

# Surface Mount Trench MOS Barrier Schottky Rectifier

**TMBS® eSMP® Series**


Top View

Bottom View

**SlimSMA (DO-221AC)**

Cathode Anode


**RoHS**  
 COMPLIANT  
 HALOGEN  
**FREE**
**FEATURES**

- Very low profile - typical height of 0.95 mm
- Ideal for automated placement
- Trench MOS Schottky technology
- Low power losses, high efficiency
- Low forward voltage drop
- 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)

**DESIGN SUPPORT TOOLS**
[click logo to get started](#)

**TYPICAL APPLICATIONS**

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

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	5.0 A
$V_{RRM}$	100 V
$I_{FSM}$	100 A
$V_F$ at $I_F = 5.0$ A (125 °C)	0.59 V
$T_{J \text{ max.}}$	150 °C
Package	SlimSMA (DO-221AC)
Circuit configuration	Single

**MECHANICAL DATA**
**Case:** SlimSMA (DO-221AC)

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 meets JESD 201 class 2 whisker test

**Polarity:** color band denotes cathode end

MAXIMUM RATINGS ( $T_A = 25$ °C unless otherwise noted)			
PARAMETER	SYMBOL	VSSAF510	UNIT
Device marking code		V510	
Maximum repetitive peak reverse voltage	$V_{RRM}$	100	V
Maximum average forward rectified current	$I_{F(AV)}^{(1)}$	2.2	A
	$I_{F(AV)}^{(2)}$	5.0	
Peak forward surge current 10 ms single half sine-wave superimposed on rated load	$I_{FSM}$	100	A
Operating junction and storage temperature range	$T_J, T_{STG}$	-40 to +150	°C

**Notes**

- (1) Free air, mounted on recommended copper pad area  
 (2) Mounted on 30 mm x 30 mm pad area



<b>ELECTRICAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)						
PARAMETER	TEST CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage	$I_F = 2.5\text{ A}$	$T_A = 25\text{ }^\circ\text{C}$	$V_F^{(1)}$	0.54	-	V
	$I_F = 5.0\text{ A}$			0.66	0.75	
	$I_F = 2.5\text{ A}$	$T_A = 125\text{ }^\circ\text{C}$		0.48	-	
	$I_F = 5.0\text{ A}$			0.59	0.68	
Reverse current	$V_R = 70\text{ V}$	$T_A = 25\text{ }^\circ\text{C}$	$I_R^{(2)}$	0.01	-	mA
		$T_A = 125\text{ }^\circ\text{C}$		2	-	
	$V_R = 100\text{ V}$	$T_A = 25\text{ }^\circ\text{C}$		-	0.5	
		$T_A = 125\text{ }^\circ\text{C}$		5	20	
Typical junction capacitance	4.0 V, 1 MHz		$C_J$	440	-	pF

**Notes**

- (1) Pulse test: 300  $\mu\text{s}$  pulse width, 1 % duty cycle  
(2) Pulse test: Pulse width  $\leq 40\text{ ms}$

<b>THERMAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise specified)			
PARAMETER	SYMBOL	VSSAF510	UNIT
Typical thermal resistance	$R_{\theta JA}^{(1)(2)}$	115	$^\circ\text{C/W}$
	$R_{\theta JM}^{(3)}$	12	

**Notes**

- (1) Free air, mounted on recommended PCB, 2 oz. pad area; thermal resistance  $R_{\theta JA}$  - junction to ambient,  $R_{\theta JM}$  - junction to mount  
(2) The heat generated must be less than thermal conductivity from junction-to-ambient:  $dP_D/DT_J < 1/R_{\theta JA}$   
(3) Mounted on 30 mm x 30 mm pad area

<b>ORDERING INFORMATION</b> (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
VSSAF510-M3/H	0.032	H	3500	7" diameter plastic tape and reel
VSSAF510-M3/I	0.032	I	14 000	13" diameter plastic tape and reel
VSSAF510HM3/H <sup>(1)</sup>	0.032	H	3500	7" diameter plastic tape and reel
VSSAF510HM3/I <sup>(1)</sup>	0.032	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)

