

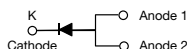
# High Current Density Surface Mount Trench MOS Barrier Schottky Rectifier

Ultra Low  $V_F = 0.26\text{ V}$  at  $I_F = 5\text{ A}$

TMBS® eSMP® Series



TO-277A (SMPC)



## FEATURES

- Very low profile - typical height of 1.1 mm
- Ideal for automated placement
- Trench MOS Schottky technology
- Low forward voltage drop, low power losses
- High efficiency operation
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



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

## TYPICAL APPLICATIONS

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

## MECHANICAL DATA

**Case:** TO-277A (SMPC)

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

**Terminals:** Matte tin plated leads, solderable per J-STD-002 and JESD 22-B102

M3 suffix meets JESD 201 class 1A whisker test

| PRIMARY CHARACTERISTICS      |                |
|------------------------------|----------------|
| $I_{F(AV)}$                  | 15 A           |
| $V_{RRM}$                    | 50 V           |
| $I_{FSM}$                    | 200 A          |
| $V_F$ at $I_F = 15\text{ A}$ | 0.41 V         |
| $T_J$ max.                   | 150 °C         |
| Package                      | TO-277A (SMPC) |
| Diode variation              | Single die     |

| MAXIMUM RATINGS ( $T_A = 25\text{ °C}$ unless otherwise noted)                    |                |             |      |
|-----------------------------------------------------------------------------------|----------------|-------------|------|
| PARAMETER                                                                         | SYMBOL         | V15PN50     | UNIT |
| Device marking code                                                               |                | 15N5        |      |
| Maximum repetitive peak reverse voltage                                           | $V_{RRM}$      | 50          | V    |
| Maximum average forward rectified current (fig. 1)                                | $I_F^{(1)}$    | 15          | A    |
|                                                                                   | $I_F^{(2)}$    | 6.0         |      |
| Maximum DC reverse voltage                                                        | $V_{DC}$       | 35          | V    |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load | $I_{FSM}$      | 200         | A    |
| Operating junction and storage temperature range                                  | $T_J, T_{STG}$ | -40 to +150 | °C   |

## Notes

(1) Mounted on 30 mm x 30 mm 2 oz. pad PCB

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

| 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> = 5.0 A | T <sub>A</sub> = 25 °C  | V <sub>F</sub> <sup>(1)</sup> | 0.38 | -    | V    |
|                                                                            | I <sub>F</sub> = 7.5 A |                         |                               | 0.41 | -    |      |
|                                                                            | I <sub>F</sub> = 15 A  |                         |                               | 0.48 | 0.56 |      |
|                                                                            | I <sub>F</sub> = 5.0 A | T <sub>A</sub> = 125 °C |                               | 0.26 | -    |      |
|                                                                            | I <sub>F</sub> = 7.5 A |                         |                               | 0.31 | -    |      |
|                                                                            | I <sub>F</sub> = 15 A  |                         |                               | 0.41 | 0.50 |      |
|                                                                            |                        |                         |                               |      |      |      |
| Reverse current                                                            | V <sub>R</sub> = 50 V  | T <sub>A</sub> = 25 °C  | I <sub>R</sub> <sup>(2)</sup> | 140  | 3000 | μA   |
|                                                                            |                        | T <sub>A</sub> = 125 °C |                               | 60   | 140  | mA   |

**Notes**

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

| <b>THERMAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted) |                          |         |                      |
|---------------------------------------------------------------------------------------------|--------------------------|---------|----------------------|
| PARAMETER                                                                                   | SYMBOL                   | V15PN50 | UNIT                 |
| Typical thermal resistance                                                                  | $R_{\theta JA}^{(1)(2)}$ | 70      | $^{\circ}\text{C/W}$ |
|                                                                                             | $R_{\theta JM}^{(3)}$    | 4       |                      |

**Notes**

- (1) Free air, mounted on recommended copper pad area; thermal resistance  $R_{\theta JA}$  - junction to ambient  
(2) The heat generated must be less than the thermal conductivity from junction-to-ambient:  $dP_D/dT_J < 1/R_{\theta JA}$   
(3) Mounted on 30 mm x 30 mm 2 oz. pad PCB; thermal resistance  $R_{\theta JM}$  - junction to mount measured at cathode side

| <b>ORDERING INFORMATION</b> (Example) |                 |                        |               |                                    |
|---------------------------------------|-----------------|------------------------|---------------|------------------------------------|
| PREFERRED P/N                         | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                      |
| V15PN50-M3/86A                        | 0.10            | 86A                    | 1500          | 7" diameter plastic tape and reel  |
| V15PN50-M3/87A                        | 0.10            | 87A                    | 6500          | 13" diameter plastic tape and reel |

