

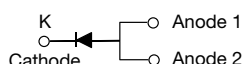
# High Current Density Surface-Mount TMBS® (Trench MOS Barrier Schottky) Rectifier

Ultra Low  $V_F = 0.42\text{ V}$  at  $I_F = 5\text{ A}$

## eSMP® Series



## SMPC (TO-277A)



## FEATURES

- Very low profile - typical height of 1.1 mm
- 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**

## LINKS TO ADDITIONAL RESOURCES



## TYPICAL APPLICATIONS

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

## MECHANICAL DATA

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

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 meet JESD 201 class 2 whisker test

| PRIMARY CHARACTERISTICS               |                |
|---------------------------------------|----------------|
| $I_{F(AV)}$                           | 10 A           |
| $V_{RRM}$                             | 100 V          |
| $I_{FSM}$                             | 180 A          |
| $V_F$ at $I_F = 10\text{ A}$ (125 °C) | 0.53 V         |
| $T_J$ max.                            | 150 °C         |
| Package                               | SMPC (TO-277A) |
| Circuit configuration                 | Single         |

| MAXIMUM RATINGS ( $T_A = 25\text{ °C}$ unless otherwise noted)                    |                   |             |      |
|-----------------------------------------------------------------------------------|-------------------|-------------|------|
| PARAMETER                                                                         | SYMBOL            | V10P103     | UNIT |
| Device marking code                                                               |                   | V1013       |      |
| Maximum repetitive peak reverse voltage                                           | $V_{RRM}$         | 100         | V    |
| Maximum DC forward current                                                        | $I_{F(AV)}^{(1)}$ | 10          | A    |
|                                                                                   | $I_{F(AV)}^{(2)}$ | 4           |      |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load | $I_{FSM}$         | 180         | A    |
| Operating junction temperature range                                              | $T_J^{(3)}$       | -40 to +150 | °C   |
| Storage temperature range                                                         | $T_{STG}$         | -55 to +150 | °C   |

## Notes

(1) Mounted on 30 mm x 30 mm pad areas aluminum PCB

(2) Free air, mounted on recommended pad area

(3) 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 <sub>J</sub> = 25 °C unless otherwise noted) |                        |                         |                               |       |      |      |
|----------------------------------------------------------------------------|------------------------|-------------------------|-------------------------------|-------|------|------|
| PARAMETER                                                                  | TEST CONDITIONS        |                         | SYMBOL                        | TYP.  | MAX. | UNIT |
| Instantaneous forward voltage                                              | I <sub>F</sub> = 5 A   | T <sub>J</sub> = 25 °C  | V <sub>F</sub> <sup>(1)</sup> | 0.49  | -    | V    |
|                                                                            | I <sub>F</sub> = 10 A  |                         |                               | 0.58  | 0.67 |      |
|                                                                            | I <sub>F</sub> = 5 A   | T <sub>J</sub> = 125 °C |                               | 0.42  | -    |      |
|                                                                            | I <sub>F</sub> = 10 A  |                         |                               | 0.53  | 0.60 |      |
| Reverse current                                                            | V <sub>R</sub> = 70 V  | T <sub>J</sub> = 25 °C  | I <sub>R</sub> <sup>(2)</sup> | 0.005 | -    | mA   |
|                                                                            |                        | T <sub>J</sub> = 125 °C |                               | 4.5   | -    |      |
|                                                                            | V <sub>R</sub> = 100 V | T <sub>J</sub> = 25 °C  |                               | -     | 0.45 |      |
|                                                                            |                        | T <sub>J</sub> = 125 °C |                               | 11    | 35   |      |
| Typical junction capacitance                                               | 4.0 V, 1 MHz           |                         | C <sub>J</sub>                | 1600  | -    | 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                   | V10P103 | 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 PCB, 2 oz. pad area; thermal resistance  $R_{\theta JA}$  - junction to ambient(3) Units 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) | PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                      |
| V10P103-M3/H                   | 0.10            | H            | 1500          | 7" diameter plastic tape and reel  |
| V10P103-M3/I                   | 0.10            | I            | 6500          | 13" diameter plastic tape and reel |
| V10P103HM3/H <sup>(1)</sup>    | 0.10            | H            | 1500          | 7" diameter plastic tape and reel  |
| V10P103HM3/I <sup>(1)</sup>    | 0.10            | I            | 6500          | 13" diameter plastic tape and reel |

