AUTOMOTIVE GRADE

COMPLIANT

HALOGEN FREE



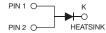
## Vishay General Semiconductor

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

Ultra Low  $V_F = 0.47 \text{ V}$  at  $I_F = 5 \text{ A}$ 







#### **LINKS TO ADDITIONAL RESOURCES**



PRIMARY CHARACTERISTICS			
I <sub>F(AV)</sub>	20 A		
$V_{RRM}$	100 V		
I <sub>FSM</sub>	200 A		
$V_F$ at $I_F = 20$ A $(T_A = 125  ^{\circ}C)$	0.70 V		
T <sub>J</sub> max.	175 °C		
Package	SlimDPAK (TO-252AE)		
Circuit configuration	Single		

#### **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 <a href="https://www.vishay.com/doc?99912"><u>www.vishay.com/doc?99912</u></a>

#### **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

<b>MAXIMUM RATINGS</b> (T <sub>A</sub> = 25 °C unless otherwise noted)				
PARAMETER	SYMBOL	V20PWM10	UNIT	
Device marking code		V20PWM10		
Maximum repetitive peak reverse voltage	V <sub>RRM</sub>	100	V	
Maximum average forward rectified current (Fig. 1)	I <sub>F(AV)</sub> (1)	20	Α	
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load			А	
Operating junction temperature range	T <sub>J</sub> <sup>(2)</sup>	-40 to +175	°C	
Storage temperature range	T <sub>STG</sub>	-55 to +175	°C	

#### Notes

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



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<b>ELECTRICAL CHARACTERISTICS</b> (T <sub>A</sub> = 25 °C unless otherwise noted)						
PARAMETER	TEST CO	NDITIONS	SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage	$I_F = 5.0 \text{ A}$	T <sub>A</sub> = 25 °C	V <sub>F</sub> <sup>(1)</sup>	0.55	-	V
	I <sub>F</sub> = 10 A			0.65	-	
	I <sub>F</sub> = 20 A			0.82	0.90	
	I <sub>F</sub> = 5.0 A	T <sub>A</sub> = 125 °C		0.47	-	
	I <sub>F</sub> = 10 A			0.58	-	
	I <sub>F</sub> = 20 A			0.70	0.78	
Reverse current	V <sub>R</sub> = 70 V	T <sub>A</sub> = 25 °C	I <sub>R</sub> <sup>(2)</sup>	0.01	-	mA
	V <sub>R</sub> = 70 V	T <sub>A</sub> = 125 °C		3	-	
	V <sub>R</sub> = 100 V	T <sub>A</sub> = 25 °C		-	0.2	
	v <sub>R</sub> = 100 v	T <sub>A</sub> = 125 °C		5	15	
Typical junction capacitance	4.0 V, 1 MHz		CJ	1575	-	pF

#### Notes

 $^{(1)}\,$  Pulse test: 300  $\mu s$  pulse width, 1 % duty cycle

(2) Pulse test: pulse width  $\leq 5$  ms

THERMAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted)				
PARAMETER	SYMBOL	V20PWM10	UNIT	
Typical thermal resistance	R <sub>θJA</sub> (1)(2)	55	°C/W	
Typical thermal resistance	R <sub>0JM</sub> (3)	2.0		

#### **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		
V20PWM10-M3/I	0.20	I	4500	13" diameter plastic tape and reel	
V20PWM10HM3/I (1)	0.20	1	4500	13" diameter plastic tape and reel	

#### Note

(1) AEC-Q101 qualified

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

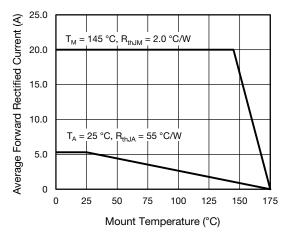


Fig. 1 - Maximum Forward Current Derating Curve

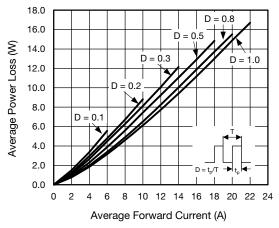


Fig. 2 - Forward Power Loss Characteristics

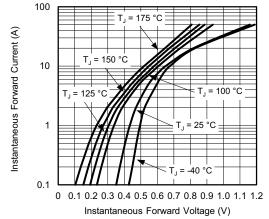


Fig. 3 - Typical Instantaneous Forward Characteristics

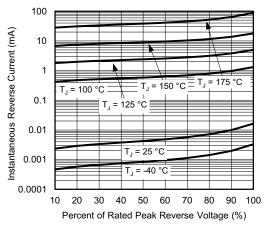


Fig. 4 - Typical Reverse Leakage Characteristics

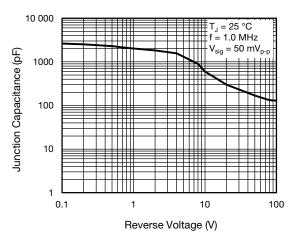


Fig. 5 - Typical Junction Capacitance

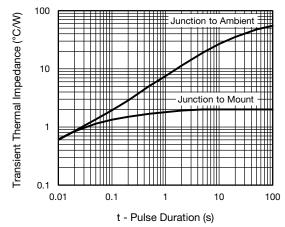


Fig. 6 - Typical Transient Thermal Impedance



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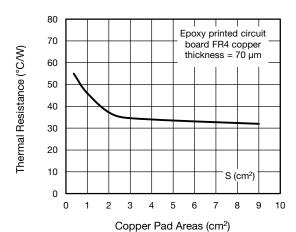
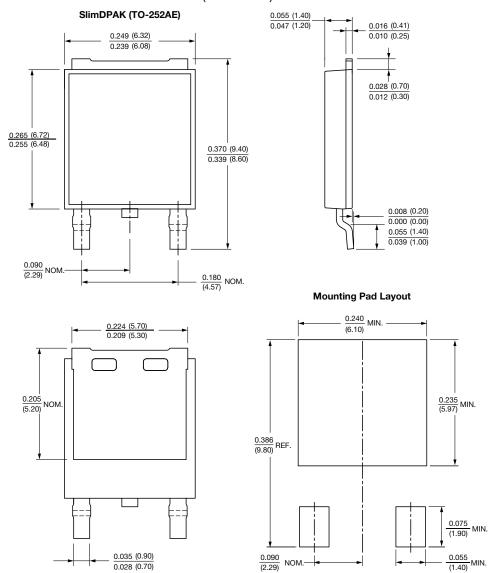


Fig. 7 - Typical Resistance Junction to Ambient vs.
Copper Pad Areas

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





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