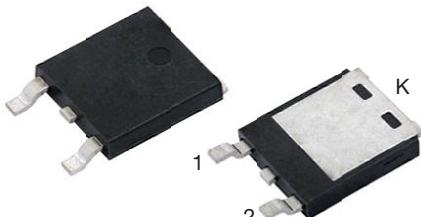


High Current Density Surface-Mount TMBS® (Trench MOS Barrier Schottky) Rectifier

Ultra Low $V_F = 0.55$ V at $I_F = 5$ A

eSMP® Series



SlimDPAK (TO-252AE)



DESIGN SUPPORT TOOLS

3D
Models Available

[click logo to get started](#)

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



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

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	20 A
V_{RRM}	120 V
I_{FSM}	150 A
V_F at $I_F = 10$ A ($T_A = 125$ °C)	0.65 V
T_J max.	175 °C
Package	SlimDPAK (TO-252AE)
Circuit configuration	Common cathode

MAXIMUM RATINGS ($T_A = 25$ °C unless otherwise noted)			
PARAMETER	SYMBOL	V20PWM12C	UNIT
Device marking code		V20PWM12C	
Maximum repetitive peak reverse voltage	V_{RRM}	120	V
Maximum average forward rectified current (Fig. 1)	$I_{F(AV)}$ (1)	20	A
per device		10	A
per diode			
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load per diode	I_{FSM}	150	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 ($T_A = 25^\circ\text{C}$ unless otherwise noted)							
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT	
Instantaneous forward voltage per diode	$I_F = 5.0 \text{ A}$	$T_A = 25^\circ\text{C}$	V_F ⁽¹⁾	0.65	-	V	
	$I_F = 10 \text{ A}$			0.84	0.92		
	$I_F = 5.0 \text{ A}$	$T_A = 125^\circ\text{C}$		0.55	-		
	$I_F = 10 \text{ A}$			0.65	0.73		
Reverse current per diode	$V_R = 90 \text{ V}$	$T_A = 25^\circ\text{C}$	I_R ⁽²⁾	0.01	-	mA	
		$T_A = 125^\circ\text{C}$		2	-		
	$V_R = 120 \text{ V}$	$T_A = 25^\circ\text{C}$		-	0.3		
		$T_A = 125^\circ\text{C}$		4	10		
Typical junction capacitance	4.0 V, 1 MHz		C_J	840	-	pF	

Notes

(1) Pulse test: 300 μs pulse width, 1 % duty cycle

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

THERMAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)				
PARAMETER	SYMBOL	V20PWM12C		UNIT
Typical thermal resistance	$R_{\theta JA}$ ⁽¹⁾⁽²⁾	55		°C/W
	$R_{\theta JM}$ ⁽³⁾	1.8		

