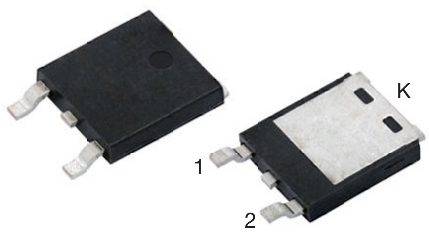
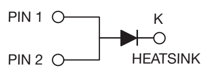
# High Current Density Surface-Mount TMBS® (Trench MOS Barrier Schottky) Rectifier

Ultra Low $V_F$ = 0.33 V at $I_F$ = 5 A

eSMP® Series




SlimDPAK (TO-252AE)




## FEATURES

- Very low profile - typical height of 1.3 mm
- Trench MOS Schottky technology
- Ideal for automated placement
- 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

RoHS COMPLIANT
HALOGEN FREE

## DESIGN SUPPORT TOOLS

click logo to get started

3D Models Available

## TYPICAL APPLICATIONS

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

## MECHANICAL DATA

**Case:** SlimDPAK (TO-252AE)
Molding compound meets UL 94 V-0 flammability rating
Base P/N-M3 - halogen-free, RoHS-compliant
Base P/NHM3 - halogen-free, RoHS-compliant, and AEC-Q101 qualified

**Terminals:** matte tin plated leads, solderable per J-STD-002 and JESD 22-B102
M3 and HM3 suffix meets JESD 201 class 2 whisker test

| PRIMARY CHARACTERISTICS | |
|---|---|
| $I_{F(AV)}$ | 20 A |
| $V_{RRM}$ | 60 V |
| $I_{FSM}$ | 200 A |
| $V_F$ at $I_F$ = 20 A ($T_A$ = 125 °C) | 0.54 V |
| $T_J$ max. | 150 °C |
| Package | SlimDPAK (TO-252AE) |
| Circuit configuration | Single |

**MAXIMUM RATINGS** ($T_A$ = 25 °C unless otherwise noted)

| PARAMETER | SYMBOL | V20PW60 | UNIT |
|---|---|---|---|
| Device marking code | | V20PW60 | |
| Maximum repetitive peak reverse voltage | $V_{RRM}$ | 60 | V |
| Maximum average forward rectified current (Fig. 1) | $I_{F(AV)}$ (1) | 20 | A |
| Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load | $I_{FSM}$ | 200 | A |
| Operating junction temperature range | $T_J$ (2) | -40 to +150 | °C |
| Storage temperature range | $T_{STG}$ | -55 to +150 | °C |

**Notes**

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

| ELECTRICAL CHARACTERISTICS ($T_A$ = 25 °C unless otherwise noted) | | | | | | |
|---|---|---|---|---|---|---|
| PARAMETER | TEST CONDITIONS | | SYMBOL | TYP. | MAX. | UNIT |
| Maximum Instantaneous forward voltage | $I_F$ = 5.0 A | $T_A$ = 25 °C | $V_F$ (1) | 0.44 | - | V |
| | $I_F$ = 10 A | | | 0.49 | - | |
| | $I_F$ = 20 A | | | 0.58 | 0.66 | |
| | $I_F$ = 5.0 A | $T_A$ = 125 °C | | 0.33 | - | |
| | $I_F$ = 10 A | | | 0.41 | - | |
| | $I_F$ = 20 A | | | 0.54 | 0.62 | |
| Reverse current | $V_R$ = 60 V | $T_A$ = 25 °C | $I_R$ (2) | - | 3.6 | mA |
| | | $T_A$ = 125 °C | | 20 | 70 | |
| Typical junction capacitance | 4.0 V, 1 MHz | | $C_J$ | 2250 | - | pF |

**Notes**

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

(2) Pulse test: pulse width ≤ 5 ms

| THERMAL CHARACTERISTICS ($T_A$ = 25 °C unless otherwise noted) | | | |
|---|---|---|---|
| PARAMETER | SYMBOL | V20PW60 | UNIT |
| Typical thermal resistance | $R_{\theta JA}$ (1)(2) | 55 | °C/W |
| | $R_{\theta JM}$ (3) | 1.8 | |

**Notes**

(1) The heat generated must be less than 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 infinite heat sink; thermal resistance $R_{\theta JM}$ - junction-to-mount

| ORDERING INFORMATION (Example) | | | | |
|---|---|---|---|---|
| PREFERRED P/N | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE |
| V20PW60-M3/I | 0.20 | I | 4500 | 13" diameter plastic tape and reel |
| V20PW60HM3/I (1) | 0.20 | I | 4500 | 13" diameter plastic tape and reel |

