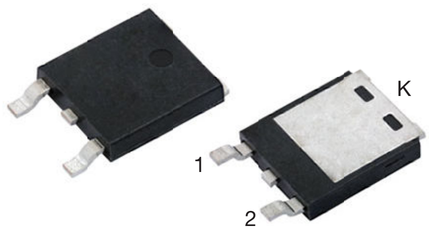
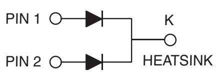
High Current Density Surface-Mount TMBS® (Trench MOS Barrier Schottky) Rectifier

Ultra Low V_F = 0.46 V at I_F = 5 A

eSMP® Series



SlimDPAK (TO-252AE)



DESIGN SUPPORT TOOLS AVAILABLE

3D Models

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

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	
$I_{F(AV)}$	40 A
V_{RRM}	100 V
I_{FSM}	240 A
V_F at I_F = 20 A (T_A = 125 °C)	0.68 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	V40PWM10C	UNIT
Device marking code			V40PWM10C	
Maximum repetitive peak reverse voltage		V_{RRM}	100	V
Maximum average forward rectified current (Fig. 1)	per device	$I_{F(AV)}$ (1)	40	A
	per diode		20	A
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load per diode		I_{FSM}	240	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 °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	V_F (1)	0.54	-	V
	I_F = 10 A			0.64	-	
	I_F = 20 A			0.81	0.89	
	I_F = 5.0 A	T_A = 125 °C		0.46	-	
	I_F = 10 A			0.57	-	
	I_F = 20 A			0.68	0.76	
Reverse current per diode	V_R = 70 V	T_A = 25 °C	I_R (2)	0.01	-	mA
		T_A = 125 °C		3.5	-	
	V_R = 100 V	T_A = 25 °C		-	0.4	
		T_A = 125 °C		7	21	
Typical junction capacitance	4.0 V, 1 MHz		C_J	1500	-	pF

Notes

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

(2) Pulse test: pulse width ≤ 5 ms

THERMAL CHARACTERISTICS (T_A = 25 °C unless otherwise noted)			
PARAMETER	SYMBOL	V40PWM10C	UNIT
Typical thermal resistance	$R_{\theta JA}$ (1)(2)	55	°C/W
	$R_{\theta JM}$ (3)	1.5	

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
V40PWM10C-M3/I	0.20	I	4500	13" diameter plastic tape and reel
V40PWM10CHM3/I (1)	0.20	I	4500	13" diameter plastic tape and reel