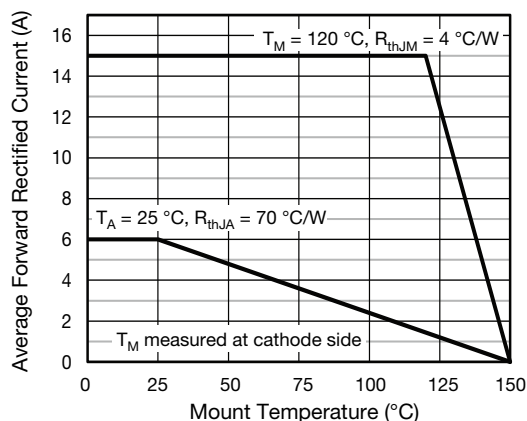
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve  
(D = Duty Cycle = 0.5)

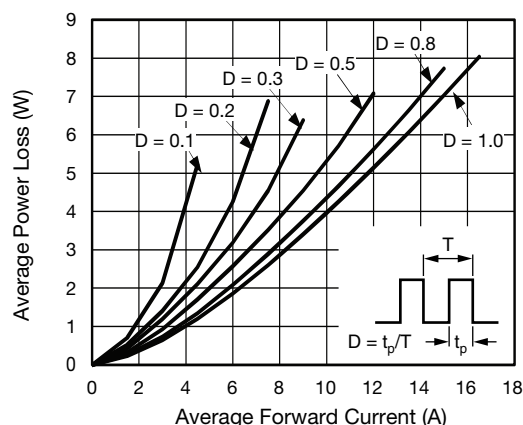


Fig. 2 - Forward Power Loss Characteristics

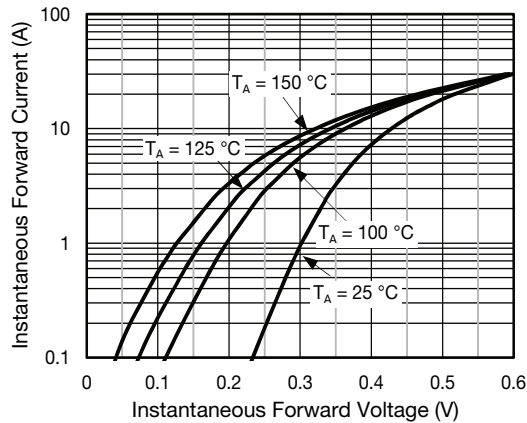


Fig. 3 - Typical Instantaneous Forward Characteristics

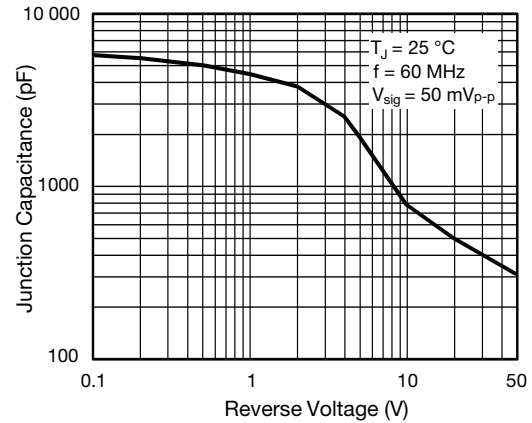


Fig. 5 - Typical Junction Capacitance

