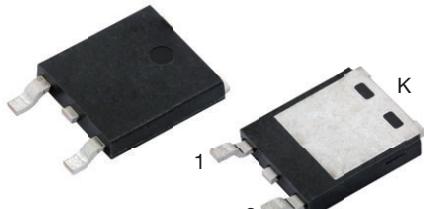


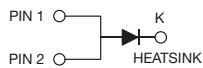
## High Current Density Surface-Mount TMBS® (Trench MOS Barrier Schottky) Rectifier

Ultra Low  $V_F$  = 0.31 V at  $I_F$  = 5 A

### eSMP® Series



**SlimDPAK (TO-252AE)**



### ADDITIONAL RESOURCES



### 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](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

### 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
$V_{RRM}$	45 V
$I_{FSM}$	200 A
$V_F$ at $I_F$ = 20 A ( $T_A$ = 125 °C)	0.46 V
$T_J$ max.	150 °C
Package	SlimDPAK (TO-252AE)
Circuit configuration	Single

### MAXIMUM RATINGS ( $T_A$ = 25 °C unless otherwise noted)

PARAMETER	SYMBOL	V20PW45	UNIT
Device marking code		V20PW45	
Maximum repetitive peak reverse voltage	$V_{RRM}$	45	V
Maximum average forward rectified current (Fig. 1)	$I_{F(AV)}$ <sup>(1)</sup>	20	A
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load	$I_{FSM}$	200	A
Operating junction temperature range	$T_J$ <sup>(2)</sup>	-40 to +150	°C
Storage temperature range	$T_{STG}$	-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:  $dP_D/dT_J < 1/R_{\theta JA}$

ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)							
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT	
Maximum instantaneous forward voltage	$I_F = 5.0 \text{ A}$	$T_A = 25^\circ\text{C}$	$V_F^{(1)}$	0.42	-	V	
	$I_F = 10 \text{ A}$			0.46	-		
	$I_F = 20 \text{ A}$			0.53	0.61		
	$I_F = 5.0 \text{ A}$	$T_A = 125^\circ\text{C}$		0.31	-		
	$I_F = 10 \text{ A}$			0.37	-		
	$I_F = 20 \text{ A}$			0.46	0.54		
Reverse current	$V_R = 45 \text{ V}$	$T_A = 25^\circ\text{C}$	$I_R^{(2)}$	-	1.5	mA	
		$T_A = 125^\circ\text{C}$		13	50		
Typical junction capacitance	4.0 V, 1 MHz		$C_J$	3000	-	pF	

**Notes**

(1) Pulse test: 300  $\mu\text{s}$  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	V20PW45		UNIT
Typical thermal resistance	$R_{\theta JA}^{(1)(2)}$	55		$^\circ\text{C/W}$
	$R_{\theta JM}^{(3)}$	1.8		

