

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

 Ultra Low  $V_F = 0.61$  V at  $I_F = 5$  A


## 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](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

## DESIGN SUPPORT TOOLS

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**3D**  
Models  
Available

## TYPICAL APPLICATIONS

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

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	20 A
$V_{RRM}$	150 V
$I_{FSM}$	150 A
$V_F$ at $I_F = 10$ A ( $T_A = 125$ °C)	0.69 V
$T_J$ max.	150 °C
Package	SlimDPAK (TO-252AE)
Circuit configuration	Common cathode

## 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

MAXIMUM RATINGS ( $T_A = 25$ °C unless otherwise noted)			
PARAMETER	SYMBOL	V20PW15C	UNIT
Device marking code		V20PW15C	
Maximum repetitive peak reverse voltage	$V_{RRM}$	150	V
Maximum average forward rectified current (fig. 1)	per device	20	A
	per diode	10	A
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load per diode	$I_{FSM}$	150	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 <sub>A</sub> = 25 °C unless otherwise noted)						
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage per diode	I <sub>F</sub> = 5.0 A	T <sub>A</sub> = 25 °C	V <sub>F</sub> <sup>(1)</sup>	0.81	-	V
	I <sub>F</sub> = 10 A			1.16	1.24	
	I <sub>F</sub> = 5.0 A	T <sub>A</sub> = 125 °C		0.61	-	
	I <sub>F</sub> = 10 A			0.69	0.75	
Reverse current per diode	V <sub>R</sub> = 100 V	T <sub>A</sub> = 25 °C	I <sub>R</sub> <sup>(2)</sup>	0.01	-	mA
		T <sub>A</sub> = 125 °C		1.5	-	
	V <sub>R</sub> = 150 V	T <sub>A</sub> = 25 °C		-	0.15	
		T <sub>A</sub> = 125 °C		3	10	
Typical junction capacitance per diode	4.0 V, 1 MHz		C <sub>J</sub>	560	-	pF

Notes

- (1) Pulse test: 300 μs pulse width, 1 % duty cycle
- (2) Pulse test: pulse width ≤ 5 ms

THERMAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted)			
PARAMETER	SYMBOL	V20PW15C	UNIT
Typical thermal resistance	R <sub>θJA</sub> <sup>(1)(2)</sup>	55	°C/W
	R <sub>θJM</sub> <sup>(3)</sup>	1.8	

Notes

- (1) The heat generated must be less than thermal conductivity from junction-to-ambient: dP<sub>D</sub>/dT<sub>J</sub> < 1/R<sub>θJA</sub>
- (2) Free air, mounted on recommended copper pad area; thermal resistance R<sub>θJA</sub> - junction to ambient
- (3) Mounted on infinite heat sink; thermal resistance R<sub>θJM</sub> - junction-to-mount

ORDERING INFORMATION (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
V20PW15C-M3/I	0.20	I	4500	13" diameter plastic tape and reel
V20PW15CHM3/I <sup>(1)</sup>	0.20	I	4500	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)

