

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

 Ultra Low $V_F = 0.58$ V at $I_F = 5$ A


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

 AUTOMOTIVE
GRADE
Available

RoHS
COMPLIANT
HALOGEN
FREE

LINKS TO ADDITIONAL RESOURCES



TYPICAL APPLICATIONS

For use in low voltage high frequency DC/DC converters, freewheeling diodes, and polarity protection applications.

PRIMARY CHARACTERISTICS

$I_{F(AV)}$	2 x 20 A
V_{RRM}	200 V
I_{FSM}	240 A
V_F at $I_F = 20$ A ($T_J = 125$ °C)	0.75 V
T_J max.	175 °C
Package	SlimDPAK (TO-252AE)
Circuit configuration	Common cathode

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	V40PW22C	UNIT
Device marking code		V40PW22C	
Maximum repetitive peak reverse voltage	V_{RRM}	200	V
Maximum average forward rectified current (fig. 1)	per device	$I_{F(AV)}^{(1)}$	A
	per diode	$I_{F(AV)}^{(1)}$	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 ($T_J = 25\text{ }^\circ\text{C}$ unless otherwise noted)						
PARAMETER	TEST CONDITIONS	SYMBOL	TYP.	MAX.	UNIT	
Maximum instantaneous forward voltage	$I_F = 5.0\text{ A}$	$T_J = 25\text{ }^\circ\text{C}$	$V_F^{(1)}$	0.74	-	V
	$I_F = 10\text{ A}$			0.8	-	
	$I_F = 20\text{ A}$			0.89	0.97	
	$I_F = 5.0\text{ A}$	$T_J = 125\text{ }^\circ\text{C}$		0.58	-	
	$I_F = 10\text{ A}$			0.65	-	
	$I_F = 20\text{ A}$			0.75	0.83	
Reverse current	$V_R = 160\text{ V}$	$T_J = 25\text{ }^\circ\text{C}$	$I_R^{(2)}$	0.0007	-	mA
		$T_J = 125\text{ }^\circ\text{C}$		1.5	-	
	$V_R = 200\text{ V}$	$T_J = 25\text{ }^\circ\text{C}$		-	0.25	
		$T_J = 125\text{ }^\circ\text{C}$		3	10	
Typical junction capacitance	4.0 V, 1 MHz	C_J	700	-	pF	

Notes

- (1) Pulse test: 300 μs pulse width, 1 % duty cycle
(2) Pulse test: pulse width $\leq 5\text{ ms}$

THERMAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)			
PARAMETER	SYMBOL	V40PW22C	UNIT
Typical thermal resistance	$R_{\theta JA}^{(1)(2)}$	65	$^\circ\text{C/W}$
	$R_{\theta JM}^{(3)}$	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, 2 oz., FR4 PCB; 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
V40PW22C-M3/I	0.20	I	4500	13" diameter plastic tape and reel
V40PW22CHM3/I ⁽¹⁾	0.20	I	4500	13" diameter plastic tape and reel

