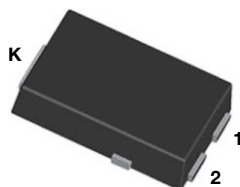


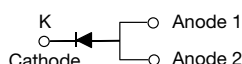
# Low Noise High Current Density Surface-Mount TMBS® (Trench MOS Barrier Schottky) Rectifier

Ultra Low  $V_F = 0.46\text{ V}$  at  $I_F = 6\text{ A}$

## eSMP® Series



## SMPC (TO-277A)



## LINKS TO ADDITIONAL RESOURCES



PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	12 A
$V_{RRM}$	100 V
$I_{FSM}$	200 A
$V_F$ at $I_F = 12\text{ A}$ (125 °C)	0.56 V
$T_J$ max.	150 °C
Package	SMPC (TO-277A)
Circuit configuration	Single

## FEATURES

- Very low profile - typical height of 1.1 mm
- Ideal for automated placement
- Trench MOS Schottky technology
- Low forward voltage drop, low power losses
- High efficiency operation
- Low reverse spike voltage
- Very low junction capacitance
- 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 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	V12P104	UNIT
Device marking code		1214	
Maximum repetitive peak reverse voltage	$V_{RRM}$	100	V
Maximum DC forward current	$I_{F(AV)}^{(1)}$	12	A
	$I_{F(AV)}^{(2)}$	3.9	
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 +150	°C
Storage temperature range	$T_{STG}$	-55 to +150	°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>J</sub> = 25 °C unless otherwise noted)						
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage	I <sub>F</sub> = 6 A	T <sub>J</sub> = 25 °C	V <sub>F</sub> <sup>(1)</sup>	0.52	-	V
	I <sub>F</sub> = 12 A			0.63	0.70	
	I <sub>F</sub> = 6 A	T <sub>J</sub> = 125 °C		0.46	-	
	I <sub>F</sub> = 12 A			0.56	0.61	
Reverse current	V <sub>R</sub> = 70 V	T <sub>J</sub> = 25 °C	I <sub>R</sub> <sup>(2)</sup>	0.003	-	mA
		T <sub>J</sub> = 125 °C		3.5	-	
	V <sub>R</sub> = 100 V	T <sub>J</sub> = 25 °C		-	0.175	
		T <sub>J</sub> = 125 °C		7	20	
Typical junction capacitance	4.0 V, 1 MHz		C <sub>J</sub>	490	-	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 specified)			
PARAMETER	SYMBOL	V12P104	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 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 TABLE**

Device code	<b>V</b>	<b>12</b>	<b>P</b>	<b>10</b>	<b>4</b>	<b>H</b>	<b>M3</b>
	①	②	③	④	⑤	⑥	⑦
①	- Vishay TMBS product						
②	- Current rating (12 = 12 A)						
③	- Package type (P = SMPC (TO-277A))						
④	- Voltage rating (10 = 100 V)						
⑤	- TMBS generation option (4 = gen 4)						
⑥	- Quality grade (H = AEC-Q101 qualified, - = industry grade)						
⑦	- Material / Environment category						
	(M3 = halogen-free, RoHS-compliant, and termination lead (Pb)-free)						

ORDERING INFORMATION (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
V12P104-M3/H	0.10	H	1500	7" diameter plastic tape and reel
V12P104-M3/I	0.10	I	6500	13" diameter plastic tape and reel
V12P104HM3/H <sup>(1)</sup>	0.10	H	1500	7" diameter plastic tape and reel
V12P104HM3/I <sup>(1)</sup>	0.10	I	6500	13" diameter plastic tape and reel

**Note**

(1) AEC-Q101 qualified

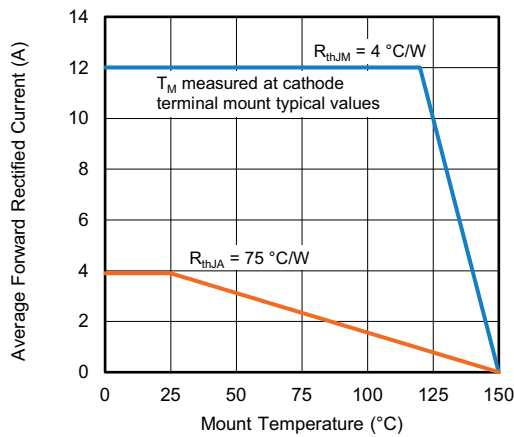
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise specified)


