

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

eSMP® Series



Top View

Bottom View

SlimSAW (DO-221AD)

Cathode  Anode

DESIGN SUPPORT TOOLS

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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

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


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

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

PARAMETER	SYMBOL	VSS8D5M12	UNIT
Device marking code		5M12	
Maximum repetitive peak reverse voltage	V_{RRM}	100	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 °C unless otherwise noted)						
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage	I _F = 2.5 A	T _A = 25 °C	V _F ⁽¹⁾	0.62	-	V
	I _F = 5 A			0.81	0.89	
	I _F = 2.5 A	T _A = 125 °C		0.53	-	
	I _F = 5 A			0.64	0.74	
Reverse current	V _R = 90 V	T _A = 25 °C	I _R ⁽²⁾	0.01	-	mA
		T _A = 125 °C		0.9	-	
	V _R = 120 V	T _A = 25 °C		-	0.35	
		T _A = 125 °C		1.6	6	
Typical junction capacitance	4.0 V, 1 MHz		C _J	460	-	pF

Notes

- (1) Pulse test: 300 μs 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 ⁽¹⁾	0.033	H	3500	7" diameter plastic tape and reel
VSS8D5M12HM3/I ⁽¹⁾	0.033	I	14 000	13" diameter plastic tape and reel

Note

- (1) AEC-Q101 qualified

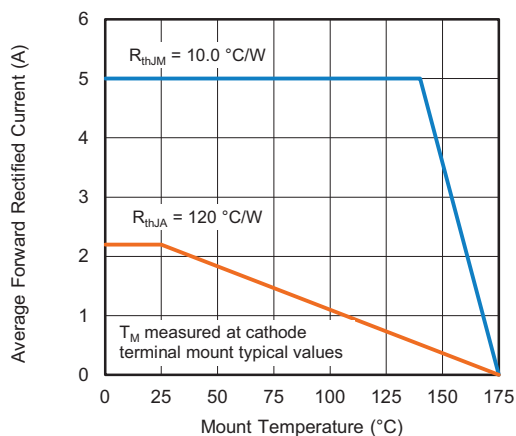
RATINGS AND CHARACTERISTICS CURVES ($T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