Notes

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

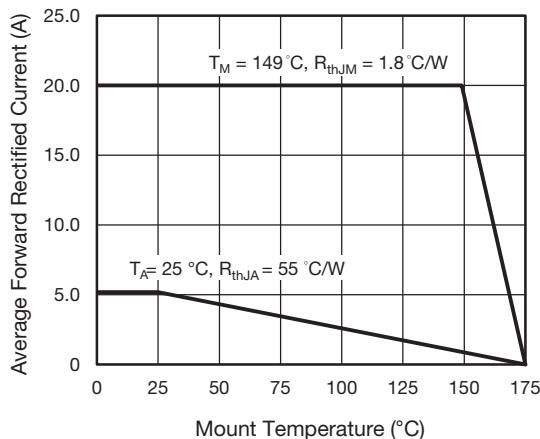
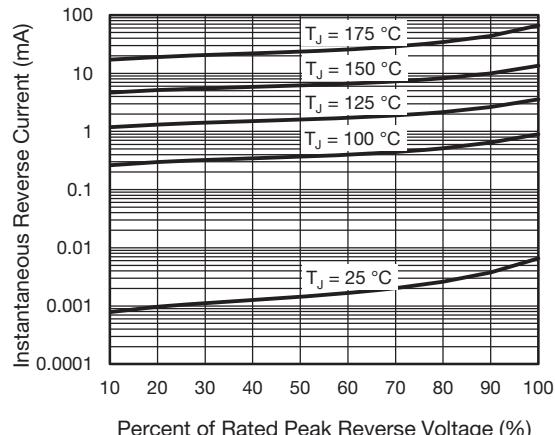
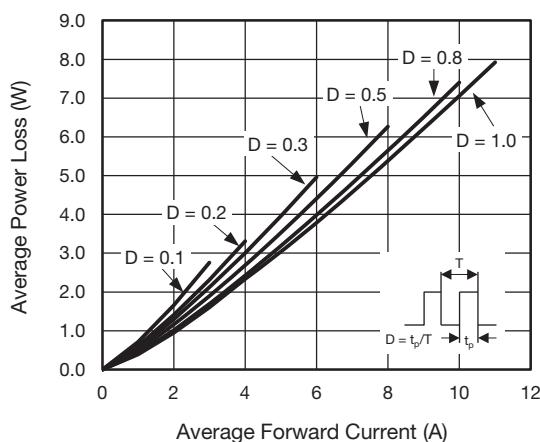
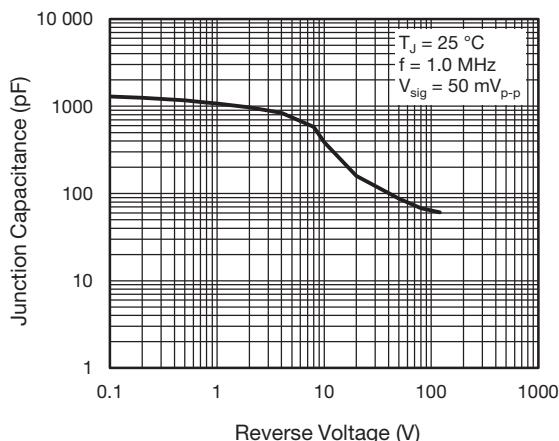
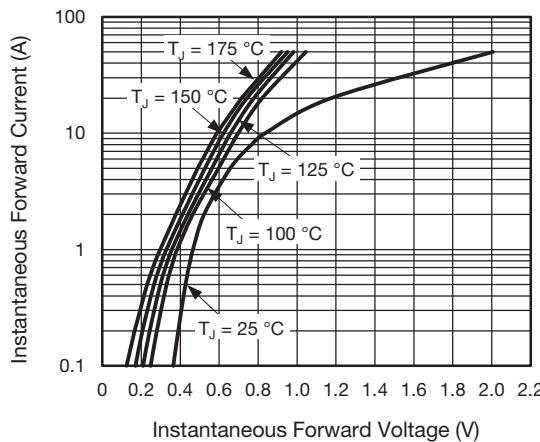
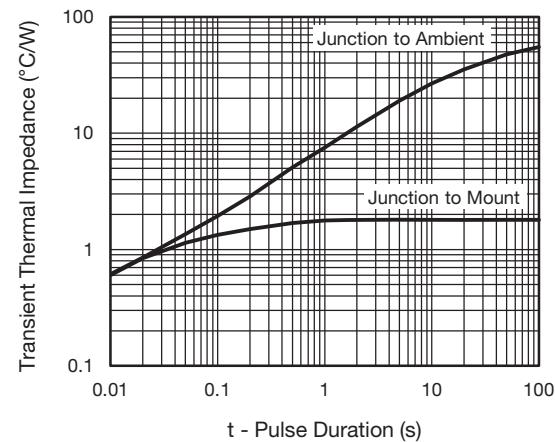
(2) Free air, mounted on recommended copper pad area; thermal resistance $R_{\theta JA}$ - junction to ambient

(3) Mounted on infinite heat sink; thermal resistance $R_{\theta JM}$ - junction-to-mount

ORDERING INFORMATION (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
V20PWM12C-M3/I	0.20	I	4500	13" diameter plastic tape and reel
V20PWM12CHM3/I ⁽¹⁾	0.20	I	4500	13" diameter plastic tape and reel

Note

(1) AEC-Q101 qualified

RATINGS AND CHARACTERISTICS CURVES ($T_A = 25^\circ\text{C}$ 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

