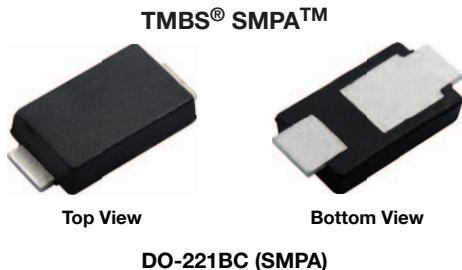


Surface Mount Trench MOS Barrier Schottky Rectifier



FEATURES

- Very low profile - typical height of 0.95 mm
- Ideal for automated placement
- Trench MOS Schottky technology
- Low power losses, high efficiency
- Low forward voltage drop
- 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



RoHS
COMPLIANT
HALOGEN
FREE

TYPICAL APPLICATIONS

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

MECHANICAL DATA

Case: DO-221BC (SMPA)

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 AEC-Q101 qualified
 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 JESD22-B102
 M3 suffix meets JESD 201 class 2 whisker test, HM3 suffix meets JESD 201 class 2 whisker test

Polarity: color band denotes cathode end

| PRIMARY CHARACTERISTICS | |
|--|-----------------|
| $I_{F(AV)}$ | 4.0 A |
| V_{RRM} | 45 V |
| I_{FSM} | 80 A |
| V_F at $I_F = 4.0$ A ($T_A = 125$ °C) | 0.41 V |
| T_J max. | 150 °C |
| Package | DO-221BC (SMPA) |
| Diode variation | Single die |

| MAXIMUM RATINGS ($T_A = 25$ °C unless otherwise noted) | | | |
|---|----------------------|---------------|------|
| PARAMETER | SYMBOL | V4PAL45 | UNIT |
| Device marking code | | 4L45 | |
| Maximum repetitive peak reverse voltage | V_{RRM} | 45 | V |
| Maximum DC forward current | I_F ⁽¹⁾ | 4.0 | A |
| | I_F ⁽²⁾ | 3.0 | |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load | I_{FSM} | 80 | A |
| Operating junction and storage temperature range | T_J, T_{STG} | - 40 to + 150 | °C |

Notes

⁽¹⁾ Units mounted on 15 mm x 15 mm pad areas, 2 oz. PCB

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

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

| PARAMETER | TEST CONDITIONS | | SYMBOL | TYP. | MAX. | UNIT | |
|-------------------------------|--------------------------------|---------------------------|-------------|------|------|---------------|--|
| Instantaneous forward voltage | $I_F = 2.0 \text{ A}$ | $T_A = 25^\circ\text{C}$ | $V_F^{(1)}$ | 0.43 | - | V | |
| | $I_F = 4.0 \text{ A}$ | | | 0.49 | 0.57 | | |
| | $I_F = 2.0 \text{ A}$ | $T_A = 125^\circ\text{C}$ | | 0.33 | - | | |
| | $I_F = 4.0 \text{ A}$ | | | 0.41 | 0.50 | | |
| Reverse current | $V_R = 45 \text{ V}$ | $T_A = 25^\circ\text{C}$ | $I_R^{(2)}$ | - | 450 | μA | |
| | | $T_A = 125^\circ\text{C}$ | | 5 | 15 | mA | |
| Typical junction capacitance | $4.0 \text{ V}, 1 \text{ MHz}$ | | C_J | 450 | - | pF | |

Notes

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

(2) Pulse test: pulse width $\leq 5 \text{ ms}$

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

| PARAMETER | SYMBOL | V4PAL45 | UNIT |
|----------------------------|-----------------------|---------|--------------------|
| Typical thermal resistance | $R_{\theta JA}^{(1)}$ | 100 | $^\circ\text{C/W}$ |
| | $R_{\theta JM}^{(1)}$ | 9 | |

Note

(1) Free air, mounted on recommended PCB, 2 oz. pad area; thermal resistance $R_{\theta JA}$ - junction to ambient; $R_{\theta JM}$ - junction to mount

ORDERING INFORMATION (Example)

| PREFERRED P/N | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
|-------------------------------|-----------------|------------------------|---------------|------------------------------------|
| V4PAL45-M3/I | 0.032 | I | 14 000 | 13" diameter plastic tape and reel |
| V4PAL45HM3/I ⁽¹⁾ | 0.032 | I | 14 000 | 13" diameter plastic tape and reel |
| V4PAL45HM3_A/I ⁽¹⁾ | 0.032 | I | 14 000 | 13" diameter plastic tape and reel |