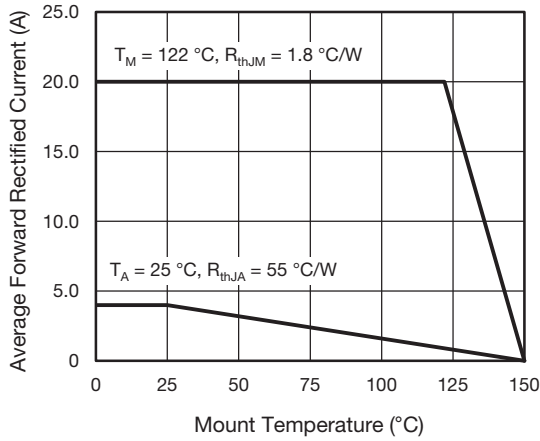


Fig. 1 - Maximum Forward Current Derating Curve

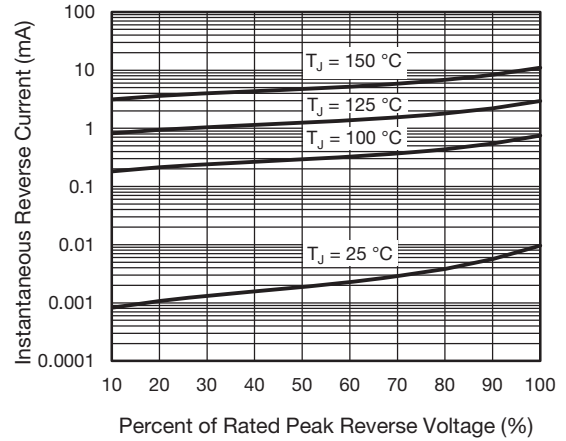


Fig. 4 - Typical Reverse Leakage Characteristics

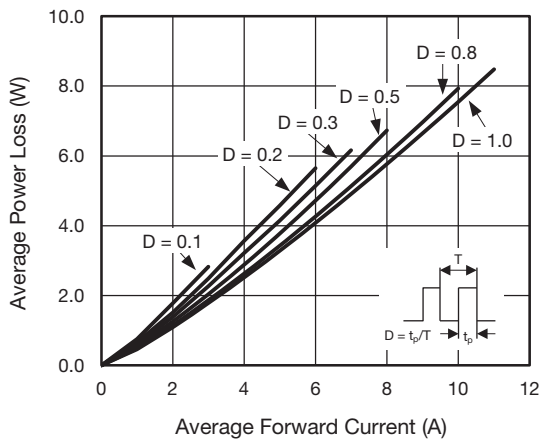


Fig. 2 - Forward Power Loss Characteristics

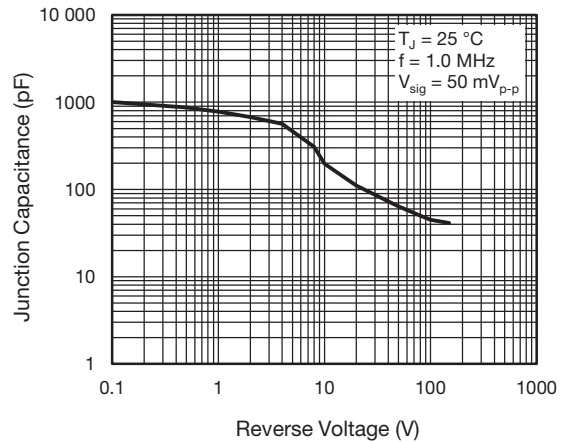


Fig. 5 - Typical Junction Capacitance

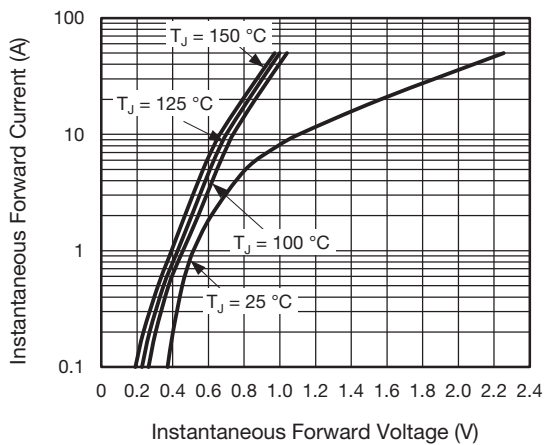


