

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

## eSMP® Series



Top View

Bottom View

### SlimSAW (DO-221AD)

Cathode  Anode

## DESIGN SUPPORT TOOLS

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

## PRIMARY CHARACTERISTICS

$I_{F(AV)}$	3 A
$V_{RRM}$	120 V
$I_{FSM}$	60 A
$V_F$ at $I_F = 3$ A (125 °C)	0.61 V
$T_J$ max.	175 °C
Package	SlimSAW (DO-221AD)
Circuit configuration	Single

## 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)

AUTOMOTIVE  
GRADE  
Available

**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, 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

H3 and HM3 suffix meets JESD 201 class 2 whisker test

**Polarity:** color band denotes cathode end

## MAXIMUM RATINGS ( $T_A = 25$ °C unless otherwise noted)

PARAMETER	SYMBOL	VSS8D3M12	UNIT
Device marking code		3M12	
Maximum repetitive peak reverse voltage	$V_{RRM}$	120	V
Maximum average forward rectified current (fig.1)	$I_{F(AV)}^{(1)}$	3	A
	$I_{F(AV)}^{(2)}$	2	
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load	$I_{FSM}$	60	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 AL PCB pad area

(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 <sub>A</sub> = 25 °C unless otherwise noted)						
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage	I <sub>F</sub> = 1.5 A	T <sub>A</sub> = 25 °C	V <sub>F</sub> <sup>(1)</sup>	0.61	-	V
	I <sub>F</sub> = 3 A			0.75	0.83	
	I <sub>F</sub> = 1.5 A	T <sub>A</sub> = 125 °C		0.52	-	
	I <sub>F</sub> = 3 A			0.61	0.69	
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		0.5	-	
	V <sub>R</sub> = 120 V	T <sub>A</sub> = 25 °C		-	0.3	
		T <sub>A</sub> = 125 °C		1	4	
Typical junction capacitance	4.0 V, 1 MHz		C <sub>J</sub>	310	-	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	$^{\circ}\text{C/W}$
	$R_{\theta JM}^{(3)}$	12	15	

**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<sup>®</sup> 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
VSS8D3M12-M3/H	0.033	H	3500	7" diameter plastic tape and reel
VSS8D3M12-M3/I	0.033	I	14 000	13" diameter plastic tape and reel
VSS8D3M12HM3/H <sup>(1)</sup>	0.033	H	3500	7" diameter plastic tape and reel
VSS8D3M12HM3/I <sup>(1)</sup>	0.033	I	14 000	13" diameter plastic tape and reel

**Note**

- (1) AEC-Q101 qualified

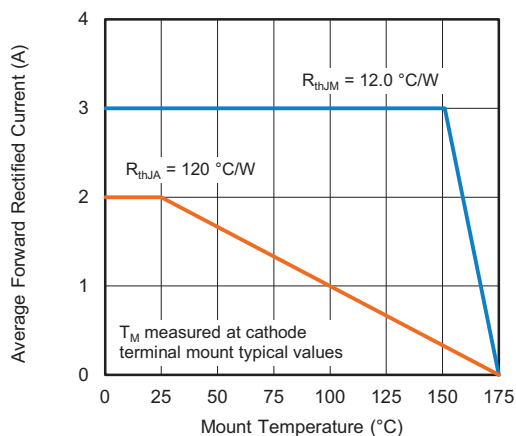
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

