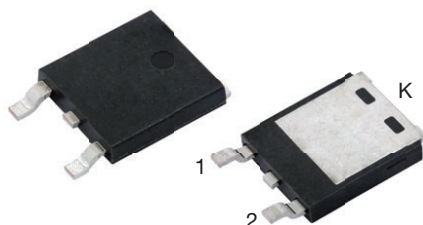


# High Current Density Surface-Mount TMBS® (Trench MOS Barrier Schottky) Rectifier

Ultra Low  $V_F = 0.35\text{ V}$  at  $I_F = 5\text{ A}$

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

AUTOMOTIVE  
GRADE  
Available



RoHS  
COMPLIANT  
HALOGEN  
FREE

## LINKS TO ADDITIONAL RESOURCES



PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	20 A
$V_{RRM}$	45 V
$I_{FSM}$	200 A
$V_F$ at $I_F = 20\text{ A}$ ( $T_A = 125\text{ °C}$ )	0.51 V
$T_J$ max.	175 °C
Package	SlimDPAK (TO-252AE)
Circuit configuration	Single

## 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	V20PWM45	UNIT
Device marking code		V20PWM45	
Maximum repetitive peak reverse voltage	$V_{RRM}$	45	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 +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:  $dP_D/dT_J < 1/R_{\theta JA}$



ELECTRICAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted)						
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage	I <sub>F</sub> = 5.0 A	T <sub>A</sub> = 25 °C	V <sub>F</sub> <sup>(1)</sup>	0.47	-	V
	I <sub>F</sub> = 10 A			0.51	-	
	I <sub>F</sub> = 20 A			0.58	0.66	
	I <sub>F</sub> = 5.0 A	T <sub>A</sub> = 125 °C		0.35	-	
	I <sub>F</sub> = 10 A			0.42	-	
	I <sub>F</sub> = 20 A			0.51	0.59	
Reverse current	V <sub>R</sub> = 45 V	T <sub>A</sub> = 25 °C	I <sub>R</sub> <sup>(2)</sup>	-	0.7	mA
		T <sub>A</sub> = 125 °C		7	20	
Typical junction capacitance	4.0 V, 1 MHz		C <sub>J</sub>	3100	-	pF

**Notes**(1) Pulse test: 300  $\mu\text{s}$  pulse width, 1 % duty cycle(2) Pulse test: pulse width  $\leq 5\text{ ms}$ 

<b>THERMAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)			
PARAMETER	SYMBOL	V20PWM45	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

<b>ORDERING INFORMATION</b> (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
V20PWM45-M3/I	0.20	I	4500	13" diameter plastic tape and reel
V20PWM45HM3/I <sup>(1)</sup>	0.20	I	4500	13" diameter plastic tape and reel

**Note**

(1) AEC-Q101 qualified

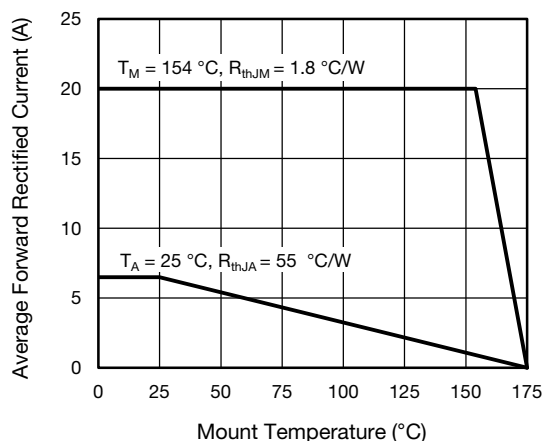
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