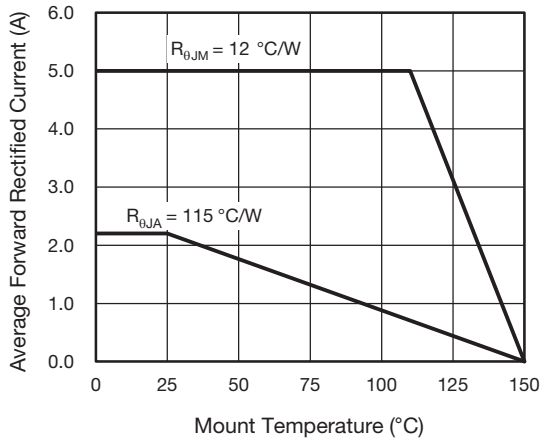


Fig. 1 - Maximum Forward Current Derating Curve

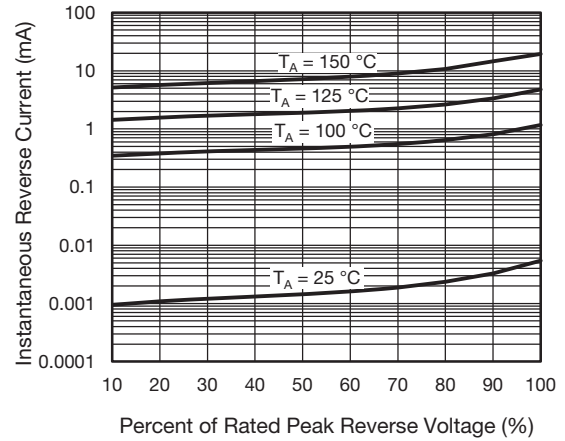


Fig. 4 - Typical Reverse Leakage Characteristics

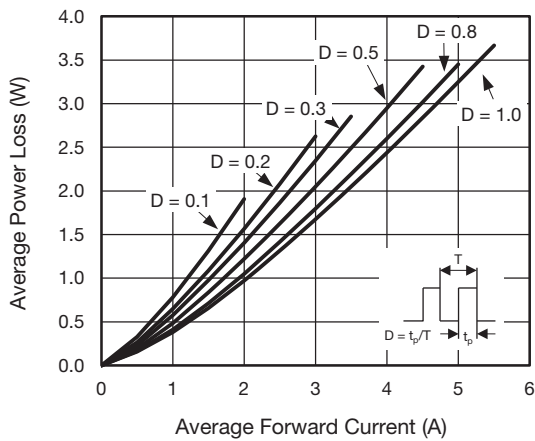


Fig. 2 - Forward Power Loss Characteristics

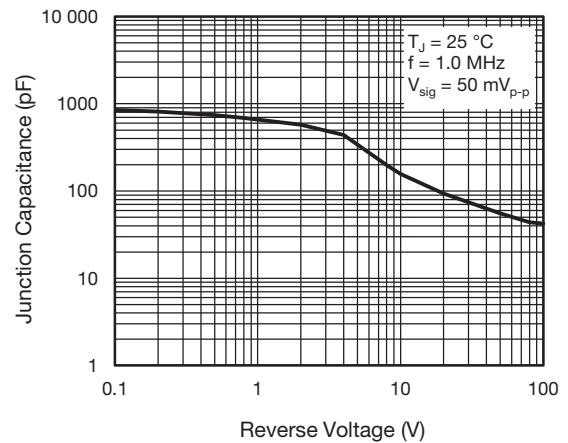


Fig. 5 - Typical Junction Capacitance

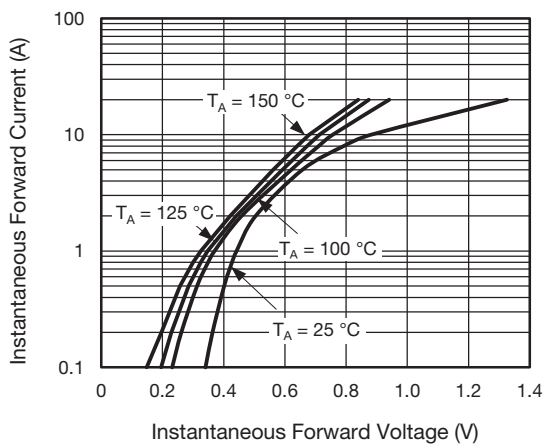