Note

- (1) AEC-Q101 qualified

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

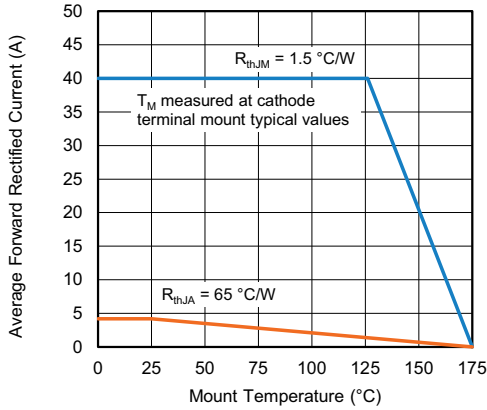


Fig. 1 - Maximum Forward Current Derating Curve

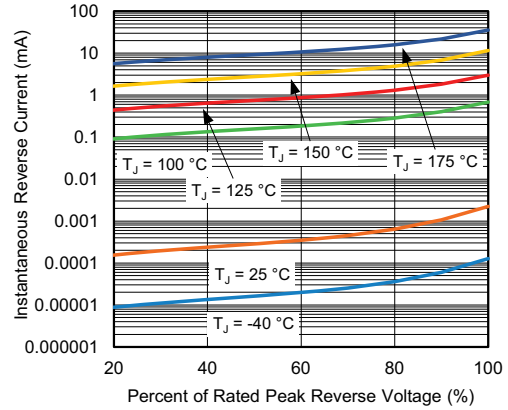


Fig. 4 - Typical Reverse Leakage Characteristics

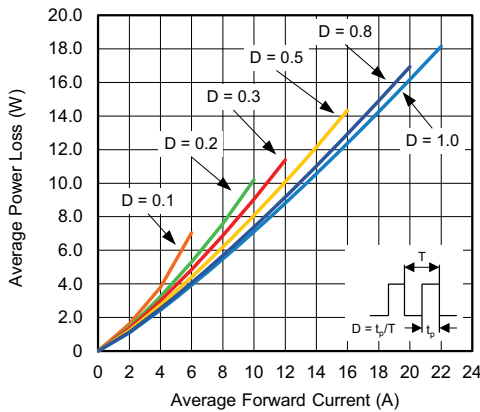


Fig. 2 - Forward Power Loss Characteristics

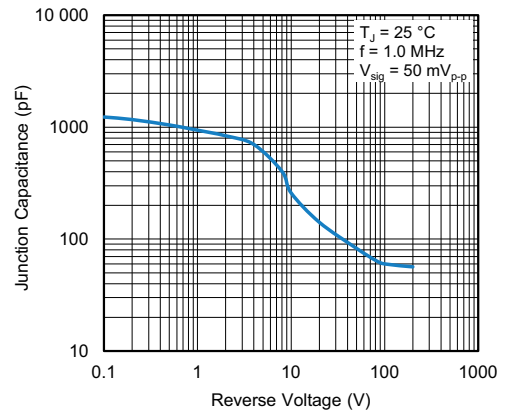


Fig. 5 - Typical Junction Capacitance