**Note**

(1) AEC-Q101 qualified

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

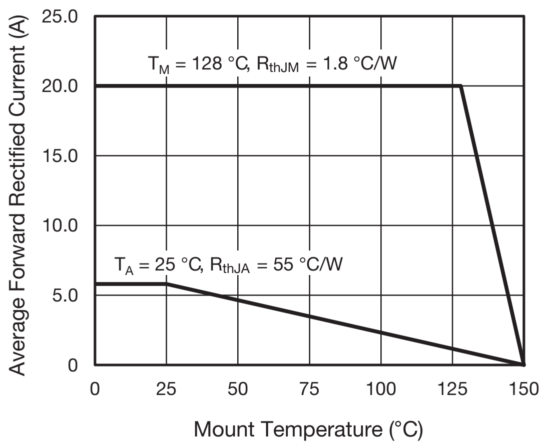



Fig. 1 - Maximum Forward Current Derating Curve

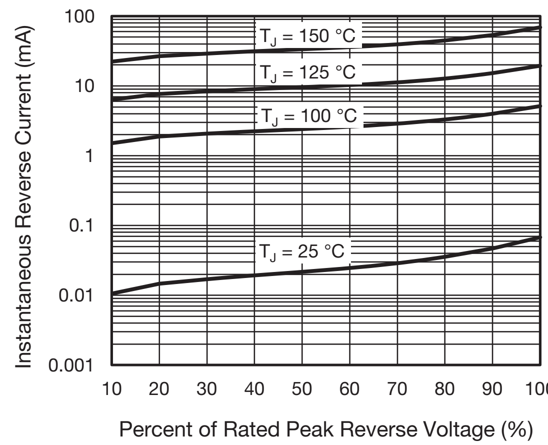



Fig. 4 - Typical Reverse Leakage Characteristics

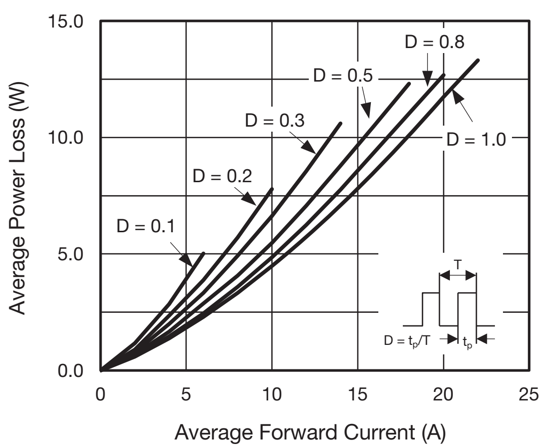



Fig. 2 - Forward Power Loss Characteristics

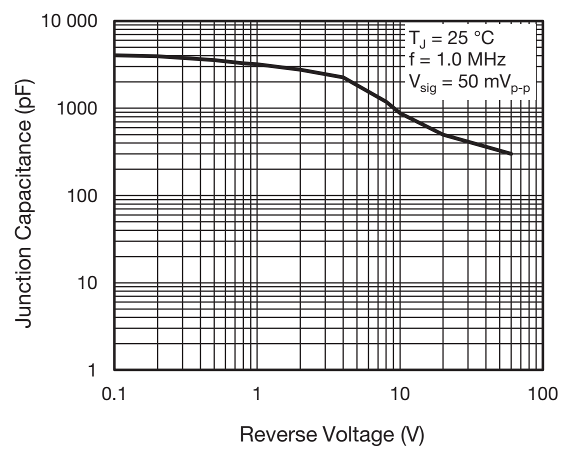



Fig. 5 - Typical Junction Capacitance

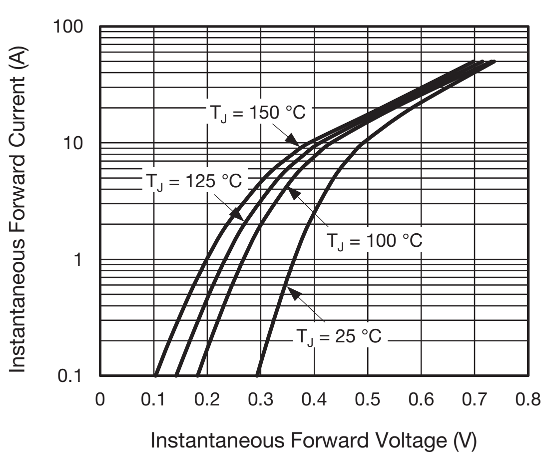



Fig. 3 - Typical Instantaneous Forward Characteristics