Note

(1) AEC-Q101 qualified

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

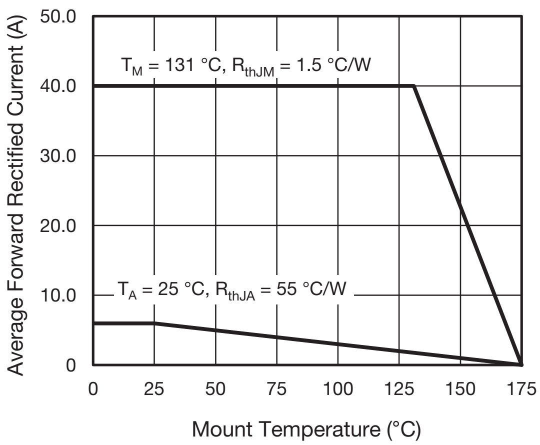


Fig. 1 - Maximum Forward Current Derating Curve

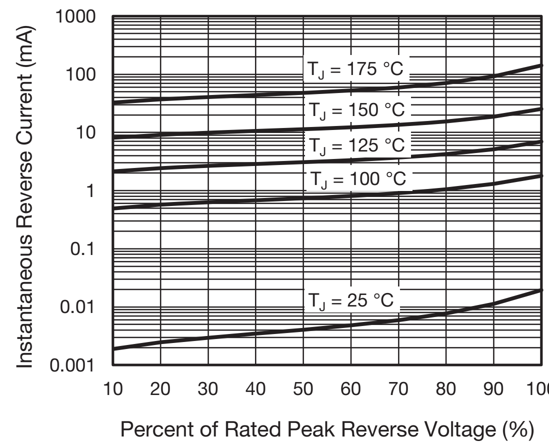


Fig. 4 - Typical Reverse Leakage Characteristics

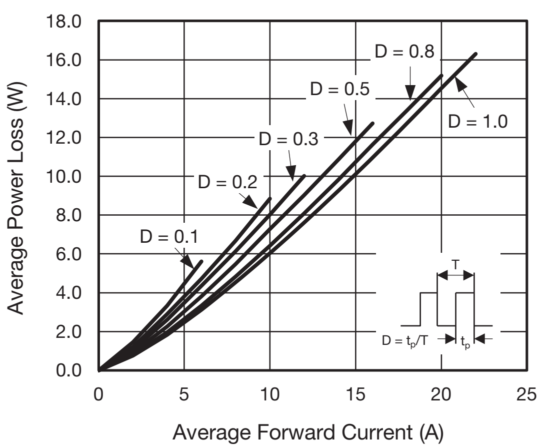


Fig. 2 - Forward Power Loss Characteristics

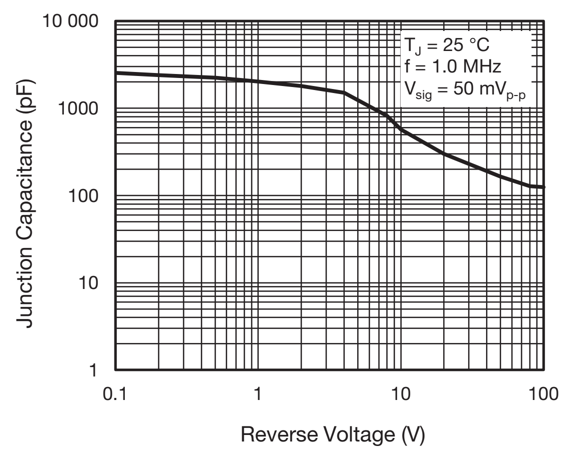


Fig. 5 - Typical Junction Capacitance

