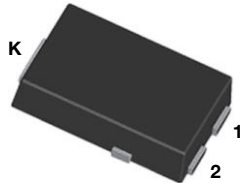
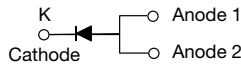


# High Current Density Surface-Mount TMBS<sup>®</sup> (Trench MOS Barrier Schottky) Rectifier

 Ultra Low  $V_F = 0.51$  V at  $I_F = 5$  A

**eSMP<sup>®</sup> 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)

 AUTOMOTIVE  
GRADE  
Available

**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**
**ADDITIONAL RESOURCES**


3D Models

**PRIMARY CHARACTERISTICS**

|                       |                |
|-----------------------|----------------|
| $I_{F(AV)}$           | 10 A           |
| $V_{RRM}$             | 120 V          |
| $I_{FSM}$             | 160 A          |
| $E_{AS}$              | 100 mJ         |
| $V_F$ at $I_F = 10$ 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** ( $T_A = 25$  °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 $I_{AS} = 2.0$ A, $T_J = 25$ °C                    | $E_{AS}$       | 100         | mJ   |
| Peak repetitive reverse current at $t_p = 2$ $\mu$ s, 1 kHz, $T_J = 38$ °C $\pm$ 2 °C | $I_{RRM}$      | 0.5         | A    |
| Operating junction and storage temperature range                                      | $T_J, T_{STG}$ | -40 to +150 | °C   |



| <b>ELECTRICAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted) |                       |                                   |             |               |      |               |
|--|-----------------------|-----------------------------------|-------------|---------------|------|---------------|
| PARAMETER  | TEST CONDITIONS       |                                   | SYMBOL      | TYP.          | MAX. | UNIT          |
| Breakdown voltage  | $I_R = 1.0\text{ mA}$ | $T_A = 25\text{ }^\circ\text{C}$  | $V_{BR}$    | 120 (minimum) | -    | V             |
| Instantaneous forward voltage  | $I_F = 5\text{ A}$    | $T_A = 25\text{ }^\circ\text{C}$  | $V_F^{(1)}$ | 0.57          | -    | V             |
|  | $I_F = 10\text{ A}$   |                                   |             | 0.74          | 0.82 |               |
|  | $I_F = 5\text{ A}$    | $T_A = 125\text{ }^\circ\text{C}$ |             | 0.51          | -    |               |
|  | $I_F = 10\text{ A}$   |                                   |             | 0.62          | 0.70 |               |
| Reverse current  | $V_R = 90\text{ V}$   | $T_A = 25\text{ }^\circ\text{C}$  | $I_R^{(2)}$ | 6             | -    | $\mu\text{A}$ |
|  |                       | $T_A = 125\text{ }^\circ\text{C}$ |             | 4.5           | -    | mA            |
|  | $V_R = 120\text{ V}$  | $T_A = 25\text{ }^\circ\text{C}$  |             | 16            | 400  | $\mu\text{A}$ |
|  |                       | $T_A = 125\text{ }^\circ\text{C}$ |             | 8.5           | 30   | mA            |

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

| <b>THERMAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^\circ\text{C}$ 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

| <b>ORDERING INFORMATION</b> (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)

