

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

Ultra Low $V_F = 0.37\text{ V}$ at $I_F = 6\text{ A}$

eSMP® Series



SMPC (TO-277A)



DESIGN SUPPORT TOOLS

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3D
Models
Available

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	12.0 A
V_{RRM}	45 V
I_{FSM}	200 A
V_F at $I_F = 12.0\text{ A}$ ($T_A = 125\text{ °C}$)	0.46 V
T_J max.	175 °C
Package	SMPC (TO-277A)
Circuit configuration	Single

FEATURES

- Very low profile - typical height of 1.1 mm
- Trench MOS Schottky technology
- 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

TYPICAL APPLICATIONS

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

MECHANICAL DATA

Case: SMPC (TO-277A)

Molding compound meets UL 94 V-0 flammability rating
Base P/N-M3 - halogen-free, RoHS-compliant, and commercial grade

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 ($T_A = 25\text{ °C}$ unless otherwise noted)			
PARAMETER	SYMBOL	V12PM45	UNIT
Device marking code		12M45	
Maximum repetitive peak reverse voltage	V_{RRM}	45	V
Maximum average forward rectified current (fig. 1)	$I_F^{(1)}$	12.0	A
	$I_F^{(2)}$	5.0	
Peak forward surge current 10 ms single half sine-wave superimposed on rated load	I_{FSM}	200	A
Operating junction temperature range	$T_J^{(3)}$	-40 to +175	°C
Storage temperature range	T_{STG}	-55 to +175	°C

Notes

(1) Mounted on 30 mm x 30 mm pad areas aluminum PCB

(2) Free air, mounted on recommended copper pad area

(3) 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	I _F = 6.0 A	T _A = 25 °C	V _F ⁽¹⁾	0.49	-	V
	I _F = 12.0 A			0.52	0.60	
	I _F = 6.0 A	T _A = 125 °C		0.37	-	
	I _F = 12.0 A			0.46	0.54	
Reverse current	V _R = 45 V	T _A = 25 °C	I _R ⁽²⁾	-	0.5	mA
		T _A = 125 °C		4.0	15	
Typical junction capacitance	4.0 V, 1 MHz		C _J	2350	-	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	V12PM45	UNIT
Typical thermal resistance	$R_{\theta JA}^{(1)(2)}$	75	$^{\circ}\text{C/W}$
	$R_{\theta JM}^{(3)}$	4	

Notes

- (1) The heat generated must be less than the 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 30 mm x 30 mm aluminum PCB; thermal resistance $R_{\theta JM}$ - junction to mount

ORDERING INFORMATION (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
V12PM45-M3/H	0.10	H	1500	7" diameter plastic tape and reel
V12PM45-M3/I	0.10	I	6500	13" diameter plastic tape and reel
V12PM45HM3/H ⁽¹⁾	0.10	H	1500	7" diameter plastic tape and reel
V12PM45HM3/I ⁽¹⁾	0.10	I	6500	13" diameter plastic tape and reel

Note

- (1) AEC-Q101 qualified

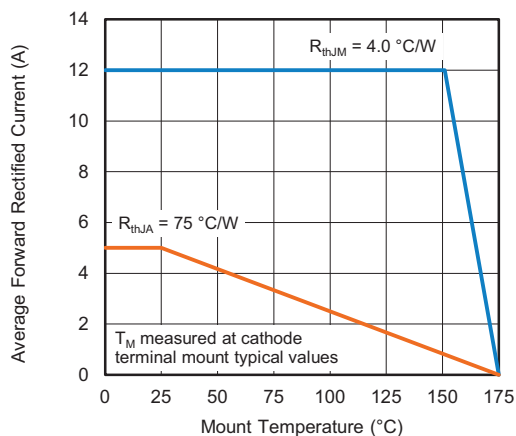
RATINGS AND CHARACTERISTICS CURVES ($T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)


