

# Surface Mount Trench MOS Barrier Schottky Rectifier



## 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)



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

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)	0.62 V
$T_J$ max.	150 °C
Package	DO-221AC (SlimSMA)
Diode variation	Single die

## TYPICAL APPLICATIONS

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

## MECHANICAL DATA

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

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	VSSAF512	UNIT
Device marking code		V512	
Maximum repetitive peak reverse voltage	$V_{RRM}$	120	V
Maximum average forward rectified current	$I_{F(AV)}^{(1)}$	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



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> = 2.5 A	T <sub>A</sub> = 25 °C	V <sub>F</sub> <sup>(1)</sup>	0.60	-	V
	I <sub>F</sub> = 5.0 A			0.77	0.88	
	I <sub>F</sub> = 2.5 A	T <sub>A</sub> = 125 °C		0.53	-	
	I <sub>F</sub> = 5.0 A			0.62	0.72	
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		1.7	-	
	V <sub>R</sub> = 120 V	T <sub>A</sub> = 25 °C		-	0.4	
		T <sub>A</sub> = 125 °C		4	15	
Typical junction capacitance	4.0 V, 1 MHz		C <sub>J</sub>	360	-	pF

Notes

- (1) Pulse test: 300 μs pulse width, 1 % duty cycle
- (2) Pulse test: Pulse width ≤ 40 ms

THERMAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise specified)			
PARAMETER	SYMBOL	VSSAF512	UNIT
Typical thermal resistance	R <sub>θJA</sub> <sup>(1)(2)</sup>	115	°C/W
	R <sub>θJM</sub> <sup>(3)</sup>	12	

Notes

- (1) Free air, mounted on recommended PCB, 2 oz. pad area; thermal resistance R<sub>θJA</sub> - junction to ambient, R<sub>θJM</sub> - junction to mount
- (2) The heat generated must be less than thermal conductivity from junction-to-ambient: dP<sub>D</sub>/DT<sub>J</sub> < 1/R<sub>θJA</sub>
- (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
VSSAF512-M3/H	0.032	H	3500	7" diameter plastic tape and reel
VSSAF512-M3/I	0.032	I	14 000	13" diameter plastic tape and reel
VSSAF512HM3/H <sup>(1)</sup>	0.032	H	3500	7" diameter plastic tape and reel
VSSAF512HM3/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)

