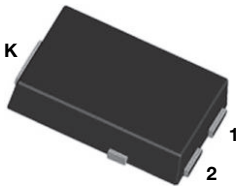
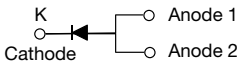
# High Current Density Surface Mount TMBS® (Trench MOS Barrier Schottky) Rectifier

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

**eSMP® Series**




**SMPC (TO-277A)**




## 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 available
  - Automotive ordering code; base P/NHM3
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

AUTOMOTIVE GRADE

RoHS COMPLIANT

HALOGEN FREE

## ADDITIONAL RESOURCES

3D Models

## TYPICAL APPLICATIONS

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

| 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 |
| Package | SMPC (TO-277A) |
| Circuit configuration | Single |

## 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** | **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 µs, 1 kHz, $T_J$ = 38 °C ± 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 °C unless otherwise noted) | | | | | | |
|---|---|---|---|---|---|---|
| **PARAMETER** | **TEST CONDITIONS** | | **SYMBOL** | **TYP.** | **MAX.** | **UNIT** |
| Breakdown voltage | $I_R$ = 1.0 mA | $T_A$ = 25 °C | $V_{BR}$ | 100 (minimum) | - | V |
| Instantaneous forward voltage | $I_F$ = 5 A | $T_A$ = 25 °C | $V_F$ (1) | 0.50 | - | |
| | $I_F$ = 12 A | | | 0.65 | 0.70 | |
| | $I_F$ = 5 A | $T_A$ = 125 °C | | 0.43 | - | |
| | $I_F$ = 12 A | | | 0.58 | 0.64 | |
| Reverse current | $V_R$ = 70 V | $T_A$ = 25 °C | $I_R$ (2) | 7.0 | - | µA |
| | | $T_A$ = 125 °C | | 4.4 | - | mA |
| | $V_R$ = 100 V | $T_A$ = 25 °C | | 21.3 | 250 | µA |
| | | $T_A$ = 125 °C | | 11.8 | 20 | mA |

**Notes**

(1) Pulse test: 300 µs pulse width, 1 % duty cycle

(2) Pulse test: Pulse width ≤ 40 ms

| **THERMAL CHARACTERISTICS** ($T_A$ = 25 °C unless otherwise specified) | | | |
|---|---|---|---|
| **PARAMETER** | **SYMBOL** | **V12P10** | **UNIT** |
| Typical thermal resistance | $R_{\theta JA}$ (1) | 60 | °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_A/H (1) | 0.10 | H | 1500 | 7" diameter plastic tape and reel |
| V12P10HM3_A/I (1) | 0.10 | I | 6500 | 13" diameter plastic tape and reel |