**Note**

(1) AEC-Q101 qualified

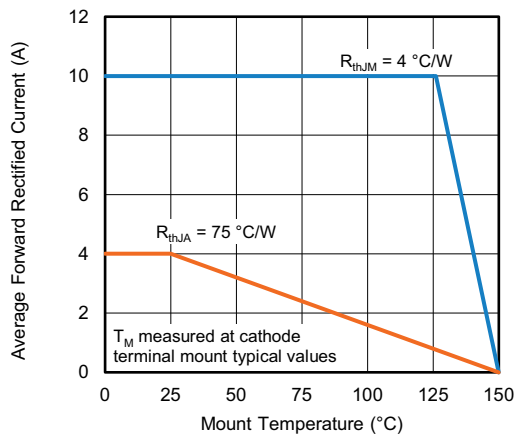
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise specified)


Fig. 1 - Maximum Forward Current Derating Curve

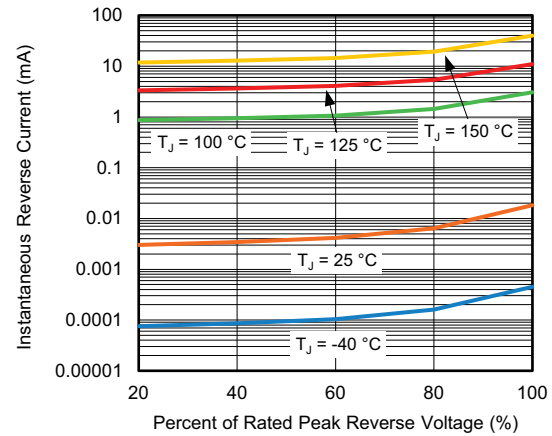


Fig. 4 - Typical Reverse Characteristics

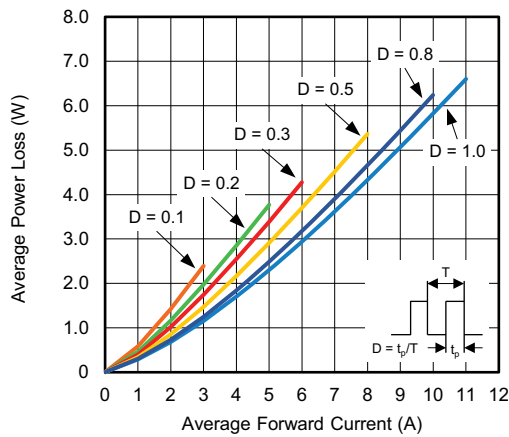


Fig. 2 - Forward Power Loss Characteristics

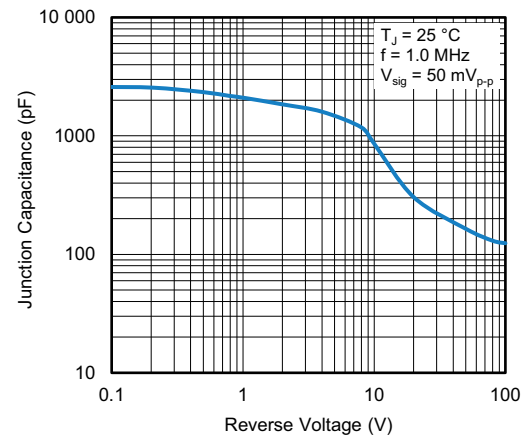


