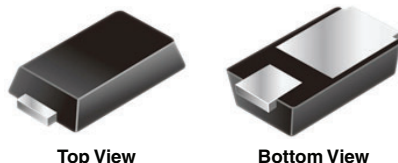


## Surface Mount ESD Capability Rectifier

### eSMP® Series



Top View

Bottom View

### MicroSMP (DO-219AD)

Anode  Cathode

### 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
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



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

### LINKS TO ADDITIONAL RESOURCES



3D Models

### TYPICAL APPLICATIONS

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

### PRIMARY CHARACTERISTICS

|                                          |                            |
|------------------------------------------|----------------------------|
| $I_{F(AV)}$                              | 0.7 A                      |
| $V_{RRM}$                                | 100 V, 200 V, 400 V, 600 V |
| $I_{FSM}$                                | 20 A                       |
| $V_F$ at $I_F = 0.7$ A ( $T_A = 125$ °C) | 0.83 V                     |
| $I_R$                                    | 1 $\mu$ A                  |
| $T_J$ max.                               | 175 °C                     |
| Package                                  | MicroSMP (TO-219AD)        |
| Circuit configuration                    | Single                     |

### MECHANICAL DATA

**Case:** MicroSMP (TO-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 automotive grade

**Terminals:** matte tin plated leads, solderable per J-STD-002 and JESD 22-B102

M3 suffix meets JESD 201 class 1A whisker test, 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         | MSE07PB     | MSE07PD | MSE07PG | MSE07PJ | UNIT |
|-----------------------------------------------------------------------------------|----------------|-------------|---------|---------|---------|------|
| Device marking code                                                               |                | 07B         | 07D     | 07G     | 07J     |      |
| Max. repetitive peak reverse voltage                                              | $V_{RRM}$      | 100         | 200     | 400     | 600     | V    |
| Max. average forward rectified current (fig. 1)                                   | $I_{F(AV)}$    | 0.7         |         |         |         | 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          |
|-------------------------------|------------------------------------------------------------------------|-------------------------------------|-------------|------|------|---------------|
| Instantaneous forward voltage | $I_F = 0.7\text{ A}$                                                   | $T_A = 25\text{ }^{\circ}\text{C}$  | $V_F^{(1)}$ | 0.94 | 1.08 | V             |
|                               |                                                                        | $T_A = 125\text{ }^{\circ}\text{C}$ |             | 0.83 | 0.95 |               |
| Reverse current               | Rated $V_R$                                                            | $T_A = 25\text{ }^{\circ}\text{C}$  | $I_R^{(2)}$ | -    | 1.0  | $\mu\text{A}$ |
|                               |                                                                        | $T_A = 125\text{ }^{\circ}\text{C}$ |             | 3.7  | 50   |               |
| Typical reverse recovery time | $I_F = 0.5\text{ A}$ , $I_R = 1.0\text{ A}$ , $I_{rr} = 0.25\text{ A}$ |                                     | $t_{rr}$    | 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                          | MSE07PB | MSE07PD | MSE07PG | MSE07PJ | 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.  $R_{\theta JL}$  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   | $> 8\text{ kV}$ |

**ORDERING INFORMATION** (Example)

| PREFERRED P/N                 | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                     |
|-------------------------------|-----------------|------------------------|---------------|-----------------------------------|
| MSE07PJ-M3/89A                | 0.006           | 89A                    | 4500          | 7" diameter plastic tape and reel |
| MSE07PJHM3/89A <sup>(1)</sup> | 0.006           | 89A                    | 4500          | 7" diameter plastic tape and reel |