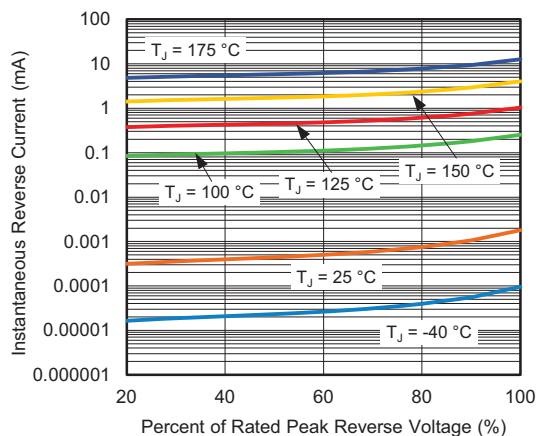


Fig. 4 - Typical Reverse Leakage Characteristics

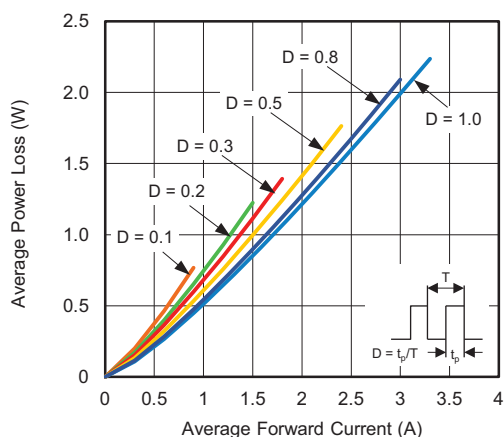


Fig. 2 - Forward Power Loss Characteristics

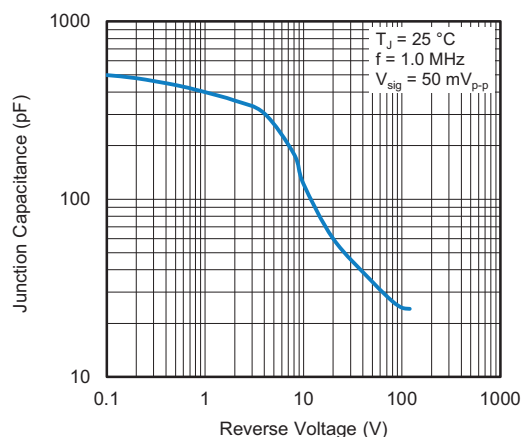


Fig. 5 - Typical Junction Capacitance

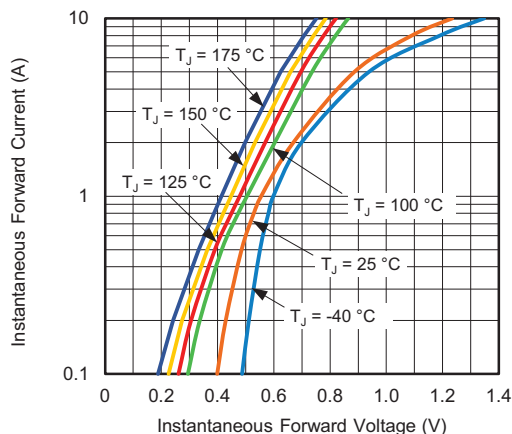


Fig. 3 - Typical Instantaneous Forward Characteristics

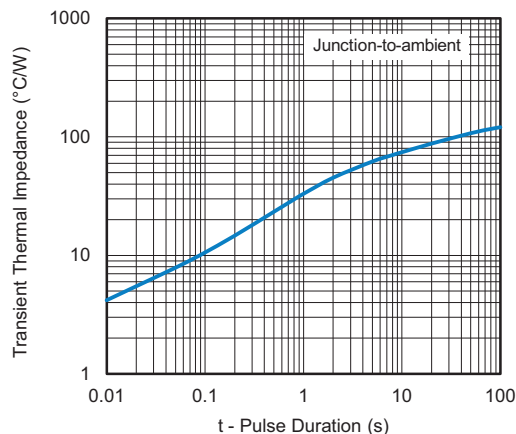
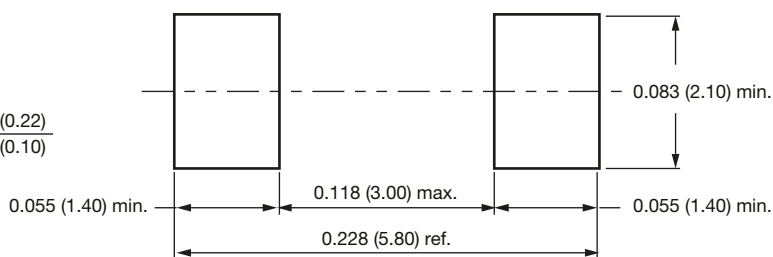
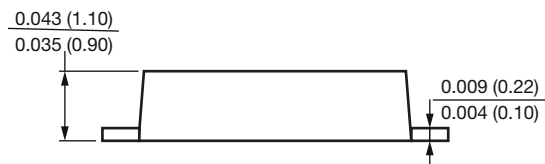
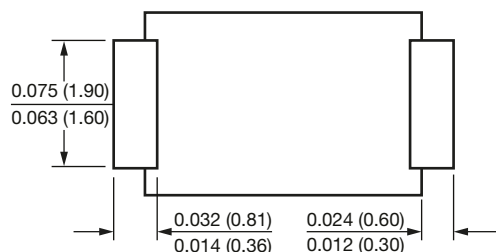
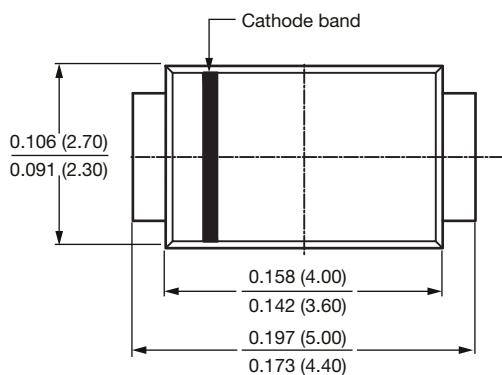


Fig. 6 - Typical Transient Thermal Impedance



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

**SlimSMAW (DO-221AD)**



**Mounting pad layout**



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