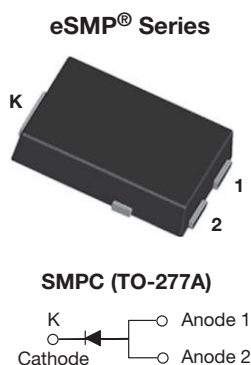


High Current Density Surface Mount TMBS® (Trench MOS Barrier Schottky) Rectifier

Ultra Low $V_F = 0.33\text{ V}$ at $I_F = 6\text{ A}$



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

AUTOMOTIVE
GRADE
Available



RoHS
COMPLIANT
HALOGEN
FREE

ADDITIONAL RESOURCES



| PRIMARY CHARACTERISTICS | |
|--------------------------------------------------------|----------------|
| $I_{F(AV)}$ | 12 A |
| V_{RRM} | 45 V |
| I_{FSM} | 200 A |
| V_F at $I_F = 12\text{ A}$ ($T_A = 125\text{ °C}$) | 0.41 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 2 whisker test, HM3 suffix meets JESD 201 class 2 whisker test

| MAXIMUM RATINGS ($T_A = 25\text{ °C}$ unless otherwise noted) | | | |
|-----------------------------------------------------------------------------------|----------------|-------------|------|
| PARAMETER | SYMBOL | V12P45 | UNIT |
| Device marking code | | V1245 | |
| Maximum repetitive peak reverse voltage | V_{RRM} | 45 | V |
| Maximum average forward rectified current (fig. 1) | $I_F^{(1)}$ | 12 | A |
| | $I_F^{(2)}$ | 4.3 | |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load | I_{FSM} | 200 | A |
| Operating junction and storage temperature range | T_J, T_{STG} | -40 to +150 | °C |

Notes

(1) Mounted on 30 mm x 30 mm pad areas aluminum PCB

(2) Free air, mounted on recommended copper pad area

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

| PARAMETER | TEST CONDITIONS | SYMBOL | TYP. | MAX. | UNIT |
|-------------------------------|----------------------|-------------|------|------|------|
| Instantaneous forward voltage | $I_F = 6.0\text{ A}$ | $V_F^{(1)}$ | 0.44 | - | V |
| | $I_F = 12\text{ A}$ | | 0.49 | 0.58 | |
| | $I_F = 6.0\text{ A}$ | | 0.33 | - | |
| | $I_F = 12\text{ A}$ | | 0.41 | 0.49 | |
| Reverse current | $V_R = 45\text{ V}$ | $I_R^{(2)}$ | - | 1 | mA |
| | | | 10 | 40 | |

Notes

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

(2) Pulse test: pulse width $\leq 5\text{ ms}$
THERMAL CHARACTERISTICS ($T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)

| PARAMETER | SYMBOL | V12P45 | UNIT |
|----------------------------|--------------------------|--------|----------------------|
| Typical thermal resistance | $R_{\theta JA}^{(1)(2)}$ | 75 | $^{\circ}\text{C/W}$ |
| | $R_{\theta JM}^{(3)}$ | 4 | |

Notes

(1) The heat generated must be less than the thermal conductivity from junction to ambient: $dP_D/dT_J < 1/R_{\theta JA}$

(2) Free air mounted on recommended copper pad area; thermal resistance $R_{\theta JA}$ - junction-to-ambient

(3) Mounted on 30 mm x 30 mm aluminum PCB; thermal resistance $R_{\theta JM}$ - junction-to-mount

ORDERING INFORMATION (Example)

| PREFERRED P/N | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
|------------------------------|-----------------|------------------------|---------------|------------------------------------|
| V12P45-M3/86A | 0.10 | 86A | 1500 | 7" diameter plastic tape and reel |
| V12P45-M3/87A | 0.10 | 87A | 6500 | 13" diameter plastic tape and reel |
| V12P45HM3_A/H ⁽¹⁾ | 0.10 | H | 1500 | 7" diameter plastic tape and reel |
| V12P45HM3_A/I ⁽¹⁾ | 0.10 | I | 6500 | 13" diameter plastic tape and reel |