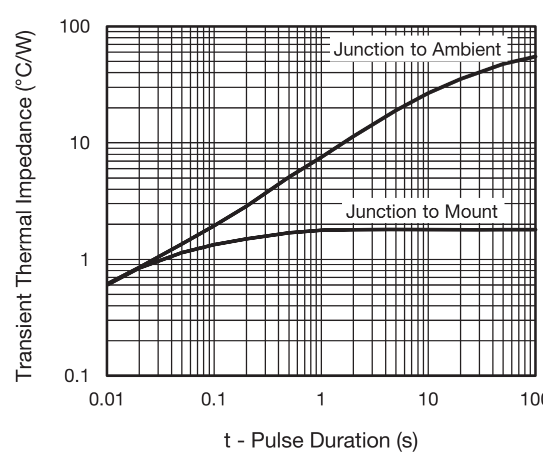



Fig. 6 - Typical Transient Thermal Impedance

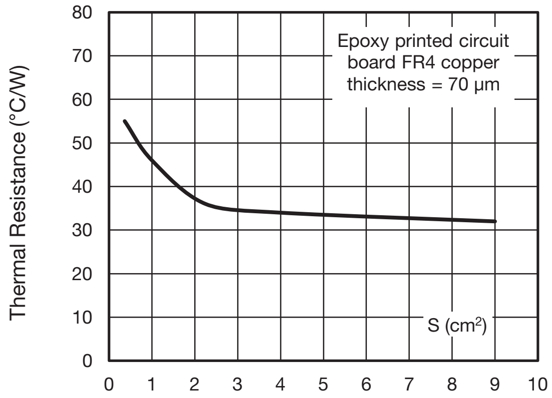
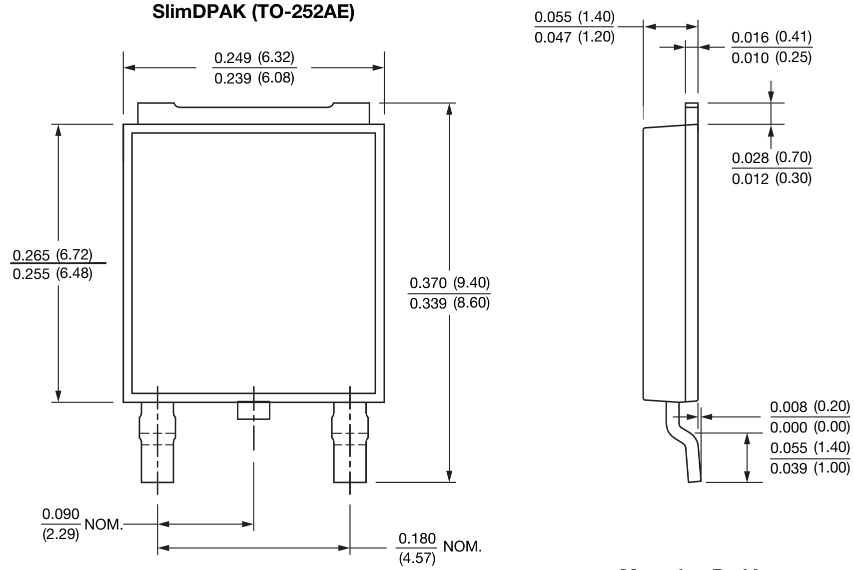
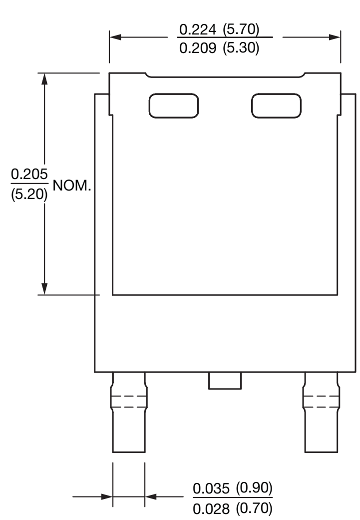



Fig. 7 - Typical Resistance Junction to Ambient vs. Copper Pad Areas

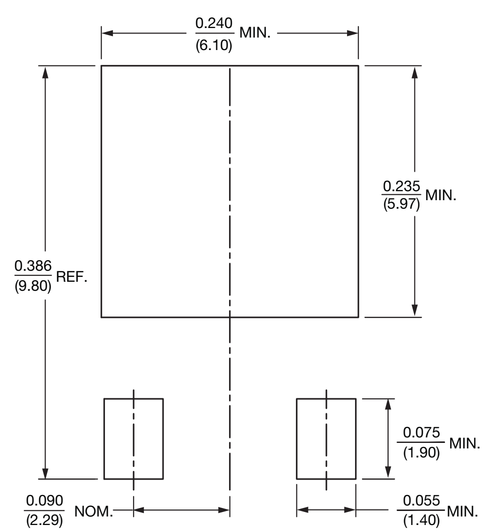
## PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

**SlimDPAK (TO-252AE)**




**Mounting Pad Layout**



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