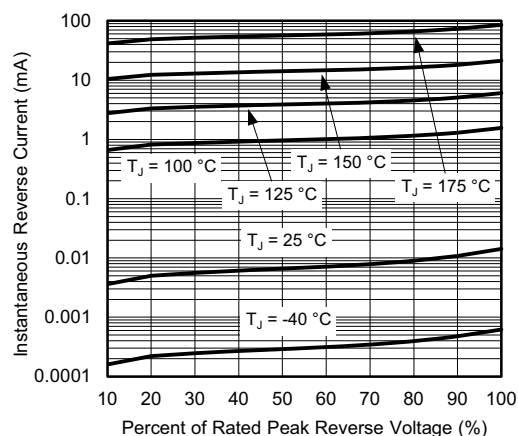


Fig. 4 - Typical Reverse Leakage Characteristics

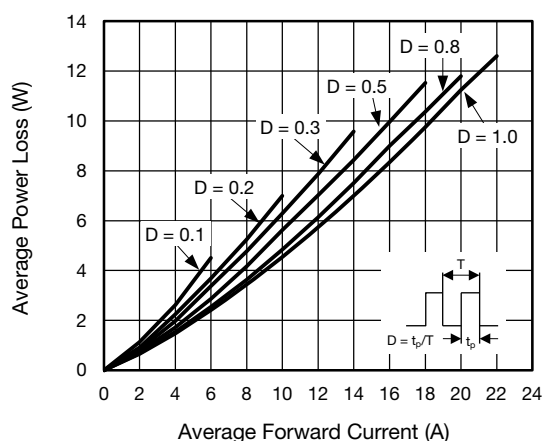


Fig. 2 - Forward Power Loss Characteristics

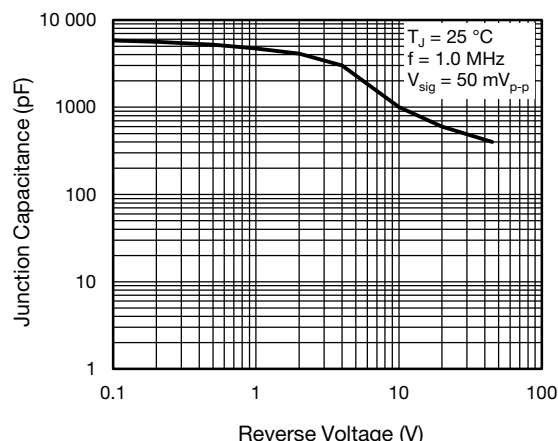


Fig. 5 - Typical Junction Capacitance

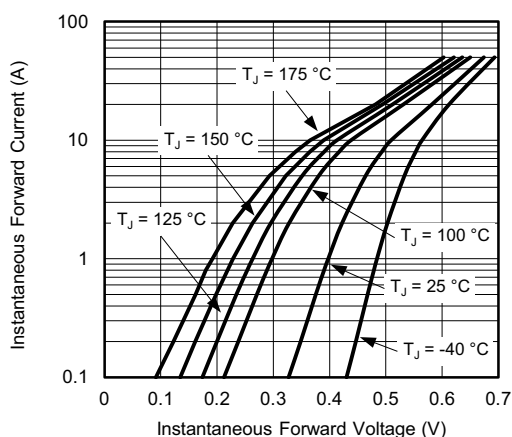


Fig. 3 - Typical Instantaneous Forward Characteristics