Note

(1) AEC-Q101 qualified

RATINGS AND CHARACTERISTICS CURVES

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

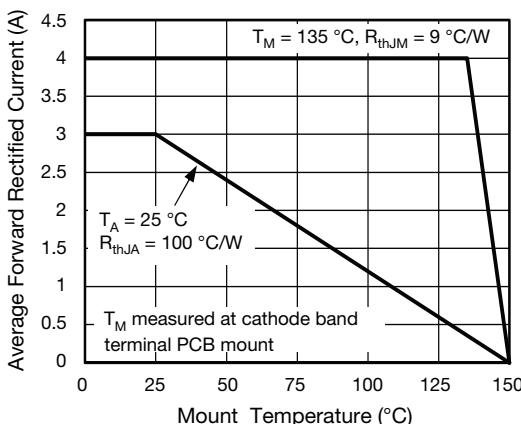


Fig. 1 - Maximum Forward Current Derating Curve

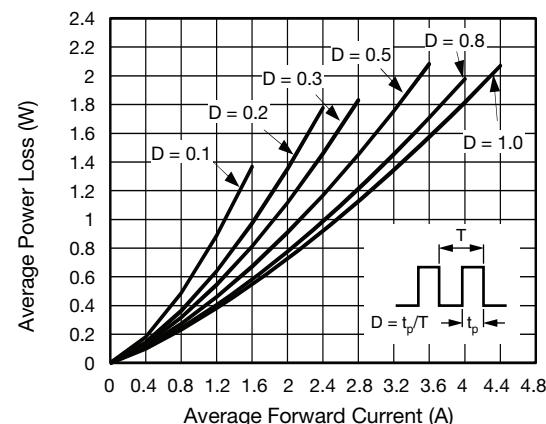


Fig. 2 - Forward Power Loss Characteristics

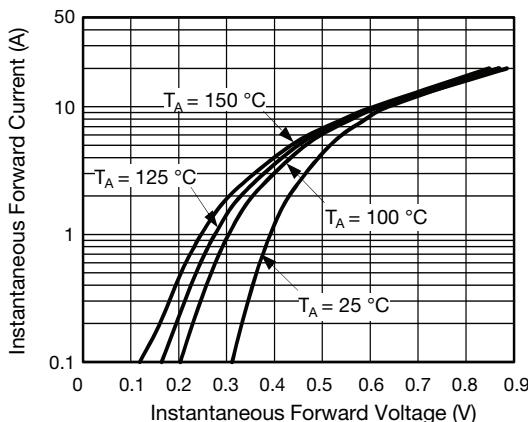


Fig. 3 - Typical Instantaneous Forward Characteristics

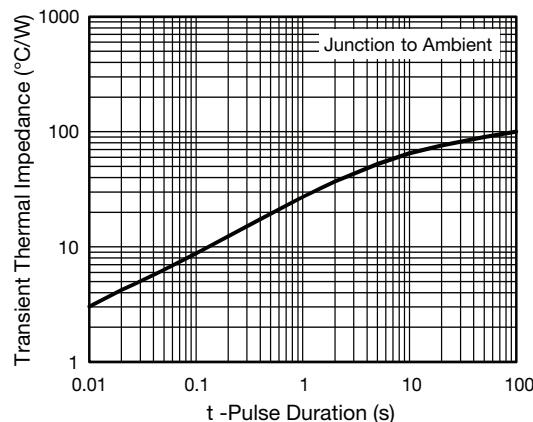


Fig. 6 - Typical Transient Thermal Impedance

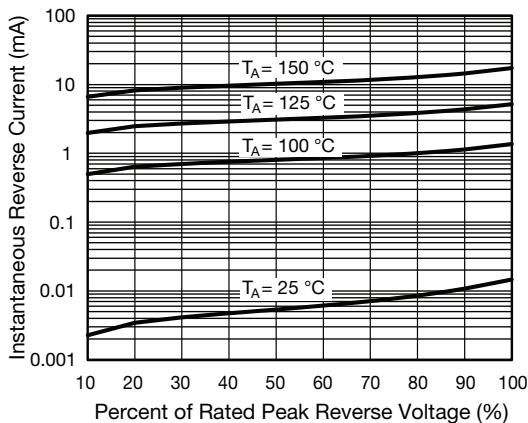


