AUTOMOTIVE

RoHS

COMPLIANT

HALOGEN

FREE



## Vishay General Semiconductor

# Surface-Mount TMBS® (Trench MOS Barrier Schottky) Rectifiers

### eSMP® Series



Bottom view

SMF (DO-219AB)

Cathode O Anode

### LINKS TO ADDITIONAL RESOURCES

Top view



PRIMARY CHARACTERISTICS			
I <sub>F(AV)</sub>	1.0 A		
V <sub>RRM</sub>	120 V		
I <sub>FSM</sub>	30 A		
$V_F$ at $I_F = 1 A (T_A = 125 °C)$	0.61 V		
T <sub>J</sub> max.	175 °C		
Package	SMF (DO-219AB)		
Circuit configuration	Single		

#### **FEATURES**

- Trench MOS Schottky technology
- · Low profile package
- · Ideal for automated placement
- · Low forward voltage drop, low power losses
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Wave and reflow solderable
- AEC-Q101 qualified available
  - Automotive ordering code: base P/NHM3
- Compatible to SOD-123W package case outline
- Material categorization: for definitions of compliance please see <a href="https://www.vishay.com/doc?99912">www.vishay.com/doc?99912</a>

#### TYPICAL APPLICATIONS

For use in high frequency inverters, freewheeling, DC/DC converters, and polarity protection in commercial, industrial, and automotive applications.

#### **MECHANICAL DATA**

Case: SMF (DO-219AB)

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 meet JESD 201 class 2 whisker test

Polarity: color band denotes the cathode end

MAXIMUM RATINGS (T <sub>A</sub> = 25 °C unless otherwise noted)				
PARAMETER	SYMBOL	V1FM12	UNIT	
Device marking code		1MS		
Maximum repetitive peak reverse voltage	$V_{RRM}$	120	V	
Maximum average forward rectified current (fig.1)	I <sub>F(AV)</sub> (1)	1.0	Α	
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load	I <sub>FSM</sub>	30	Α	
Operating junction temperature range	T <sub>J</sub> <sup>(2)</sup>	-40 to +175	°C	
Storage temperature range	T <sub>STG</sub>	-55 to +175		

#### Notes

(1) Free air, mounted on FR4 PCB, 2 oz. standard footprint

(2) 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>6,IA</sub>



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<b>ELECTRICAL CHARACTERISTICS</b> (T <sub>A</sub> = 25 °C unless otherwise noted)						
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage	I <sub>F</sub> = 0.5 A	T <sub>A</sub> = 25 °C		0.62	-	V
	I <sub>F</sub> = 1.0 A		V <sub>E</sub> (1)	0.77	0.87	
	I <sub>F</sub> = 0.5 A	T <sub>A</sub> = 125 °C	V <sub>F</sub> (')	0.52	-	
	I <sub>F</sub> = 1.0 A			0.61	0.69	
Reverse current	V <sub>R</sub> = 90 V	T <sub>A</sub> = 25 °C		0.30	-	
	v <sub>R</sub> = 90 v	T <sub>A</sub> = 125 °C	I <sub>R</sub> <sup>(2)</sup>	180	-	
	V <sub>R</sub> = 120 V	T <sub>A</sub> = 25 °C	-	65	μA	
		T <sub>A</sub> = 125 °C		300	1500	•
Typical junction capacitance	4.0 V, 1 MHz	-	CJ	95	-	pF

#### **Notes**

(1) Pulse test: 300 µs pulse width, 1 % duty cycle

 $^{(2)}$  Pulse test: Pulse width  $\leq 5 \text{ ms}$ 

THERMAL CHARACTERISTICS (T <sub>A</sub> = 25 °c unless otherwise noted)				
PARAMETER	SYMBOL	V1FM12	UNIT	
Tunical thermal registeres	R <sub>0JA</sub> (1)(2)	125	°C/W	
Typical thermal resistance	R <sub>0JM</sub> (2)	30	]	

#### Notes

 $^{(1)}$  The heat generated must be less than the thermal conductivity from junction-to-ambient:  $dP_D/dT_J < 1/R_{\theta JA}$ 

<sup>(2)</sup> Device mounted on FR4 PCB, 2 oz. standard footprint, thermal resistance  $R_{\theta JA}$  – junction-to-ambient; thermal resistance  $R_{\theta JM}$  – junction-to-mount

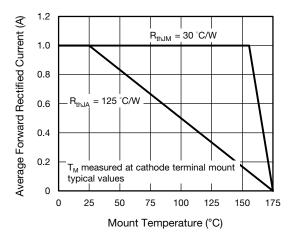
ORDERING INFORMATION (Example)					
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE	
V1FM12-M3/H	0.015	Н	3000	7" diameter plastic tape and reel	
V1FM12-M3/I	0.015	I	10 000	13" diameter plastic tape and reel	
V1FM12HM3/H (1)	0.015	Н	3000	7" diameter plastic tape and reel	
V1FM12HM3/I (1)	0.015	I	10 000	13" diameter plastic tape and reel	

### Note

(1) AEC-Q101 qualified

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## RATINGS AND CHARACTERISTICS CURVES (T<sub>A</sub> = 25 °C unless otherwise noted)



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Fig. 1 - Maximum Forward Current Derating Curve

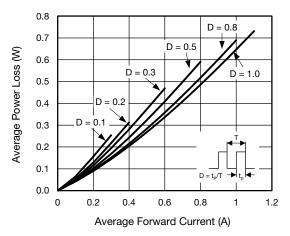


Fig. 2 - Average Power Loss Characteristics

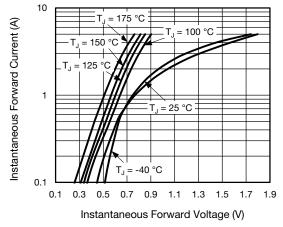


Fig. 3 - Typical Instantaneous Forward Characteristics

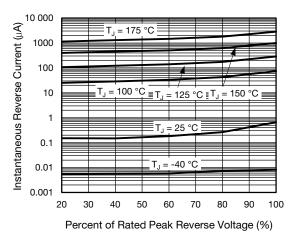


Fig. 4 - Typical Reverse Leakage Characteristics

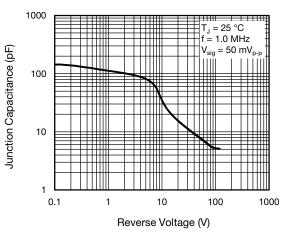


Fig. 5 - Typical Junction Capacitance

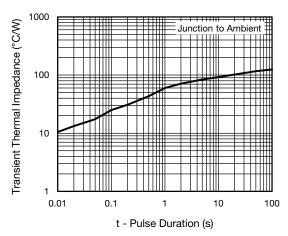
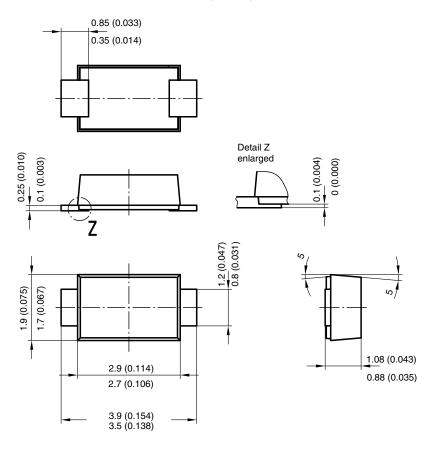


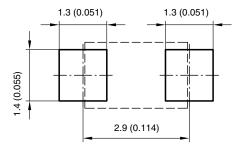
Fig. 6 - Typical Transient Thermal Impedance

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



### Foot print recommendation:



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