**Note**

(1) AEC-Q101 qualified

## RATINGS AND CHARACTERISTICS CURVES ($T_A$ = 25 °C unless otherwise noted)

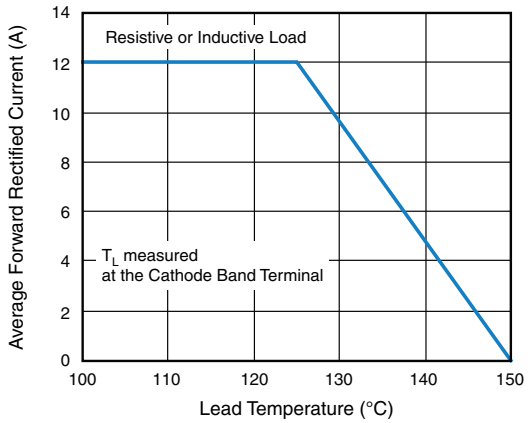



Fig. 1 - Maximum Forward Current Derating Curve

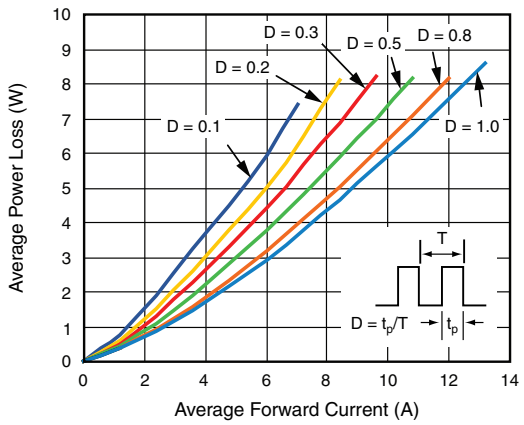



Fig. 2 - Forward Power Loss Characteristics

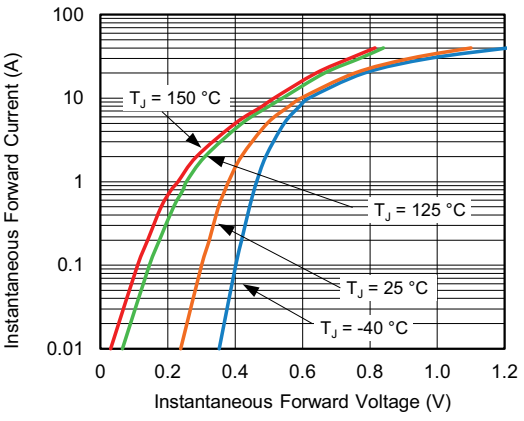



Fig. 3 - Typical Instantaneous Forward Characteristics

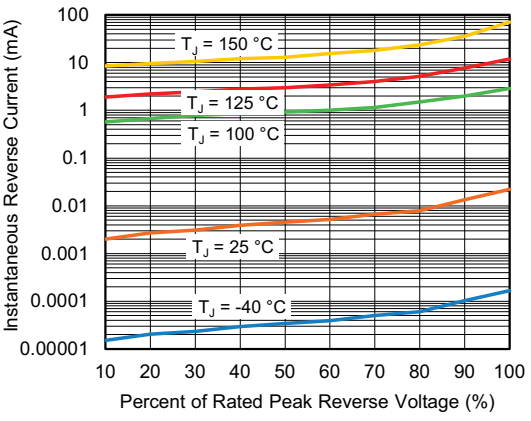



Fig. 4 - Typical Reverse Leakage Characteristics

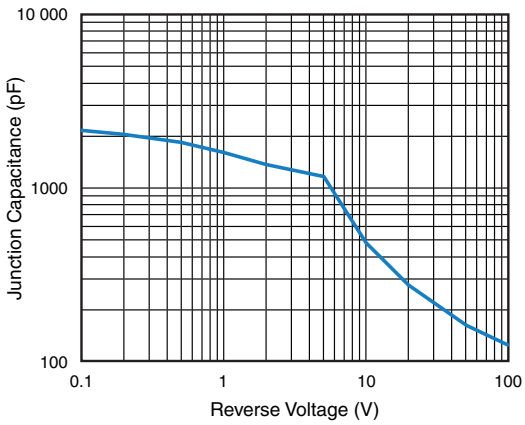



Fig. 5 - Typical Junction Capacitance

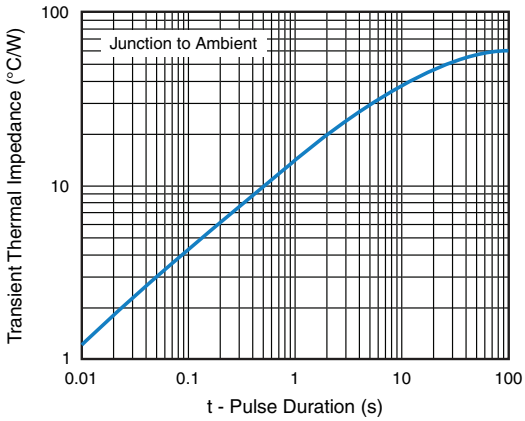
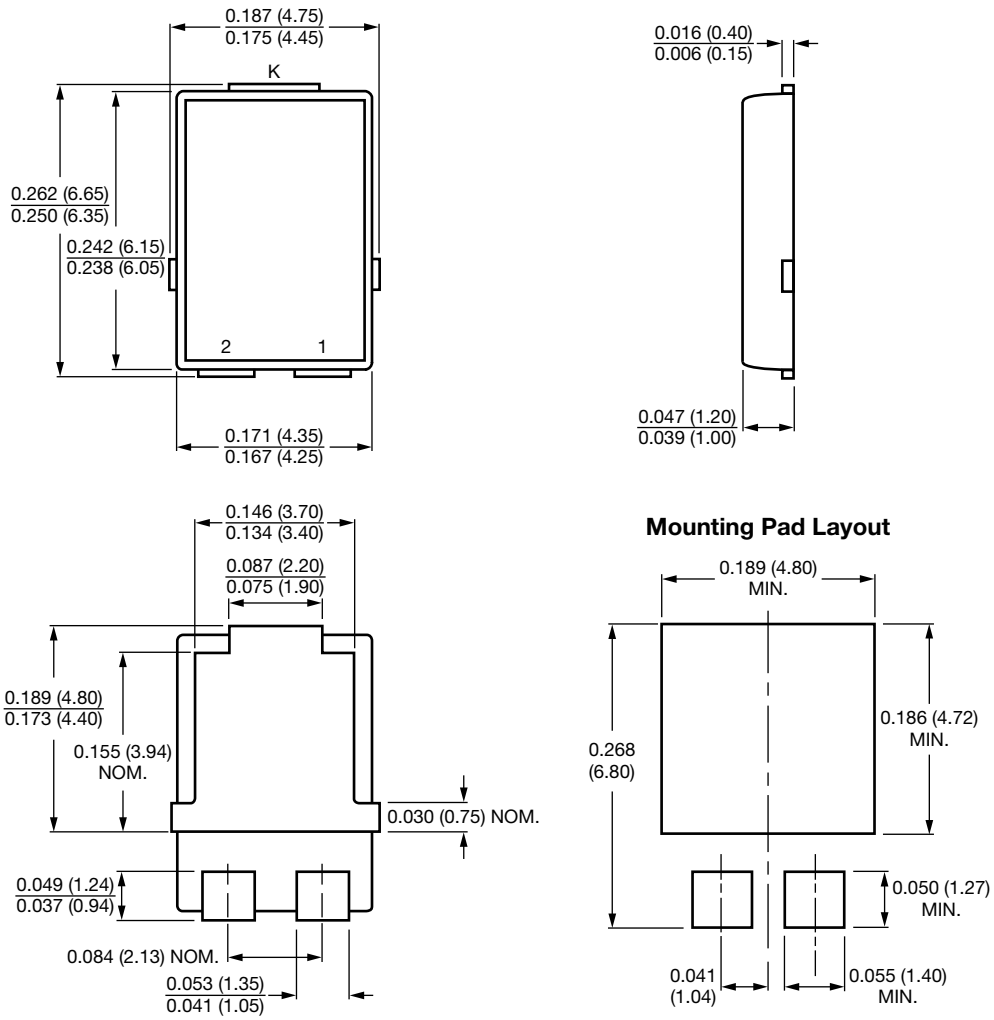



Fig. 6 - Typical Transient Thermal Impedance

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

**SMPC (TO-277A)**




Conform to JEDEC® TO-277A

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