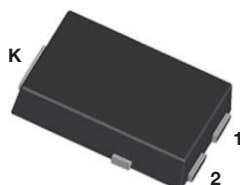


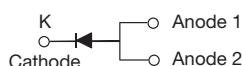
# High Current Density Surface-Mount TMBS® (Trench MOS Barrier Schottky) Rectifier

Ultra Low  $V_F = 0.53 \text{ V}$  at  $I_F = 6 \text{ A}$

## eSMP® Series



## SMPC (TO-277A)



## DESIGN SUPPORT TOOLS

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## PRIMARY CHARACTERISTICS

$I_{F(AV)}$	12 A
$V_{RRM}$	120 V
$I_{FSM}$	160 A
$V_F$ at $I_F = 12 \text{ A}$	0.63 V
$T_J \text{ max.}$	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)



**RoHS**  
COMPLIANT  
HALOGEN  
FREE

## TYPICAL APPLICATIONS

For use in low voltage high frequency DC/DC converters, freewheeling, 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

Base P/NHM3\_X - halogen-free, RoHS-compliant, and

AEC-Q101 qualified

("\_X") denotes revision code e.g. A, B, ....)

**Terminals:** matte tin plated leads, solderable per J-STD-002 and JESD 22-B102

M3 suffix meets JESD 201 class 2 whisker test, HM3 suffix meets JESD 201 class 2 whisker test

## MAXIMUM RATINGS ( $T_A = 25 \text{ °C}$ unless otherwise noted)

PARAMETER	SYMBOL	V12PM12	UNIT
Device marking code		12M12	
Maximum repetitive peak reverse voltage	$V_{RRM}$	120	V
Maximum DC forward current	$I_F^{(1)}$	12	A
	$I_F^{(2)}$	4.1	
Peak forward surge current 10 ms single half sine-wave superimposed on rated load	$I_{FSM}$	160	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 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 <sub>A</sub> = 25 °C unless otherwise noted)						
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage	I <sub>F</sub> = 6 A	T <sub>A</sub> = 25 °C	V <sub>F</sub> <sup>(1)</sup>	0.60	-	V
	I <sub>F</sub> = 12 A			0.75	0.83	
	I <sub>F</sub> = 6 A	T <sub>A</sub> = 125 °C		0.53	-	
	I <sub>F</sub> = 12 A			0.63	0.71	
Reverse current	V <sub>R</sub> = 90 V	T <sub>A</sub> = 25 °C	I <sub>R</sub> <sup>(2)</sup>	3	-	μA
		T <sub>A</sub> = 125 °C		2	-	mA
	V <sub>R</sub> = 120 V	T <sub>A</sub> = 25 °C		-	500	μA
		T <sub>A</sub> = 125 °C		5	35	mA
Typical junction capacitance	4.0 V, 1 MHz		C <sub>J</sub>	950	-	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 ( $T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)			
PARAMETER	SYMBOL	V12PM12	UNIT
Typical thermal resistance	$R_{\theta JA}^{(1)(2)}$	62	$^{\circ}\text{C/W}$
	$R_{\theta JM}^{(3)}$	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 PCB, 2 oz. pad area; thermal resistance  $R_{\theta JA}$  - junction to ambient  
 (3) Units 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
V12PM12-M3/86A	0.10	86A	1500	7" diameter plastic tape and reel
V12PM12-M3/87A	0.10	87A	6500	13" diameter plastic tape and reel
V12PM12HM3_A/H <sup>(1)</sup>	0.10	H	1500	7" diameter plastic tape and reel
V12PM12HM3_A/I <sup>(1)</sup>	0.10	I	6500	13" diameter plastic tape and reel

**Note**

- (1) Automotive grade

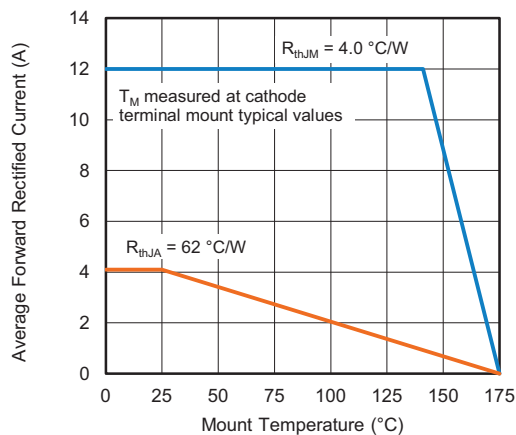
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)