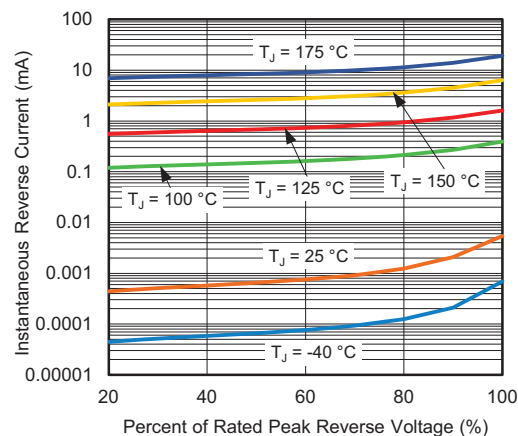


Fig. 4 - Typical Reverse Leakage Characteristics

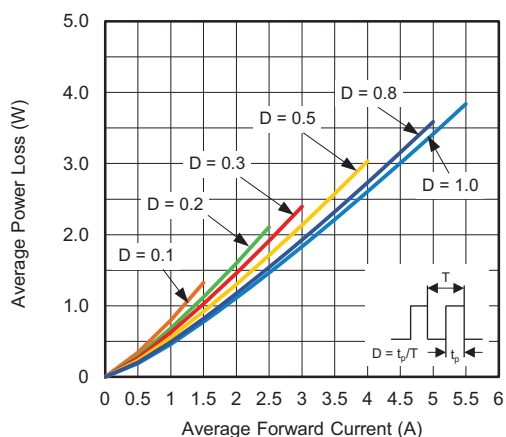


Fig. 2 - Forward Power Loss Characteristics

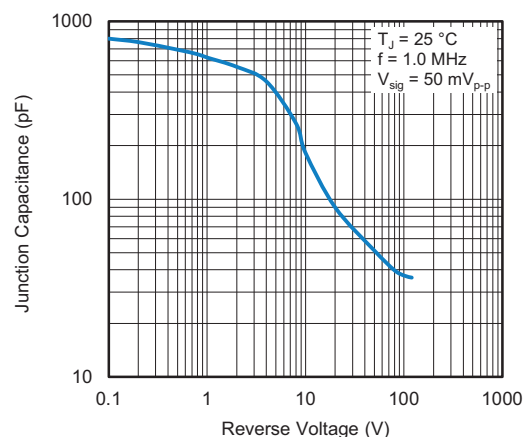


Fig. 5 - Typical Junction Capacitance

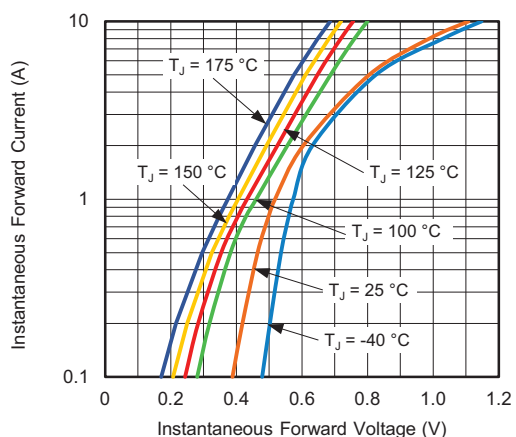


Fig. 3 - Typical Instantaneous Forward Characteristics

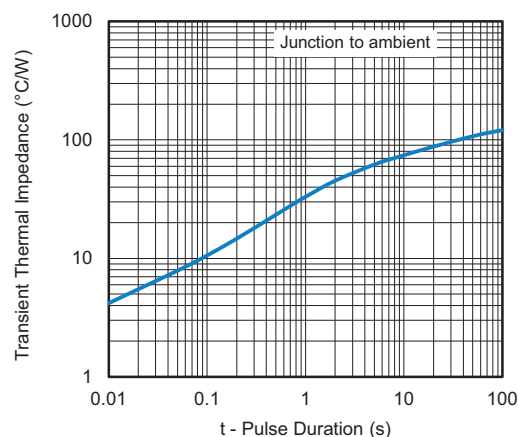
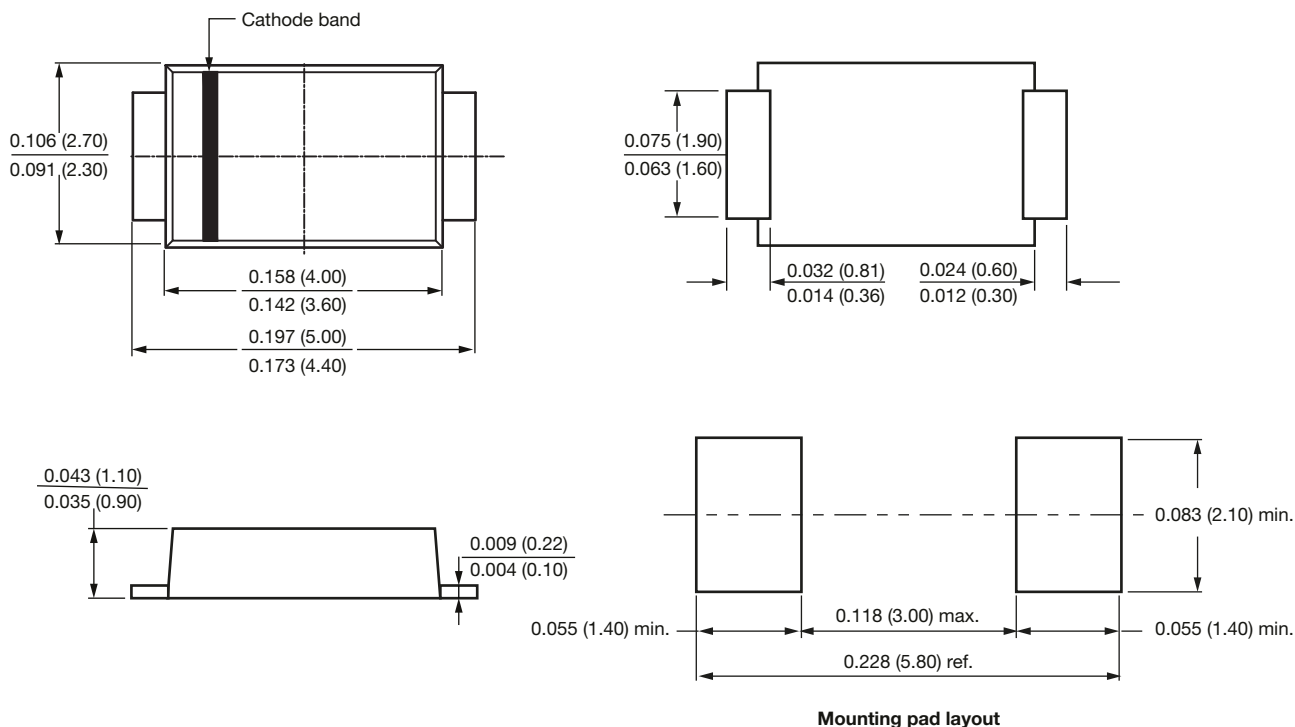


Fig. 6 - Typical Transient Thermal Impedance



PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

SlimSMAW (DO-221AD)





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