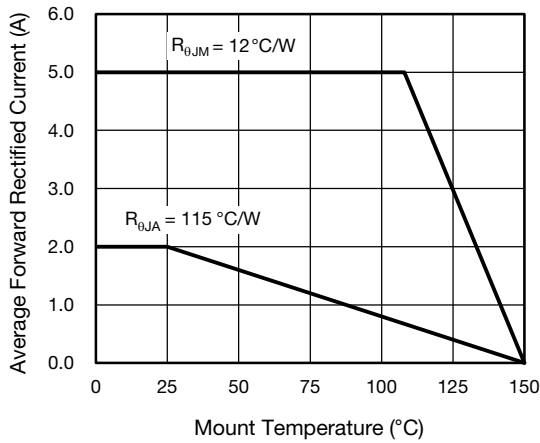


Fig. 1 - Maximum Forward Current Derating Curve

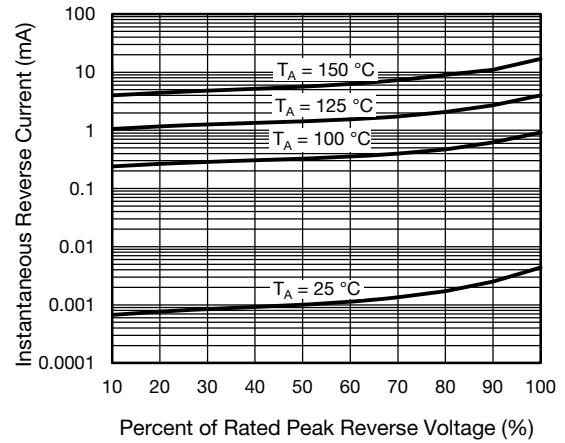


Fig. 4 - Typical Reverse Leakage Characteristics

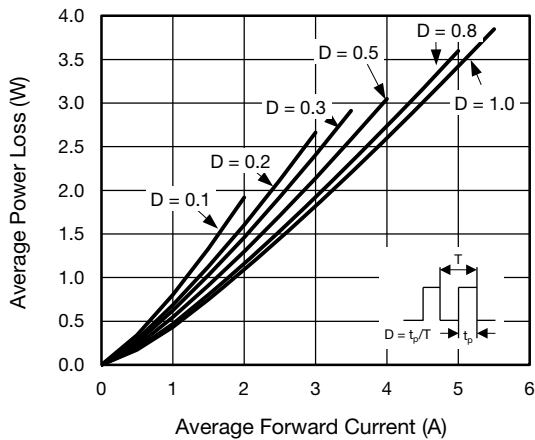


Fig. 2 - Forward Power Loss Characteristics

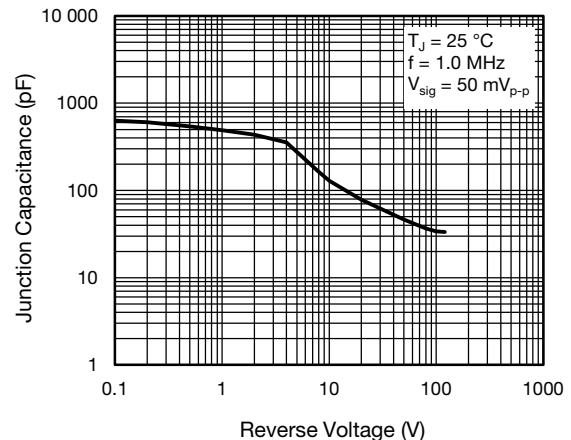


Fig. 5 - Typical Junction Capacitance

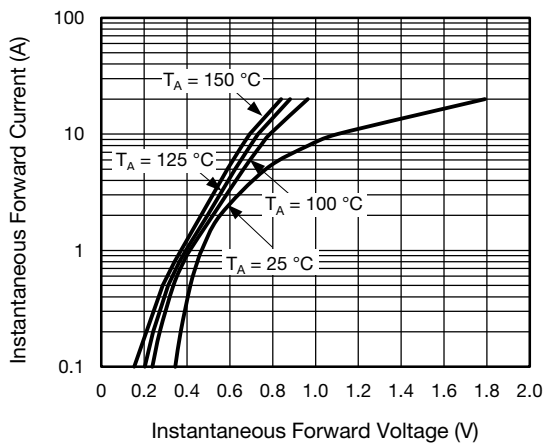


Fig. 3 - Typical Instantaneous Forward Characteristics

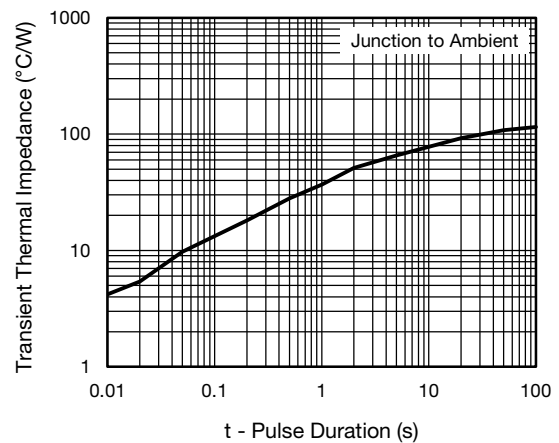


Fig. 6 - Typical Transient Thermal Impedance

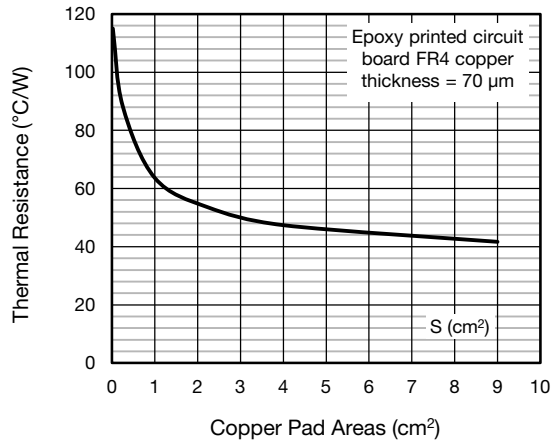
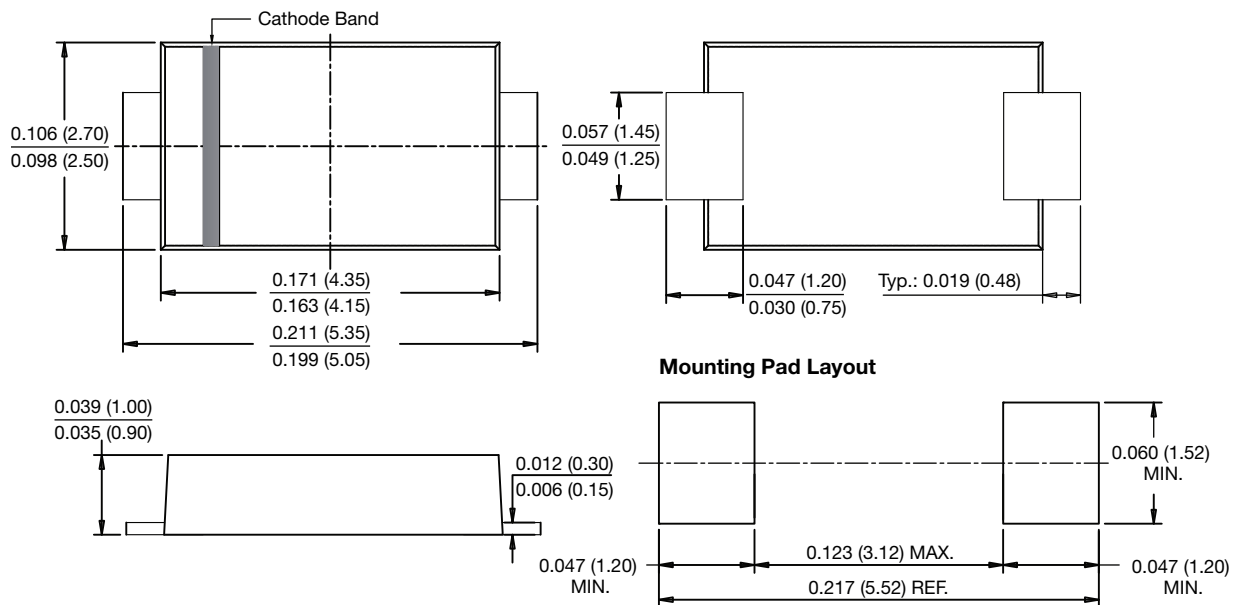


Fig. 7 - Thermal Resistance Junction to Ambient vs. Copper Pad Area

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

**DO-221AC (SlimSMA)**





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