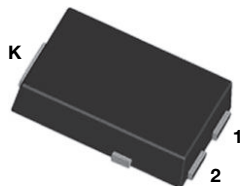


# High Current Density Surface Mount Trench MOS Barrier Schottky Rectifier

Ultra Low  $V_F = 0.42\text{ V}$  at  $I_F = 6\text{ A}$

## 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
- 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**

## TYPICAL APPLICATIONS

For use in low voltage high frequency inverters, freewheeling, DC/DC converters, 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

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

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 JESD 22-B102

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

## PRIMARY CHARACTERISTICS

|                                                        |                |
|--------------------------------------------------------|----------------|
| $I_{F(AV)}$                                            | 12 A           |
| $V_{RRM}$                                              | 80 V           |
| $I_{FSM}$                                              | 200 A          |
| $V_F$ at $I_F = 12\text{ A}$ ( $T_A = 125\text{ °C}$ ) | 0.54 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         | V12P8       | UNIT       |
|-----------------------------------------------------------------------------------|----------------|-------------|------------|
| Device marking code                                                               |                | V128        |            |
| Maximum repetitive peak reverse voltage                                           | $V_{RRM}$      | 80          | V          |
| Maximum average forward rectified current (fig. 1)                                | $I_F^{(1)}$    | 12          | A          |
|                                                                                   | $I_F^{(2)}$    | 4.3         |            |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load | $I_{FSM}$      | 200         | A          |
| Voltage rate of change (rated $V_R$ )                                             | $dV/dt$        | 10 000      | V/ $\mu$ s |
| Operating junction and storage temperature range                                  | $T_J, T_{STG}$ | -40 to +150 | °C         |

## Notes

(1) Mounted on 30 mm x 30 mm pad areas aluminum 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 | $I_F = 6.0\text{ A}$ | $V_F^{(1)}$ | 0.49 | -    | V    |
|                               | $I_F = 12\text{ A}$  |             | 0.58 | 0.66 |      |
|                               | $I_F = 6.0\text{ A}$ |             | 0.42 | -    |      |
|                               | $I_F = 12\text{ A}$  |             | 0.54 | 0.62 |      |
| Reverse current               | $V_R = 80\text{ V}$  | $I_R^{(2)}$ | -    | 1    | mA   |
|                               |                      |             | 12   | 30   |      |

**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 noted)

| PARAMETER                  | SYMBOL                   | V12P8 | UNIT                 |
|----------------------------|--------------------------|-------|----------------------|
| Typical thermal resistance | $R_{\theta JA}^{(1)(2)}$ | 75    | $^{\circ}\text{C/W}$ |
|                            | $R_{\theta JM}^{(3)}$    | 4     |                      |

**Notes**

- (1) The heat generated must be less than the thermal conductivity from junction to ambient:  $dP_D/dT_J < 1/R_{\theta JA}$   
 (2) Free air mounted on recommended copper pad area; thermal resistance  $R_{\theta JA}$  - junction to ambient  
 (3) Mounted on 30 mm x 30 mm aluminum 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                      |
|-----------------------------|-----------------|------------------------|---------------|------------------------------------|
| V12P8-M3/86A                | 0.10            | 86A                    | 1500          | 7" diameter plastic tape and reel  |
| V12P8-M3/87A                | 0.10            | 87A                    | 6500          | 13" diameter plastic tape and reel |
| V12P8HM3/86A <sup>(1)</sup> | 0.10            | 86A                    | 1500          | 7" diameter plastic tape and reel  |
| V12P8HM3/87A <sup>(1)</sup> | 0.10            | 87A                    | 6500          | 13" diameter plastic tape and reel |
| V12P8HM3_A/H <sup>(1)</sup> | 0.10            | H                      | 1500          | 7" diameter plastic tape and reel  |
| V12P8HM3_A/I <sup>(1)</sup> | 0.10            | I                      | 6500          | 13" diameter plastic tape and reel |

