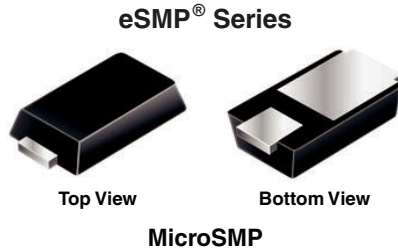




## Surface Mount Ultrafast Rectifiers



## 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-020C, LF maximum peak of 260 °C
- AEC-Q101 qualified
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC
- **Halogen-free according to IEC 61249-2-21 definition**

AUTOMOTIVE  
GRADE  
Available



RoHS  
COMPLIANT  
HALOGEN  
FREE

## PRIMARY CHARACTERISTICS

|                        |                     |
|------------------------|---------------------|
| $I_{F(AV)}$            | 1.0 A               |
| $V_{RRM}$              | 100 V, 150 V, 200 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              |

## TYPICAL APPLICATIONS

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

## MECHANICAL DATA

**Case:** MicroSMP

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         | MUH1PB        | MUH1PC | MUH1PD | UNIT |
|---|----------------|---------------|--------|--------|------|
| Device marking code   |                | HB            | HC     | HD     |      |
| Maximum repetitive peak reverse voltage   | $V_{RRM}$      | 100           | 150    | 200    | 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   |

# MUH1PB thru MUH1PD

Vishay General Semiconductor



| ELECTRICAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted) |   |                         |                               |      |      |    |
|--|---|-------------------------|-------------------------------|------|------|----|
| PARAMETER  | TEST CONDITIONS   | SYMBOL                  | TYP.                          | MAX. | UNIT |    |
| Maximum instantaneous forward voltage                                      | I <sub>F</sub> = 0.5 A  | T <sub>A</sub> = 25 °C  | V <sub>F</sub> <sup>(1)</sup> | 0.90 | -    | V  |
|  | I <sub>F</sub> = 1.0 A  |                         |                               | 1.0  | 1.05 |    |
|  | I <sub>F</sub> = 0.5 A  | T <sub>A</sub> = 125 °C |                               | 0.72 | -    |    |
|  | I <sub>F</sub> = 1.0 A  |                         |                               | 0.82 | 0.90 |    |
| Maximum reverse current  | Rated V <sub>R</sub>  | T <sub>A</sub> = 25 °C  | I <sub>R</sub> <sup>(2)</sup> | -    | 1.0  | μA |
|  |   | T <sub>A</sub> = 125 °C |                               | 3.0  | 15   |    |
| Maximum reverse recovery time  | I <sub>F</sub> = 0.5 A, I <sub>R</sub> = 1.0 A, I <sub>rr</sub> = 0.25 A                              | T <sub>A</sub> = 25 °C  | t <sub>rr</sub>               | 19   | 25   | ns |
| Typical reverse recovery time  | I <sub>F</sub> = 1.0 A, di/dt = 50 A/μs, V <sub>R</sub> = 30 V, I <sub>rr</sub> = 0.1 I <sub>RM</sub> |                         |                               | 29   | 40   |    |
| Typical softness factor (t <sub>b</sub> /t <sub>a</sub> )                  | I <sub>F</sub> = 1.0 A, di/dt = 200 A/μs, V <sub>R</sub> = 200 V                                      | T <sub>A</sub> = 125 °C | S                             | 0.5  | -    |    |
| Typical reverse recovery current   |   |                         | I <sub>RM</sub>               | 3.4  | 4.6  | A  |
| Typical stored charge  |   |                         | Q <sub>rr</sub>               | 45   | -    | nC |
| Typical junction capacitance   | 4.0 V, 1 MHz  |                         | C <sub>J</sub>                | 10   | -    | pF |

