AUTOMOTIVE GRADE

COMPLIANT

HALOGEN FREE



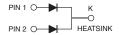
## Vishay General Semiconductor

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

Ultra Low  $V_F = 0.51 \text{ V}$  at  $I_F = 1.5 \text{ A}$ 







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



PRIMARY CHARACTERISTICS				
I <sub>F(AV)</sub>	2 x 3 A			
$V_{RRM}$	120 V			
I <sub>FSM</sub>	70 A			
$V_F$ at $I_F = 3 \text{ A (T}_J = 125 ^{\circ}\text{C)}$	0.6 V			
T <sub>J</sub> max.	150 °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
- MSL level 1, per 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

#### 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	V6PW12C	UNIT
Device marking code			V6PW12C	
Maximum repetitive peak reverse voltage		$V_{RRM}$	120	V
Maximum average forward rectified current (Fig. 1)	per device	I <sub>F(AV)</sub> (1)	6	А
	per diode		3	Α
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load per diode	I <sub>FSM</sub>	I <sub>FSM</sub> 70		
Operating junction temperature range		T <sub>J</sub> <sup>(2)</sup>	-40 to +150	°C
Storage temperature range	T <sub>STG</sub>	-55 to +150	°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> = 1.5 A	T <sub>J</sub> = 25 °C	- V <sub>F</sub> <sup>(1)</sup>	0.58	-	V	
	I <sub>F</sub> = 3 A			0.73	0.8		
	I <sub>F</sub> = 1.5 A	T <sub>J</sub> = 125 °C		0.51	-		
	I <sub>F</sub> = 3 A			0.6	0.68		
Reverse current per diode	V <sub>R</sub> = 90 V	T <sub>J</sub> = 25 °C	I <sub>R</sub> <sup>(2)</sup>	0.001	-	mA	
	V <sub>R</sub> = 90 V	T <sub>J</sub> = 125 °C		1.25	-		
	V <sub>R</sub> = 120 V	T <sub>J</sub> = 25 °C		-	0.1		
		T <sub>J</sub> = 125 °C		2.5	7		
Typical junction capacitance per diode	4.0 V, 1 MHz		CJ	280	-	pF	

#### Notes

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

(2) Pulse test: pulse width ≤ 5 ms

THERMAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted)					
PARAMETER	SYMBOL	V6PW12C	UNIT		
Typical thermal resistance per device	R <sub>0</sub> JA (1)(2)	65	°C/W		
Typical thermal resistance per device	R <sub>0JM</sub> (3)	2.5	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	
V6PW12C-M3/I	0.20	I	4500	13" diameter plastic tape and reel	
V6PW12CHM3/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)

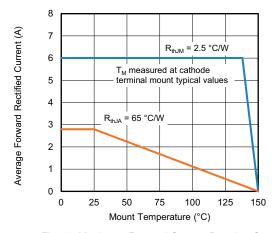


Fig. 1 - Maximum Forward Current Derating Curve

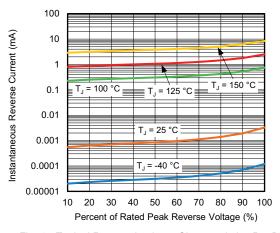


Fig. 4 - Typical Reverse Leakage Characteristics Per Diode

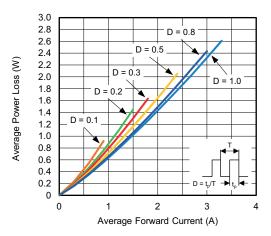


Fig. 2 - Forward Power Loss Characteristics Per Diode

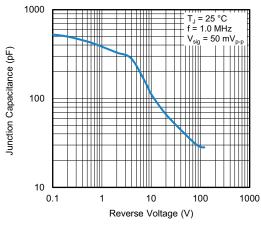


Fig. 5 - Typical Junction Capacitance Per Diode

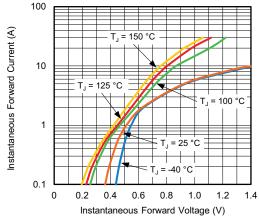


Fig. 3 - Typical Instantaneous Forward Characteristics Per Diode

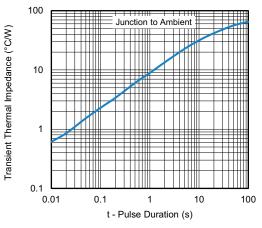


Fig. 6 - Typical Transient Thermal Impedance





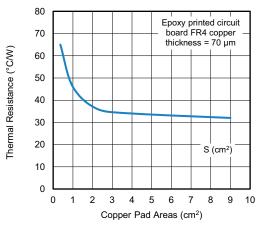
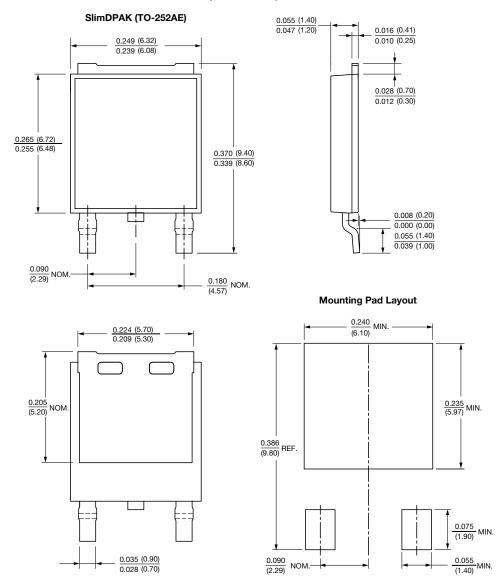


Fig. 7 - Typical Resistance Junction to Ambient vs. Copper Pad Areas

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





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