

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

 Ultra Low  $V_F = 0.39$  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)

 AUTOMOTIVE  
GRADE  
Available

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

## LINKS TO ADDITIONAL RESOURCES



3D Models

## 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
$V_{RRM}$	45 V
$I_{FSM}$	150 A
$V_F$ at $I_F = 10$ A ( $T_A = 125$ °C)	0.46 V
$T_J$ max.	175 °C
Package	SlimDPAK (TO-252AE)
Circuit configuration	Common cathode

MAXIMUM RATINGS ( $T_A = 25$ °C unless otherwise noted)			
PARAMETER	SYMBOL	V20PWM45C	UNIT
Device marking code		V20PWM45C	
Maximum repetitive peak reverse voltage	$V_{RRM}$	45	V
Maximum average forward rectified current (fig. 1)	$I_{F(AV)}$ <sup>(1)</sup>	per device	20
		per diode	10
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	$T_J$ <sup>(2)</sup>	-40 to +175	°C
Storage temperature range	$T_{STG}$	-55 to +175	°C

## Notes

<sup>(1)</sup> With infinite heatsink

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

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

PARAMETER	TEST CONDITIONS	SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage per diode	$I_F = 5.0\text{ A}$	$T_A = 25\text{ }^\circ\text{C}$	0.49	-	V
	$I_F = 10\text{ A}$		0.54	0.62	
	$I_F = 5.0\text{ A}$	$T_A = 125\text{ }^\circ\text{C}$	0.39	-	
	$I_F = 10\text{ A}$		0.46	0.54	
Reverse current per diode	$V_R = 45\text{ V}$	$T_A = 25\text{ }^\circ\text{C}$	-	0.2	mA
		$T_A = 125\text{ }^\circ\text{C}$	3	8	
Typical junction capacitance	4.0 V, 1 MHz	$C_J$	1590	-	pF

**Notes**(1) Pulse test: 300  $\mu\text{s}$  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	V20PWM45C	UNIT
Typical thermal resistance	$R_{\theta JA}$ (1)(2)	55	$^\circ\text{C/W}$
	$R_{\theta JM}$ (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
V20PWM45C-M3/I	0.20	I	4500	13" diameter plastic tape and reel
V20PWM45CHM3/I (1)	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)