Fig. 5 - Typical Junction Capacitance

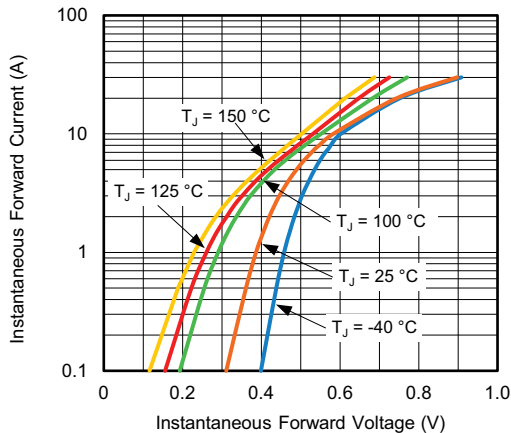


Fig. 3 - Typical Instantaneous Forward Characteristics

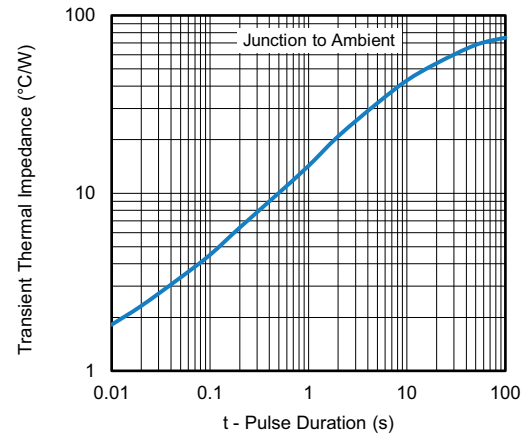
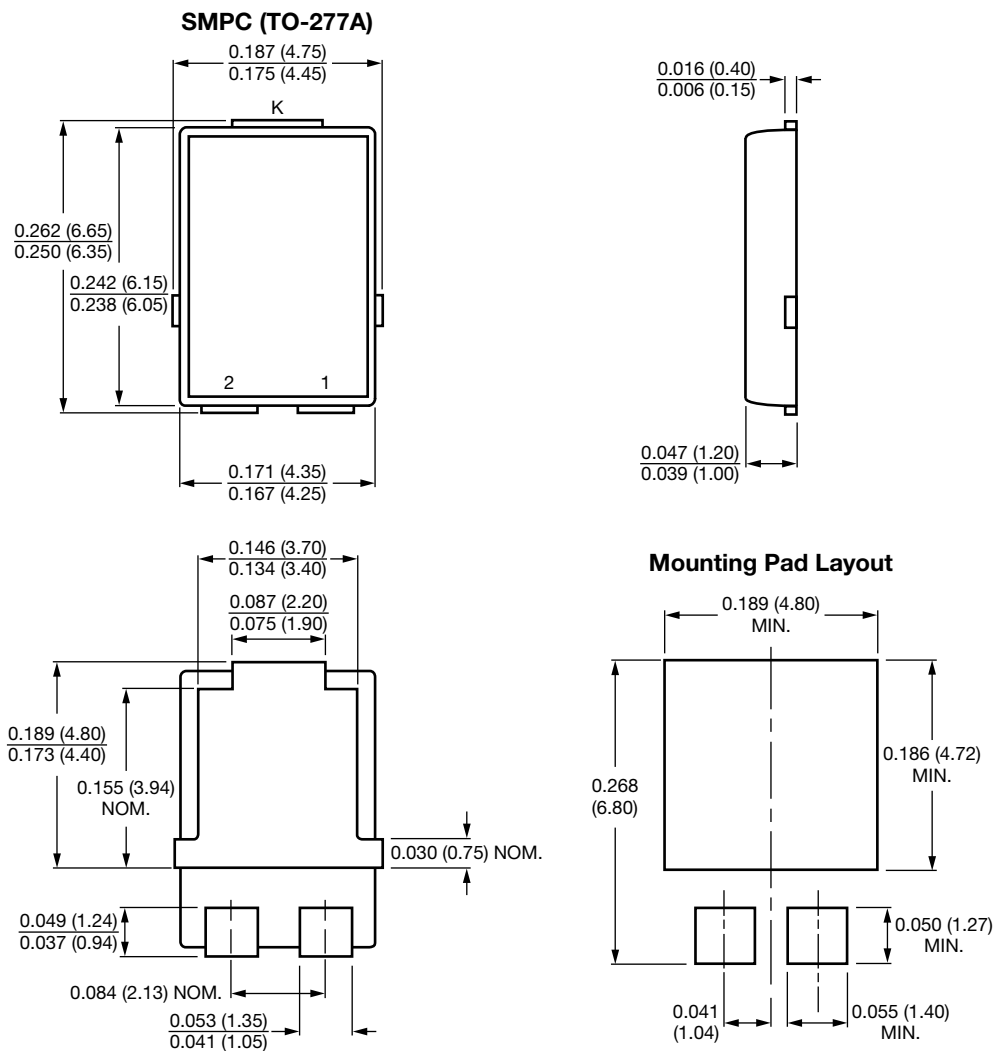


Fig. 6 - Typical Transient Thermal Impedance



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





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