

# Surface-Mount TMBS® (Trench MOS Barrier Schottky) Rectifier

## eSMP® 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)



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

## LINKS TO ADDITIONAL RESOURCES



3D Models

## PRIMARY CHARACTERISTICS

|                        |                |
|------------------------|----------------|
| $I_{F(AV)}$            | 3.0 A          |
| $V_{RRM}$              | 45 V           |
| $I_{FSM}$              | 80 A           |
| $V_F$ at $I_F = 3.0$ A | 0.37 V         |
| $T_J$ max.             | 150 °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      | V3PL45      | UNIT |
|-----------------------------------------------------------------------------------|-------------|-------------|------|
| Device marking code                                                               |             | 3LE         |      |
| Maximum repetitive peak reverse voltage                                           | $V_{RRM}$   | 45          | V    |
| Maximum DC forward current                                                        | $I_F^{(1)}$ | 3           | 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                                  | $T_J^{(2)}$ | -40 to +150 | °C   |
| Operating junction and storage temperature range                                  | $T_{STG}$   | -55 to +150 | °C   |

## Notes

(1) Free air, mounted on recommended copper pad area

(2) 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 <sub>F</sub> = 1.5 A | T <sub>A</sub> = 25 °C  | V <sub>F</sub> <sup>(1)</sup> | 0.41 | -    | V    |
|                               | I <sub>F</sub> = 3 A   |                         |                               | 0.46 | 0.54 |      |
|                               | I <sub>F</sub> = 1.5 A | T <sub>A</sub> = 125 °C |                               | 0.31 | -    |      |
|                               | I <sub>F</sub> = 3 A   |                         |                               | 0.37 | 0.46 |      |
| Reverse current               | V <sub>R</sub> = 45 V  | T <sub>A</sub> = 25 °C  | I <sub>R</sub> <sup>(2)</sup> | -    | 0.45 | mA   |
|                               |                        | T <sub>A</sub> = 125 °C |                               | 5.0  | 25.0 |      |
| Typical junction capacitance  | 4.0 V, 1 MHz           |                         | C <sub>J</sub>                | 550  | -    | 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                | V3PL45 | 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                      |
|----------------------------|-----------------|------------------------|---------------|------------------------------------|
| V3PL45-M3/H                | 0.024           | H                      | 3000          | 7" diameter plastic tape and reel  |
| V3PL45-M3/I                | 0.024           | I                      | 10 000        | 13" diameter plastic tape and reel |
| V3PL45HM3/H <sup>(1)</sup> | 0.024           | H                      | 3000          | 7" diameter plastic tape and reel  |
| V3PL45HM3/I <sup>(1)</sup> | 0.024           | I                      | 10 000        | 13" diameter plastic tape and reel |

**Note**

(1) AEC-Q101 qualified

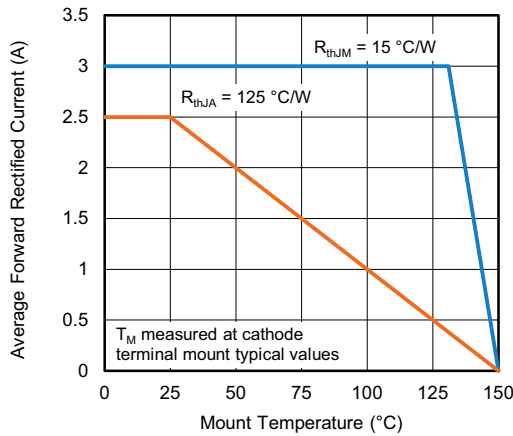
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

