AUTOMOTIVE GRADE

COMPLIANT

HALOGEN FREE



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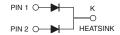
## Vishay General Semiconductor

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

Ultra Low  $V_F = 0.45 \text{ V}$  at  $I_F = 5 \text{ A}$ 







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



PRIMARY CHARACTERISTICS				
I <sub>F(AV)</sub>	2 x 10 A			
V <sub>RRM</sub>	60 V			
I <sub>FSM</sub>	150 A			
V <sub>F</sub> at I <sub>F</sub> = 10 A (T <sub>J</sub> = 125 °C)	0.54 V			
T <sub>J</sub> max.	175 °C			
Package	SlimDPAK (TO-252AE)			
Circuit configuration	Common cathode			

#### **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

MAXIMUM RATINGS (T <sub>A</sub> = 25 °C unless otherwise noted)				
PARAMETER		SYMBOL	V20PWM63C	UNIT
Device marking code			V20PWM63C	
Maximum repetitive peak reverse voltage		$V_{RRM}$	60	V
Maximum average forward rectified current (fig. 1)	per device	I <sub>F(AV)</sub> (1)	20	А
	per diode		10	А
Peak forward surge current 8.3 ms single half sine-wasuperimposed on rated load per diode	I <sub>FSM</sub>	150	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

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

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



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<b>ELECTRICAL CHARACTERISTICS</b> (T <sub>J</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>J</sub> = 25 °C	V <sub>F</sub> <sup>(1)</sup>	0.54	-	V
	I <sub>F</sub> = 10 A			0.60	0.66	
	I <sub>F</sub> = 5.0 A	- T <sub>J</sub> = 125 °C		0.45	-	
	I <sub>F</sub> = 10 A			0.54	0.60	
Reverse current per diode	V 60.V	T <sub>J</sub> = 25 °C	I <sub>R</sub> <sup>(2)</sup>	-	0.02	m A
	$V_R = 60 \text{ V}$ $T_J = 125 \text{ °C}$	IR (-)	1.0	3.5	mA	
Typical junction capacitance per diode	4.0 V, 1 MHz		CJ	1500	-	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	V20PWM63C	UNIT		
Typical thermal resistance per device	R <sub>0JA</sub> (1)(2)	65	°C/W		
Typical triefmal resistance per device	R <sub>0JM</sub> (3)	1.8	C/ VV		

#### **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	
V20PWM63C-M3/I	0.20	I	4500	13" diameter plastic tape and reel	
V20PWM63CHM3/I (1)	0.20	I	4500	13" diameter plastic tape and reel	

#### Note

(1) AEC-Q101 qualified



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## RATINGS AND CHARACTERISTICS CURVES (T<sub>A</sub> = 25 °C unless otherwise noted)

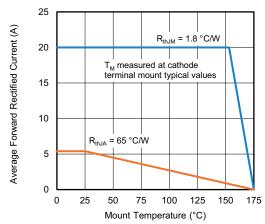


Fig. 1 - Maximum Forward Current Derating Curve

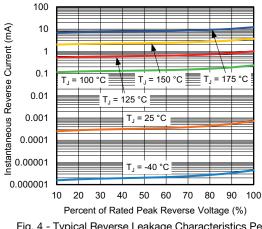


Fig. 4 - Typical Reverse Leakage Characteristics Per Diode

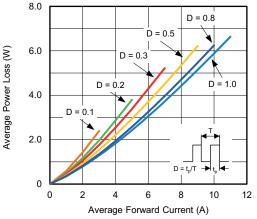


Fig. 2 - Forward Power Loss Characteristics Per Diode

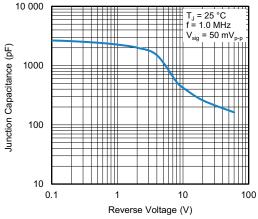


Fig. 5 - Typical Junction Capacitance Per Diode

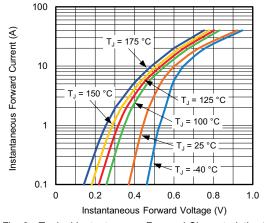


Fig. 3 - Typical Instantaneous Forward Characteristics Per Diode

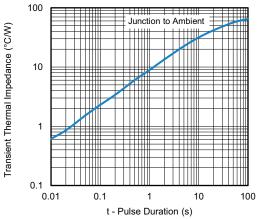


Fig. 6 - Typical Transient Thermal Impedance

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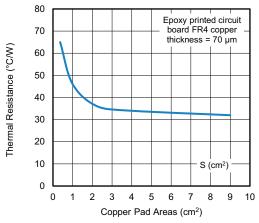
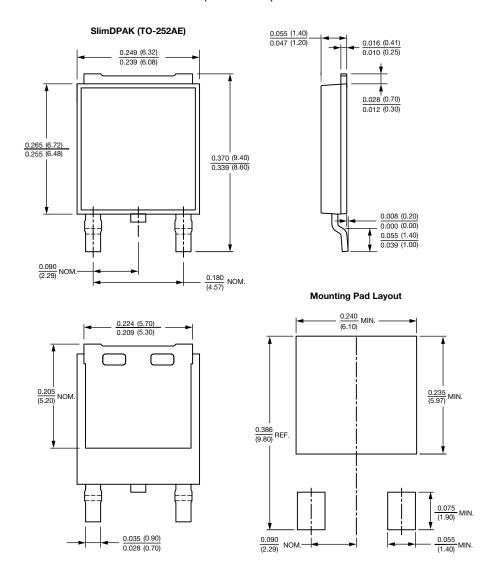


Fig. 7 - Typical Resistance Junction to Ambient vs. Copper Pad Areas

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





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