

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

Ultra Low $V_F = 0.39\text{ V}$ at $I_F = 5\text{ A}$



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

AUTOMOTIVE
GRADE
Available



RoHS
COMPLIANT
HALOGEN
FREE

LINKS TO ADDITIONAL RESOURCES



3D Models

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	20 A
V_{RRM}	45 V
I_{FSM}	150 A
V_F at $I_F = 10\text{ A}$ ($T_A = 125\text{ °C}$)	0.46 V
T_J max.	175 °C
Package	SlimDPAK (TO-252AE)
Circuit configuration	Common cathode

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

MAXIMUM RATINGS ($T_A = 25\text{ °C}$ 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)	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 +175	°C
Storage temperature range	T_{STG}	-55 to +175	°C

Notes

(1) With infinite heatsink

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

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

PARAMETER	TEST CONDITIONS	SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage per diode	$I_F = 5.0\text{ A}$	$T_A = 25\text{ }^{\circ}\text{C}$	$V_F^{(1)}$	0.49	V
	$I_F = 10\text{ A}$			0.54	
	$I_F = 5.0\text{ A}$	$T_A = 125\text{ }^{\circ}\text{C}$	$V_F^{(1)}$	0.39	
	$I_F = 10\text{ A}$			0.46	
Reverse current per diode	$V_R = 45\text{ V}$	$T_A = 25\text{ }^{\circ}\text{C}$	$I_R^{(2)}$	-	mA
		$T_A = 125\text{ }^{\circ}\text{C}$		3	
Typical junction capacitance	4.0 V, 1 MHz		C_J	1590	pF

Notes(1) Pulse test: 300 μs pulse width, 1 % duty cycle(2) Pulse test: pulse width $\leq 5\text{ ms}$ **THERMAL CHARACTERISTICS** ($T_A = 25\text{ }^{\circ}\text{C}$ 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

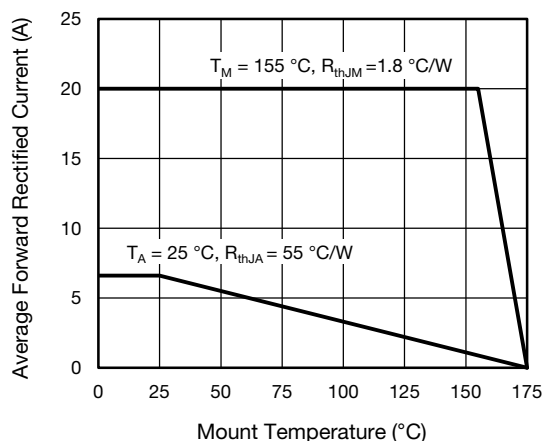
RATINGS AND CHARACTERISTICS CURVES ($T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

