

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



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: 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

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

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 _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⁾	0.60	-	V
	I _F = 5.0 A			0.77	0.88	
	I _F = 2.5 A	T _A = 125 °C		0.53	-	
	I _F = 5.0 A			0.62	0.72	
Reverse current	V _R = 90 V	T _A = 25 °C	I _R ⁽²⁾	0.01	-	mA
		T _A = 125 °C		1.7	-	
	V _R = 120 V	T _A = 25 °C		-	0.4	
		T _A = 125 °C		4	15	
Typical junction capacitance	4.0 V, 1 MHz		C _J	360	-	pF

Notes

- (1) Pulse test: 300 μs 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	VSSAF512	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
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 ⁽¹⁾	0.032	H	3500	7" diameter plastic tape and reel
VSSAF512HM3/I ⁽¹⁾	0.032	I	14 000	13" diameter plastic tape and reel

Note

- (1) AEC-Q101 qualified

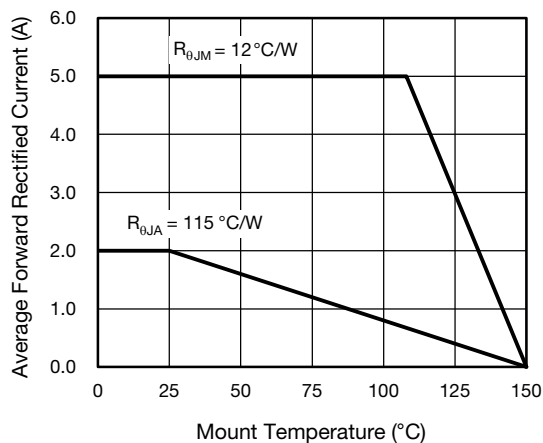
RATINGS AND CHARACTERISTICS CURVES ($T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)