Fig. 1 - Forward Current Derating Curve

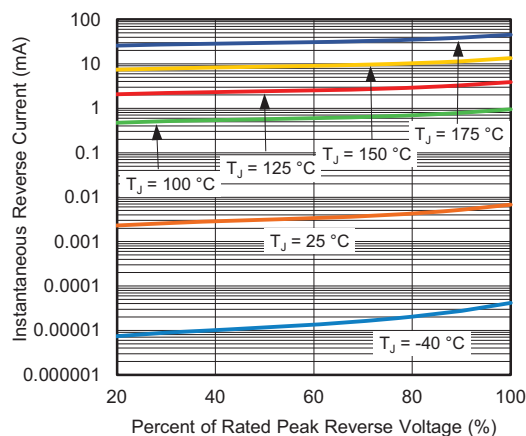


Fig. 4 - Typical Reverse Leakage Characteristics Per Diode

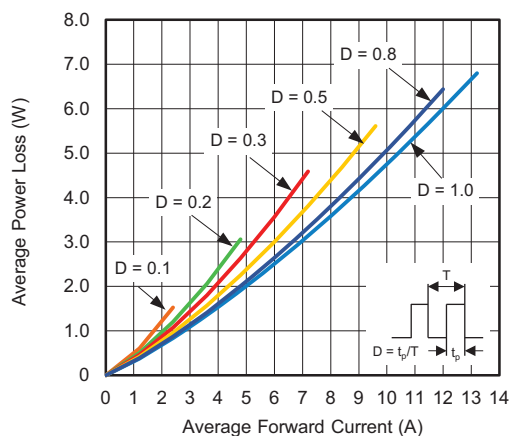


Fig. 2 - Forward Power Loss Characteristics

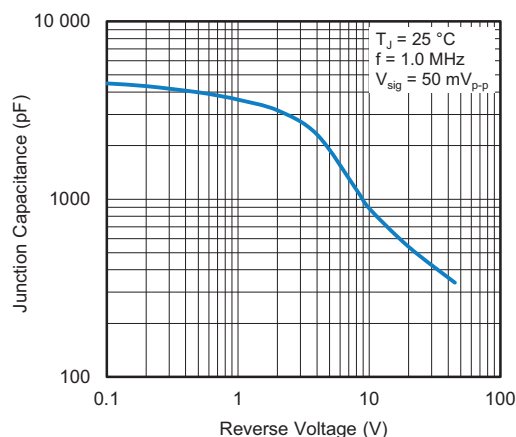


Fig. 5 - Typical Junction Capacitance

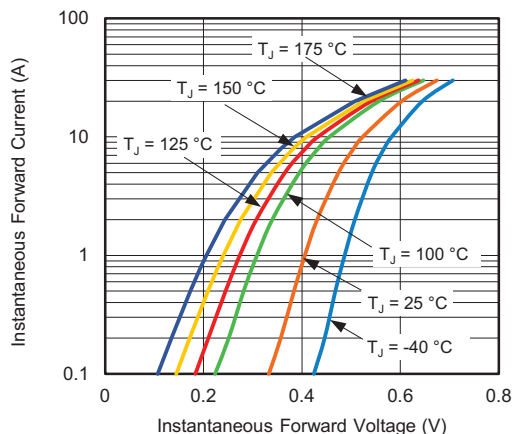


