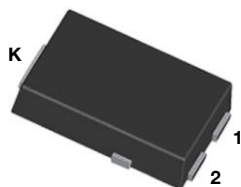


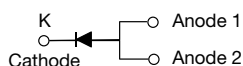
# High Current Density Surface-Mount TMBS® (Trench MOS Barrier Schottky) Rectifier

Ultra Low  $V_F = 0.51\text{ V}$  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**

## ADDITIONAL RESOURCES



| PRIMARY CHARACTERISTICS      |                |
|------------------------------|----------------|
| $I_{F(AV)}$                  | 10 A           |
| $V_{RRM}$                    | 120 V          |
| $I_{FSM}$                    | 160 A          |
| $E_{AS}$                     | 100 mJ         |
| $V_F$ at $I_F = 10\text{ A}$ | 0.62 V         |
| $T_J$ 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 suffix meets JESD 201 class 1A whisker test, HM3 suffix meets JESD 201 class 2 whisker test

| MAXIMUM RATINGS ( $T_A = 25\text{ °C}$ unless otherwise noted)                                                |                |             |      |
|---------------------------------------------------------------------------------------------------------------|----------------|-------------|------|
| PARAMETER                                                                                                     | SYMBOL         | V10P12      | UNIT |
| Device marking code                                                                                           |                | V1012       |      |
| Maximum repetitive peak reverse voltage                                                                       | $V_{RRM}$      | 120         | 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                             | $I_{FSM}$      | 160         | 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, $T_J = 38\text{ °C} \pm 2\text{ °C}$ | $I_{RRM}$      | 0.5         | A    |
| Operating junction and storage temperature range                                                              | $T_J, T_{STG}$ | -40 to +150 | °C   |

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

| PARAMETER                     | TEST CONDITIONS         |                         | SYMBOL                        | TYP.          | MAX. | UNIT |
|-------------------------------|-------------------------|-------------------------|-------------------------------|---------------|------|------|
| Breakdown voltage             | I <sub>R</sub> = 1.0 mA | T <sub>A</sub> = 25 °C  | V <sub>BR</sub>               | 120 (minimum) | -    | V    |
| Instantaneous forward voltage | I <sub>F</sub> = 5 A    | T <sub>A</sub> = 25 °C  | V <sub>F</sub> <sup>(1)</sup> | 0.57          | -    | V    |
|                               | I <sub>F</sub> = 10 A   |                         |                               | 0.74          | 0.82 |      |
|                               | I <sub>F</sub> = 5 A    | T <sub>A</sub> = 125 °C |                               | 0.51          | -    |      |
|                               | I <sub>F</sub> = 10 A   |                         |                               | 0.62          | 0.70 |      |
| Reverse current               | V <sub>R</sub> = 90 V   | T <sub>A</sub> = 25 °C  | I <sub>R</sub> <sup>(2)</sup> | 6             | -    | μA   |
|                               |                         | T <sub>A</sub> = 125 °C |                               | 4.5           | -    | mA   |
|                               | V <sub>R</sub> = 120 V  | T <sub>A</sub> = 25 °C  |                               | 16            | 400  | μA   |
|                               |                         | T <sub>A</sub> = 125 °C |                               | 8.5           | 30   | 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 noted)

| PARAMETER                  | SYMBOL                | V10P12 | UNIT                 |
|----------------------------|-----------------------|--------|----------------------|
| Typical thermal resistance | $R_{\theta JA}^{(1)}$ | 60     | $^{\circ}\text{C/W}$ |
|                            | $R_{\theta JL}$       | 4      |                      |

**Note**

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

**ORDERING INFORMATION** (Example)

| PREFERRED P/N                | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                      |
|------------------------------|-----------------|------------------------|---------------|------------------------------------|
| V10P12-M3/86A                | 0.10            | 86A                    | 1500          | 7" diameter plastic tape and reel  |
| V10P12-M3/87A                | 0.10            | 87A                    | 6500          | 13" diameter plastic tape and reel |
| V10P12HM3_A/H <sup>(1)</sup> | 0.10            | H                      | 1500          | 7" diameter plastic tape and reel  |
| V10P12HM3_A/I <sup>(1)</sup> | 0.10            | I                      | 6500          | 13" diameter plastic tape and reel |

**Note**

(1) AEC-Q101 qualified

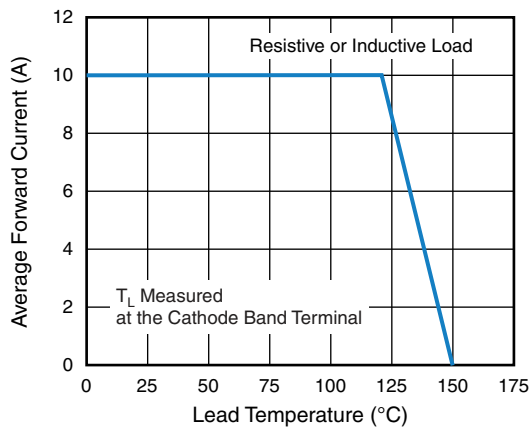
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

