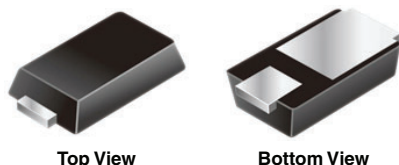


## Surface Mount Ultrafast Rectifiers

### 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 power losses
- Ultrafast recovery times for high frequency
- 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**

### ADDITIONAL RESOURCES



### TYPICAL APPLICATIONS

For use in secondary rectification and freewheeling for ultrafast switching speeds AC/AC and DC/DC converters.

### 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 automotive grade

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

M3 suffix meets JESD 201 class 2 whisker test, HM3 suffix meets JESD 201 class 2 whisker test

**Polarity:** color band denotes the cathode end

### PRIMARY CHARACTERISTICS

|                        |                     |
|------------------------|---------------------|
| $I_{F(AV)}$            | 1.0 A               |
| $V_{RRM}$              | 100 V, 150 V        |
| $I_{FSM}$              | 10 A                |
| $t_{rr}$               | 25 ns               |
| $V_F$ at $I_F = 1.0$ A | 0.82 V              |
| $I_R$                  | 1 $\mu$ A           |
| $T_J$ max.             | 175 °C              |
| Package                | MicroSMP (DO-219AD) |
| Circuit configuration  | Single              |

### MAXIMUM RATINGS ( $T_A = 25$ °C unless otherwise noted)

| PARAMETER                                                                         | SYMBOL         | MUH1PB      | MUH1PC | UNIT |
|-----------------------------------------------------------------------------------|----------------|-------------|--------|------|
| Device marking code                                                               |                | HB          | HC     |      |
| Maximum repetitive peak reverse voltage                                           | $V_{RRM}$      | 100         | 150    | V    |
| Maximum 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 | $I_{FSM}$      | 10          |        | 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          |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------|-------------|------|------|---------------|
| Maximum instantaneous forward voltage | $I_F = 0.5\text{ A}$                                                                                             | $V_F^{(1)}$ | 0.90 | -    | V             |
|                                       | $I_F = 1.0\text{ A}$                                                                                             |             | 1.0  | 1.05 |               |
|                                       | $I_F = 0.5\text{ A}$                                                                                             |             | 0.72 | -    |               |
|                                       | $I_F = 1.0\text{ A}$                                                                                             |             | 0.82 | 0.90 |               |
| Maximum reverse current               | Rated $V_R$                                                                                                      | $I_R^{(2)}$ | -    | 1.0  | $\mu\text{A}$ |
|                                       |                                                                                                                  |             | 3.0  | 15   |               |
| Maximum reverse recovery time         | $I_F = 0.5\text{ A}$ , $I_R = 1.0\text{ A}$ ,<br>$I_{rr} = 0.25\text{ A}$                                        | $t_{rr}$    | 19   | 25   | ns            |
| Typical reverse recovery time         | $I_F = 1.0\text{ A}$ , $dI/dt = 50\text{ A}/\mu\text{s}$ ,<br>$V_R = 30\text{ V}$ , $I_{rr} = 0.1\text{ I}_{RM}$ |             | 29   | 40   |               |
| Typical softness factor ( $t_b/t_a$ ) | $I_F = 1.0\text{ A}$ , $dI/dt = 200\text{ A}/\mu\text{s}$ ,<br>$V_R = 200\text{ V}$                              | $S$         | 0.5  | -    |               |
| Typical reverse recovery current      |                                                                                                                  | $I_{RM}$    | 3.4  | 4.6  | A             |
| Typical stored charge                 |                                                                                                                  | $Q_{rr}$    | 45   | -    | nC            |
| Typical junction capacitance          |                                                                                                                  | $C_J$       | 10   | -    | 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                          | MUH1PB | MUH1PC | MUH1PD | UNIT |
|----------------------------|---------------------------------|--------|--------|--------|------|
| Typical thermal resistance | R <sub>θJA</sub> <sup>(1)</sup> | 166    |        |        | °C/W |
|                            | R <sub>θJM</sub> <sup>(1)</sup> | 40     |        |        |      |