Fig. 4 - Typical Reverse Leakage Characteristics

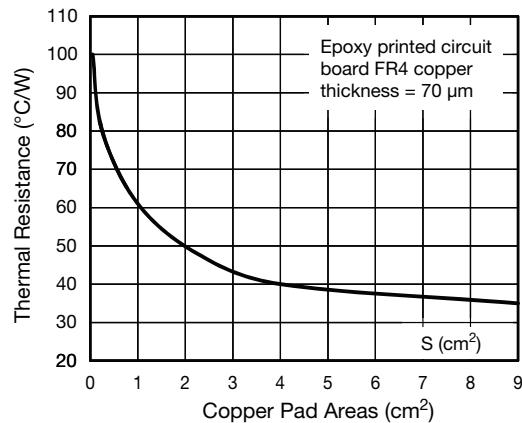


Fig. 7 - Thermal Resistance Junction to Ambient vs. Copper Pad Areas

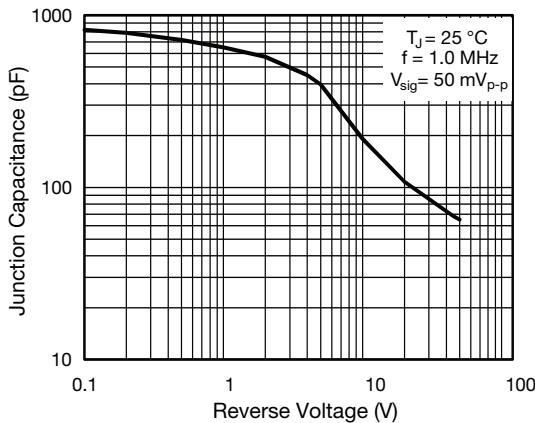
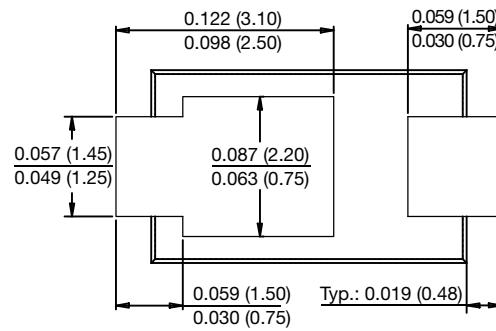
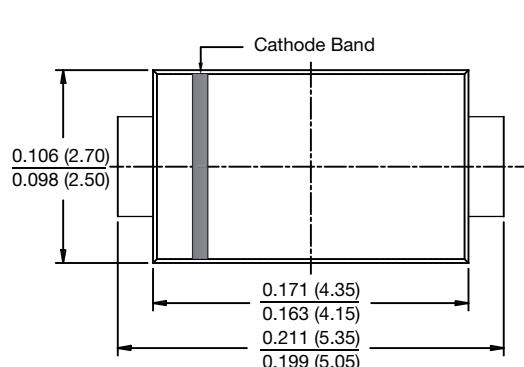
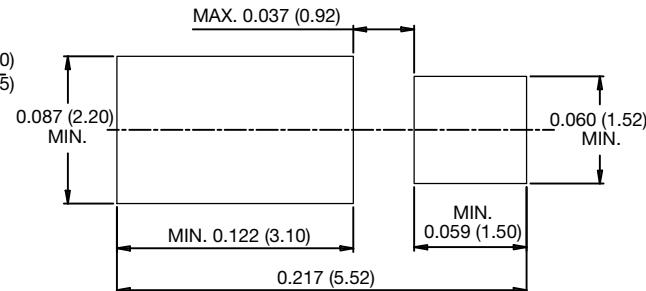
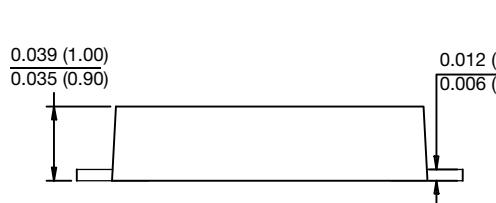


Fig. 5 - Typical Junction Capacitance

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

DO-221BC (SMPA)

Mounting Pad Layout


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