

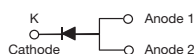
## High Current Density Surface Mount Trench MOS Barrier Schottky Rectifier

Ultra Low  $V_F = 0.43$  V at  $I_F = 5$  A

TMBS® eSMP® Series



TO-277A (SMPC)



### FEATURES

- Very low profile - typical height of 1.1 mm
- Ideal for automatic 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
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC
- **Halogen-free according to IEC 61249-2-21 definition**

AUTOMOTIVE  
GRADE  
Available



RoHS  
COMPLIANT  
HALOGEN  
FREE

### PRIMARY CHARACTERISTICS

|                       |        |
|-----------------------|--------|
| $I_{F(AV)}$           | 12 A   |
| $V_{RRM}$             | 100 V  |
| $I_{FSM}$             | 200 A  |
| $E_{AS}$              | 100 mJ |
| $V_F$ at $I_F = 12$ A | 0.58 V |
| $T_J$ max.            | 150 °C |

### 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 automotive grade

**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         | V12P10        | UNIT |
|---|----------------|---------------|------|
| Device marking code   |                | V1210         |      |
| Maximum repetitive peak reverse voltage   | $V_{RRM}$      | 100           | V    |
| Maximum average forward rectified current (fig. 1)                                    | $I_{F(AV)}$    | 12            | A    |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load     | $I_{FSM}$      | 200           | 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 | $I_{RRM}$      | 1.0           | 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   | $I_R = 1.0\text{ mA}$ | $T_A = 25\text{ }^\circ\text{C}$  | $V_{BR}$    | 100 (minimum) | -    | V             |
| Instantaneous forward voltage   | $I_F = 5\text{ A}$    | $T_A = 25\text{ }^\circ\text{C}$  | $V_F^{(1)}$ | 0.50          | -    |               |
|   | $I_F = 12\text{ A}$   |                                   |             | 0.65          | 0.70 |               |
|   | $I_F = 5\text{ A}$    | $T_A = 125\text{ }^\circ\text{C}$ |             | 0.43          | -    |               |
|   | $I_F = 12\text{ A}$   |                                   |             | 0.58          | 0.64 |               |
| Reverse current   | $V_R = 70\text{ V}$   | $T_A = 25\text{ }^\circ\text{C}$  | $I_R^{(2)}$ | 7.0           | -    | $\mu\text{A}$ |
|   |                       | $T_A = 125\text{ }^\circ\text{C}$ |             | 4.4           | -    | mA            |
|   | $V_R = 100\text{ V}$  | $T_A = 25\text{ }^\circ\text{C}$  |             | 21.3          | 250  | $\mu\text{A}$ |
|   |                       | $T_A = 125\text{ }^\circ\text{C}$ |             | 11.8          | 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                | V12P10 | 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                      |
| V12P10-M3/86A                  | 0.10            | 86A          | 1500          | 7" diameter plastic tape and reel  |
| V12P10-M3/87A                  | 0.10            | 87A          | 6500          | 13" diameter plastic tape and reel |
| V12P10HM3/86A <sup>(1)</sup>   | 0.10            | 86A          | 1500          | 7" diameter plastic tape and reel  |
| V12P10HM3/87A <sup>(1)</sup>   | 0.10            | 87A          | 6500          | 13" diameter plastic tape and reel |