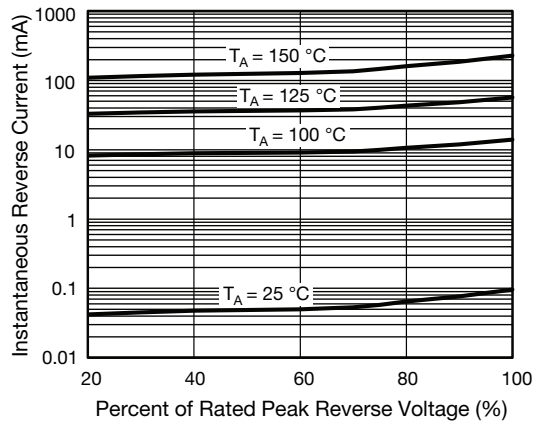


Fig. 4 - Typical Reverse Leakage Characteristics

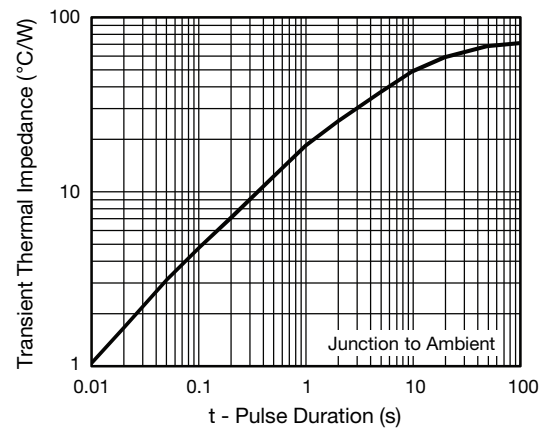
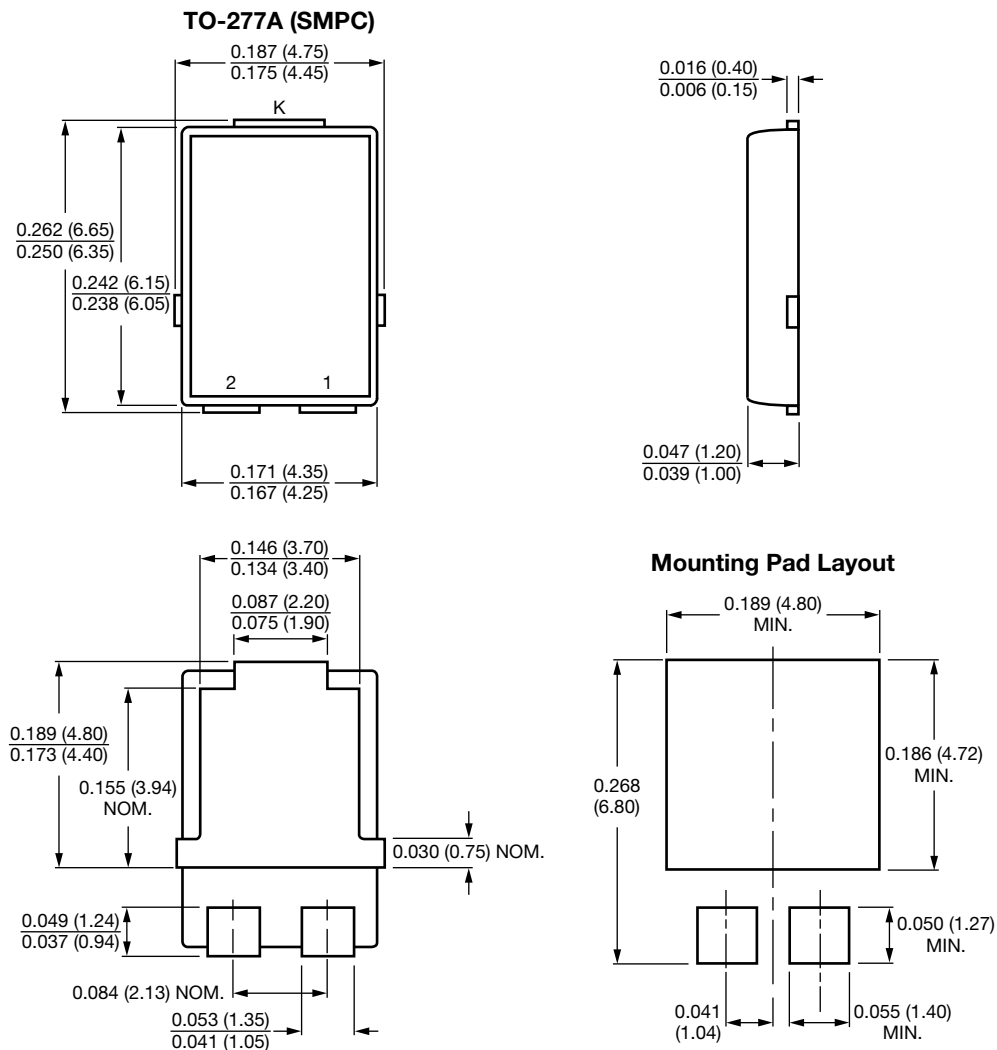


Fig. 6 - Typical Transient Thermal Impedance



PACKAGE OUTLINE DIMENSIONS in inches (millimeters)



Conform to JEDEC TO-277A



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