

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

## eSMP® Series



Top View

Bottom View

### SlimSAW (DO-221AD)

Cathode  Anode

## LINKS TO ADDITIONAL RESOURCES



## FEATURES

- Low-profile package
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified available
  - Automotive ordering code: base P/NHM3
- Compatible to SOD-128 package case outline
- 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 high frequency inverters, freewheeling, DC/DC converters, and polarity protection in commercial, industrial, and automotive applications.

## MECHANICAL DATA

**Case:** SlimSAW (DO-221AD)

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 cathode end

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	5 A
$V_{RRM}$	120 V
$I_{FSM}$	100 A
$V_F$ at $I_F = 5$ A ( $T_A = 125$ °C)	0.64 V
$T_J$ max.	175 °C
Package	SlimSAW (DO-221AD)
Circuit configuration	Single

MAXIMUM RATINGS ( $T_A = 25$ °C unless otherwise noted)			
PARAMETER	SYMBOL	VSS8D5M12	UNIT
Device marking code		5M12	
Maximum repetitive peak reverse voltage	$V_{RRM}$	120	V
Maximum average forward rectified current (fig.1)	$I_{F(AV)}^{(1)}$	5	A
	$I_{F(AV)}^{(2)}$	2.2	
Peak forward surge current 10 ms single half sine-wave superimposed on rated load	$I_{FSM}$	100	A
Operating junction temperature range	$T_J^{(3)}$	-40 to +175	°C
Storage temperature range	$T_{STG}$	-55 to +175	

## Notes

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

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

PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage	I <sub>F</sub> = 2.5 A	T <sub>A</sub> = 25 °C	V <sub>F</sub> <sup>(1)</sup>	0.62	-	V
	I <sub>F</sub> = 5 A			0.81	0.89	
	I <sub>F</sub> = 2.5 A	T <sub>A</sub> = 125 °C		0.53	-	
	I <sub>F</sub> = 5 A			0.64	0.74	
Reverse current	V <sub>R</sub> = 90 V	T <sub>A</sub> = 25 °C	I <sub>R</sub> <sup>(2)</sup>	0.01	-	mA
		T <sub>A</sub> = 125 °C		0.9	-	
	V <sub>R</sub> = 120 V	T <sub>A</sub> = 25 °C		-	0.35	
		T <sub>A</sub> = 125 °C		1.6	6	
Typical junction capacitance	4.0 V, 1 MHz		C <sub>J</sub>	460	-	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	TYP.	MAX.	UNIT
Typical thermal resistance	$R_{\theta JA}^{(1)(2)}$	120	150	$^{\circ}\text{C/W}$
	$R_{\theta JM}^{(3)}$	10	12	

**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) Thermal resistance junction-to-ambient to follow JEDEC® 51-2A, device mounted on FR4 PCB, 2 oz., standard footprint

(3) Thermal resistance junction-to-mount to follow JEDEC 51-14 transient dual interface test method (TDIM)

**ORDERING INFORMATION** (Example)

PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
VSS8D5M12-M3/H	0.033	H	3500	7" diameter plastic tape and reel
VSS8D5M12-M3/I	0.033	I	14 000	13" diameter plastic tape and reel
VSS8D5M12HM3/H <sup>(1)</sup>	0.033	H	3500	7" diameter plastic tape and reel
VSS8D5M12HM3/I <sup>(1)</sup>	0.033	I	14 000	13" diameter plastic tape and reel

**Note**

(1) AEC-Q101 qualified

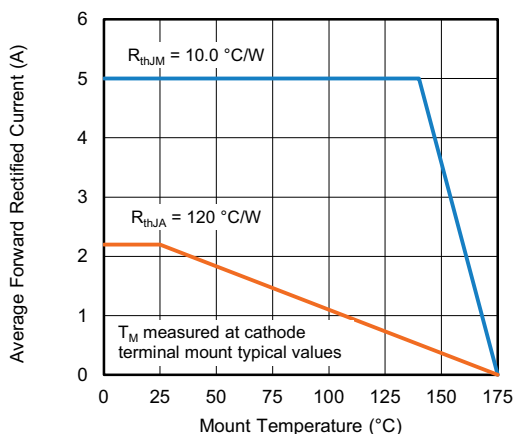
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

