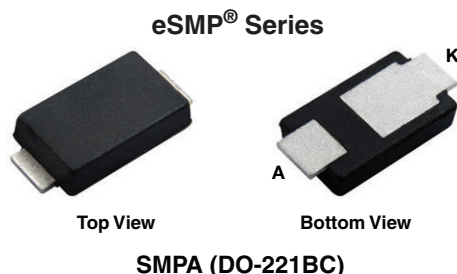


# Surface-Mount TMBS® (Trench MOS Barrier Schottky) Rectifier



Anode  Cathode

## FEATURES

- Very low profile - typical height of 0.95 mm
- Ideal for automated placement
- 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**

## LINKS TO ADDITIONAL RESOURCES



| PRIMARY CHARACTERISTICS                  |                 |
|------------------------------------------|-----------------|
| $I_{F(AV)}$                              | 4.0 A           |
| $V_{RRM}$                                | 45 V            |
| $I_{FSM}$                                | 80 A            |
| $V_F$ at $I_F = 4.0$ A ( $T_A = 125$ °C) | 0.41 V          |
| $T_J$ max.                               | 150 °C          |
| Package                                  | SMPA (DO-221BC) |
| Circuit configuration                    | Single          |

## TYPICAL APPLICATIONS

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

## MECHANICAL DATA

**Case:** SMPA (DO-221BC)

Molding compound meets UL 94 V-0 flammability rating  
Base P/N-M3 - halogen-free, RoHS-compliant, and commercial grade

Base P/NHM3\_X - halogen-free, RoHS-compliant, and AEC-Q101 qualified

("\_X" denotes revision code e.g. A, B,.....)

**Terminals:** matte tin plated leads, solderable per J-STD-002 and JESD22-B102

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

**Polarity:** color band denotes cathode end

| MAXIMUM RATINGS ( $T_A = 25$ °C unless otherwise noted)                           |                |             |      |
|-----------------------------------------------------------------------------------|----------------|-------------|------|
| PARAMETER                                                                         | SYMBOL         | V4PAL45     | UNIT |
| Device marking code                                                               |                | 4L45        |      |
| Maximum repetitive peak reverse voltage                                           | $V_{RRM}$      | 45          | V    |
| Maximum DC forward current                                                        | $I_F^{(1)}$    | 4.0         | A    |
|                                                                                   | $I_F^{(2)}$    | 3.0         |      |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load | $I_{FSM}$      | 80          | A    |
| Operating junction and storage temperature range                                  | $T_J, T_{STG}$ | -40 to +150 | °C   |

## Notes

(1) Units mounted on 15 mm x 15 mm pad areas, 2 oz. PCB

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

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

| PARAMETER                     | TEST CONDITIONS      | SYMBOL                              | TYP. | MAX. | UNIT          |
|-------------------------------|----------------------|-------------------------------------|------|------|---------------|
| Instantaneous forward voltage | $I_F = 2.0\text{ A}$ | $T_A = 25\text{ }^{\circ}\text{C}$  | 0.43 | -    | V             |
|                               | $I_F = 4.0\text{ A}$ |                                     | 0.49 | 0.57 |               |
|                               | $I_F = 2.0\text{ A}$ | $T_A = 125\text{ }^{\circ}\text{C}$ | 0.33 | -    |               |
|                               | $I_F = 4.0\text{ A}$ |                                     | 0.41 | 0.50 |               |
| Reverse current               | $V_R = 45\text{ V}$  | $T_A = 25\text{ }^{\circ}\text{C}$  | -    | 450  | $\mu\text{A}$ |
|                               |                      | $T_A = 125\text{ }^{\circ}\text{C}$ | 5    | 15   | mA            |
| Typical junction capacitance  | 4.0 V, 1 MHz         | $C_J$                               | 450  | -    | 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                | V4PAL45 | UNIT                 |
|----------------------------|-----------------------|---------|----------------------|
| Typical thermal resistance | $R_{\theta JA}^{(1)}$ | 100     | $^{\circ}\text{C/W}$ |
|                            | $R_{\theta JM}^{(1)}$ | 9       |                      |