**Notes**

- (1) Pulse test: 300 μs pulse width, 1 % duty cycle
- (2) Pulse test: Pulse width ≤ 40 ms

| THERMAL CHARACTERISTICS (T <sub>A</sub> = 25 °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<sub>θJA</sub> - from junction to ambient, R<sub>θJM</sub> - and junction to mount

| ORDERING INFORMATION (Example) |                 |                        |               |                                   |
|--------------------------------|-----------------|------------------------|---------------|-----------------------------------|
| PREFERRED P/N                  | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                     |
| MUH1PD-M3/89A                  | 0.006           | 89A                    | 4500          | 7" diameter plastic tape and reel |
| MUH1PDHM3/89A <sup>(1)</sup>   | 0.006           | 89A                    | 4500          | 7" diameter plastic tape and reel |

**Note**

- (1) Automotive grade

## RATINGS AND CHARACTERISTICS CURVES

(T<sub>A</sub> = 25 °C unless otherwise noted)

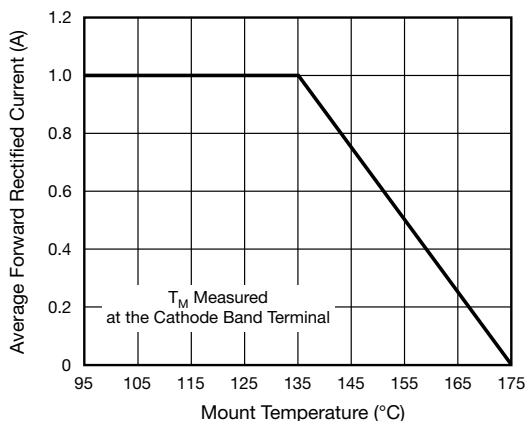


Fig. 1 - Maximum Forward Current Derating Curve

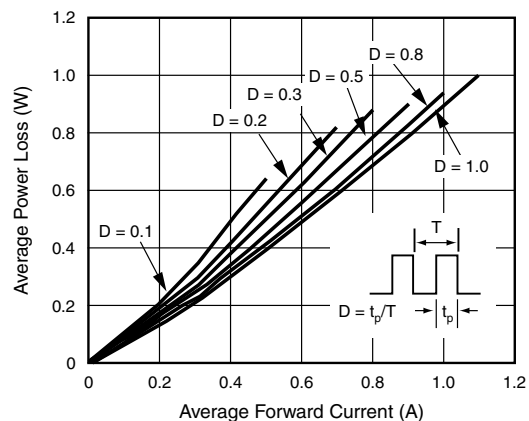


Fig. 2 - Forward Power Loss Characteristics



# MUH1PB thru MUH1PD

Vishay General Semiconductor

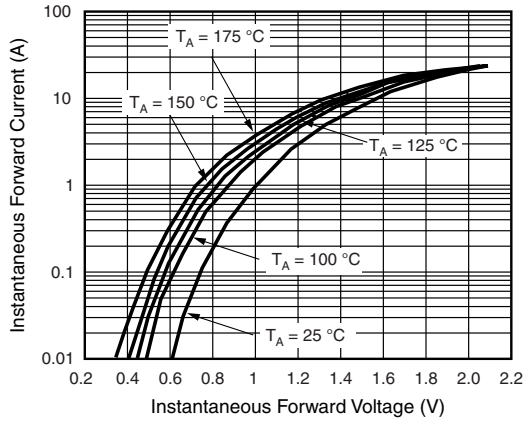


Fig. 3 - Typical Instantaneous Forward Characteristics

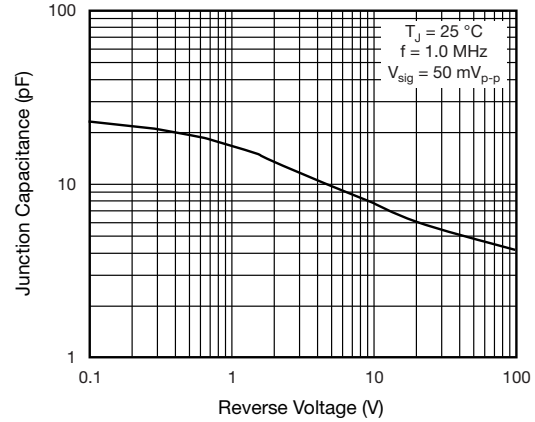


Fig. 5 - Typical Junction Capacitance

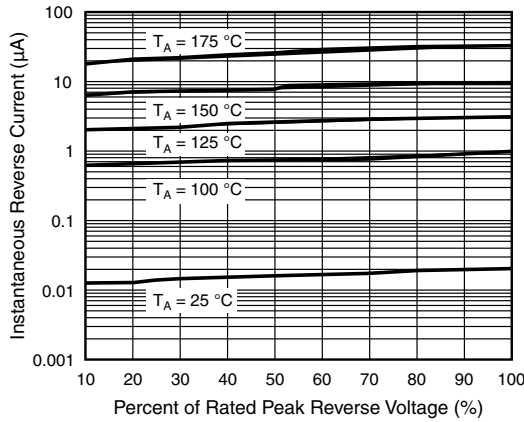


Fig. 4 - Typical Reverse Characteristics

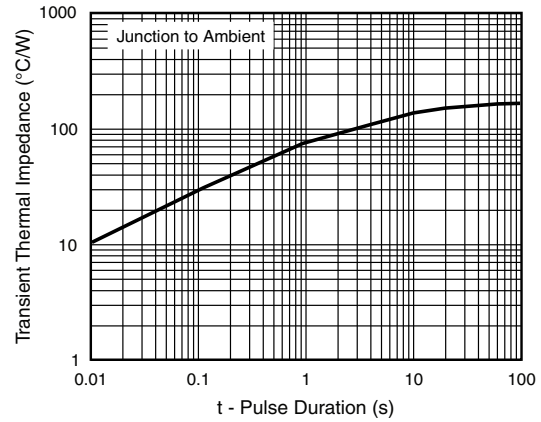
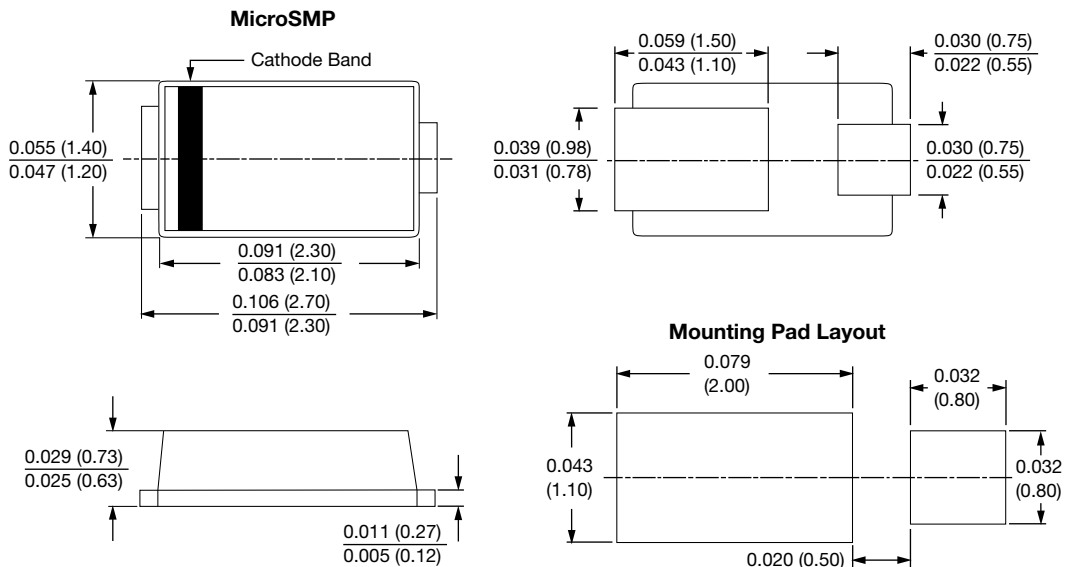


Fig. 6 - Typical Transient Thermal Impedance

## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)





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