Fig. 3 - Typical Instantaneous Forward Characteristics

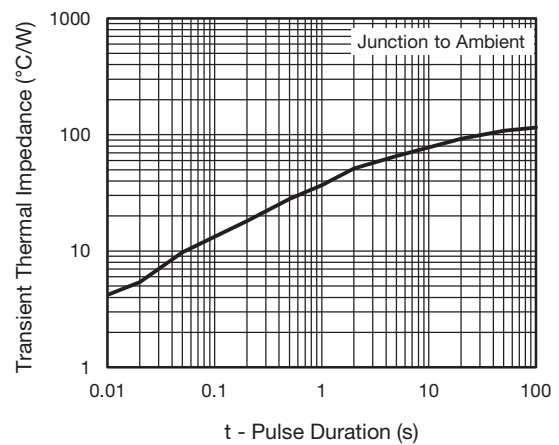


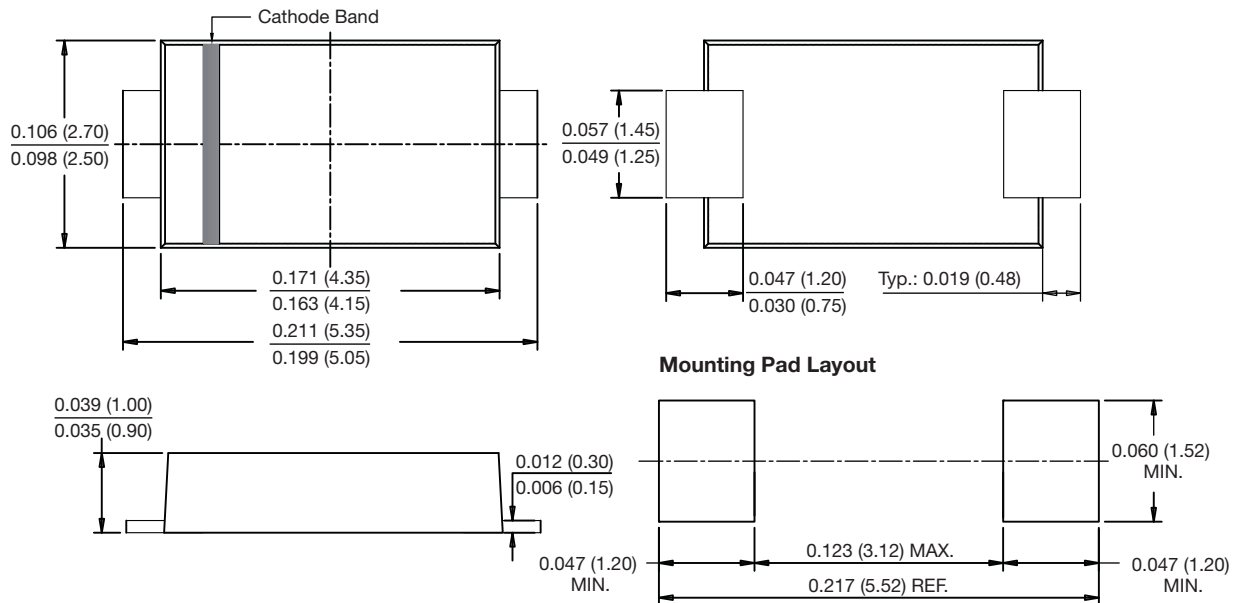
Fig. 6 - Typical Transient Thermal Impedance



Fig. 7 - Thermal Resistance Junction to Ambient vs. Copper Pad Area

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

**SlimSMA (DO-221AC)**





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