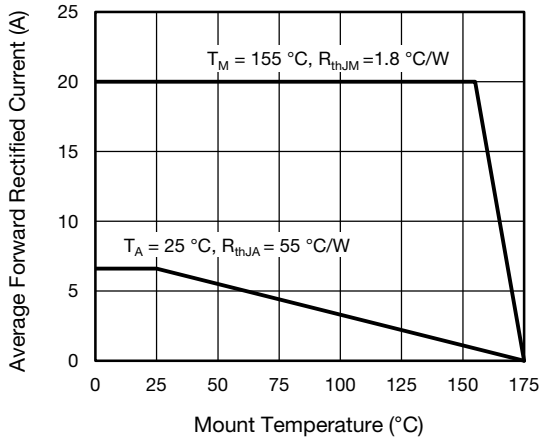


Fig. 1 - Maximum Forward Current Derating Curve

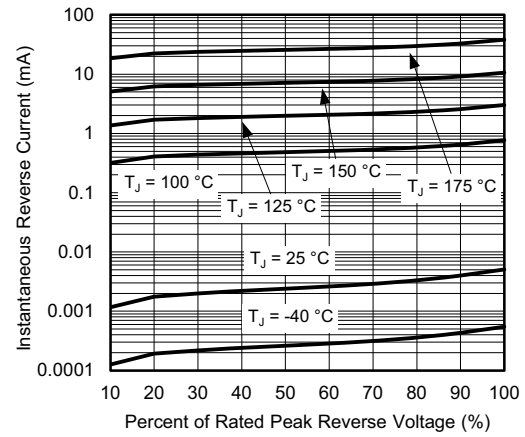


Fig. 4 - Typical Reverse Leakage Characteristics

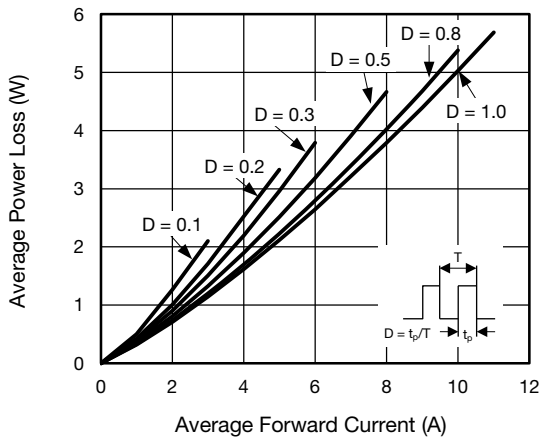


Fig. 2 - Forward Power Loss Characteristics

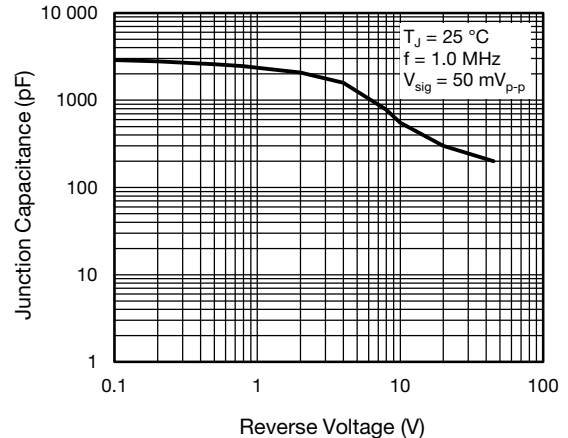


Fig. 5 - Typical Junction Capacitance

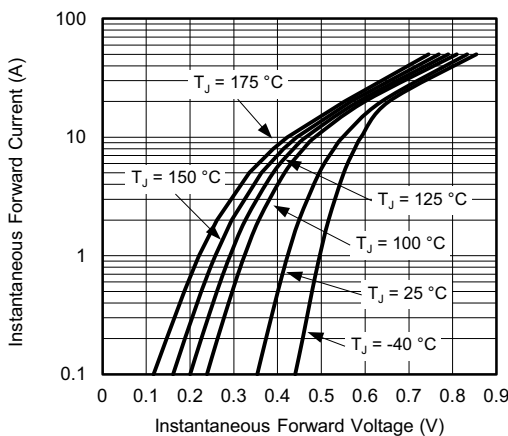


Fig. 3 - Typical Instantaneous Forward Characteristics

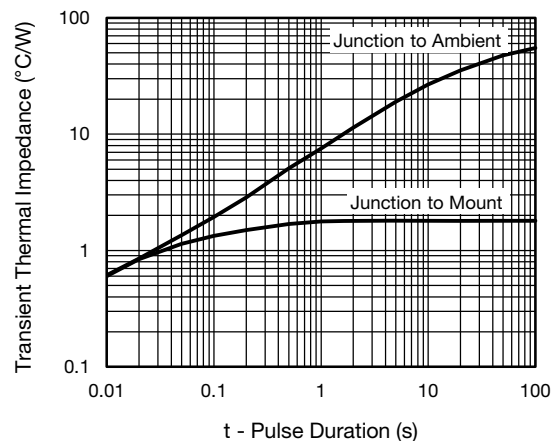


Fig. 6 - Typical Transient Thermal Impedance

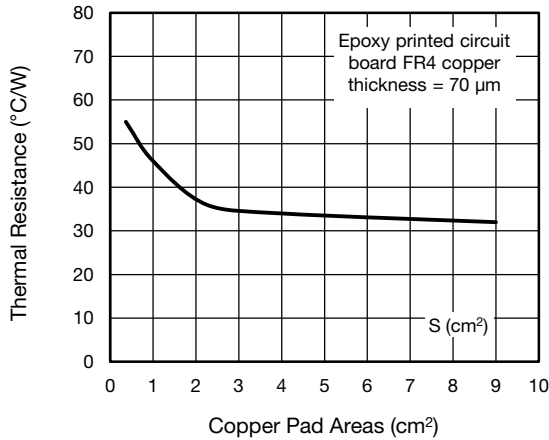
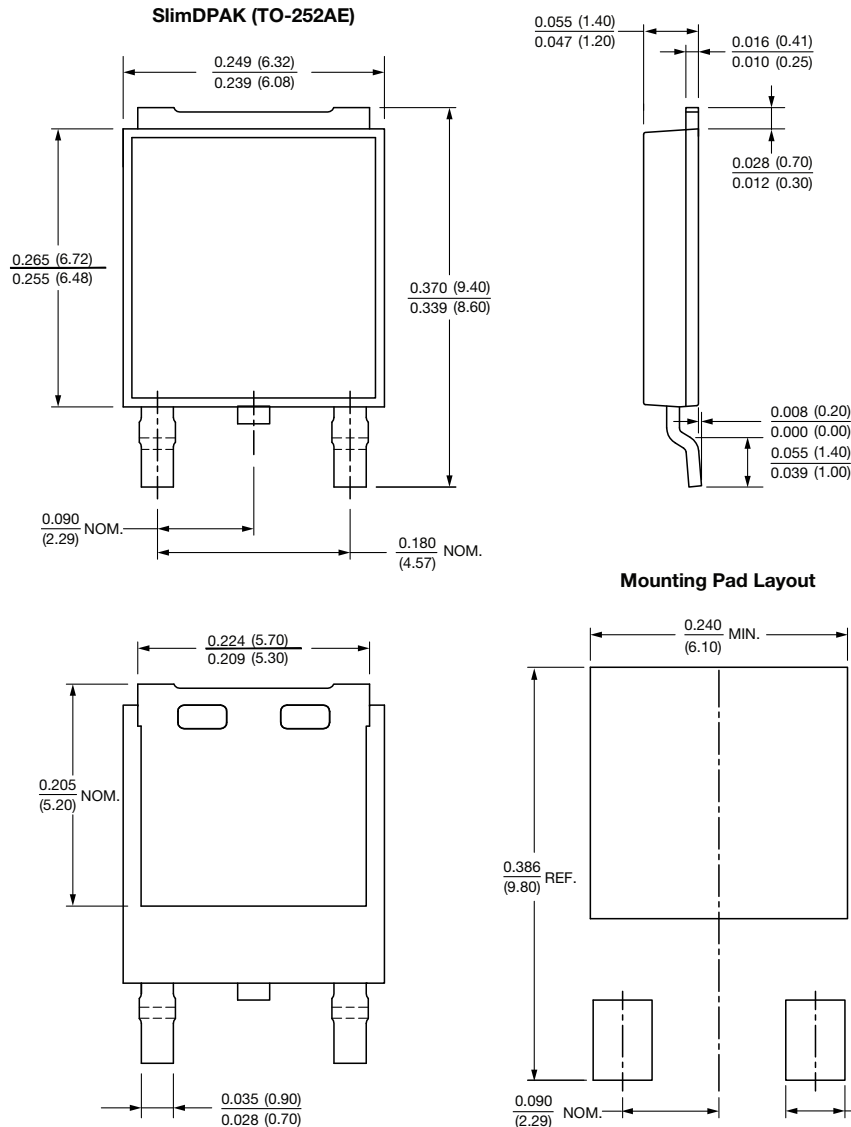


Fig. 7 - Typical Resistance Junction to Ambient vs. Copper Pad Areas

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





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