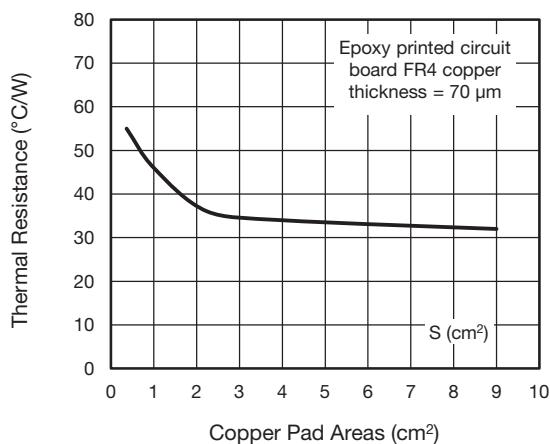
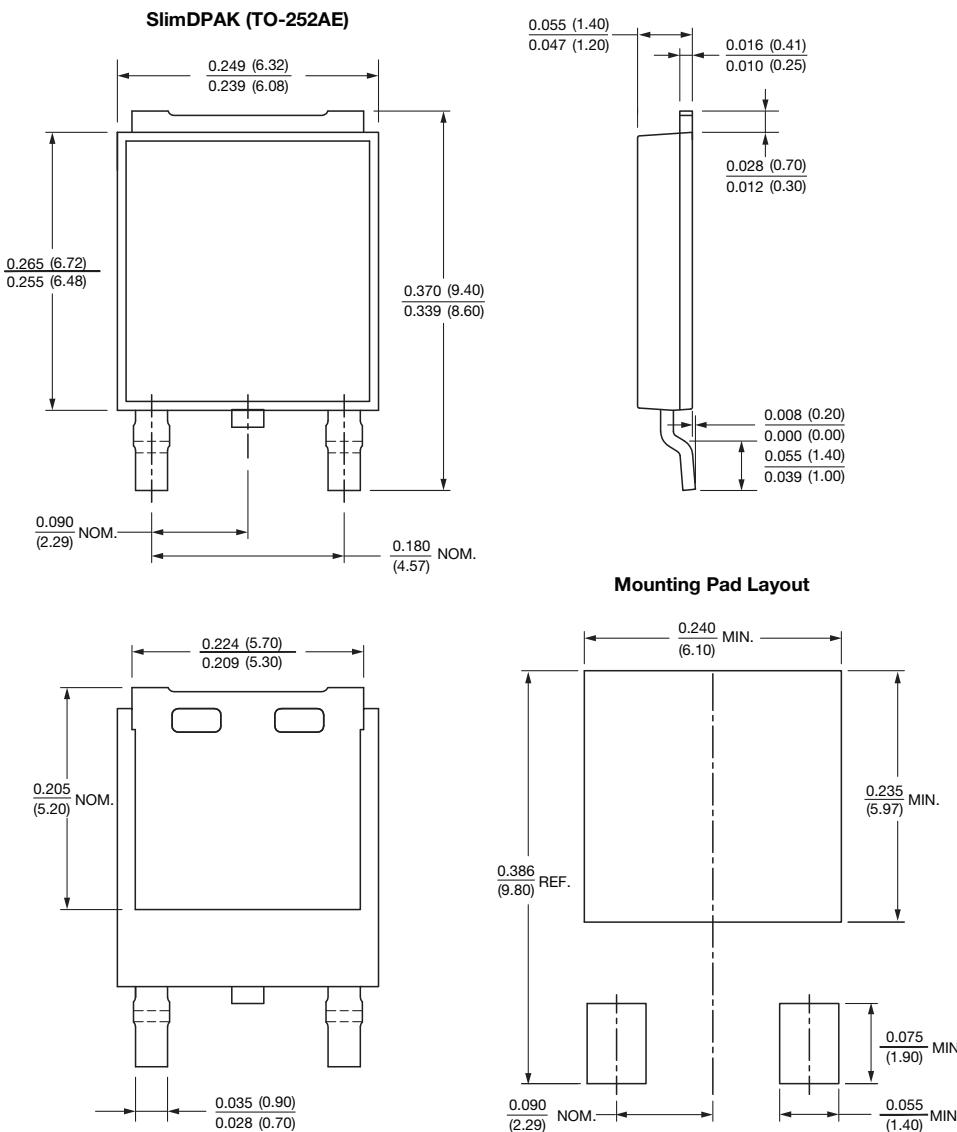


Fig. 7 - Typical Resistance Junction to Ambient vs.
Copper Pad Areas

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)



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