

# High Current Density Surface Mount Trench MOS Barrier Schottky Rectifier

Ultra Low  $V_F = 0.50$  V at  $I_F = 6$  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

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

M3 and HM3 suffix meets JESD 201 class 2 whisker test

| PRIMARY CHARACTERISTICS        |                |
|--------------------------------|----------------|
| $I_{F(AV)}$                    | 12 A           |
| $V_{RRM}$                      | 100 V          |
| $I_{FSM}$                      | 200 A          |
| $V_F$ at $I_F = 15$ A (125 °C) | 0.61 V         |
| $T_J$ max.                     | 150 °C         |
| Package                        | TO-277A (SMPC) |
| Diode variations               | Single die     |

| MAXIMUM RATINGS ( $T_A = 25$ °C unless otherwise noted)                           |                   |             |      |
|-----------------------------------------------------------------------------------|-------------------|-------------|------|
| PARAMETER                                                                         | SYMBOL            | V12PM10     | UNIT |
| Device marking code                                                               |                   | 12M10       |      |
| Maximum repetitive peak reverse voltage                                           | $V_{RRM}$         | 100         | V    |
| Maximum DC forward current                                                        | $I_{F(AV)}^{(1)}$ | 12          | A    |
|                                                                                   | $I_{F(AV)}^{(2)}$ | 3.8         |      |
| 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 pad areas aluminum PCB

(2) Free air, mounted on recommended 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> = 6 A   | T <sub>A</sub> = 25 °C  | V <sub>F</sub> <sup>(1)</sup> | 0.57 | -    | V    |
|                                                                            | I <sub>F</sub> = 12 A  |                         |                               | 0.69 | 0.75 |      |
|                                                                            | I <sub>F</sub> = 6 A   | T <sub>A</sub> = 125 °C |                               | 0.50 | -    |      |
|                                                                            | I <sub>F</sub> = 12 A  |                         |                               | 0.61 | 0.66 |      |
| Reverse current                                                            | V <sub>R</sub> = 70 V  | T <sub>A</sub> = 25 °C  | I <sub>R</sub> <sup>(2)</sup> | 0.02 | -    | mA   |
|                                                                            |                        | T <sub>A</sub> = 125 °C |                               | 2.5  | -    |      |
|                                                                            | V <sub>R</sub> = 100 V | T <sub>A</sub> = 25 °C  |                               | -    | 0.20 |      |
|                                                                            |                        | T <sub>A</sub> = 125 °C |                               | 5    | 16   |      |

**Notes**

- (1) Pulse test: 300  $\mu\text{s}$  pulse width, 1 % duty cycle  
 (2) Pulse test: Pulse width  $\leq 40\text{ ms}$

| THERMAL CHARACTERISTICS ( $T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise specified) |                       |         |                      |
|------------------------------------------------------------------------------------------|-----------------------|---------|----------------------|
| PARAMETER                                                                                | SYMBOL                | V12PM10 | UNIT                 |
| Typical thermal resistance                                                               | $R_{\theta JA}^{(1)}$ | 75      | $^{\circ}\text{C/W}$ |
|                                                                                          | $R_{\theta JM}^{(2)}$ | 4       |                      |

**Notes**

- (1) Free air, mounted on recommended copper pad area; thermal resistance  $R_{\theta JA}$  - junction to ambient  
 (2) Mounted on 30 mm x 30 mm pad areas aluminum PCB, thermal resistance  $R_{\theta JM}$  - junction to mount

| ORDERING INFORMATION (Example) |                 |              |               |                                    |
|--------------------------------|-----------------|--------------|---------------|------------------------------------|
| PREFERRED P/N                  | UNIT WEIGHT (g) | PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                      |
| V12PM10-M3/H                   | 0.10            | H            | 1500          | 7" diameter plastic tape and reel  |
| V12PM10-M3/I                   | 0.10            | I            | 6500          | 13" diameter plastic tape and reel |
| V12PM10HM3/H <sup>(1)</sup>    | 0.10            | H            | 1500          | 7" diameter plastic tape and reel  |
| V12PM10HM3/I <sup>(1)</sup>    | 0.10            | I            | 6500          | 13" diameter plastic tape and reel |

**Note**

- (1) AEC-Q101 qualified

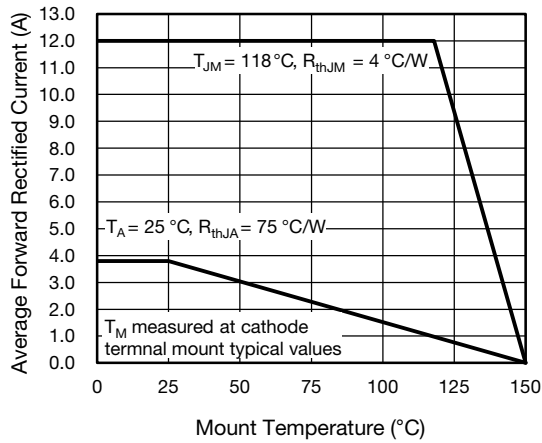
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise specified)