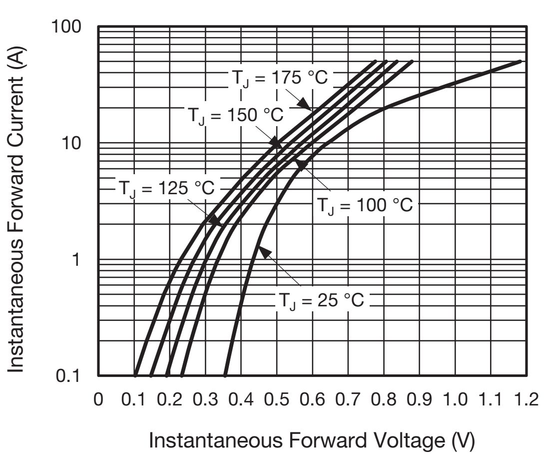


Fig. 3 - Typical Instantaneous Forward Characteristics

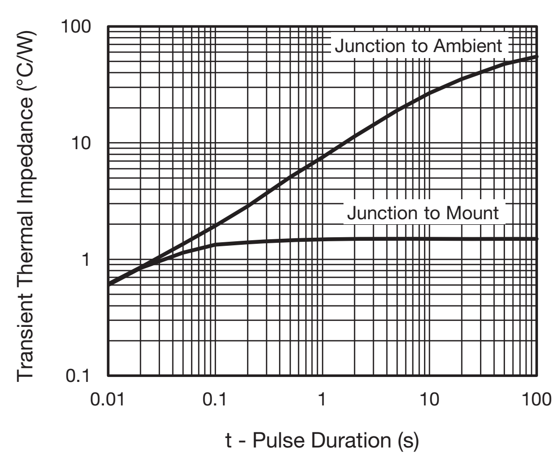


Fig. 6 - Typical Transient Thermal Impedance

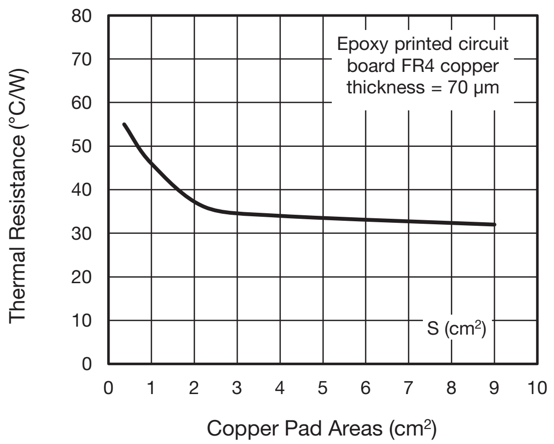
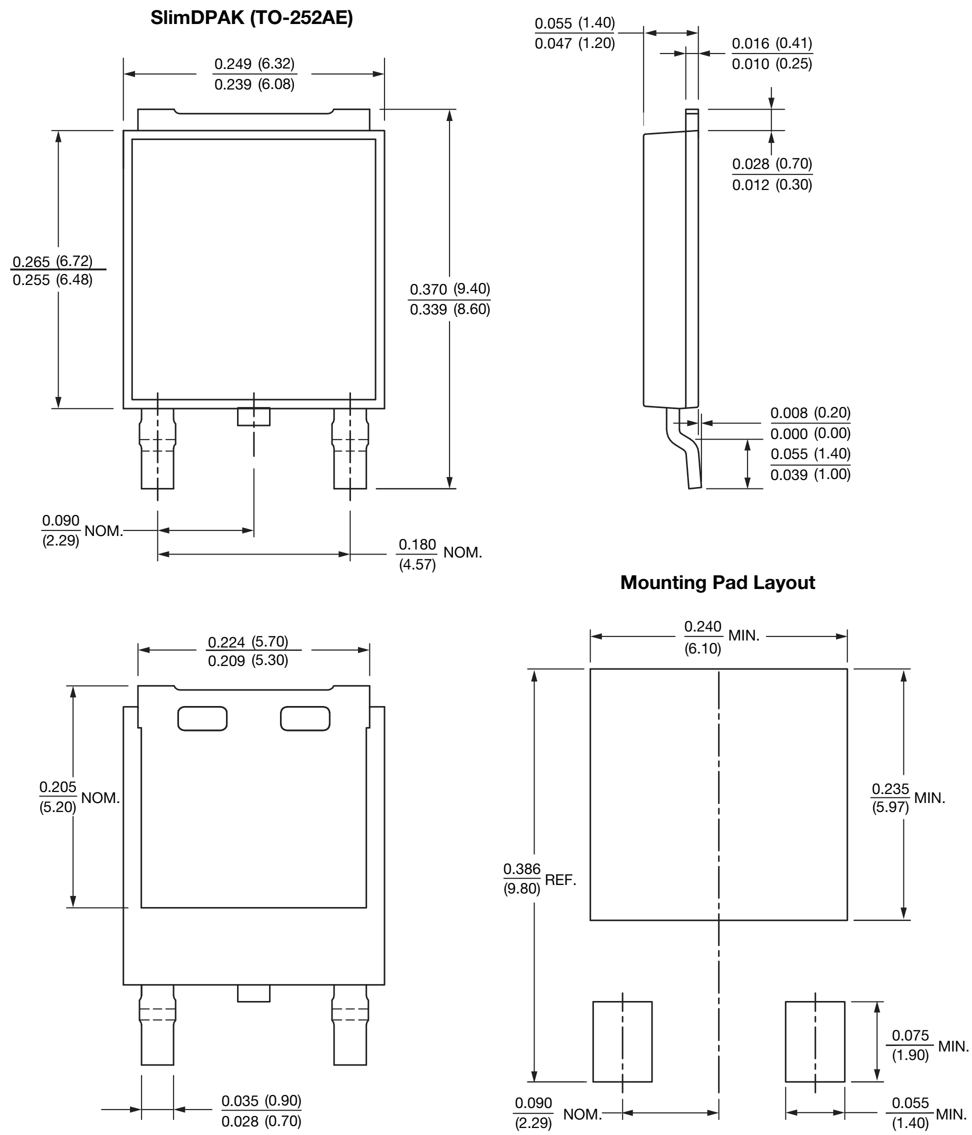


Fig. 7 - Typical Resistance Junction to Ambient vs. Copper Pad Areas

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)



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