

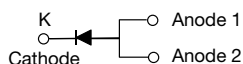
# High Current Density Surface Mount TMBS® (Trench MOS Barrier Schottky) Rectifier Ultra Low

$$V_F = 0.453 \text{ V at } I_F = 5 \text{ A}$$

## eSMP® Series



## SMPC (TO-277A)



## 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)



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

## LINKS TO ADDITIONAL RESOURCES



| PRIMARY CHARACTERISTICS       |                |
|-------------------------------|----------------|
| $I_{F(AV)}$                   | 10 A           |
| $V_{RRM}$                     | 100 V          |
| $I_{FSM}$                     | 180 A          |
| $E_{AS}$                      | 100 mJ         |
| $V_F$ at $I_F = 10 \text{ A}$ | 0.574 V        |
| $T_J \text{ max.}$            | 150 °C         |
| Package                       | SMPC (TO-277A) |
| Circuit configuration         | Single         |

## 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\_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 and HM3 suffix meet JESD 201 class 2 whisker test

| MAXIMUM RATINGS ( $T_A = 25 \text{ °C}$ unless otherwise noted)                                                   |             |             |      |
|-------------------------------------------------------------------------------------------------------------------|-------------|-------------|------|
| PARAMETER                                                                                                         | SYMBOL      | V10P10      | UNIT |
| Device marking code                                                                                               |             | V1010       |      |
| Maximum repetitive peak reverse voltage                                                                           | $V_{RRM}$   | 100         | V    |
| Maximum average forward rectified current (fig. 1)                                                                | $I_{F(AV)}$ | 10          | A    |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load                                 | $I_{FSM}$   | 180         | A    |
| Non-repetitive avalanche energy at $I_{AS} = 2.0 \text{ A}$ , $T_J = 25 \text{ °C}$                               | $E_{AS}$    | 100         | mJ   |
| Peak repetitive reverse current at $t_p = 2 \text{ } \mu\text{s}$ , 1 kHz, $T_J = 38 \text{ °C} \pm 2 \text{ °C}$ | $I_{RRM}$   | 1.0         | A    |
| Operating junction temperature range                                                                              | $T_J^{(1)}$ | -40 to +150 | °C   |
| Storage temperature range                                                                                         | $T_{STG}$   | -55 to +150 | °C   |

### Note

<sup>(1)</sup> 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>A</sub> = 25 °C unless otherwise noted) |                        |                         |                               |               |      |      |
|----------------------------------------------------------------------------|------------------------|-------------------------|-------------------------------|---------------|------|------|
| PARAMETER                                                                  | TEST CONDITIONS        |                         | SYMBOL                        | TYP.          | MAX. | UNIT |
| Breakdown voltage                                                          | I <sub>R</sub> = 1 mA  | T <sub>A</sub> = 25 °C  | V <sub>BR</sub>               | 100 (minimum) | -    | V    |
| Instantaneous forward voltage                                              | I <sub>F</sub> = 5 A   | T <sub>A</sub> = 25 °C  | V <sub>F</sub> <sup>(1)</sup> | 0.512         | -    | V    |
|                                                                            | I <sub>F</sub> = 10 A  |                         |                               | 0.625         | 0.68 |      |
|                                                                            | I <sub>F</sub> = 5 A   | T <sub>A</sub> = 125 °C |                               | 0.453         | -    |      |
|                                                                            | I <sub>F</sub> = 10 A  |                         |                               | 0.574         | 0.62 |      |
| Reverse current                                                            | V <sub>R</sub> = 70 V  | T <sub>A</sub> = 25 °C  | I <sub>R</sub> <sup>(2)</sup> | 7.1           | -    | μA   |
|                                                                            |                        | T <sub>A</sub> = 125 °C |                               | 4.5           | -    | mA   |
|                                                                            | V <sub>R</sub> = 100 V | T <sub>A</sub> = 25 °C  |                               | 30.4          | 150  | μA   |
|                                                                            |                        | T <sub>A</sub> = 125 °C |                               | 10.4          | 20   | mA   |

**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                | V10P10 | UNIT                 |
| Typical thermal resistance                                                               | $R_{\theta JA}^{(1)}$ | 60     | $^{\circ}\text{C/W}$ |
|                                                                                          | $R_{\theta JL}$       | 3      |                      |