**Note**

(1) Automotive grade



**RATINGS AND CHARACTERISTICS CURVES**

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

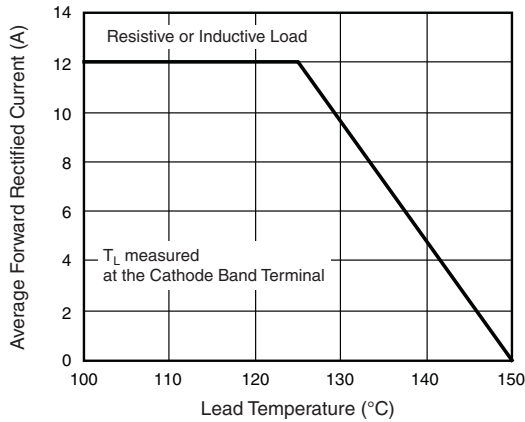


Fig. 1 - Maximum Forward Current Derating Curve

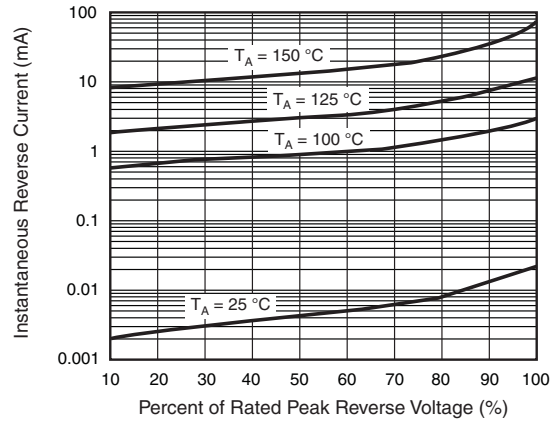


Fig. 4 - Typical Reverse Leakage Characteristics

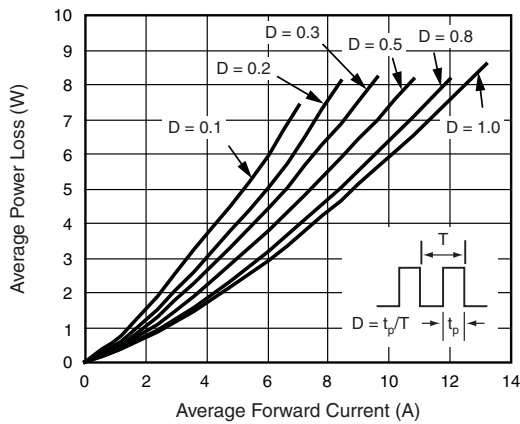


Fig. 2 - Forward Power Loss Characteristics

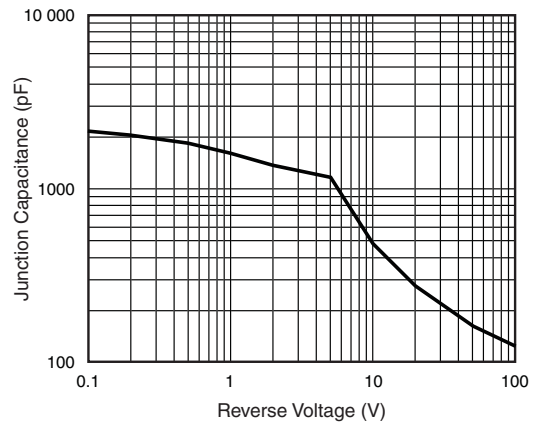


