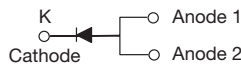


# High Current Density Surface-Mount TMBS<sup>®</sup> (Trench MOS Barrier Schottky) Rectifier

 Ultra Low  $V_F = 0.37$  V at  $I_F = 6$  A

 eSMP<sup>®</sup> Series


SMPC (TO-277A)


**DESIGN SUPPORT TOOLS**
[click logo to get started](#)
**3D**  
Models  
Available

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	12.0 A
$V_{RRM}$	45 V
$I_{FSM}$	200 A
$V_F$ at $I_F = 12.0$ A ( $T_A = 125$ °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](http://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 ( $T_A = 25$ °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)	$I_F$ <sup>(1)</sup>	12.0	A
	$I_F$ <sup>(2)</sup>	5.0	
Peak forward surge current 10 ms single half sine-wave superimposed on rated load	$I_{FSM}$	200	A
Operating junction temperature range	$T_J$ <sup>(3)</sup>	-40 to +175	°C
Storage temperature range	$T_{STG}$	-55 to +175	°C

**Notes**
<sup>(1)</sup> Mounted on 30 mm x 30 mm pad areas aluminum PCB

<sup>(2)</sup> Free air, mounted on recommended copper pad area

<sup>(3)</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 <sub>A</sub> = 25 °C unless otherwise noted)						
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage	I <sub>F</sub> = 6.0 A	T <sub>A</sub> = 25 °C	V <sub>F</sub> <sup>(1)</sup>	0.49	-	V
	I <sub>F</sub> = 12.0 A			0.52	0.60	
	I <sub>F</sub> = 6.0 A	T <sub>A</sub> = 125 °C		0.37	-	
	I <sub>F</sub> = 12.0 A			0.46	0.54	
Reverse current	V <sub>R</sub> = 45 V	T <sub>A</sub> = 25 °C	I <sub>R</sub> <sup>(2)</sup>	-	0.5	mA
		T <sub>A</sub> = 125 °C		4.0	15	
Typical junction capacitance	4.0 V, 1 MHz		C <sub>J</sub>	2350	-	pF

**Notes**

- (1) Pulse test: 300 μs pulse width, 1 % duty cycle  
(2) Pulse test: pulse width ≤ 5 ms

THERMAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted)			
PARAMETER	SYMBOL	V12PM45	UNIT
Typical thermal resistance	R <sub>θJA</sub> <sup>(1)(2)</sup>	75	°C/W
	R <sub>θJM</sub> <sup>(3)</sup>	4	

**Notes**

- (1) The heat generated must be less than the thermal conductivity from junction to ambient: dP<sub>D</sub>/dT<sub>J</sub> < 1/R<sub>θJA</sub>  
(2) Free air mounted on recommended copper pad area; thermal resistance R<sub>θJA</sub> - junction to ambient  
(3) Mounted on 30 mm x 30 mm aluminum PCB; thermal resistance R<sub>θJM</sub> - 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 <sup>(1)</sup>	0.10	H	1500	7" diameter plastic tape and reel
V12PM45HM3/I <sup>(1)</sup>	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)

