

# 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 |                |
|-------------------------|----------------|
| $I_{F(AV)}$             | 2.0 A          |
| $V_{RRM}$               | 200 V          |
| $I_{FSM}$               | 50 A           |
| $V_F$ at $I_F = 2.0$ A  | 0.68 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                     | V2P22L      | UNIT |
| Device marking code                                                               |                            | V2D         |      |
| Maximum repetitive peak reverse voltage                                           | $V_{RRM}$                  | 200         | V    |
| Maximum DC forward current                                                        | $I_{F(AV)}$ <sup>(1)</sup> | 2           | A    |
|                                                                                   | $I_{F(AV)}$ <sup>(2)</sup> | 1.6         | A    |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load | $I_{FSM}$                  | 50          | 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 <sub>A</sub> = 25 °C unless otherwise noted) |                        |                         |                               |       |      |      |
|----------------------------------------------------------------------------|------------------------|-------------------------|-------------------------------|-------|------|------|
| PARAMETER                                                                  | TEST CONDITIONS        |                         | SYMBOL                        | TYP.  | MAX. | UNIT |
| Instantaneous forward voltage                                              | I <sub>F</sub> = 1.0 A | T <sub>A</sub> = 25 °C  | V <sub>F</sub> <sup>(1)</sup> | 0.76  | -    | V    |
|                                                                            | I <sub>F</sub> = 2.0 A |                         |                               | 0.83  | 0.91 |      |
|                                                                            | I <sub>F</sub> = 1.0 A | T <sub>A</sub> = 125 °C |                               | 0.60  | -    |      |
|                                                                            | I <sub>F</sub> = 2.0 A |                         |                               | 0.68  | 0.76 |      |
| Reverse current                                                            | V <sub>R</sub> = 160 V | T <sub>A</sub> = 25 °C  | I <sub>R</sub> <sup>(2)</sup> | 0.001 | -    | mA   |
|                                                                            |                        | T <sub>A</sub> = 125 °C |                               | 0.2   | -    |      |
|                                                                            | V <sub>R</sub> = 200 V | T <sub>A</sub> = 25 °C  |                               | -     | 0.04 | mA   |
|                                                                            |                        | T <sub>A</sub> = 125 °C |                               | 0.4   | 2.0  |      |
| Typical junction capacitance                                               | 4.0 V, 1 MHz           |                         | C <sub>J</sub>                | 90.0  | -    | pF   |

Notes

- (1) Pulse test: 300 μs pulse width, 1 % duty cycle
- (2) Pulse test: pulse width ≤ 5 ms

| THERMAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise specified) |                                    |        |      |
|-----------------------------------------------------------------------------|------------------------------------|--------|------|
| PARAMETER                                                                   | SYMBOL                             | V2P22L | UNIT |
| Typical thermal resistance                                                  | R <sub>θJA</sub> <sup>(1)(2)</sup> | 125    | °C/W |
|                                                                             | R <sub>θJM</sub> <sup>(3)</sup>    | 15     |      |

Notes

- (1) The heat generated must be less than the thermal conductivity from junction-to-ambient: dP<sub>D</sub>/dT<sub>J</sub> < 1/R<sub>θJA</sub>
- (2) Free air, mounted on recommended copper pad area; thermal resistance R<sub>θJA</sub> - junction-to-ambient
- (3) Mounted on 10 mm x 10 mm aluminum PCB; thermal resistance R<sub>θJM</sub> - junction-to-mount

| ORDERING INFORMATION (Example) |                 |                        |               |                                    |
|--------------------------------|-----------------|------------------------|---------------|------------------------------------|
| PREFERRED P/N                  | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                      |
| V2P22L-M3/H                    | 0.024           | H                      | 3000          | 7" diameter plastic tape and reel  |
| V2P22L-M3/I                    | 0.024           | I                      | 10 000        | 13" diameter plastic tape and reel |
| V2P22LHM3/H <sup>(1)</sup>     | 0.024           | H                      | 3000          | 7" diameter plastic tape and reel  |
| V2P22LHM3/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)