**Note**(1) Free air, mounted on recommended copper pad area. Thermal resistance  $R_{\theta JA}$  - from junction to ambient,  $R_{\theta JM}$  - and junction to mount**ORDERING INFORMATION** (Example)

| PREFERRED P/N                | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                     |
|------------------------------|-----------------|------------------------|---------------|-----------------------------------|
| MUH1PC-M3/89A                | 0.006           | 89A                    | 4500          | 7" diameter plastic tape and reel |
| MUH1PCHM3/89A <sup>(1)</sup> | 0.006           | 89A                    | 4500          | 7" diameter plastic tape and reel |

**Note**

(1) Automotive grade



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

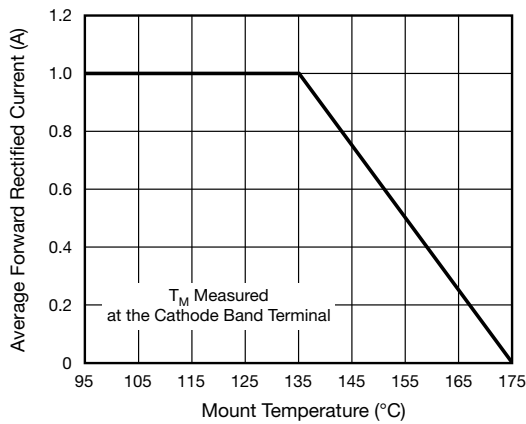


Fig. 1 - Maximum Forward Current Derating Curve

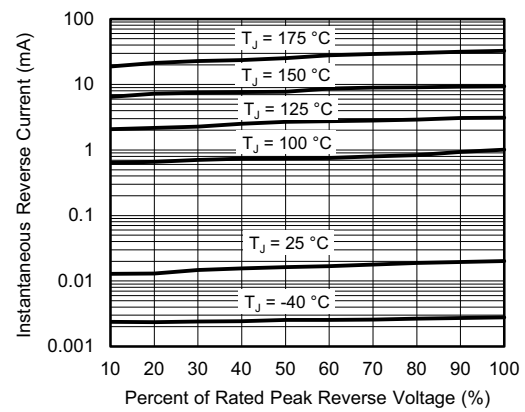


Fig. 4 - Typical Reverse Characteristics

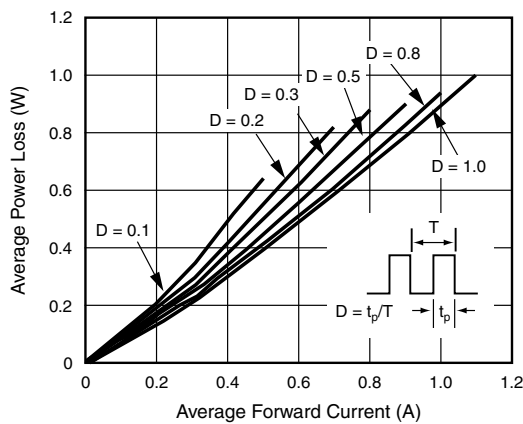


Fig. 2 - Forward Power Loss Characteristics

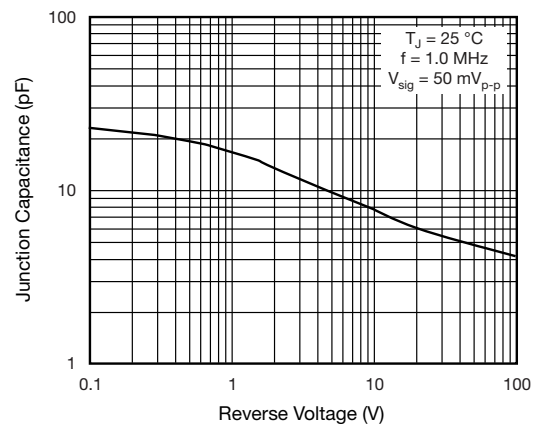


Fig. 5 - Typical Junction Capacitance

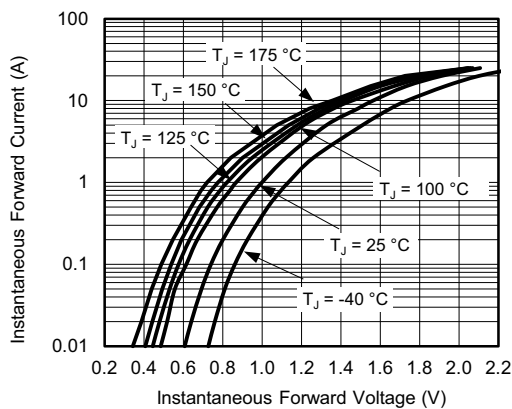


Fig. 3 - Typical Instantaneous Forward Characteristics

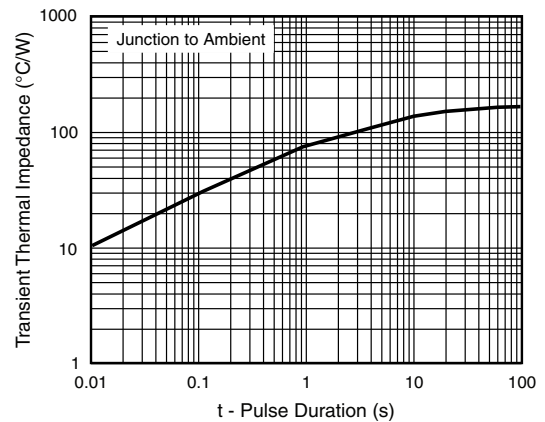
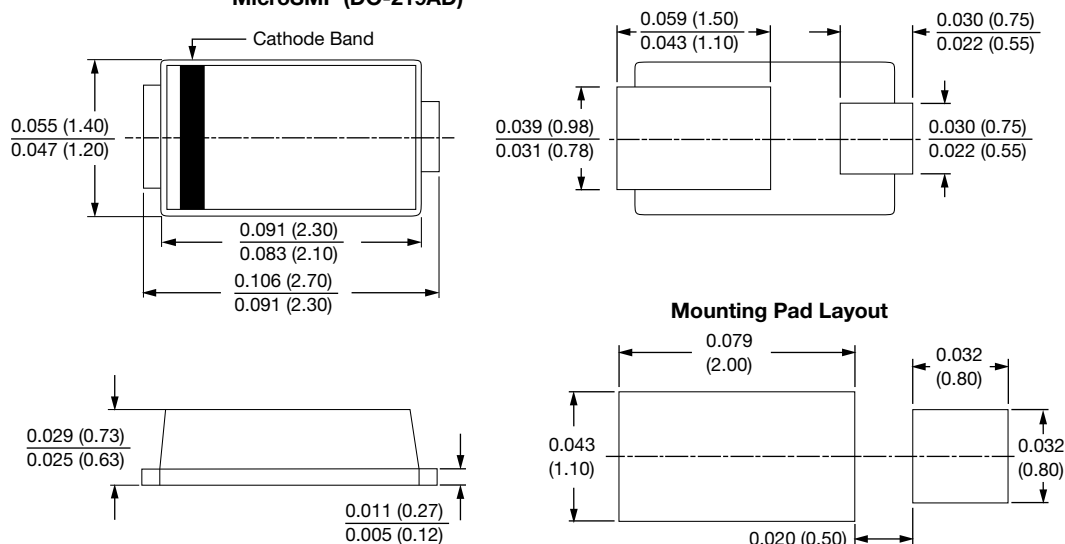


Fig. 6 - Typical Transient Thermal Impedance



## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

### MicroSMP (DO-219AD)





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