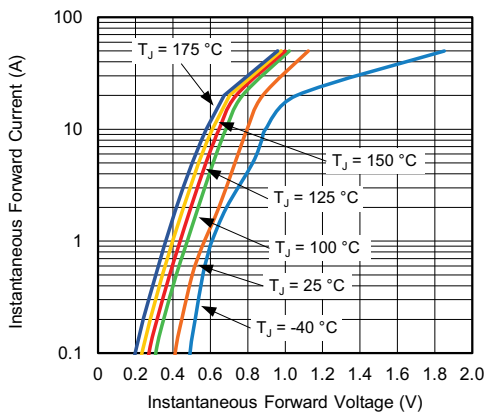


Fig. 3 - Typical Instantaneous Forward Characteristics

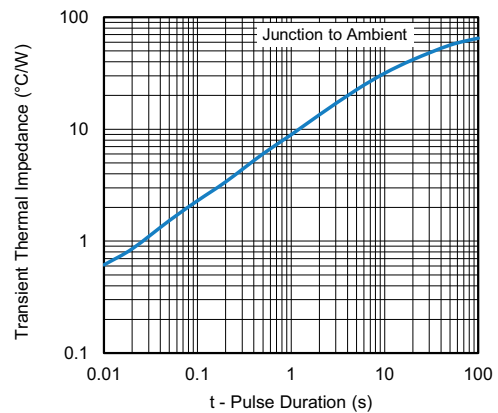


Fig. 6 - Typical Transient Thermal Impedance

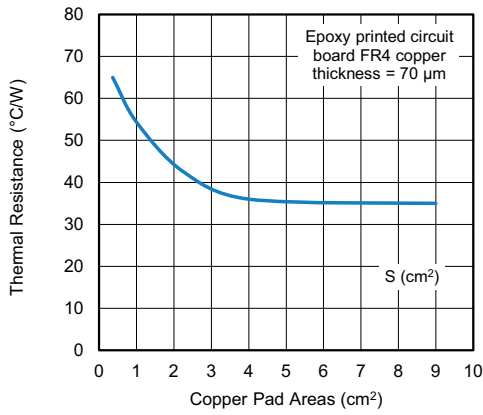
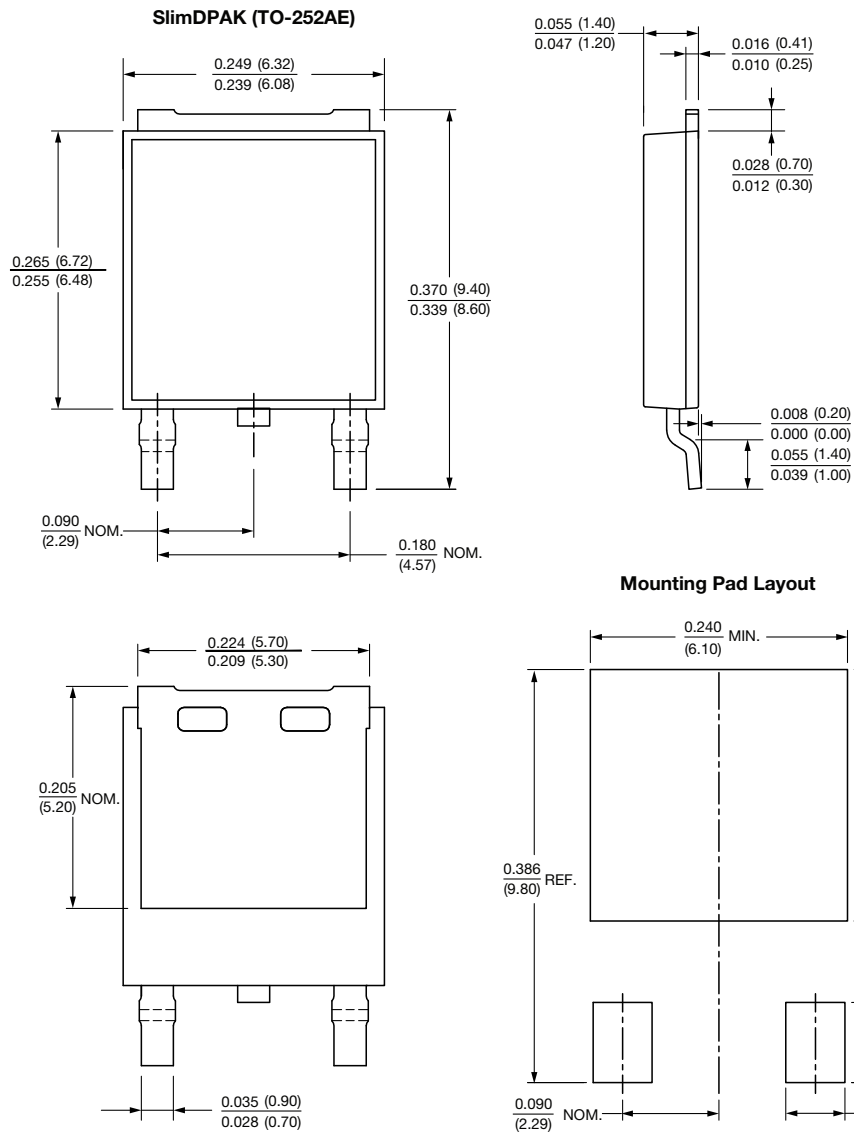


Fig. 7 - Typical Resistance Junction to Ambient vs. Copper Pad Areas



PACKAGE OUTLINE DIMENSIONS in inches (millimeters)





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