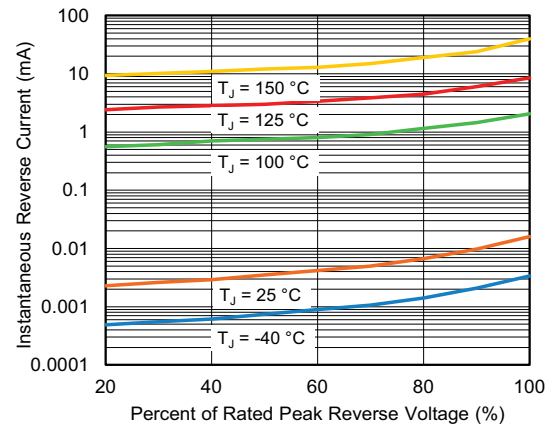


Fig. 4 - Typical Reverse Characteristics

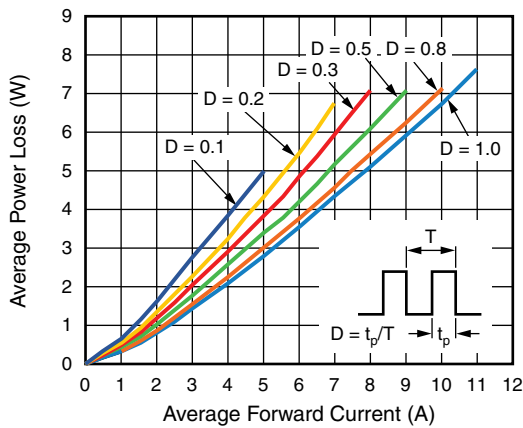


Fig. 2 - Forward Power Loss Characteristics

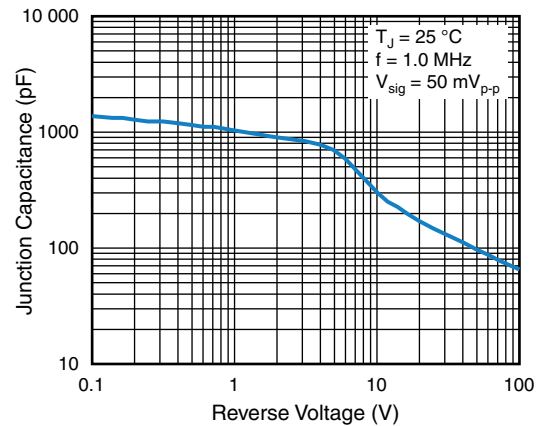


Fig. 5 - Typical Junction Capacitance

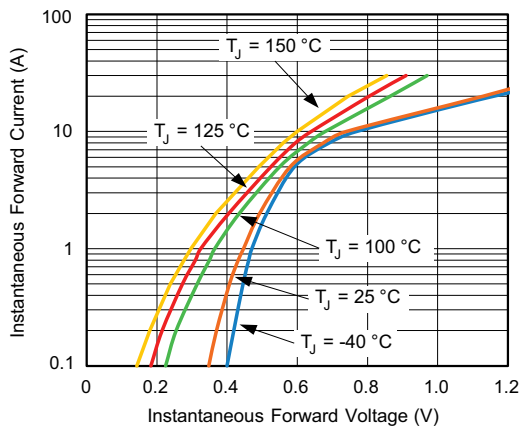


Fig. 3 - Typical Instantaneous Forward Characteristics

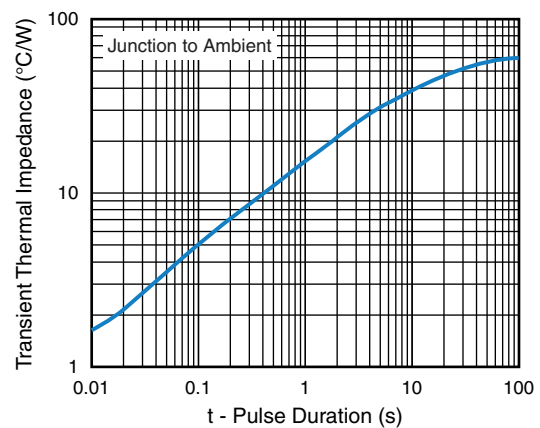


Fig. 6 - Typical Transient Thermal Impedance

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


Conform to JEDEC® TO-277A



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