Fig. 3 - Typical Instantaneous Forward Characteristics

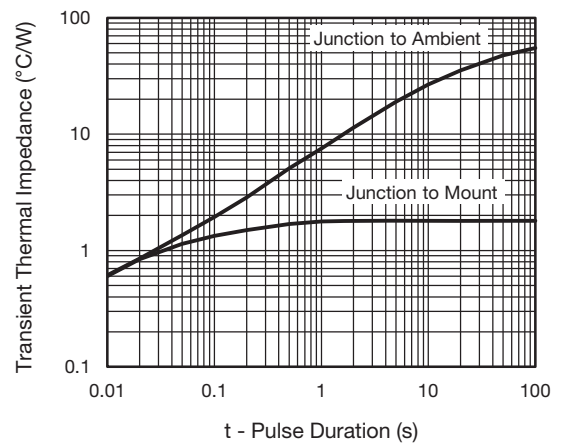


Fig. 6 - Typical Transient Thermal Impedance

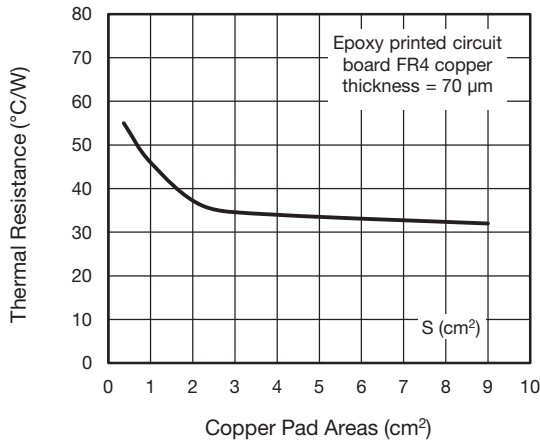
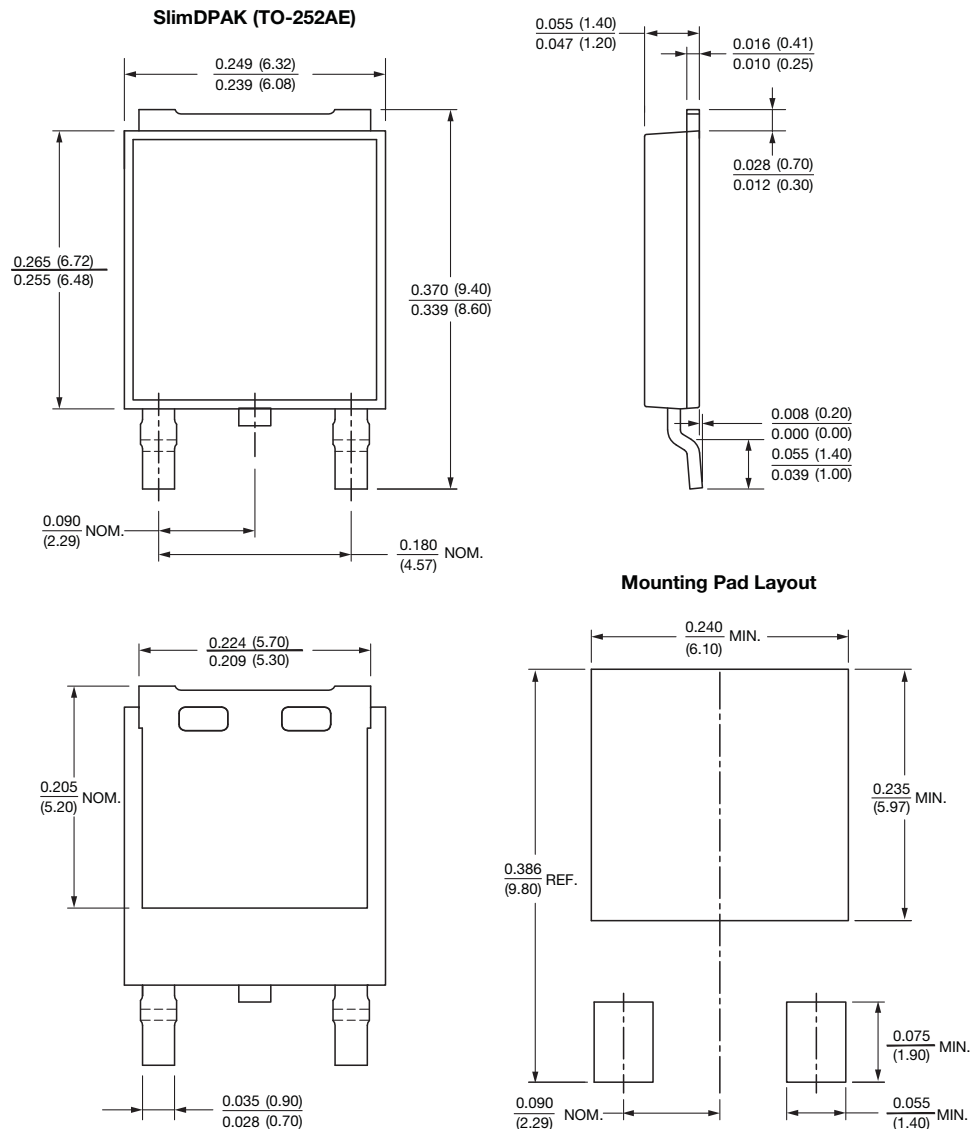


Fig. 7 - Typical Resistance Junction to Ambient vs. Copper Pad Areas

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





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