**Notes**

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

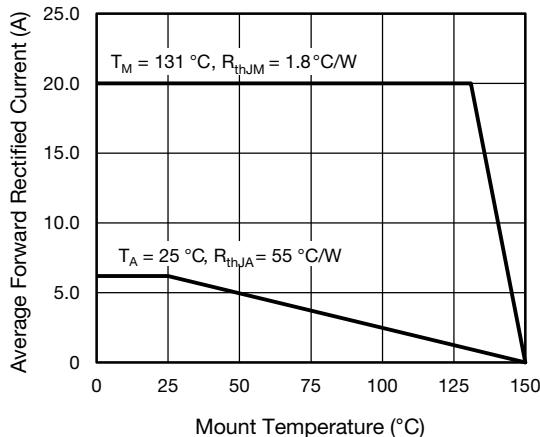
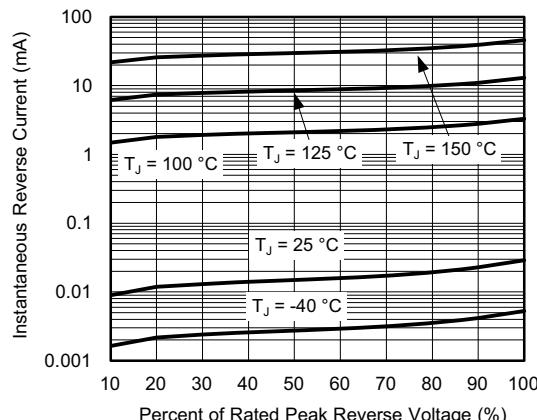
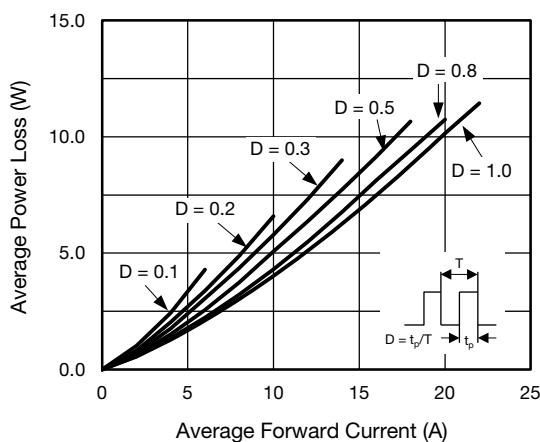
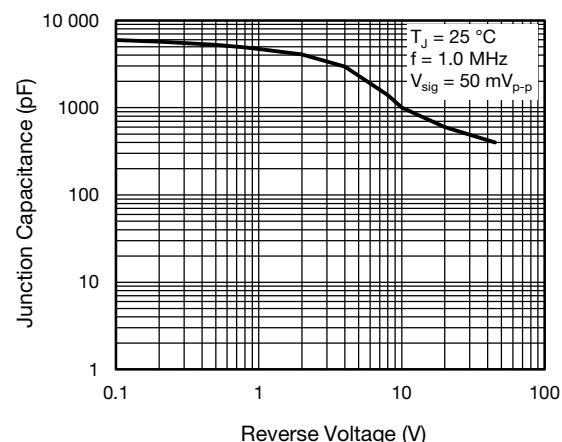
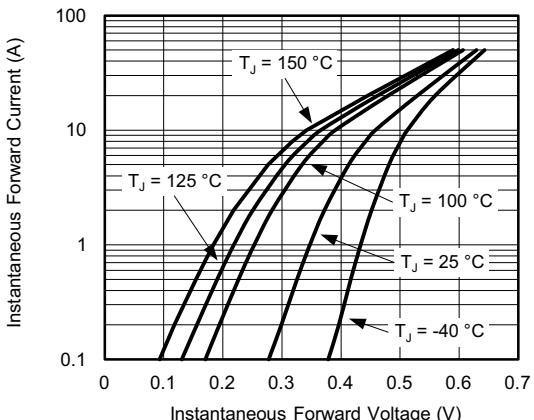
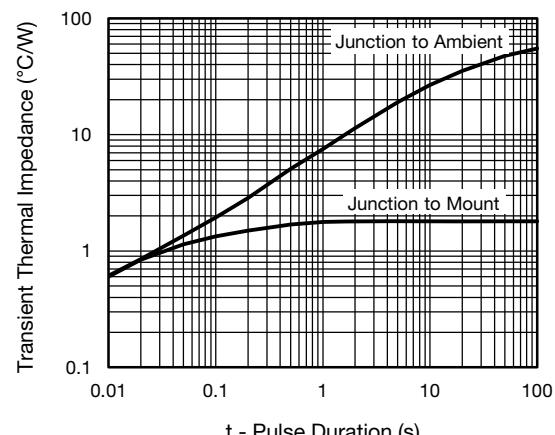
(2) Free air, mounted on recommended copper pad area; thermal resistance  $R_{\theta JA}$  - junction to ambient

(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
V20PW45-M3/I	0.20	I	4500	13" diameter plastic tape and reel
V20PW45HM3/I <sup>(1)</sup>	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**