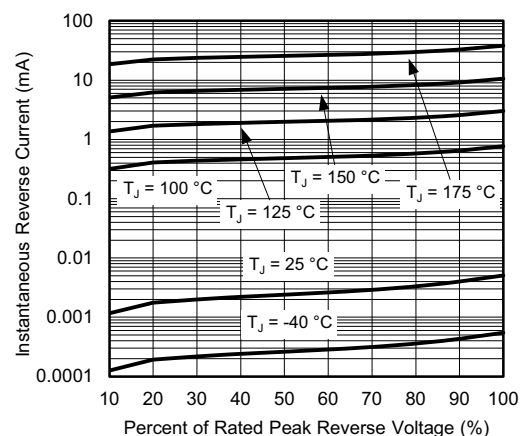


Fig. 4 - Typical Reverse Leakage Characteristics

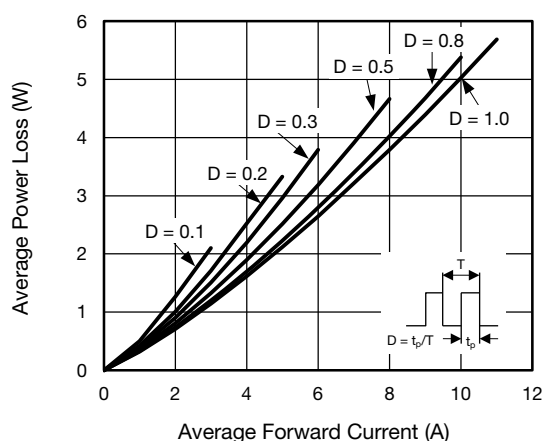


Fig. 2 - Forward Power Loss Characteristics

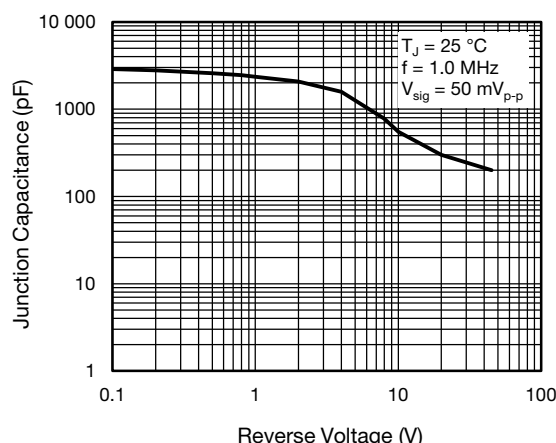


Fig. 5 - Typical Junction Capacitance

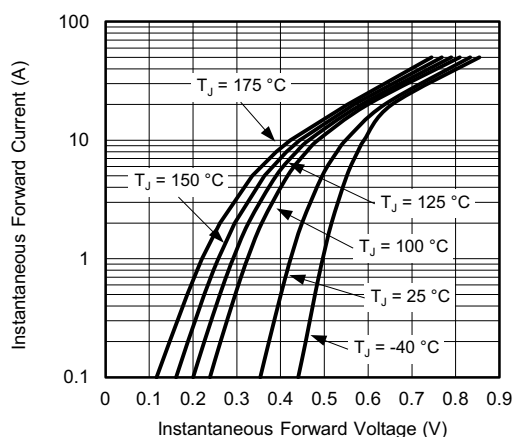


Fig. 3 - Typical Instantaneous Forward Characteristics

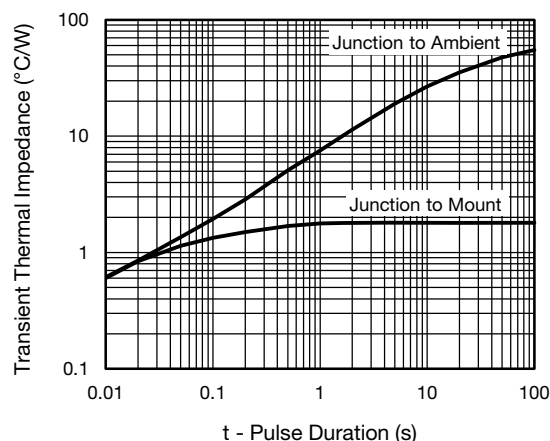


Fig. 6 - Typical Transient Thermal Impedance

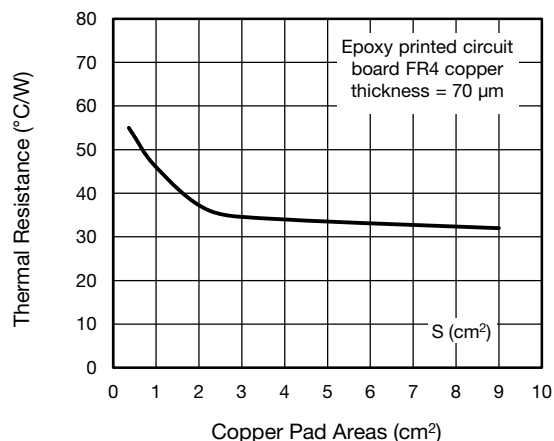
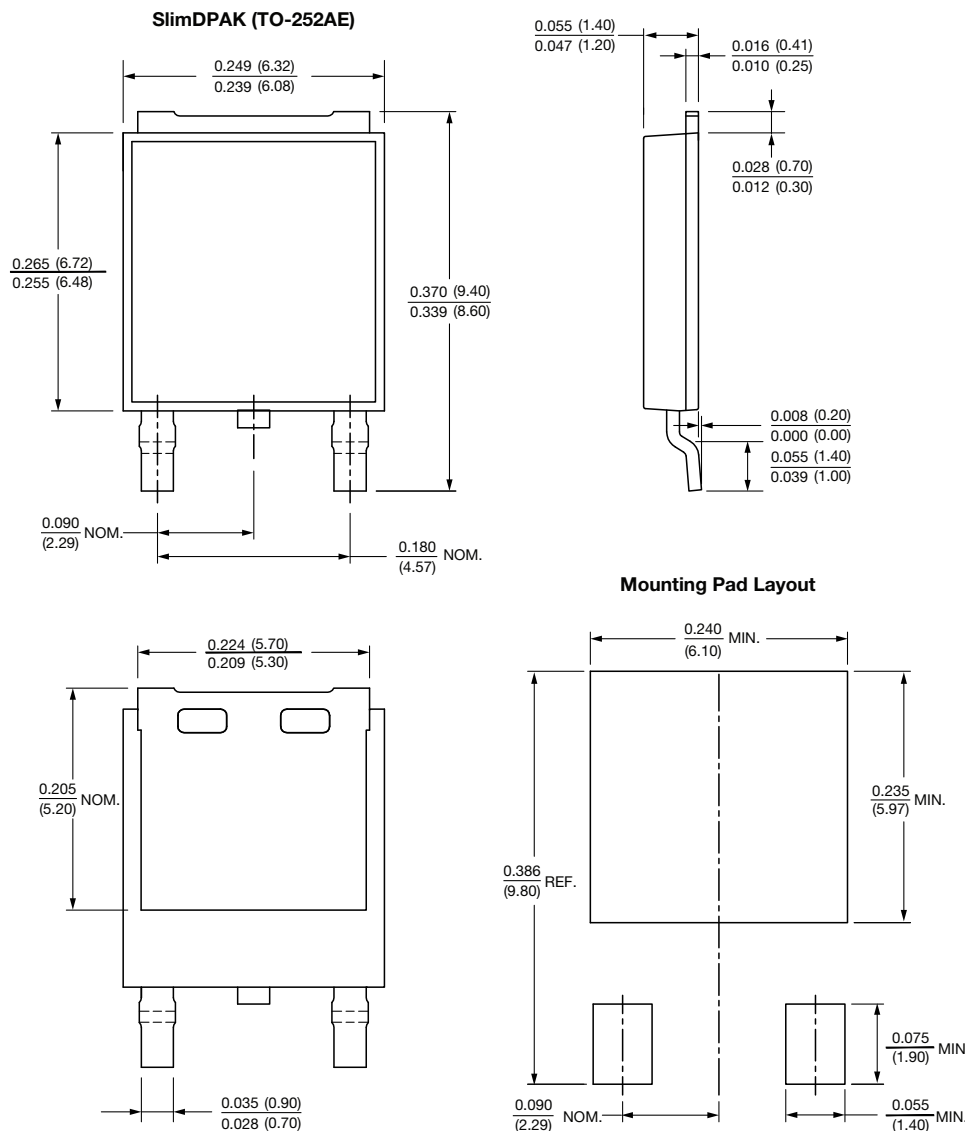


Fig. 7 - Typical Resistance Junction to Ambient vs. Copper Pad Areas

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)





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