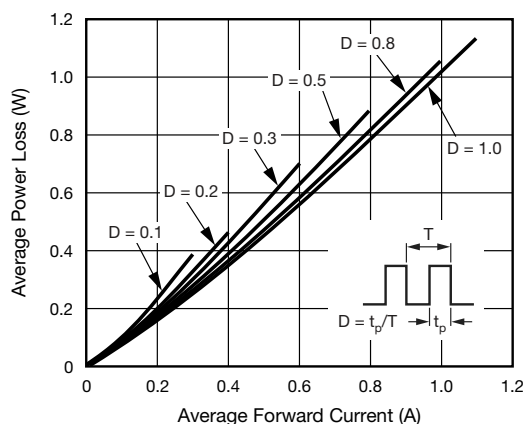


Fig. 2 - Forward Power Loss Characteristics

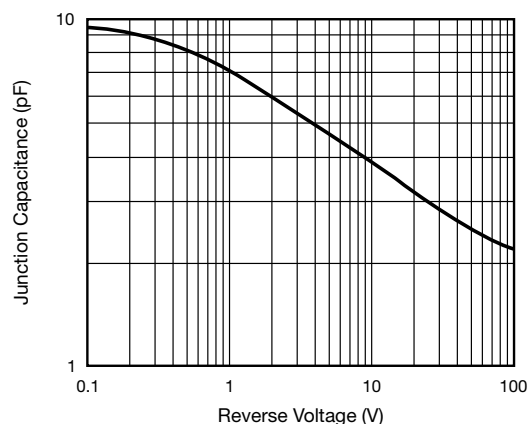


Fig. 5 - Typical Junction Capacitance

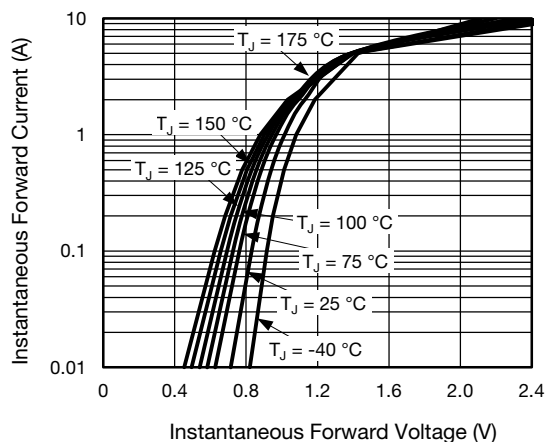


Fig. 3 - Typical Instantaneous Forward Characteristics

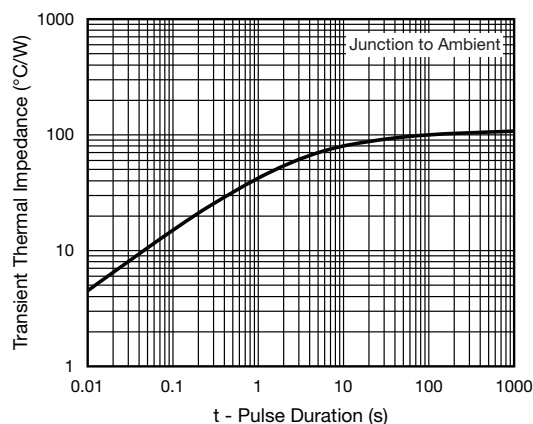
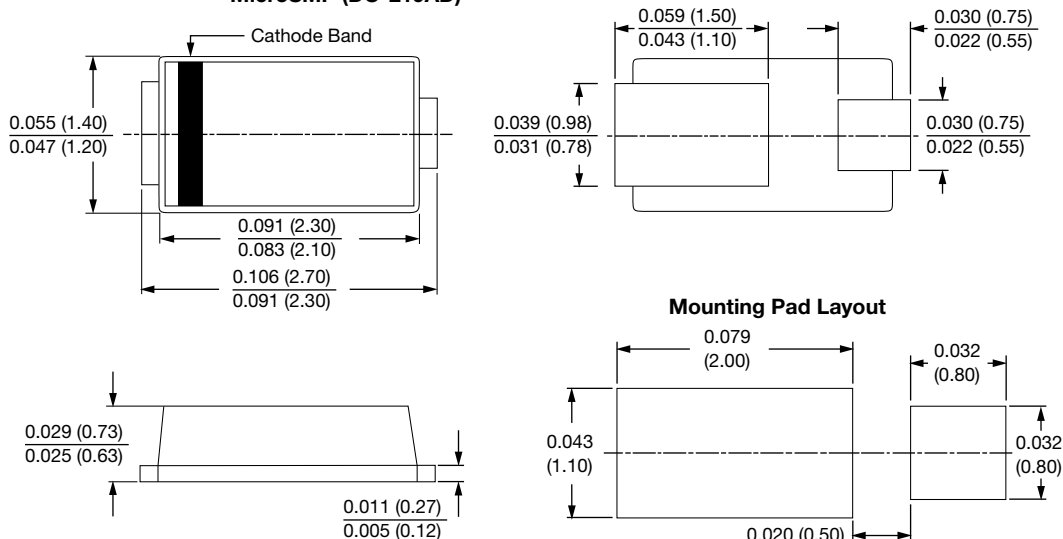


Fig. 6 - Typical Transient Thermal Impedance



## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

**MicroSMP (DO-219AD)**





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