Note

(1) AEC-Q101 qualified

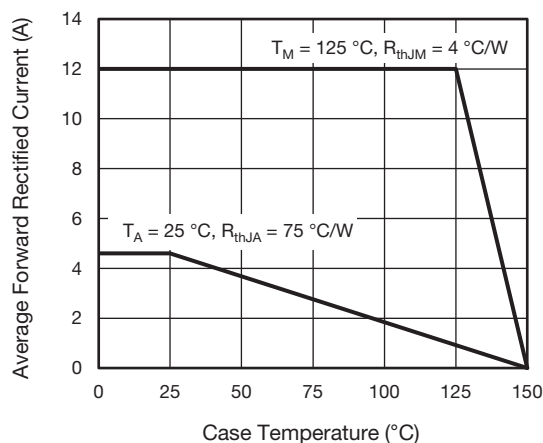
RATINGS AND CHARACTERISTICS CURVES ($T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)


Fig. 1 - Forward Current Derating Curve

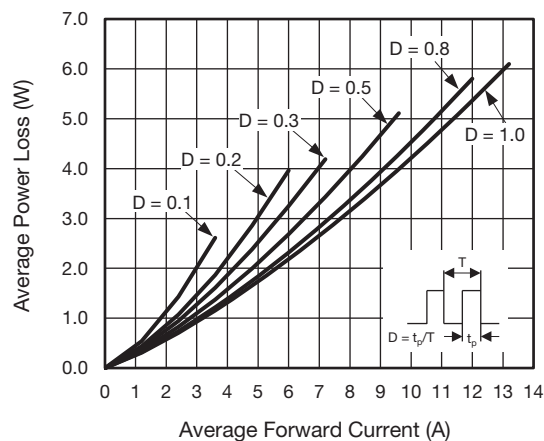


Fig. 2 - Forward Power Loss Characteristics

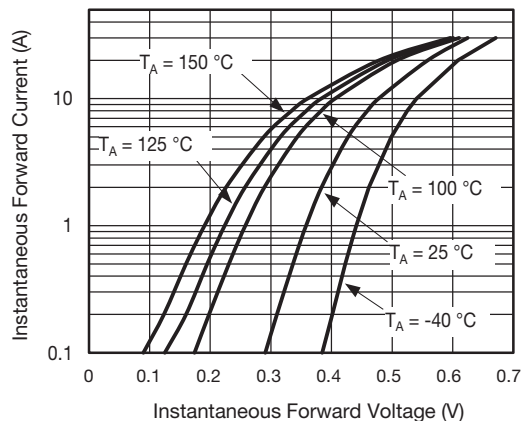


Fig. 3 - Typical Instantaneous Forward Characteristics

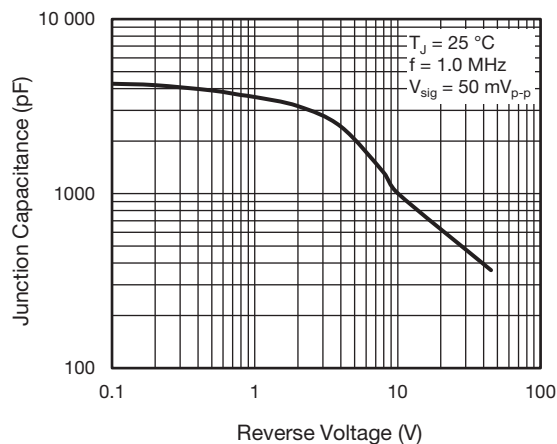