**Note**

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

**ORDERING INFORMATION** (Example)

| PREFERRED P/N                 | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                      |
|-------------------------------|-----------------|------------------------|---------------|------------------------------------|
| V4PAL45-M3/I                  | 0.032           | I                      | 14 000        | 13" diameter plastic tape and reel |
| V4PAL45HM3_A/I <sup>(1)</sup> | 0.032           | I                      | 14 000        | 13" diameter plastic tape and reel |

**Note**

(1) AEC-Q101 qualified

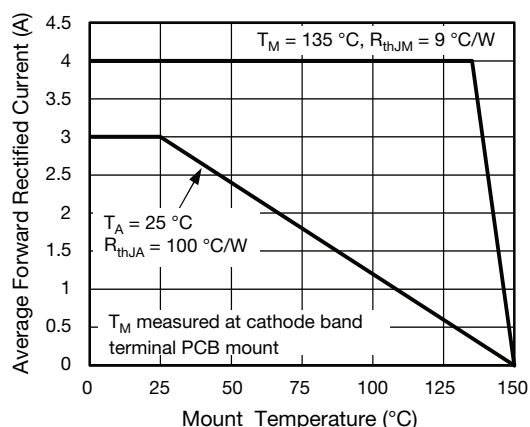
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise specified)