**Note**

(1) AEC-Q101 qualified



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

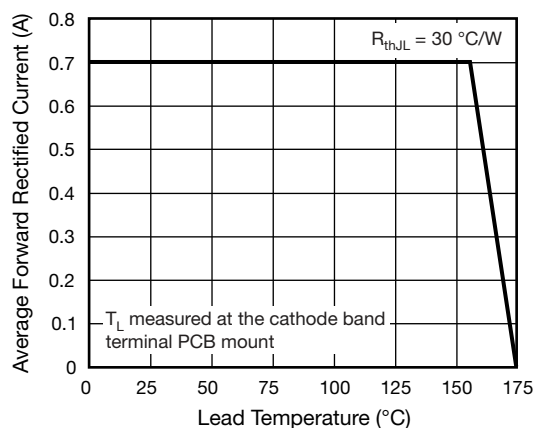


Fig. 1 - Forward Current Derating Curve

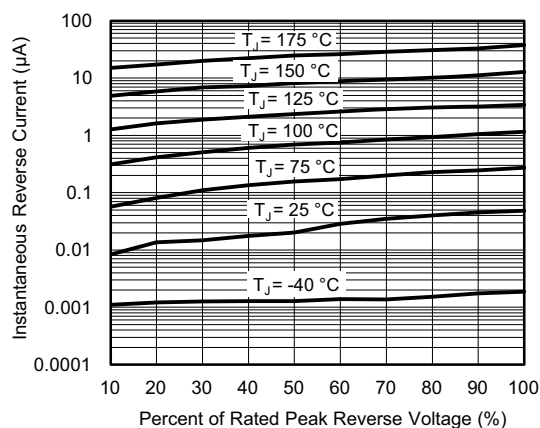


Fig. 4 - Typical Reverse Leakage Characteristics

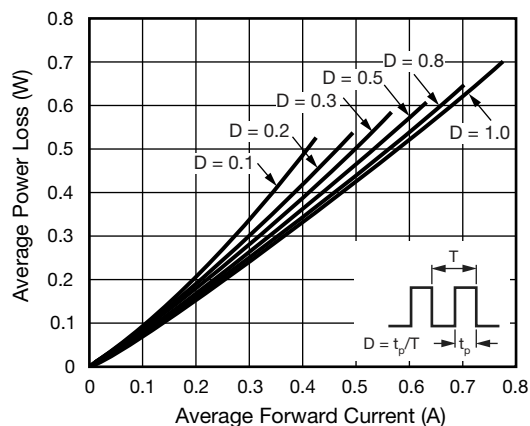


Fig. 2 - Forward Power Loss Characteristics

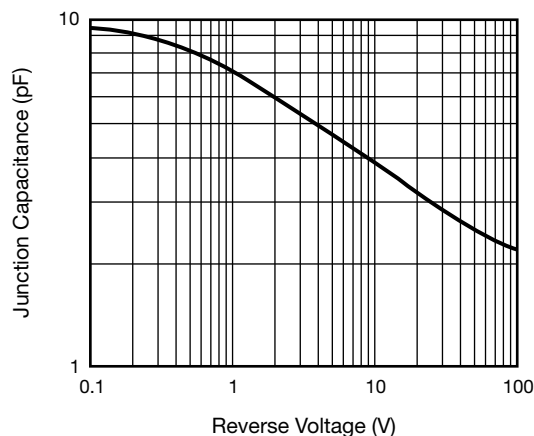


Fig. 5 - Typical Junction Capacitance

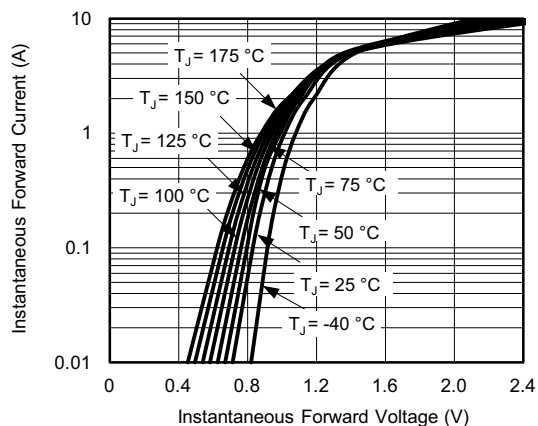


Fig. 3 - Typical Instantaneous Forward Characteristics

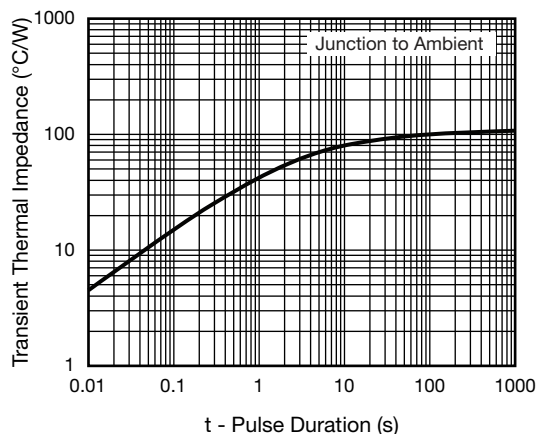
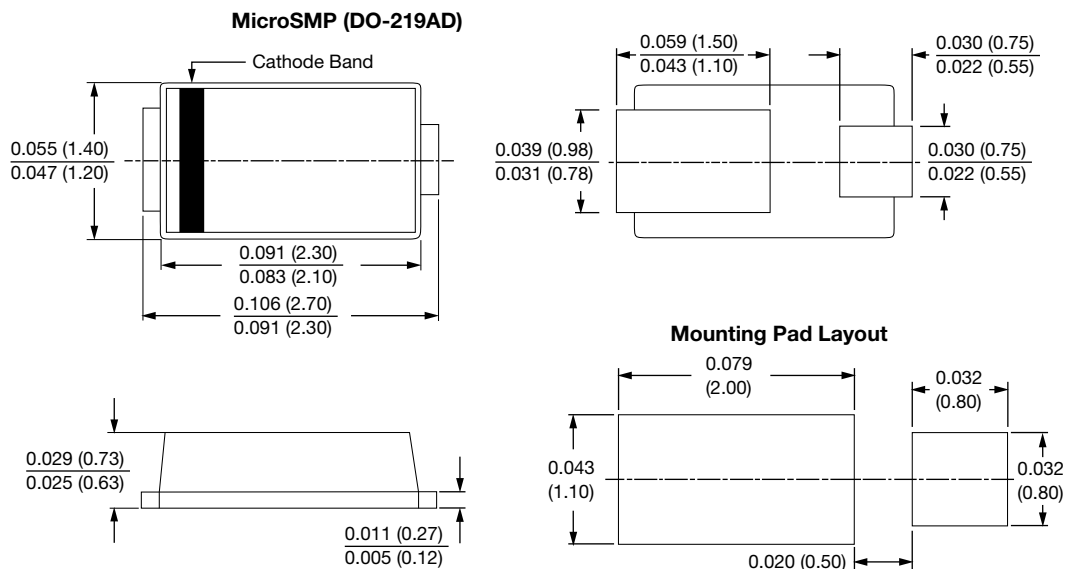


Fig. 6 - Typical Transient Thermal Impedance



## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)





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