**Note**

(1) Units mounted on recommended PCB 1 oz. pad layout

| ORDERING INFORMATION (Example) |                 |              |               |                                    |
|--------------------------------|-----------------|--------------|---------------|------------------------------------|
| PREFERRED P/N                  | UNIT WEIGHT (g) | PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                      |
| V10P10-M3/86A                  | 0.10            | 86A          | 1500          | 7" diameter plastic tape and reel  |
| V10P10-M3/87A                  | 0.10            | 87A          | 6500          | 13" diameter plastic tape and reel |
| V10P10HM3_A/H <sup>(1)</sup>   | 0.10            | H            | 1500          | 7" diameter plastic tape and reel  |
| V10P10HM3_A/I <sup>(1)</sup>   | 0.10            | I            | 6500          | 13" diameter plastic tape and reel |

**Note**

(1) AEC-Q101 qualified

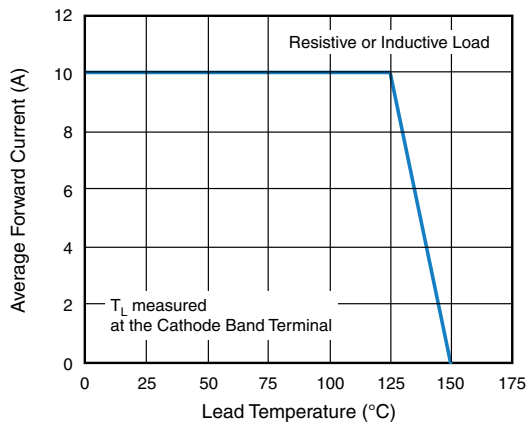
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise specified)