**Note**

- (1) AEC-Q101 qualified

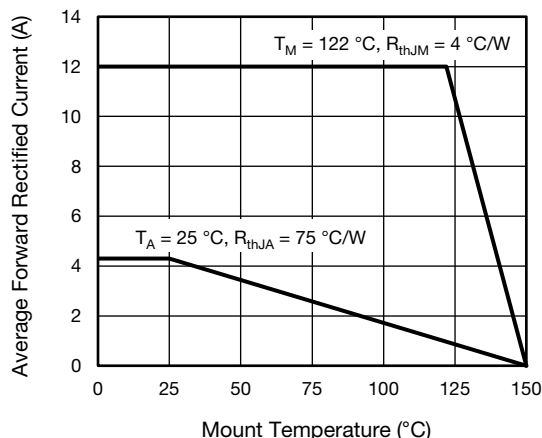
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)

Fig. 1 - Forward Current Derating Curve

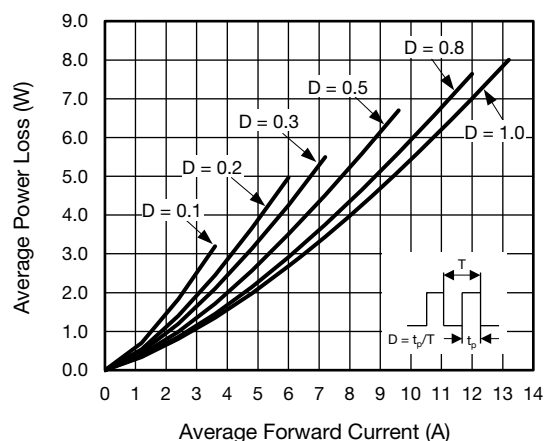


Fig. 2 - Forward Power Loss Characteristics

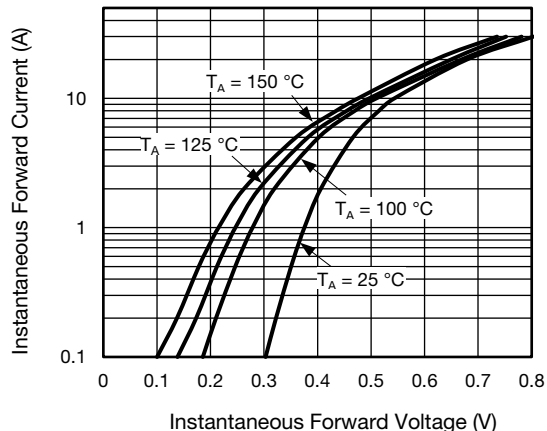


Fig. 3 - Typical Instantaneous Forward Characteristics

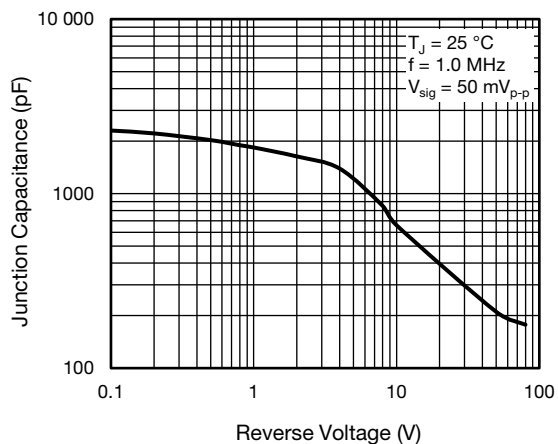