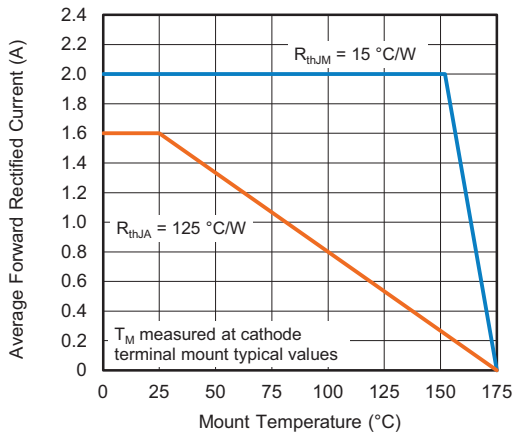


Fig. 1 - Maximum Forward Current Derating Curve

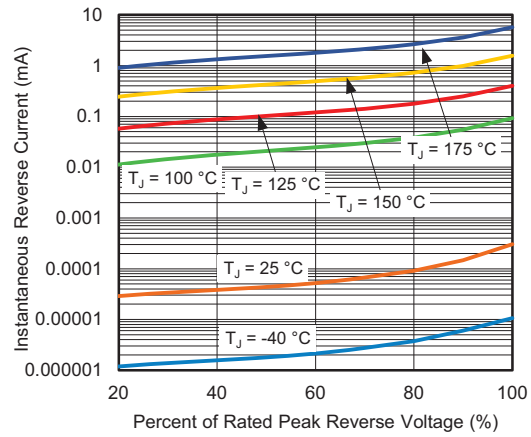


Fig. 4 - Typical Reverse Characteristics

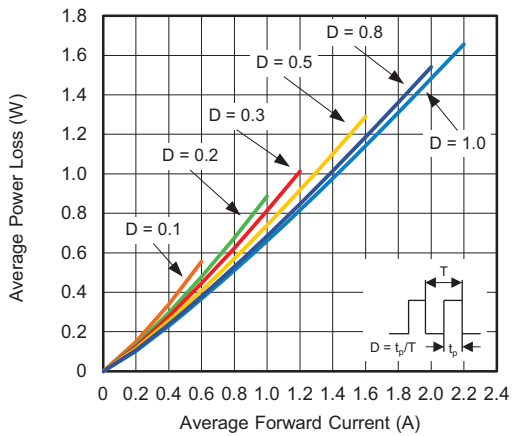


Fig. 2 - Forward Power Loss Characteristics

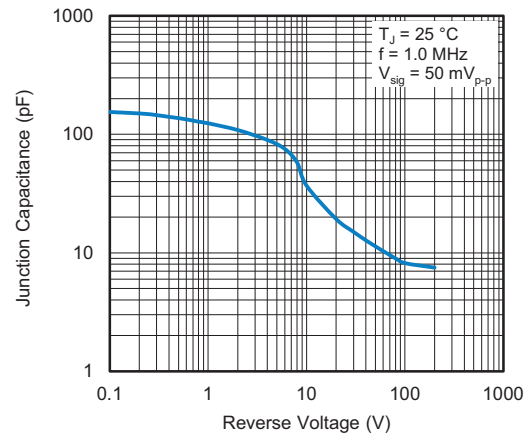


Fig. 5 - Typical Junction Capacitance

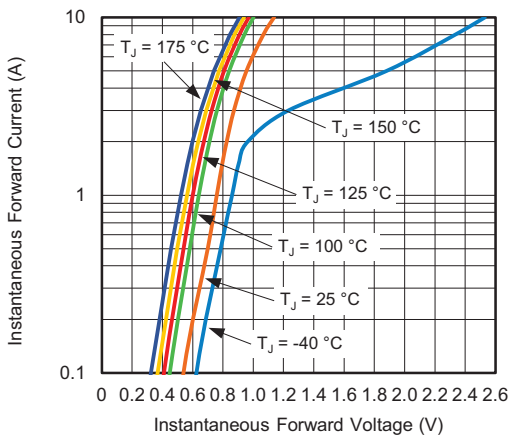


Fig. 3 - Typical Instantaneous Forward Characteristics

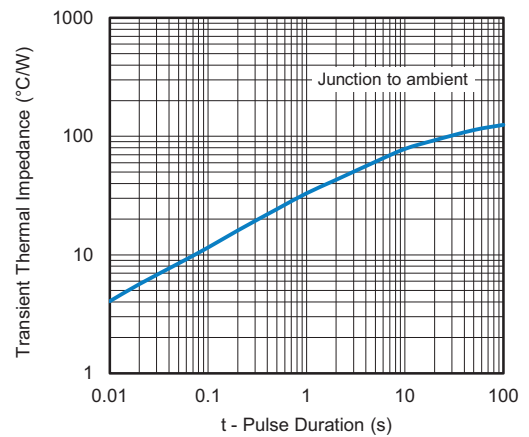
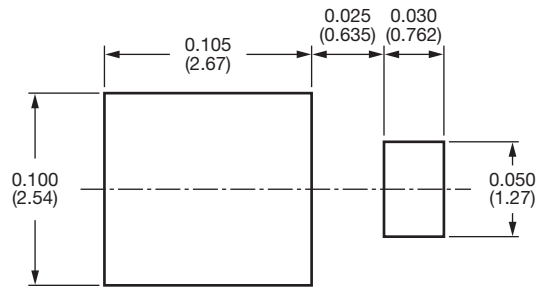
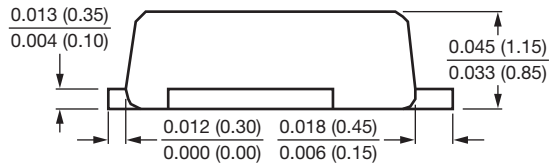
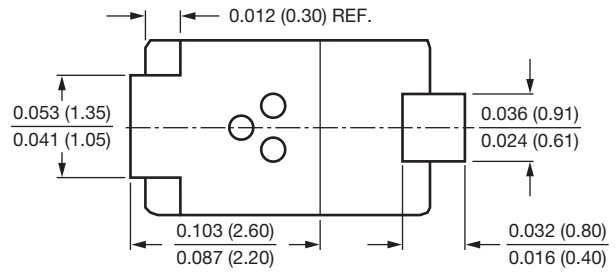
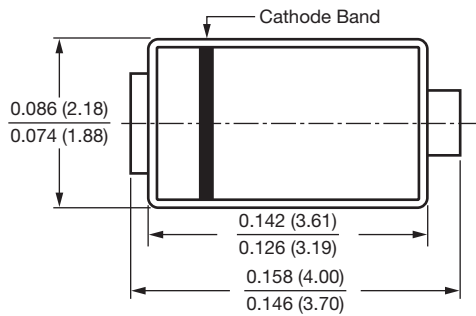


Fig. 6 - Typical Transient Thermal Impedance



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

**SMP (DO-220AA)**





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