

# Surface-Mount TMBS<sup>®</sup> (Trench MOS Barrier Schottky) Rectifier

**eSMP<sup>®</sup> Series**

**SMP (DO-220AA)**

Cathode Anode

**FEATURES**

- Low profile package
- Trench MOS Schottky technology
- Low power losses, high efficiency
- Low forward voltage drop
- 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**
**DESIGN SUPPORT TOOLS AVAILABLE**


3D Models

| PRIMARY CHARACTERISTICS |                |
|-------------------------|----------------|
| $I_{F(AV)}$             | 3.0 A          |
| $V_{RRM}$               | 60 V           |
| $I_{FSM}$               | 80 A           |
| $V_F$ at $I_F = 3.0$ A  | 0.47 V         |
| $T_J$ max.              | 175 °C         |
| Package                 | SMP (DO-220AA) |
| Circuit configuration   | Single         |

**TYPICAL APPLICATIONS**

For use in low voltage, high frequency inverters, freewheeling, DC/DC converters, and polarity protection applications.

**MECHANICAL DATA**
**Case:** SMP (DO-220AA)

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 suffix meets JESD 201 class 2 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                     | V3PM6       | UNIT |
| Device marking code   |                            | 3M6         |      |
| Maximum repetitive peak reverse voltage   | $V_{RRM}$                  | 60          | V    |
| Maximum DC forward current  | $I_{F(AV)}$ <sup>(1)</sup> | 3           | A    |
|   | $I_{F(AV)}$ <sup>(2)</sup> | 2.4         | A    |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load | $I_{FSM}$                  | 80          | A    |
| Operating junction and storage temperature range                                  | $T_J$ <sup>(3)</sup>       | -40 to +175 | °C   |
| Operating junction and storage temperature range                                  | $T_{STG}$                  | -55 to +175 | °C   |

**Notes**
<sup>(1)</sup> Mounted on 10 mm x 10 mm PCB pad area

<sup>(2)</sup> Free air, mounted on recommended copper pad area

<sup>(3)</sup> The heat generated must be less than the thermal conductivity from junction-to-ambient:  $dP_D/dT_J < 1/R_{\theta JA}$



| ELECTRICAL CHARACTERISTICS ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted) |                      |                                   |             |      |      |      |
|---|----------------------|-----------------------------------|-------------|------|------|------|
| PARAMETER   | TEST CONDITIONS      |                                   | SYMBOL      | TYP. | MAX. | UNIT |
| Instantaneous forward voltage   | $I_F = 1.5\text{ A}$ | $T_A = 25\text{ }^\circ\text{C}$  | $V_F^{(1)}$ | 0.50 | -    | V    |
|   | $I_F = 3\text{ A}$   |                                   |             | 0.55 | 0.63 |      |
|   | $I_F = 1.5\text{ A}$ | $T_A = 125\text{ }^\circ\text{C}$ |             | 0.39 | -    |      |
|   | $I_F = 3\text{ A}$   |                                   |             | 0.47 | 0.55 |      |
| Reverse current   | $V_R = 60\text{ V}$  | $T_A = 25\text{ }^\circ\text{C}$  | $I_R^{(2)}$ | -    | 0.2  | mA   |
|   |                      | $T_A = 125\text{ }^\circ\text{C}$ |             | 1.5  | 5.0  |      |
| Typical junction capacitance  | 4.0 V, 1 MHz         |                                   | $C_J$       | 400  | -    | pF   |

**Notes**

- (1) Pulse test: 300  $\mu\text{s}$  pulse width, 1 % duty cycle  
(2) Pulse test: pulse width  $\leq 5\text{ ms}$

| THERMAL CHARACTERISTICS ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise specified) |                       |       |                    |
|--|-----------------------|-------|--------------------|
| PARAMETER  | SYMBOL                | V3PM6 | UNIT               |
| Typical thermal resistance   | $R_{\theta JA}^{(1)}$ | 125   | $^\circ\text{C/W}$ |
|  | $R_{\theta JM}^{(2)}$ | 15    |                    |