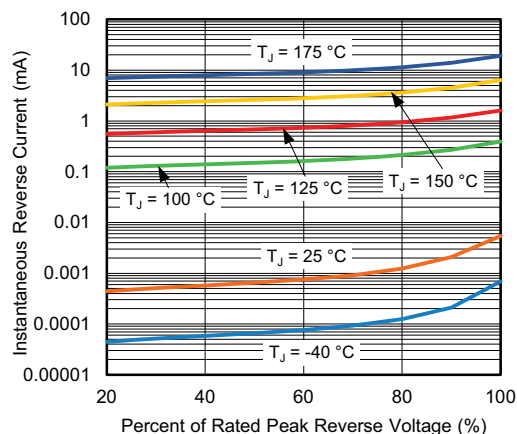


Fig. 4 - Typical Reverse Leakage Characteristics

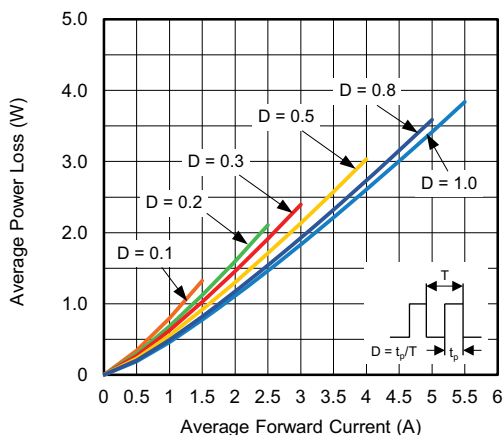


Fig. 2 - Forward Power Loss Characteristics

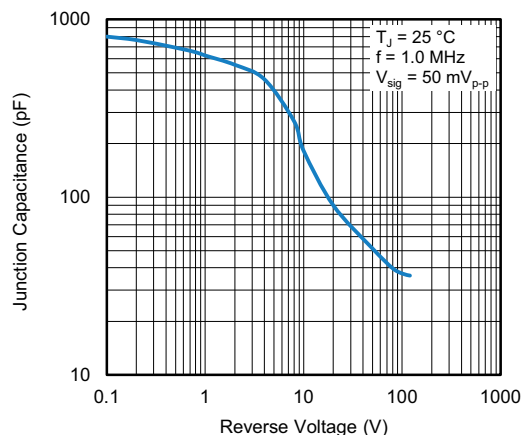


Fig. 5 - Typical Junction Capacitance

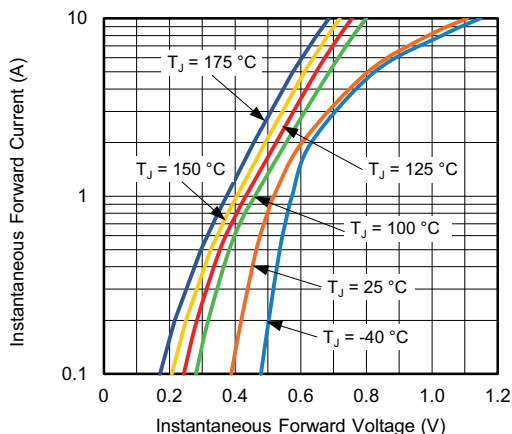


Fig. 3 - Typical Instantaneous Forward Characteristics

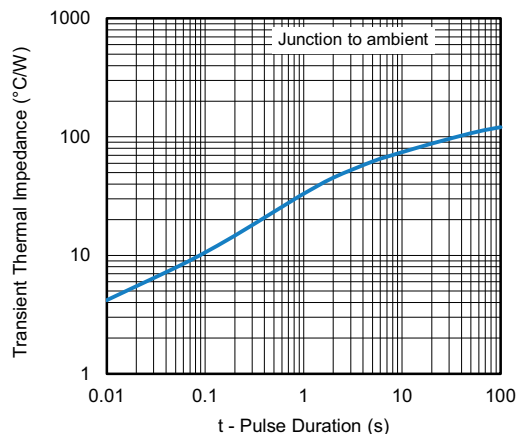
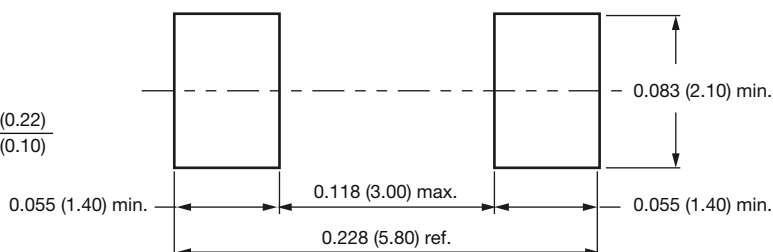
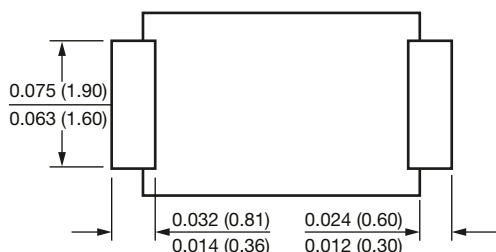
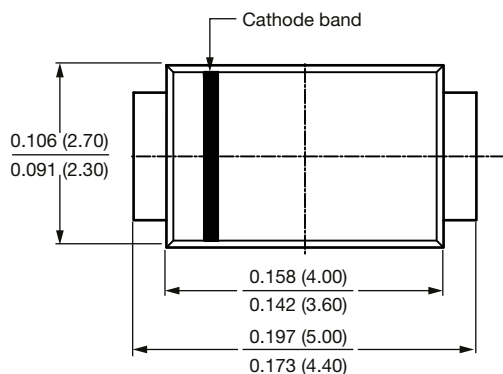


Fig. 6 - Typical Transient Thermal Impedance



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

**SlimSMAW (DO-221AD)**



**Mounting pad layout**



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