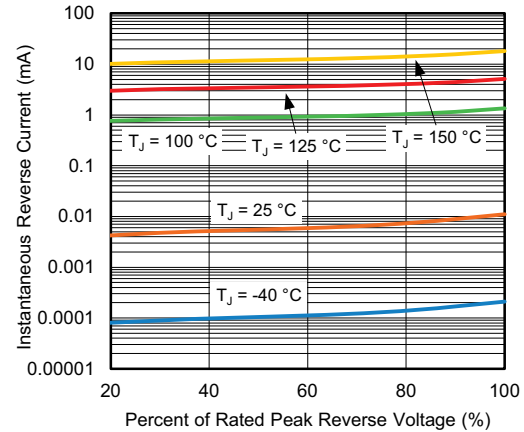


Fig. 4 - Typical Reverse Characteristics

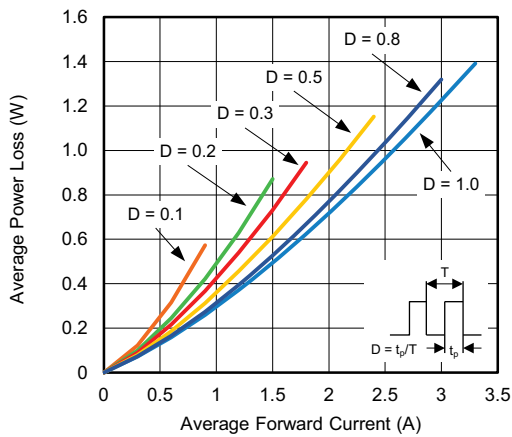


Fig. 2 - Forward Power Loss Characteristics

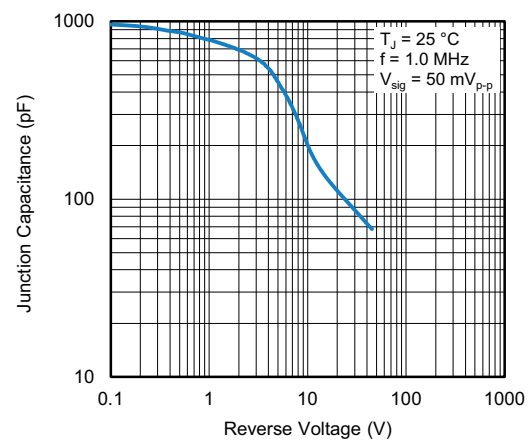


Fig. 5 - Typical Junction Capacitance

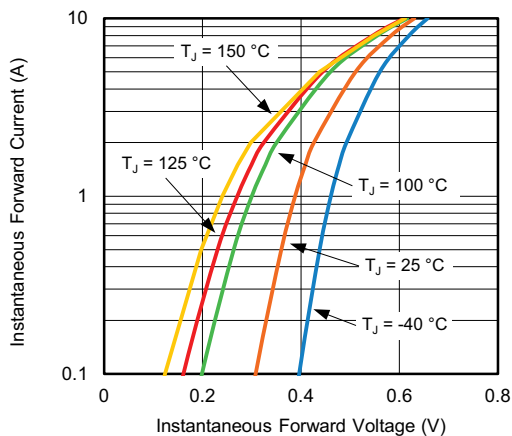


Fig. 3 - Typical Instantaneous Forward Characteristics

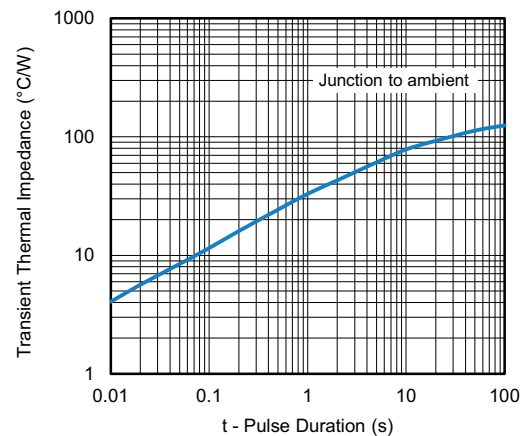
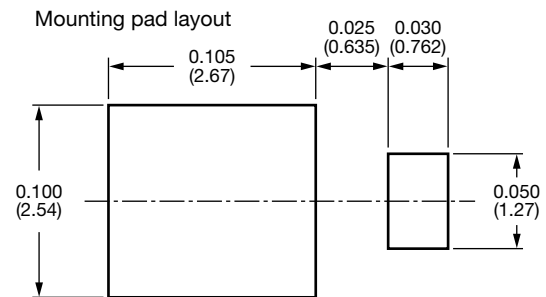
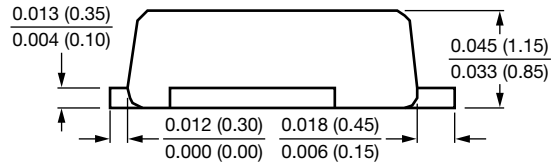
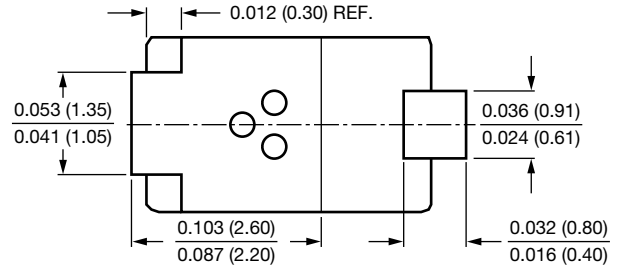
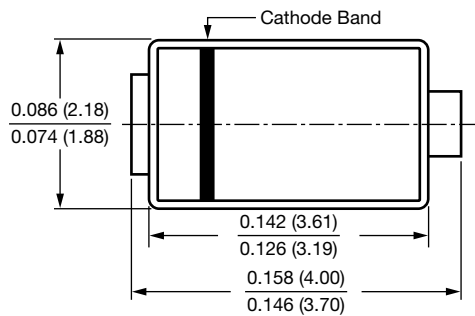


Fig. 6 - Typical Transient Thermal Impedance

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

**SMP (DO-220AA)**




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