Fig. 1 - Maximum Forward Current Derating Curve

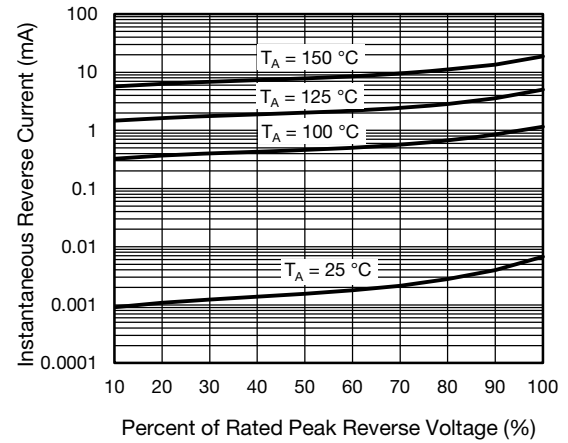


Fig. 4 - Typical Reverse Characteristics

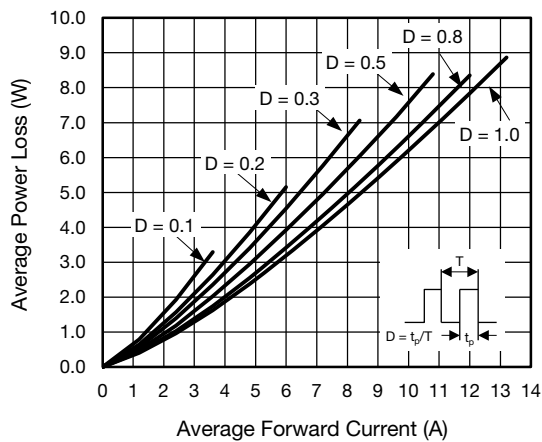


Fig. 2 - Forward Power Loss Characteristics

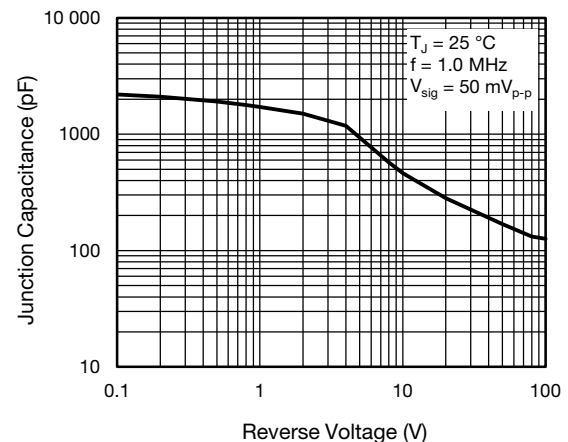


Fig. 5 - Typical Junction Capacitance

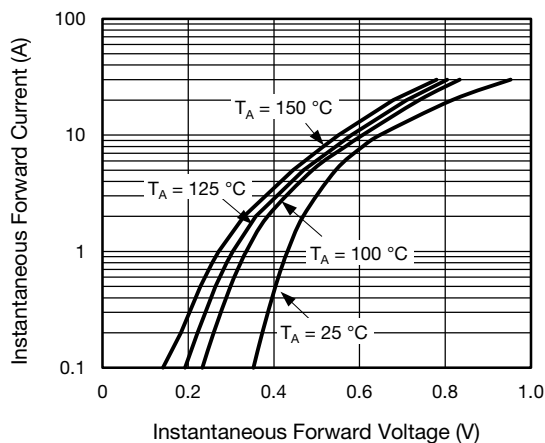


Fig. 3 - Typical Instantaneous Forward Characteristics

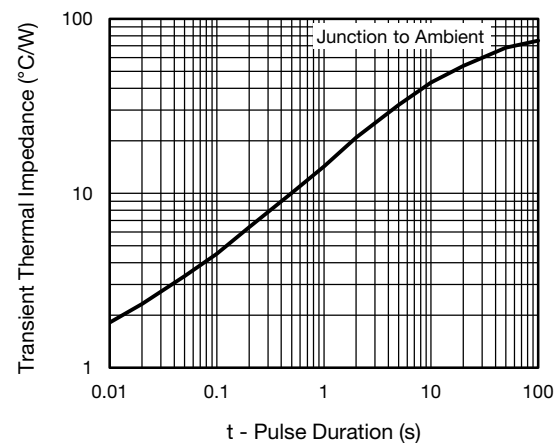


Fig. 6 - Typical Transient Thermal Impedance



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





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