Fig. 1 - Maximum Forward Current Derating Curve

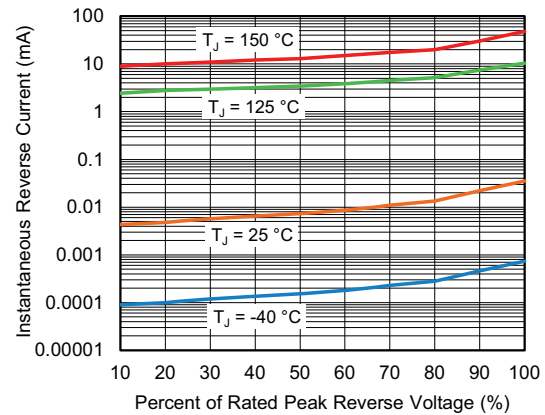


Fig. 4 - Typical Reverse Characteristics

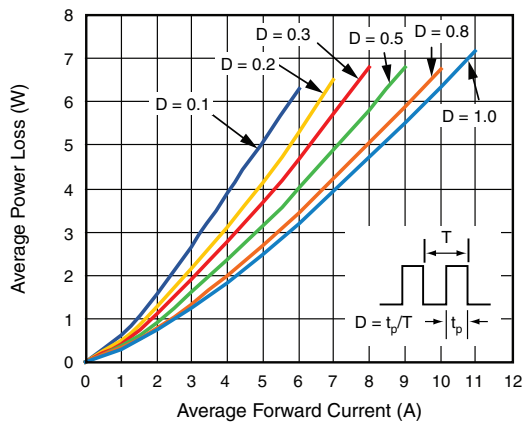


Fig. 2 - Forward Power Loss Characteristics

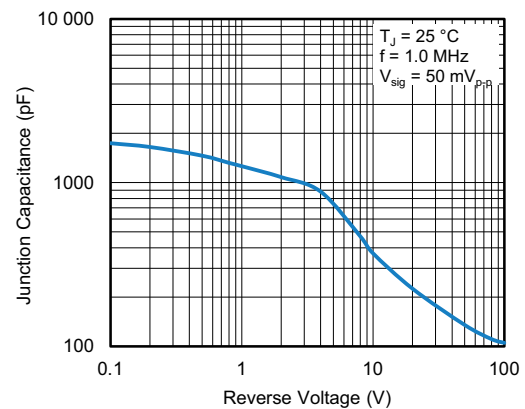


Fig. 5 - Typical Junction Capacitance

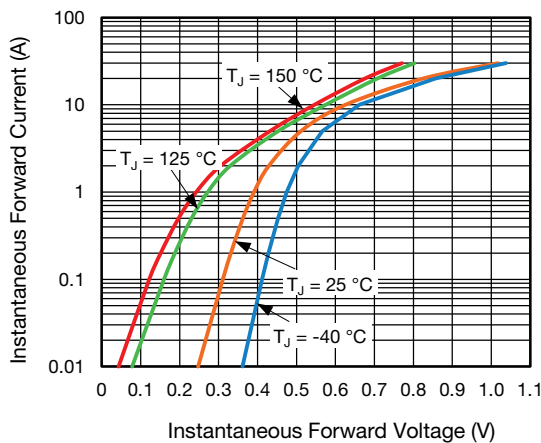


Fig. 3 - Typical Instantaneous Forward Characteristics

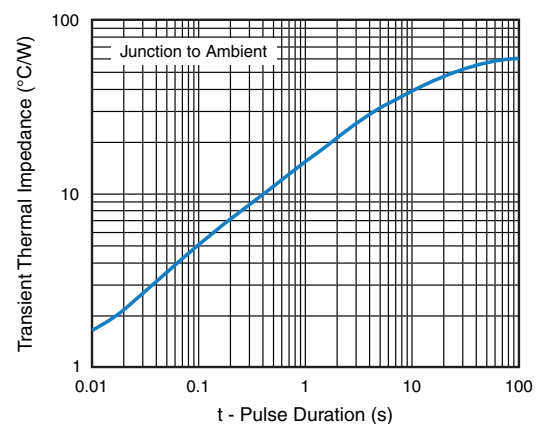
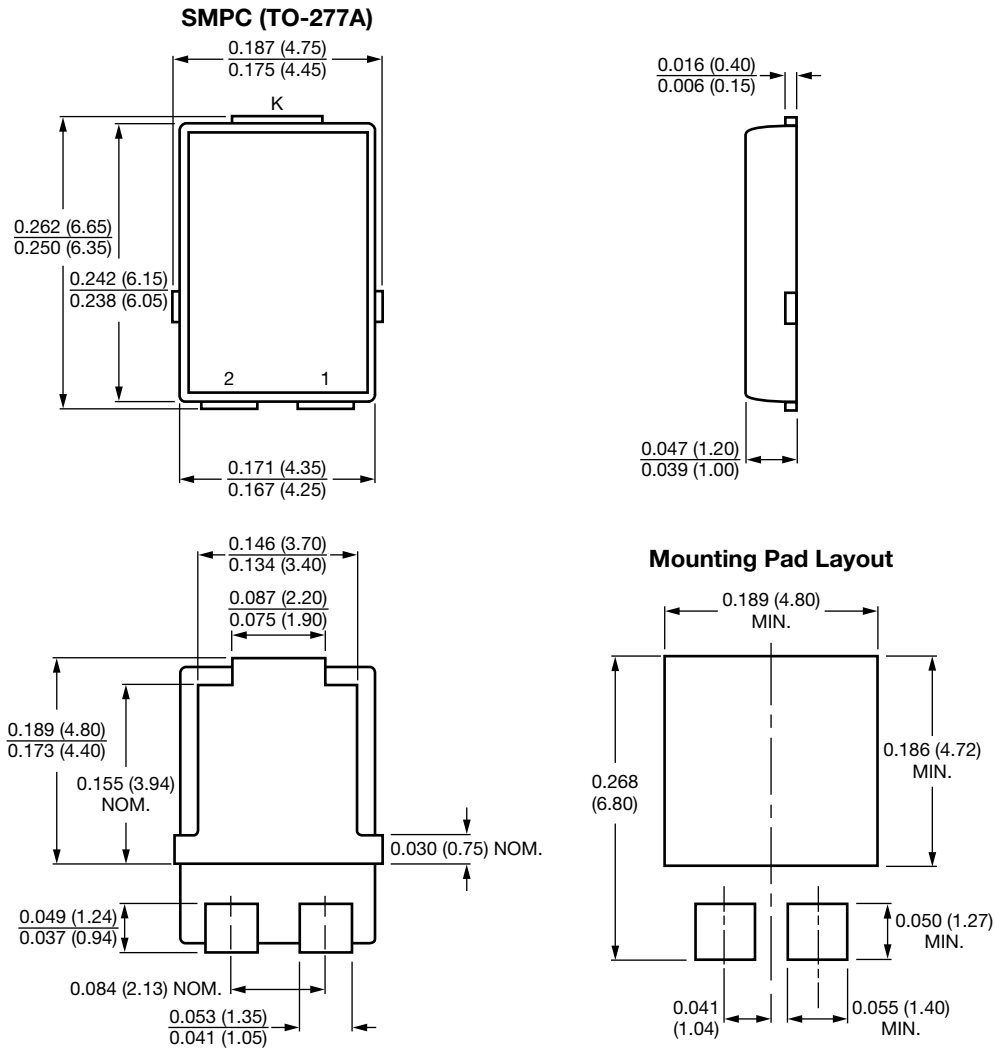


Fig. 6 - Typical Transient Thermal Impedance

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


Conform to JEDEC® TO-277A



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