Fig. 1 - Maximum Forward Current Derating Curve

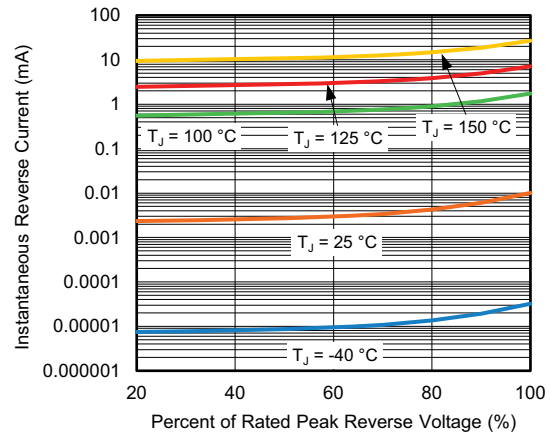


Fig. 4 - Typical Reverse Characteristics

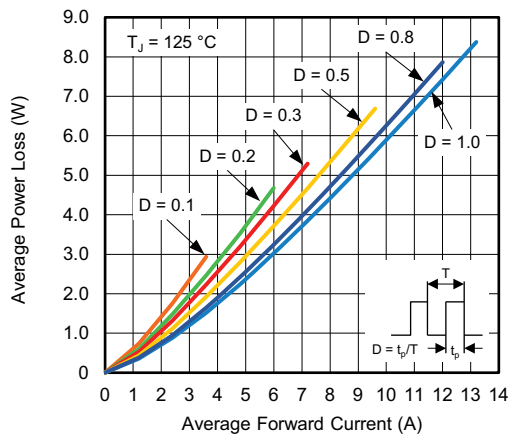


Fig. 2 - Forward Power Loss Characteristics

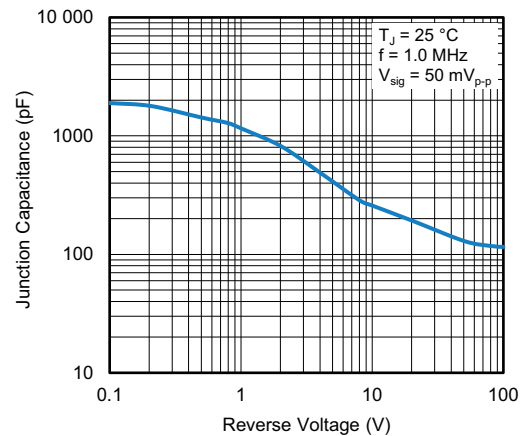


Fig. 5 - Typical Junction Capacitance

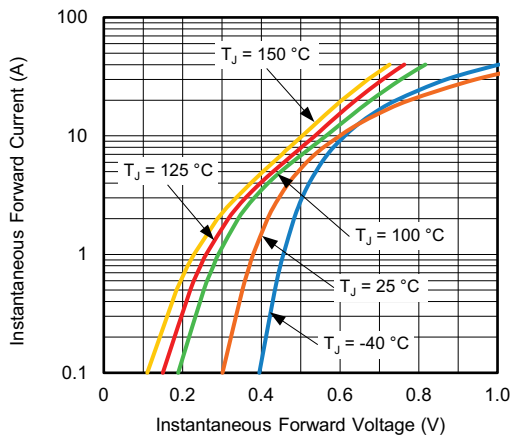


