

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

## eSMP® Series



Top View

Bottom View

### SlimSMA (DO-221AC)

Cathode  Anode

## 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)

AUTOMOTIVE  
GRADE  
Available

RoHS  
COMPLIANT  
HALOGEN  
FREE

## LINKS TO ADDITIONAL RESOURCES



3D Models

## PRIMARY CHARACTERISTICS

$I_{F(AV)}$	5.0 A
$V_{RRM}$	120 V
$I_{FSM}$	100 A
$V_F$ at $I_F = 5.0$ A (125 °C)	0.64 V
$T_J$ max.	175 °C
Package	SlimSMA (DO-221AC)
Circuit configuration	Single

## TYPICAL APPLICATIONS

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

## 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	VSSAF5M12	UNIT
Device marking code		5M12	
Maximum repetitive peak reverse voltage	$V_{RRM}$	120	V
Maximum DC forward current	$I_{F(AV)}^{(1)}$	2.4	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 +175	°C

## Notes

(1) Free air, mounted on recommended copper pad area

(2) Mounted on 30 mm x 30 mm pad area

**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>	0.64	-	V
	I <sub>F</sub> = 5.0 A			0.81	0.89	
	I <sub>F</sub> = 2.5 A	T <sub>A</sub> = 125 °C		0.55	-	
	I <sub>F</sub> = 5.0 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		0.8	-	
	V <sub>R</sub> = 120 V	T <sub>A</sub> = 25 °C	I <sub>R</sub> <sup>(2)</sup>	-	0.35	mA
		T <sub>A</sub> = 125 °C		1.6	6	
Typical junction capacitance	4.0 V, 1 MHz		C <sub>J</sub>	420	-	pF

**Notes**(1) Pulse test: 300  $\mu\text{s}$  pulse width, 1 % duty cycle(2) Pulse test: Pulse width  $\leq 40\text{ ms}$ **THERMAL CHARACTERISTICS** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise specified)

PARAMETER	SYMBOL	VSSAF5M12	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

**ORDERING INFORMATION** (Example)

PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
VSSAF5M12-M3/H	0.032	H	3500	7" diameter plastic tape and reel
VSSAF5M12-M3/I	0.032	I	14 000	13" diameter plastic tape and reel
VSSAF5M12HM3/H <sup>(1)</sup>	0.032	H	3500	7" diameter plastic tape and reel
VSSAF5M12HM3/I <sup>(1)</sup>	0.032	I	14 000	13" diameter plastic tape and reel

**Note**

(1) AEC-Q101 qualified

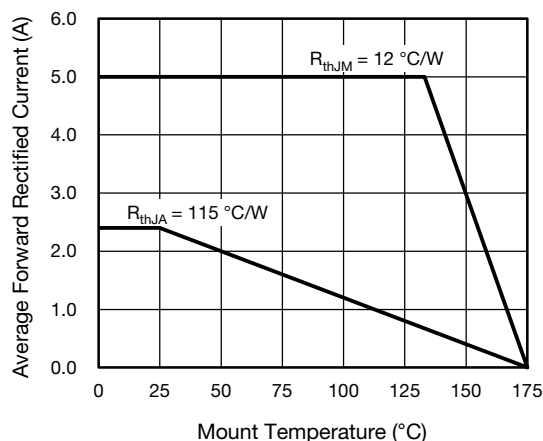
**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