**Notes**

- (1) Free air, mounted on recommended PCB, 1 oz. pad area; thermal resistance  $R_{\theta JA}$  - junction-to-ambient  
(2) Mounted on 10 mm x 10 mm copper pad area PCB; thermal resistance  $R_{\theta JM}$  - junction-to-mount

| ORDERING INFORMATION (Example) |                 |                        |               |                                    |
|--------------------------------|-----------------|------------------------|---------------|------------------------------------|
| PREFERRED P/N                  | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                      |
| V3PM6-M3/H                     | 0.024           | H                      | 3000          | 7" diameter plastic tape and reel  |
| V3PM6-M3/I                     | 0.024           | I                      | 10 000        | 13" diameter plastic tape and reel |
| V3PM6HM3/H <sup>(1)</sup>      | 0.024           | H                      | 3000          | 7" diameter plastic tape and reel  |
| V3PM6HM3/I <sup>(1)</sup>      | 0.024           | I                      | 10 000        | 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)

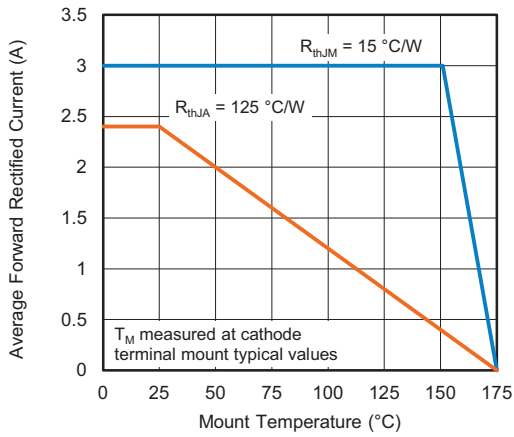


Fig. 1 - Maximum Forward Current Derating Curve

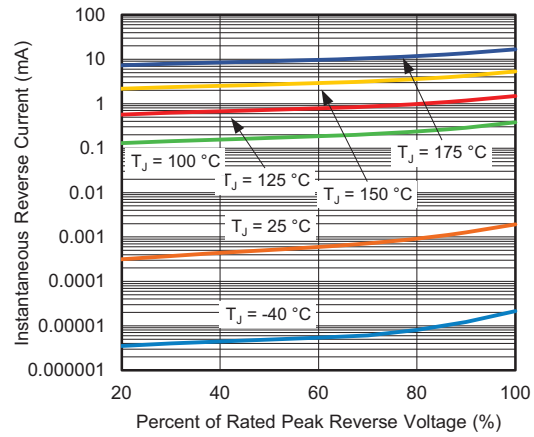


Fig. 4 - Typical Reverse Characteristics

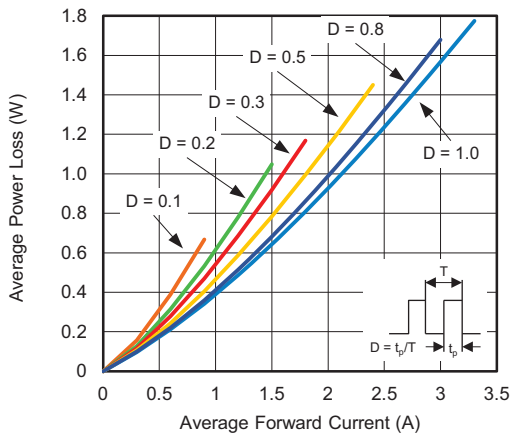


Fig. 2 - Forward Power Loss Characteristics

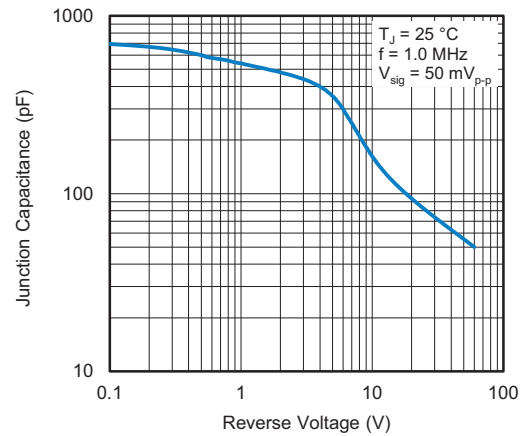


Fig. 5 - Typical Junction Capacitance

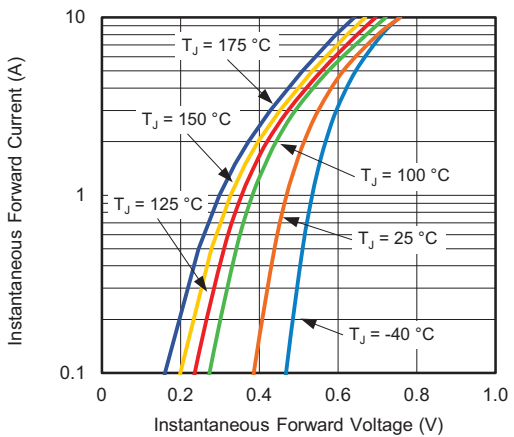


Fig. 3 - Typical Instantaneous Forward Characteristics

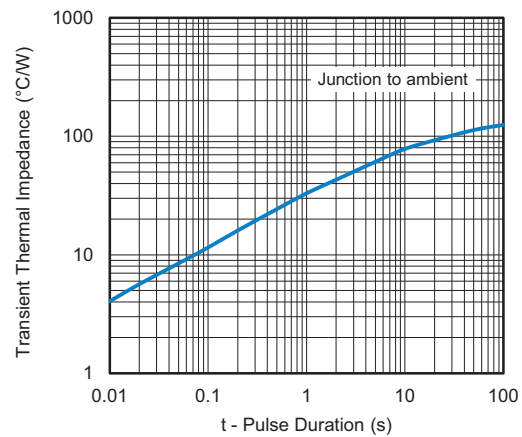
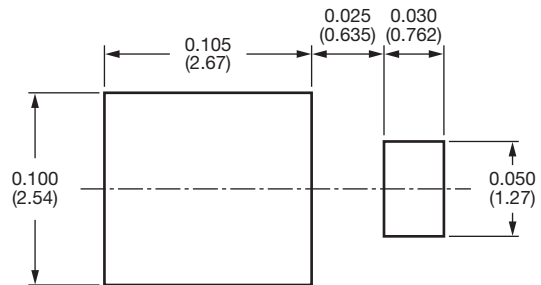
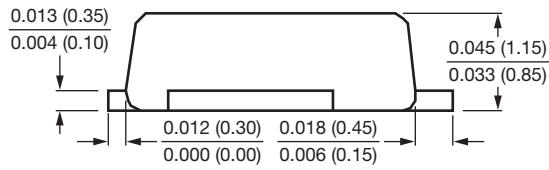
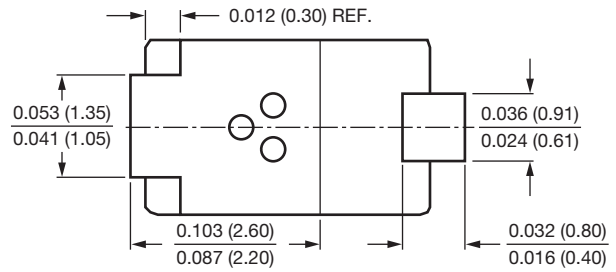
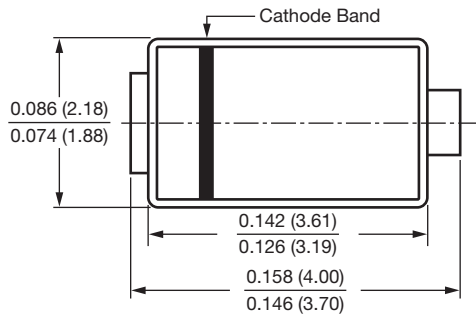


Fig. 6 - Typical Transient Thermal Impedance

**PACKAGE OUTLINE DIMENSIONS** in inches (millimeters)

**SMP (DO-220AA)**





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