Fig. 3 - Typical Instantaneous Forward Characteristics

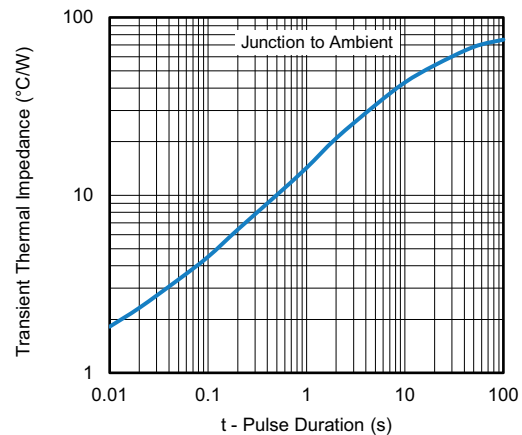
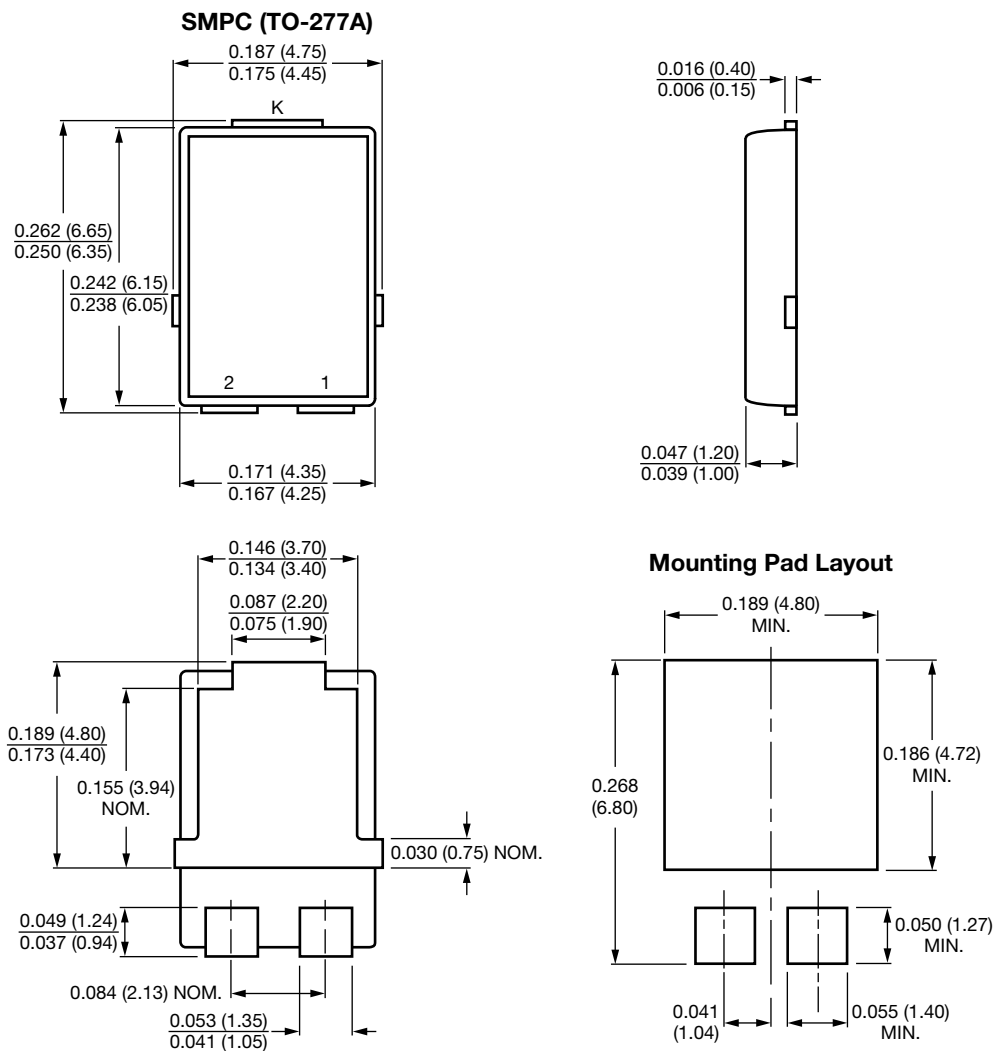


Fig. 6 - Typical Transient Thermal Impedance



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



Conform to JEDEC® TO-277A



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