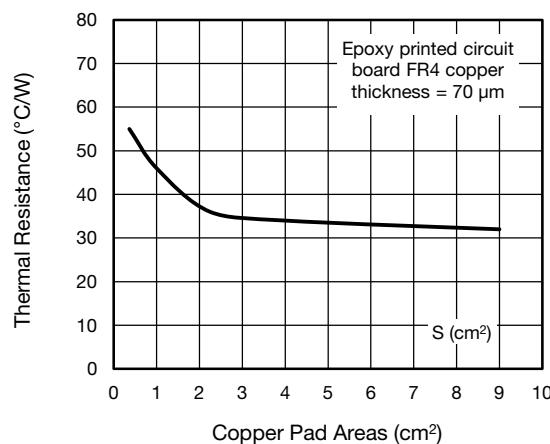
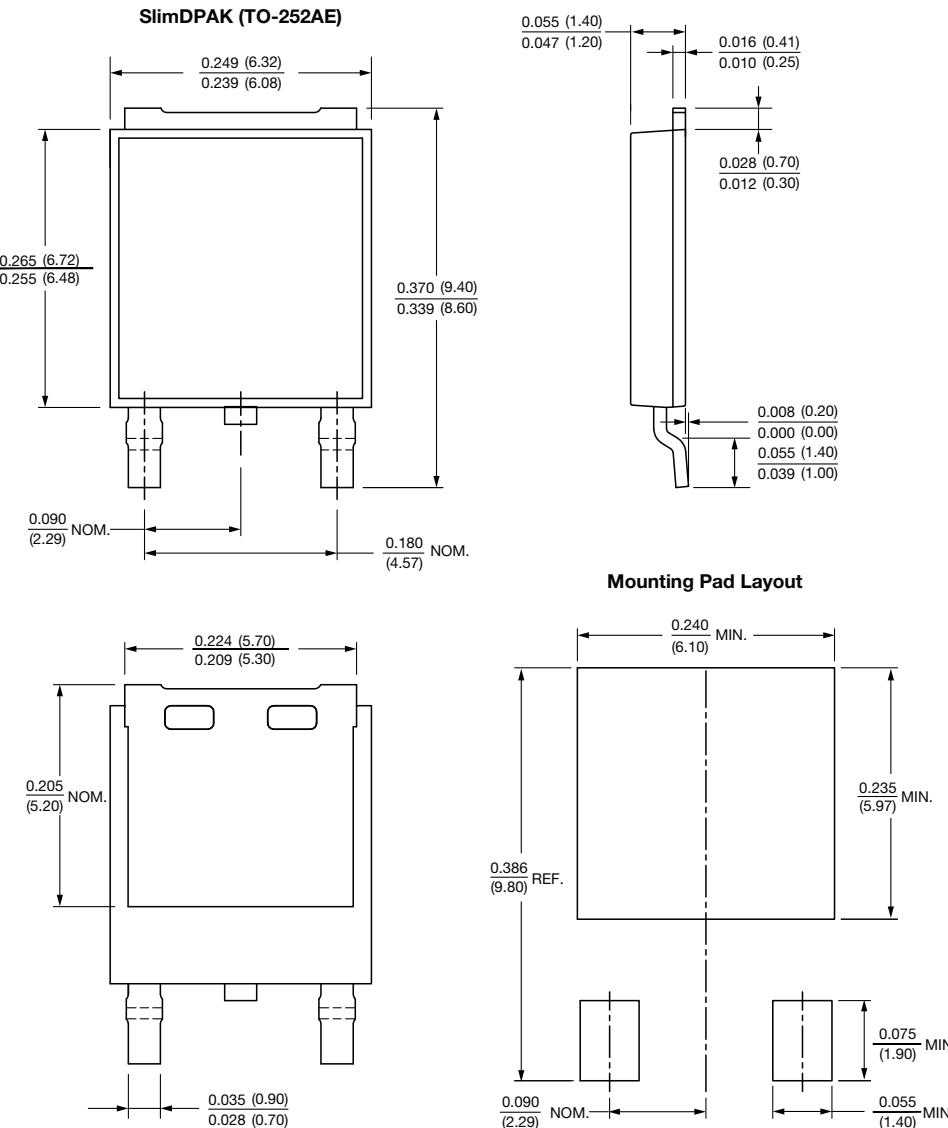


Fig. 7 - Typical Resistance Junction to Ambient vs. Copper Pad Areas

### PACKAGE OUTLINE DIMENSIONS in inches (millimeters)



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