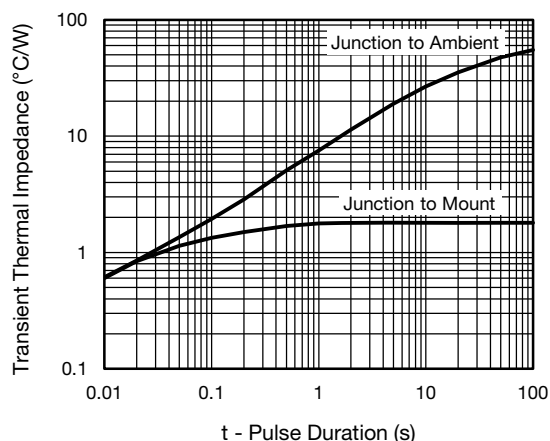


Fig. 6 - Typical Transient Thermal Impedance

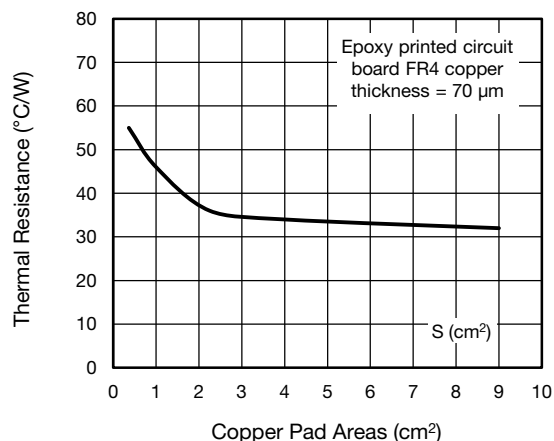
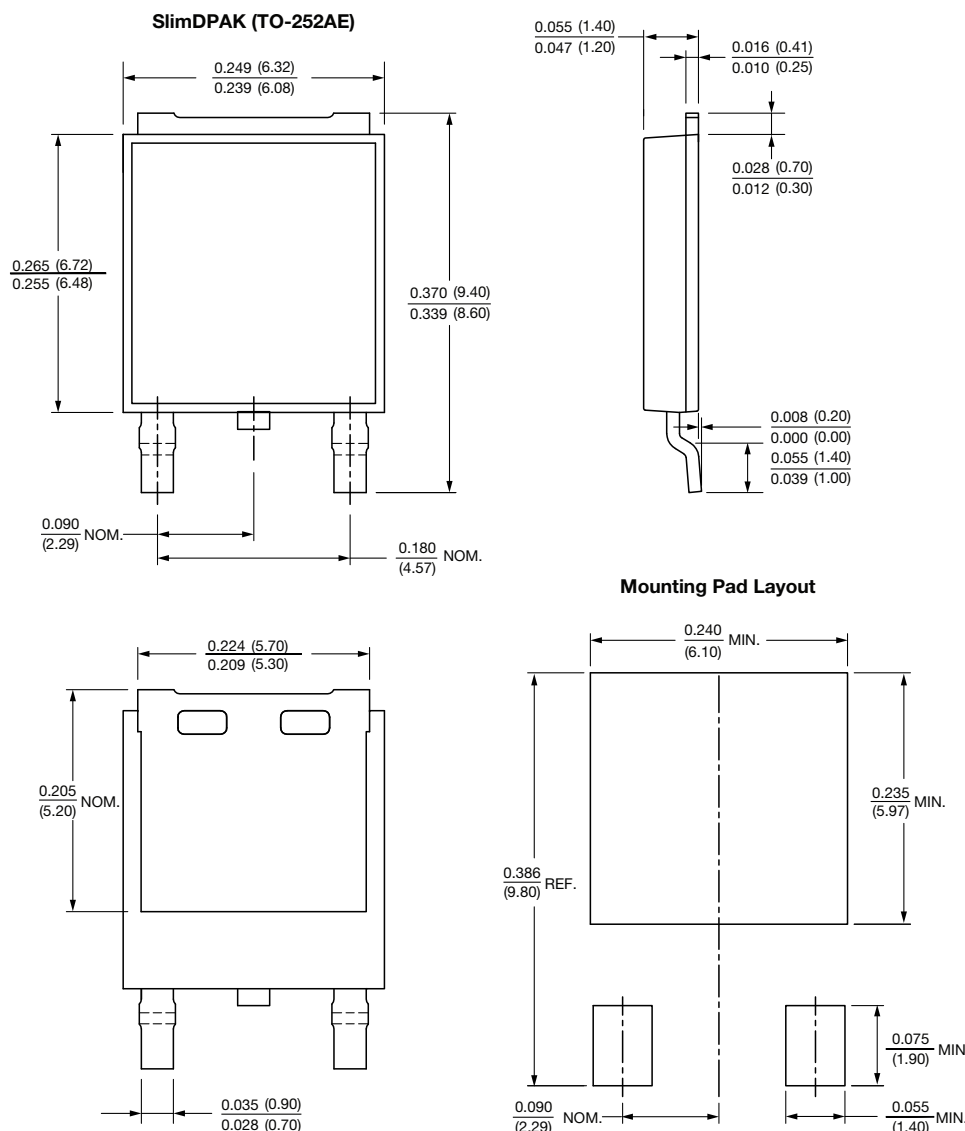


Fig. 7 - Typical Resistance Junction to Ambient vs. Copper Pad Areas

### PACKAGE OUTLINE DIMENSIONS in inches (millimeters)





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