Fig. 5 - Typical Junction Capacitance

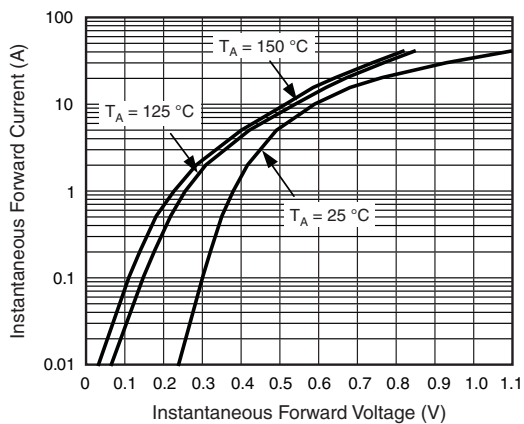


Fig. 3 - Typical Instantaneous Forward Characteristics

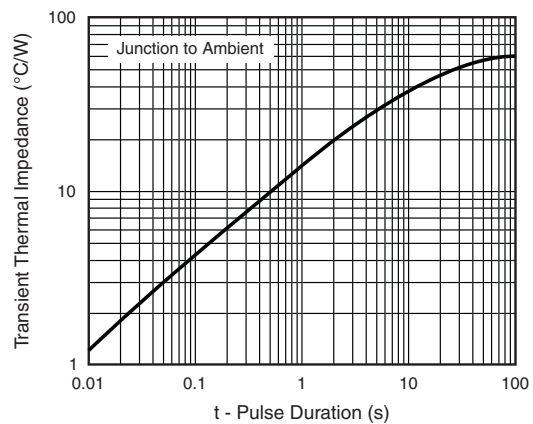
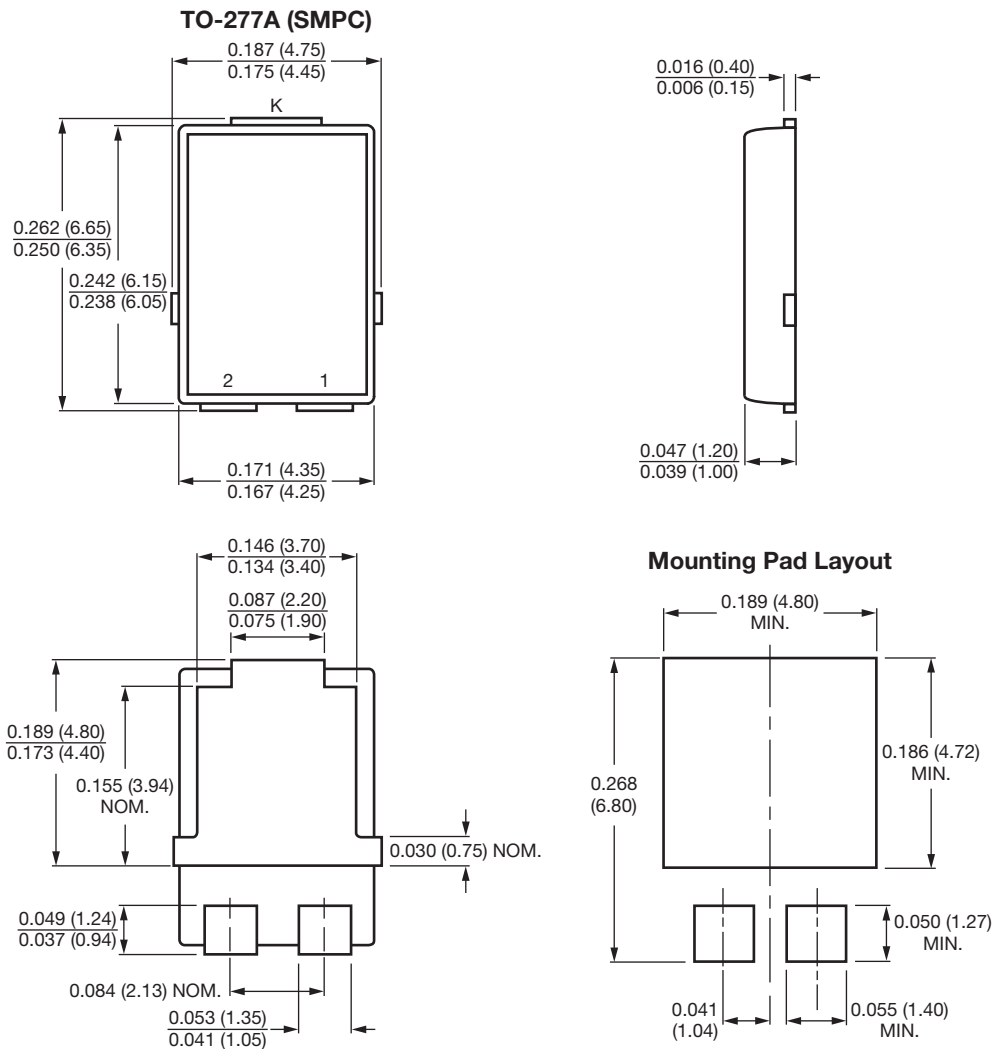


Fig. 6 - Typical Transient Thermal Impedance



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



Conform to JEDEC TO-277A



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