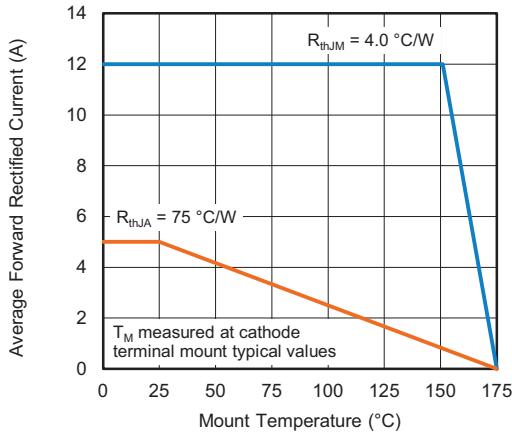


Fig. 1 - Forward Current Derating Curve

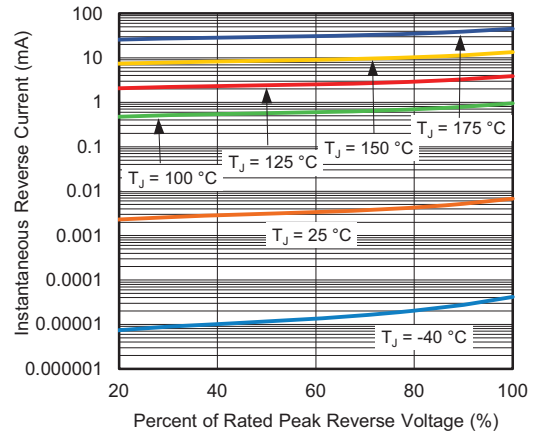


Fig. 4 - Typical Reverse Leakage Characteristics Per Diode

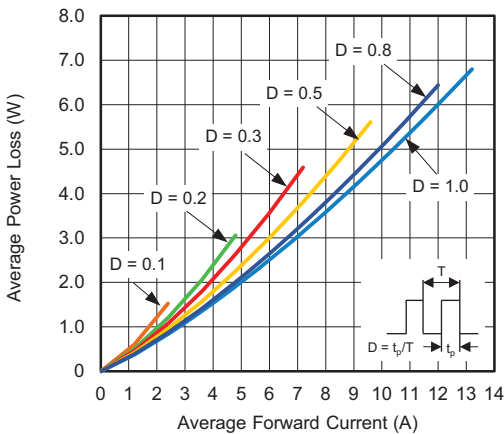


Fig. 2 - Forward Power Loss Characteristics

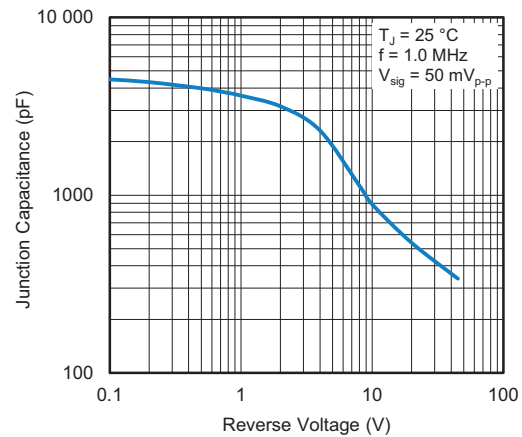


Fig. 5 - Typical Junction Capacitance

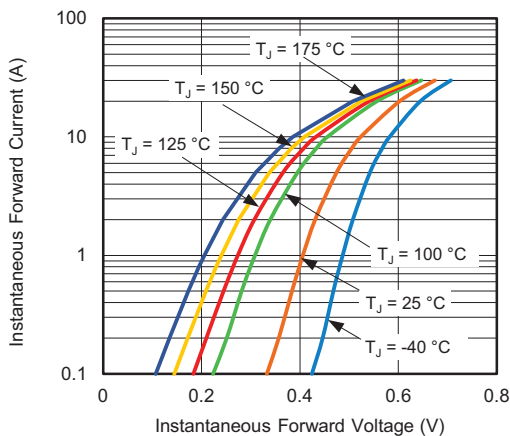


Fig. 3 - Typical Instantaneous Forward Characteristics

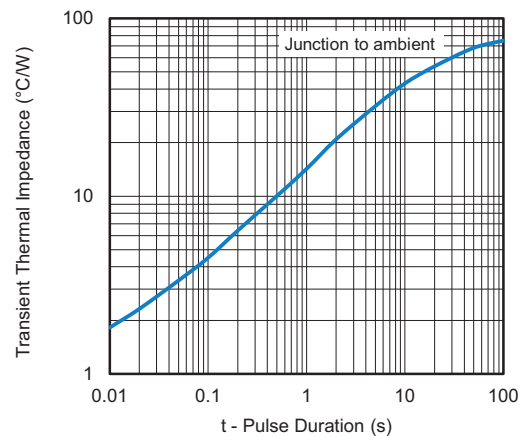


Fig. 6 - Typical Transient Thermal Impedance

**PACKAGE OUTLINE DIMENSIONS** in inches (millimeters)





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