Fig. 1 - Maximum Forward Current Derating Curve

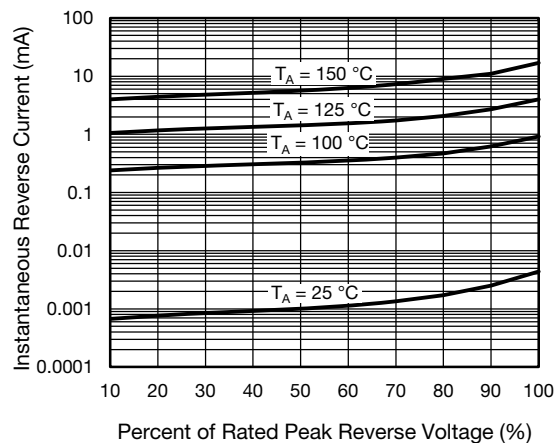


Fig. 4 - Typical Reverse Leakage Characteristics

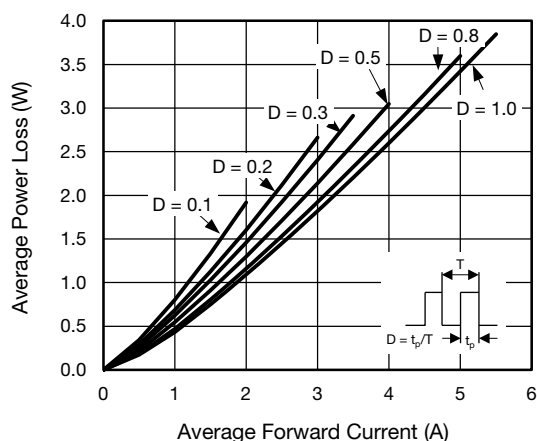


Fig. 2 - Forward Power Loss Characteristics

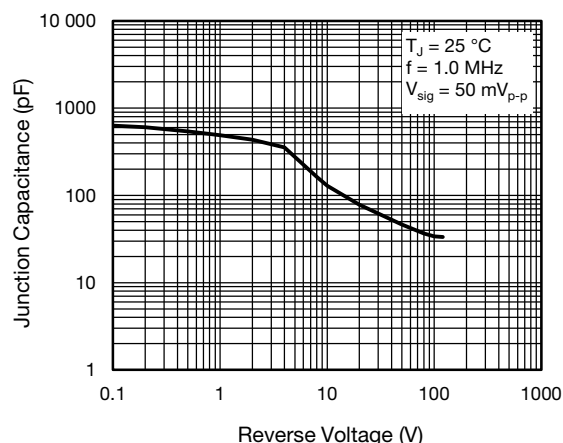


Fig. 5 - Typical Junction Capacitance

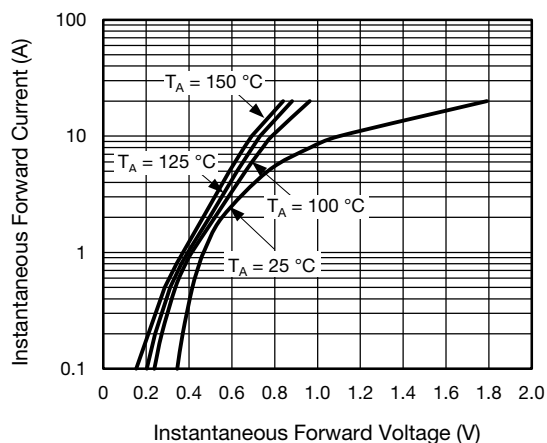


Fig. 3 - Typical Instantaneous Forward Characteristics

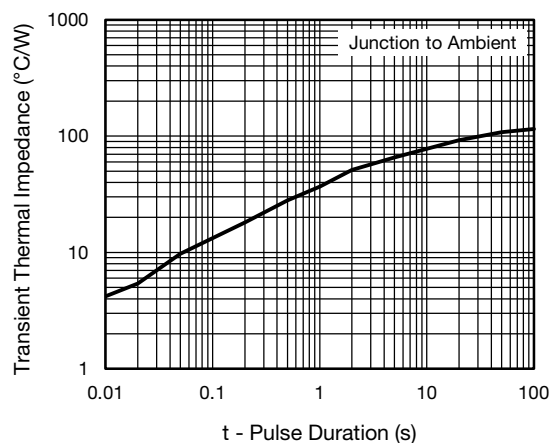


Fig. 6 - Typical Transient Thermal Impedance

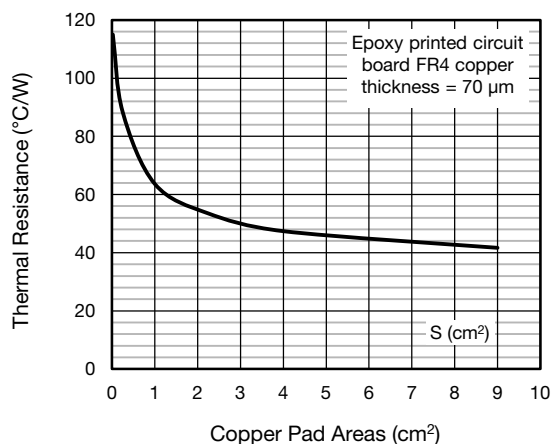
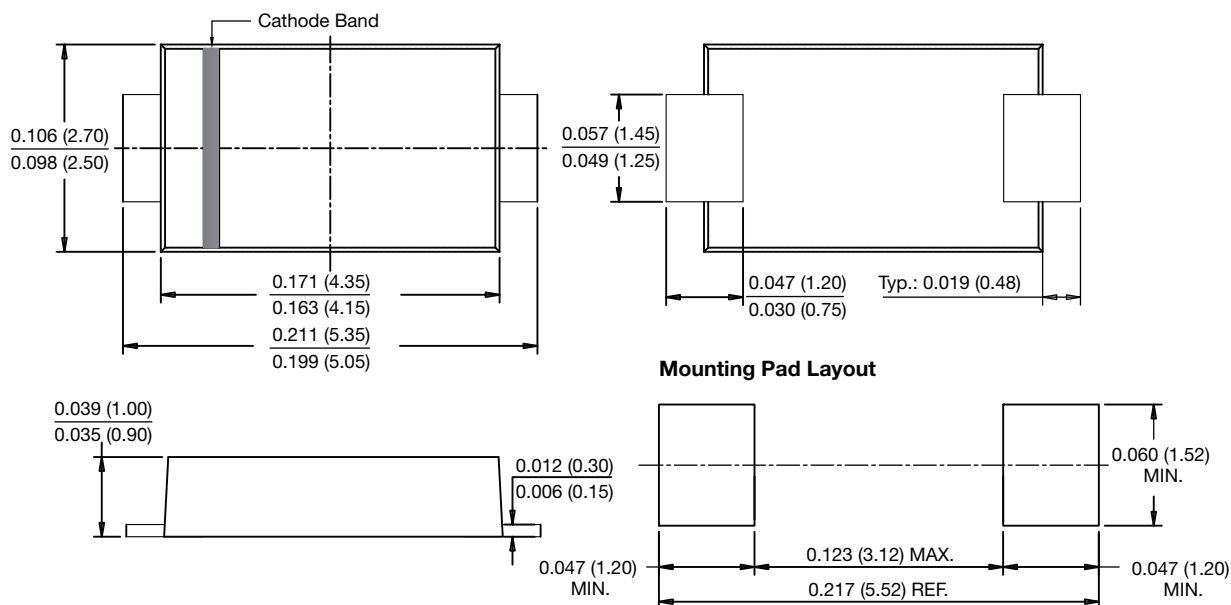


Fig. 7 - Thermal Resistance Junction to Ambient vs. Copper Pad Area

PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

DO-221AC (SlimSMA)





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