Fig. 5 - Typical Junction Capacitance

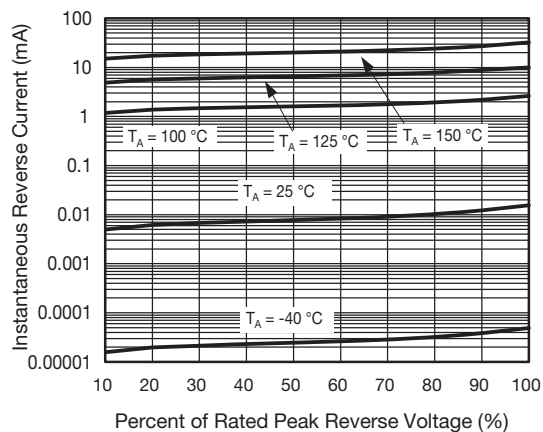


Fig. 4 - Typical Reverse Leakage Characteristics

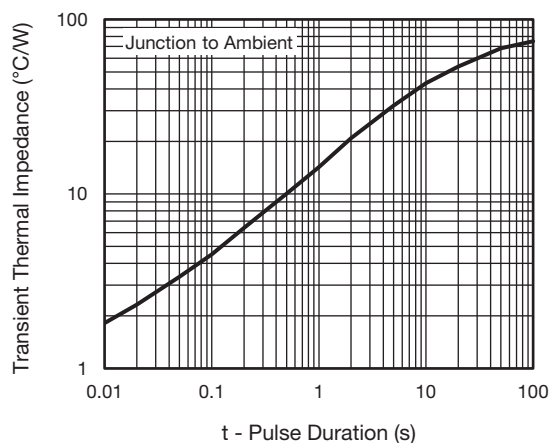
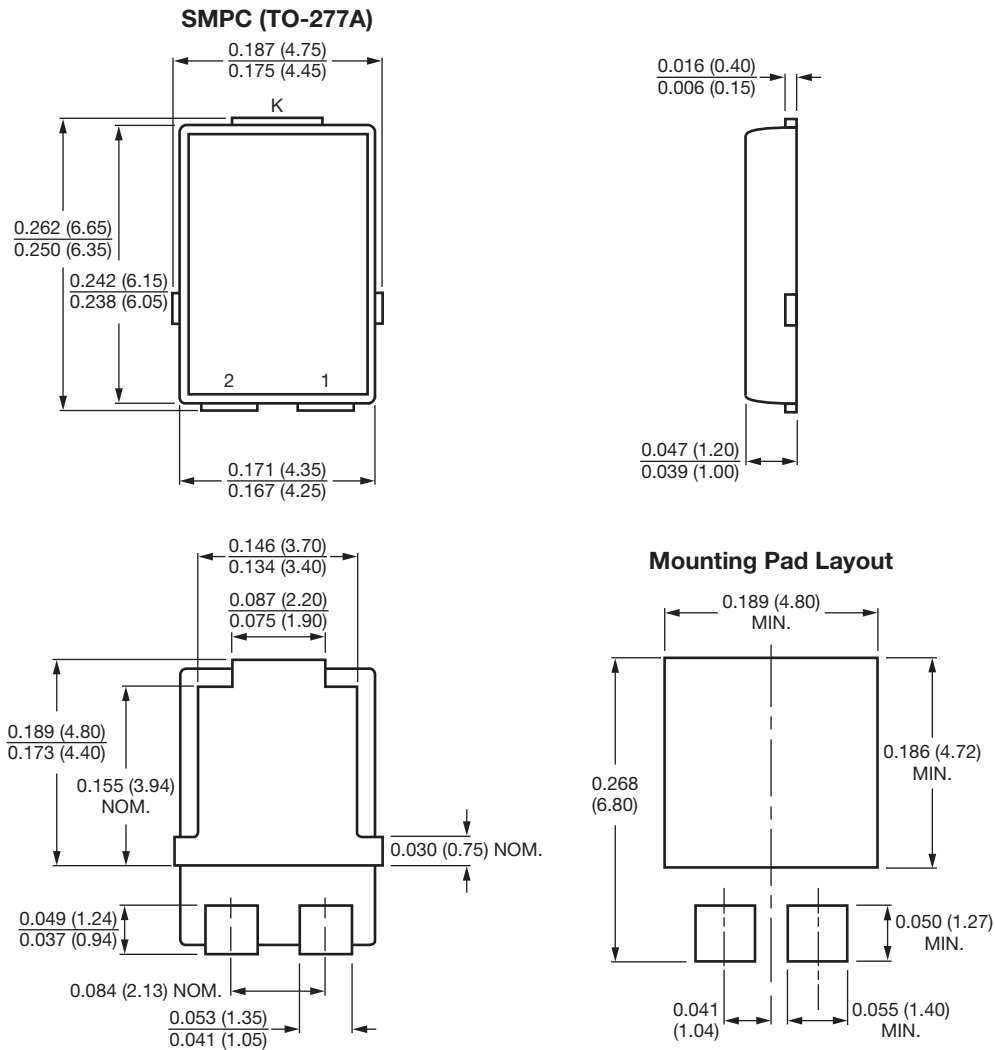


Fig. 6 - Typical Transient Thermal Impedance

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)


Conform to JEDEC® TO-277A



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