Fig. 5 - Typical Junction Capacitance

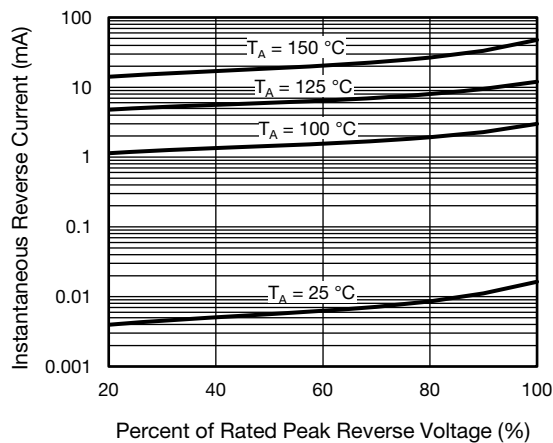


Fig. 4 - Typical Reverse Leakage Characteristics

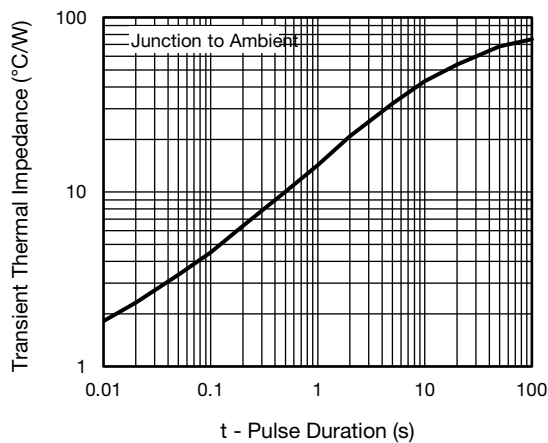
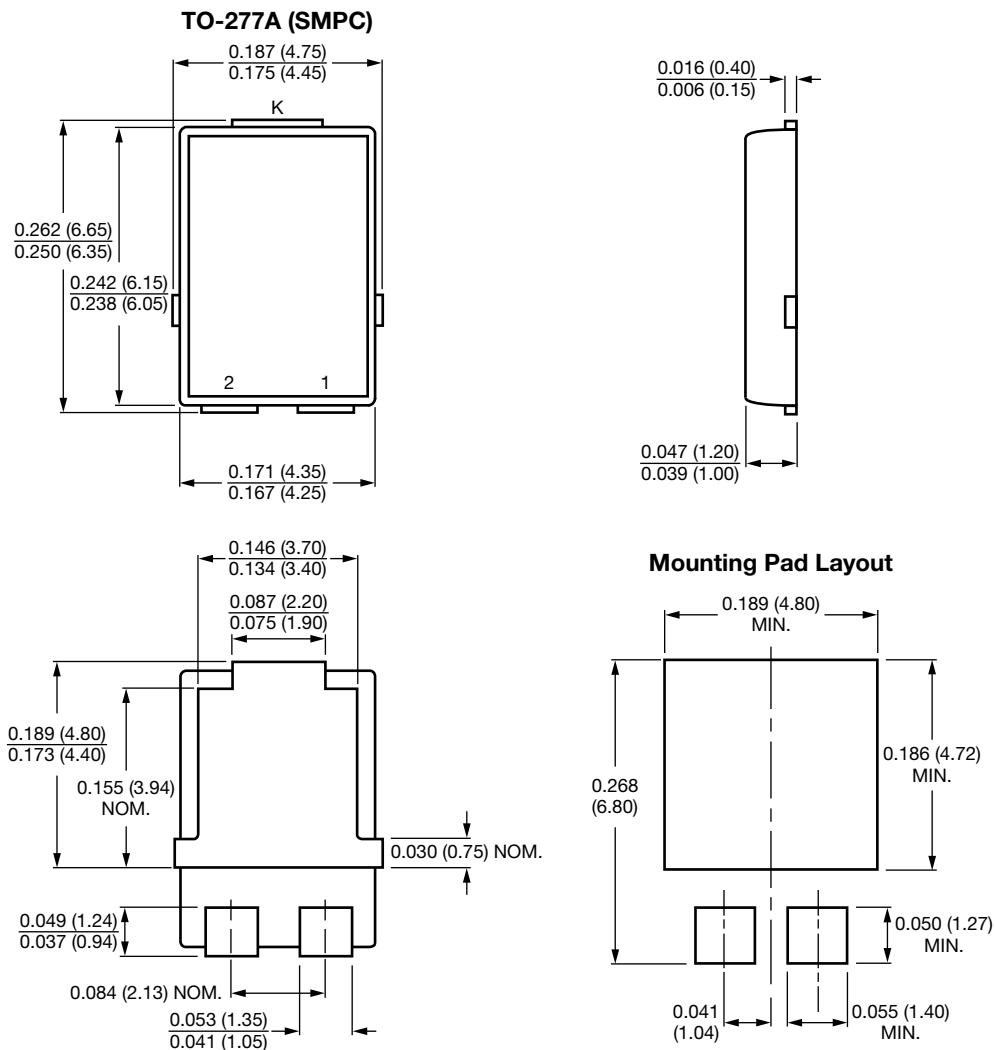


Fig. 6 - Typical Transient Thermal Impedance



## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)



Conform to JEDEC® TO-277A



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