Fig. 1 - Maximum Forward Current Derating Curve

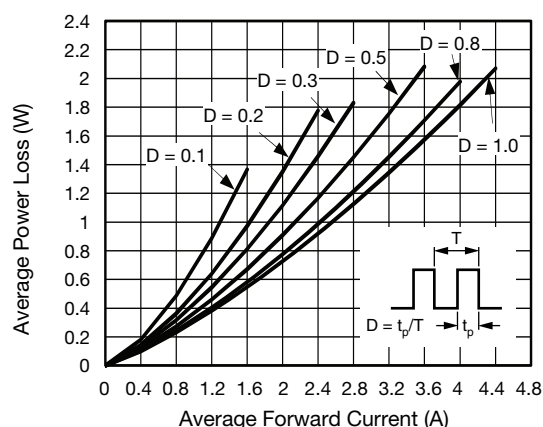


Fig. 2 - Forward Power Loss Characteristics

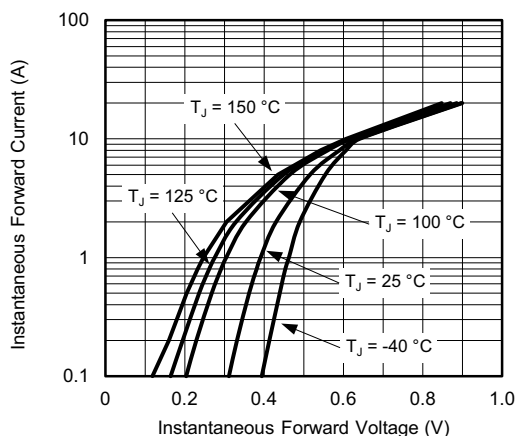


Fig. 3 - Typical Instantaneous Forward Characteristics

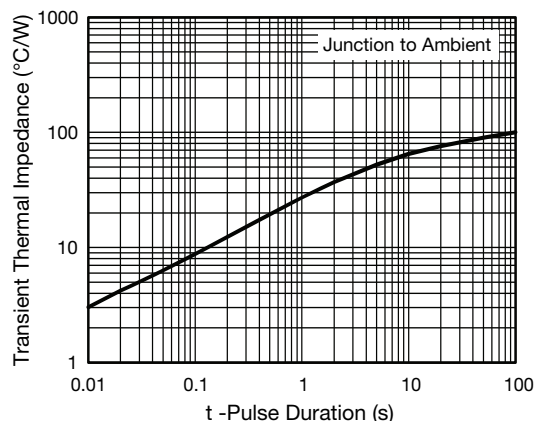


Fig. 6 - Typical Transient Thermal Impedance

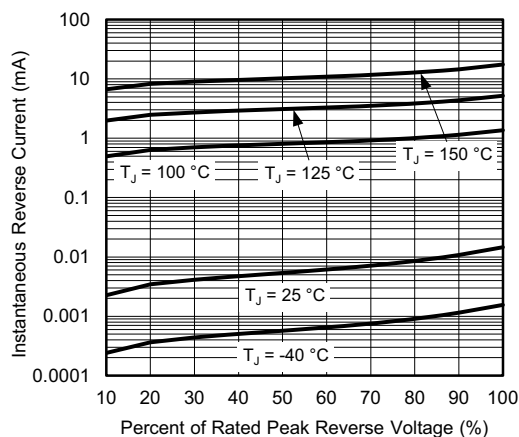


Fig. 4 - Typical Reverse Leakage Characteristics

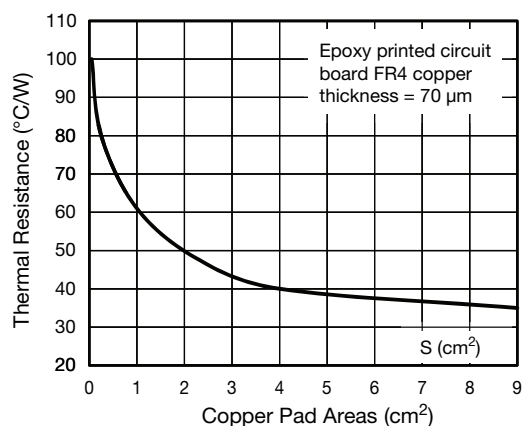


Fig. 7 - Thermal Resistance Junction to Ambient vs. Copper Pad Areas

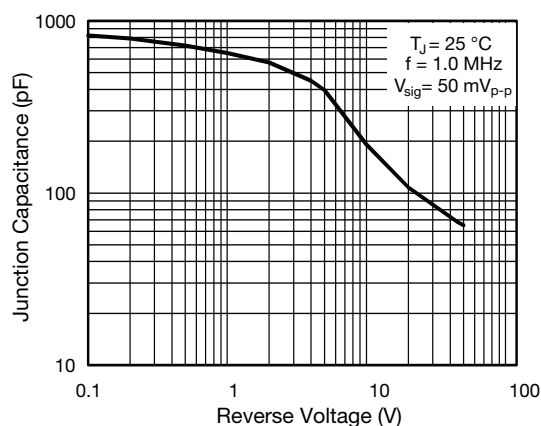
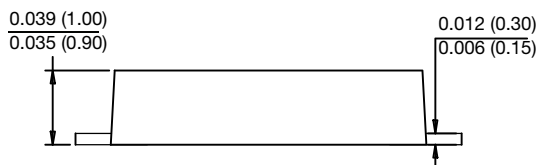
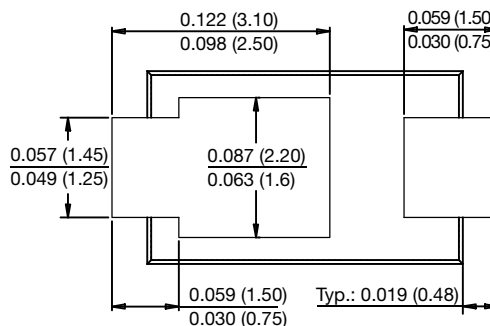
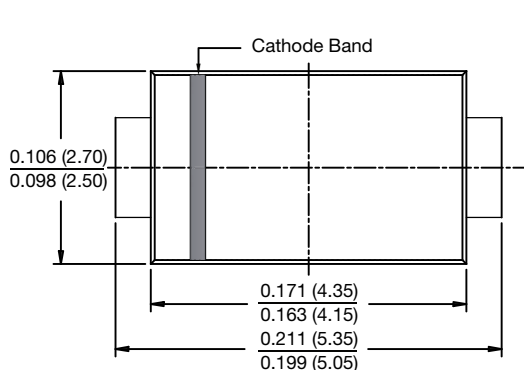


Fig. 5 - Typical Junction Capacitance

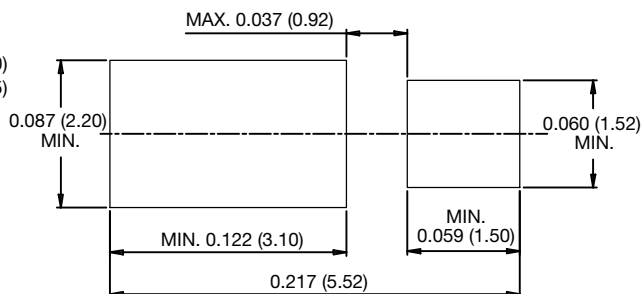


**PACKAGE OUTLINE DIMENSIONS** in inches (millimeters)

**SMPA (DO-221BC)**



**Mounting Pad Layout**





## Disclaimer

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