Fig. 1 - Forward Current Derating Curve

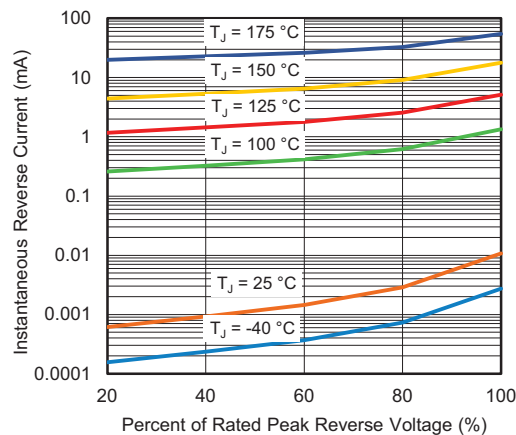


Fig. 4 - Typical Reverse Leakage Characteristics

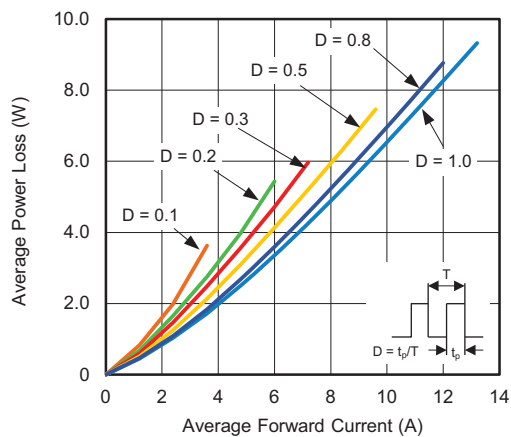


Fig. 2 - Forward Power Loss Characteristics

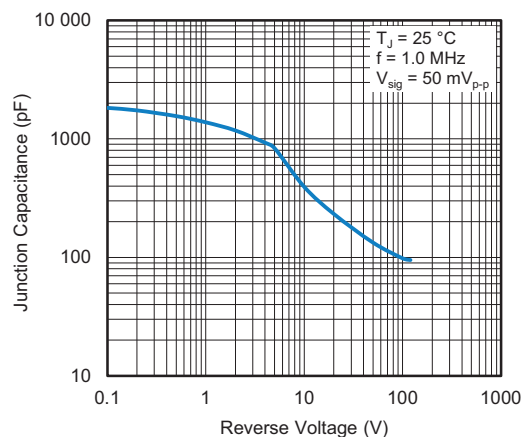


Fig. 5 - Typical Junction Capacitance

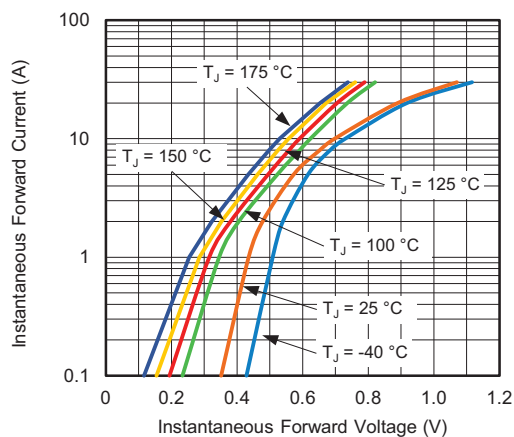


Fig. 3 - Typical Instantaneous Forward Characteristics

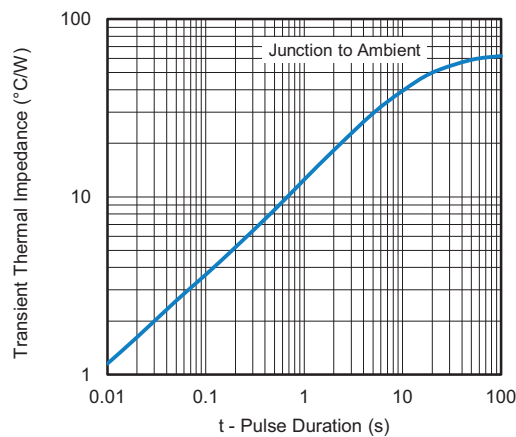


Fig. 6 - Typical Transient Thermal Impedance



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



Conform to JEDEC® TO-277A



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