Fig. 3 - Typical Instantaneous Forward Characteristics

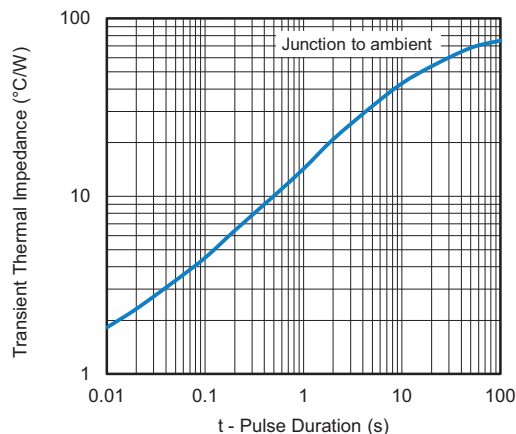
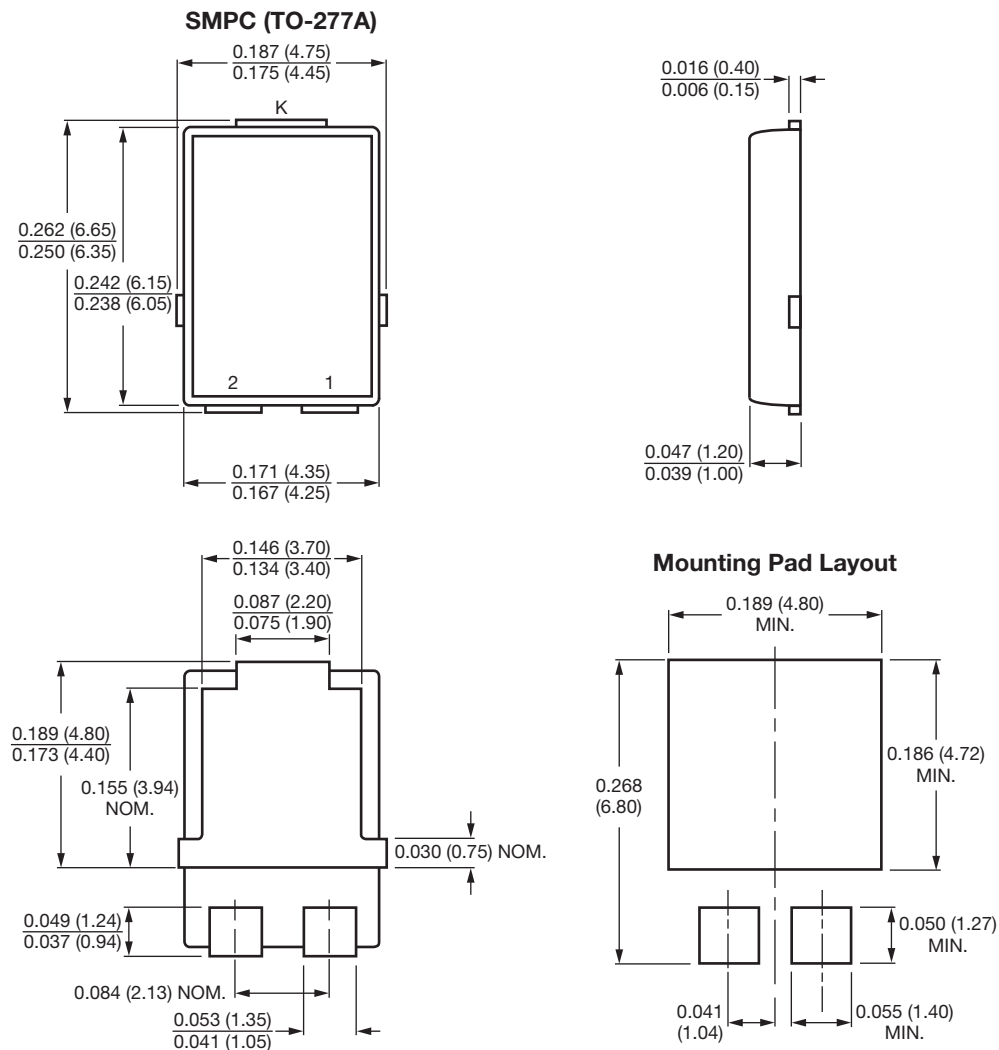


Fig. 6 - Typical Transient Thermal Impedance



PACKAGE OUTLINE DIMENSIONS in inches (millimeters)



Conform to JEDEC® TO-277A



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