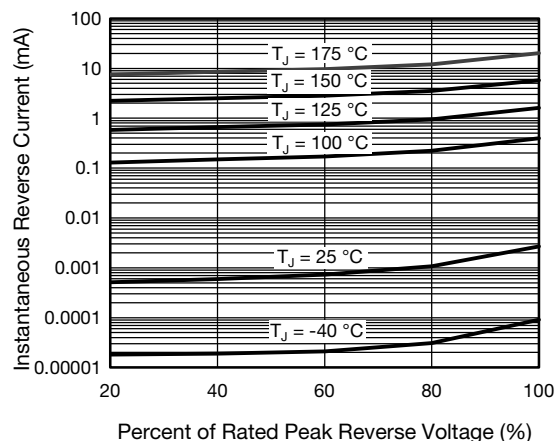


Fig. 4 - Typical Reverse Leakage Characteristics

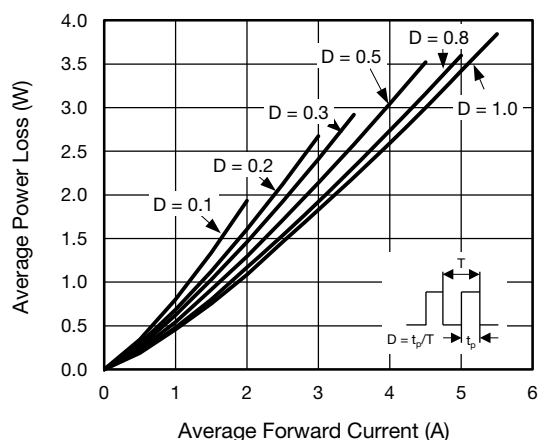


Fig. 2 - Forward Power Loss Characteristics

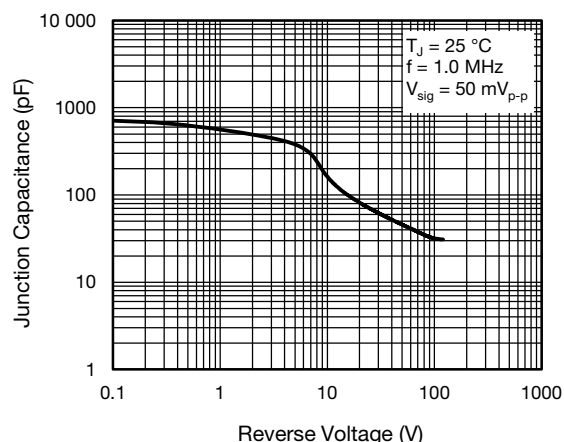


Fig. 5 - Typical Junction Capacitance

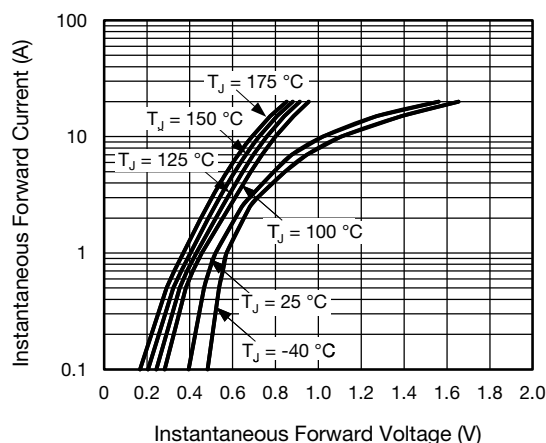


Fig. 3 - Typical Instantaneous Forward Characteristics

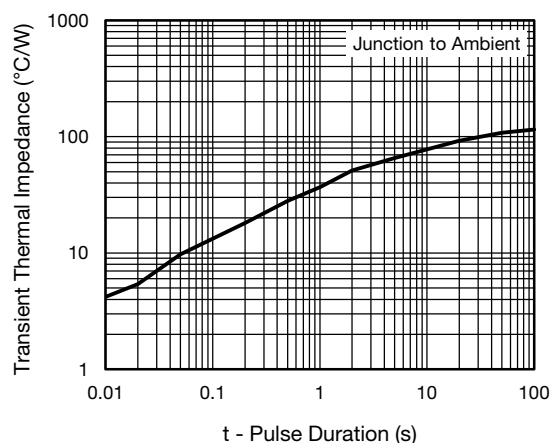


Fig. 6 - Typical Transient Thermal Impedance

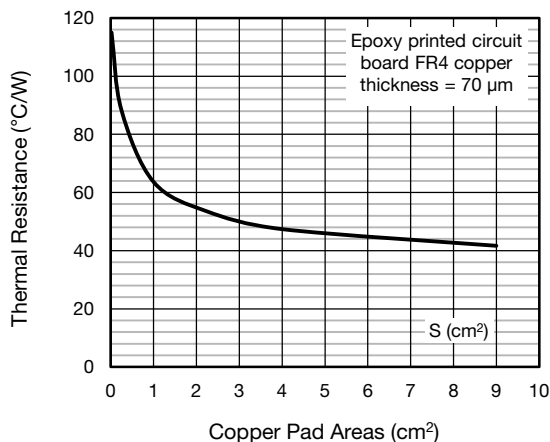
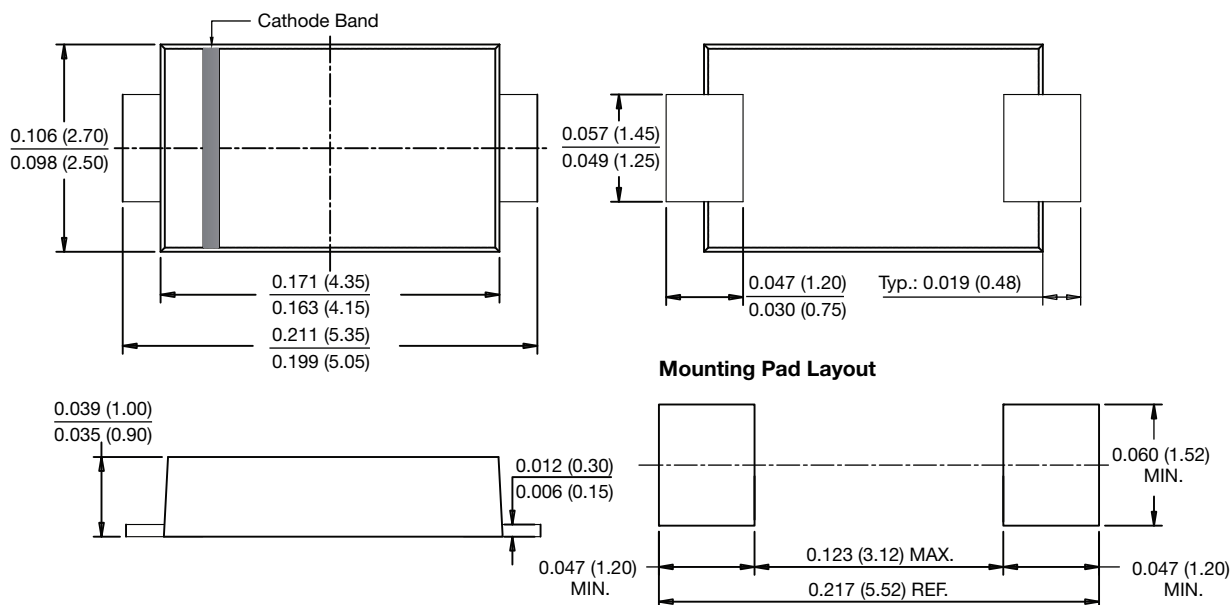


Fig. 7 - Thermal Resistance Junction to Ambient vs. Copper Pad Area

### PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

#### DO-221AC (SlimSMA)





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