AUTOMOTIVE GRADE

COMPLIANT

HALOGEN FREE



Vishay General Semiconductor

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

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



LINKS TO ADDITIONAL RESOURCES



PRIMARY CHARACTERISTICS				
I _{F(AV)}	2 x 10 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-252A				
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 <u>www.vishay.com/doc?99912</u>

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 °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	I _{F(AV)} ⁽¹⁾	20	Α
	per diode		10	А
Peak forward surge current 8.3 ms single half sine-was superimposed on rated load per diode	I _{FSM}	150	А	
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: $dP_D/dT_J < 1/R_{\theta JA}$



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ELECTRICAL CHARACTERISTICS (T _A = 25 °C unless otherwise noted)							
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT	
Instantaneous forward voltage per diode	I _F = 5.0 A	T _A = 25 °C		0.49	-		
	I _F = 10 A	V _E (1)	0.54	0.62	V		
	I _F = 5.0 A	T _A = 125 °C	T 105 %C	VF(')	0.39	-	V
	I _F = 10 A		A = 125 C	0.46	0.54		
Reverse current per diode	V _R = 45 V	T _A = 25 °C	I _R ⁽²⁾	-	0.2	mA	
	V _R = 45 V T _A = 125 °C	IR (=)	3	8	IIIA		
Typical junction capacitance	4.0 V, 1 MHz		CJ	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 °C unless otherwise noted)				
PARAMETER SYMBOL V20PWM45C				
Typical thermal resistance	R _{θJA} (1)(2)	55	°C/W	
	R _{θJM} ⁽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	
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

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

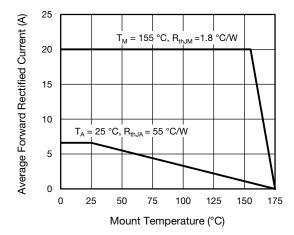


Fig. 1 - Maximum Forward Current Derating Curve

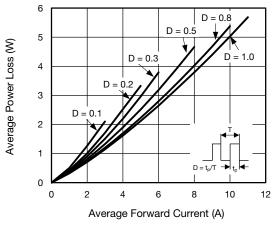


Fig. 2 - Forward Power Loss Characteristics

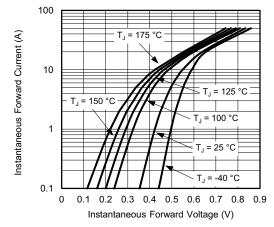


Fig. 3 - Typical Instantaneous Forward Characteristics

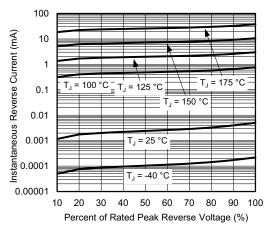


Fig. 4 - Typical Reverse Leakage Characteristics

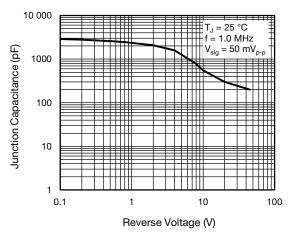


Fig. 5 - Typical Junction Capacitance

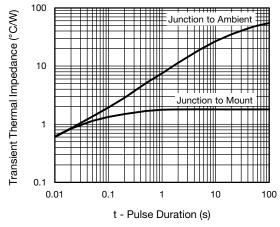


Fig. 6 - Typical Transient Thermal Impedance



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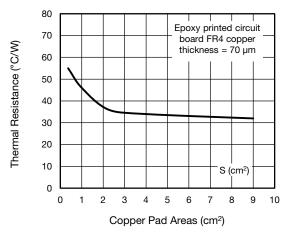
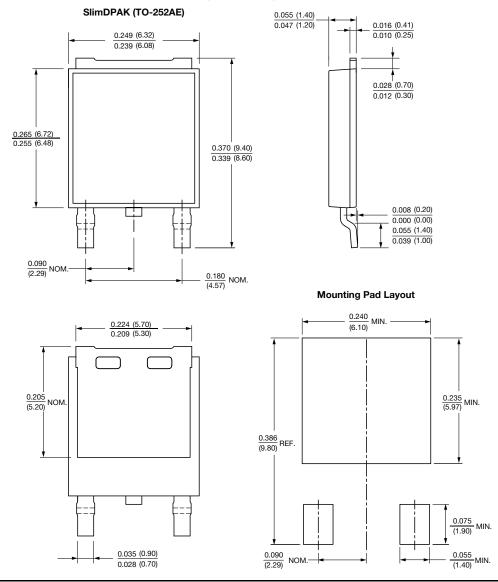


Fig. 7 - Typical Resistance Junction to Ambient vs. Copper Pad Areas

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)





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