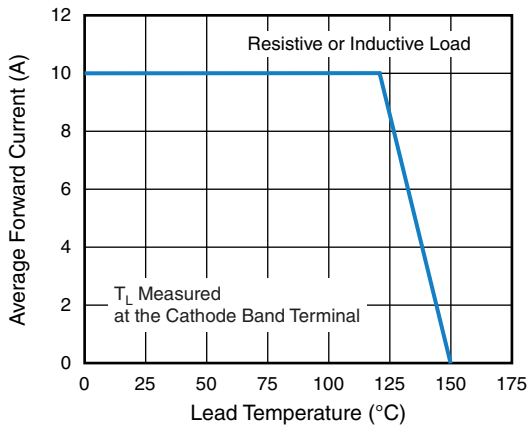


Fig. 1 - Maximum Forward Current Derating Curve

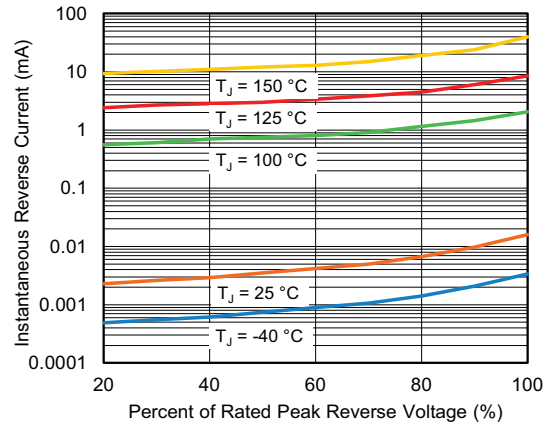


Fig. 4 - Typical Reverse Characteristics

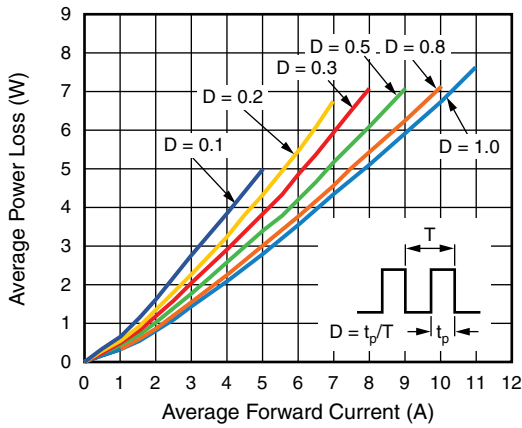


Fig. 2 - Forward Power Loss Characteristics

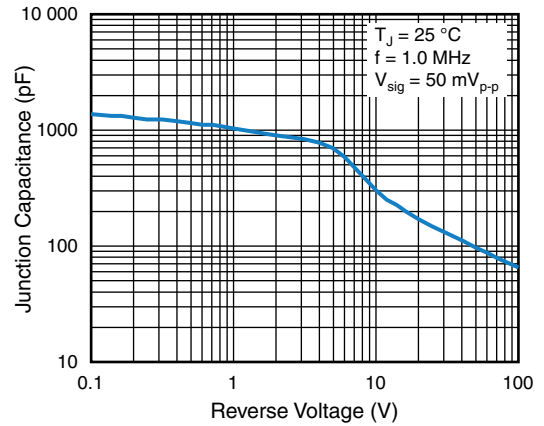


Fig. 5 - Typical Junction Capacitance

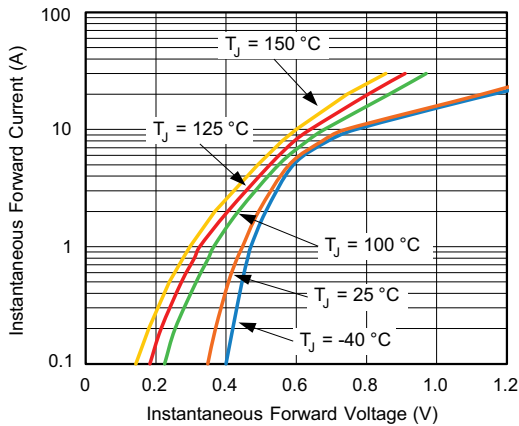


Fig. 3 - Typical Instantaneous Forward Characteristics

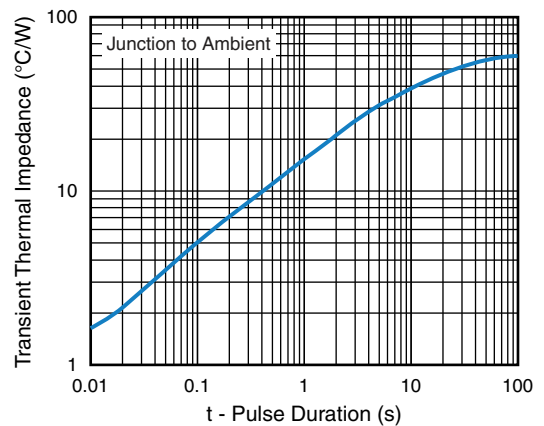


Fig. 6 - Typical Transient Thermal Impedance



PACKAGE OUTLINE DIMENSIONS in inches (millimeters)



Conform to JEDEC® TO-277A



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