AUTOMOTIVE

RoHS

COMPLIANT HALOGEN

FREE



### Vishay General Semiconductor

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



SlimSMA (DO-221AC)

Cathode O Anode

#### **LINKS TO ADDITIONAL RESOURCES**



PRIMARY CHARACTERISTICS				
I <sub>F(AV)</sub>	5.0 A			
$V_{RRM}$	150 V			
I <sub>FSM</sub>	100 A			
V <sub>F</sub> at I <sub>F</sub> = 5.0 A (125 °C)	0.66 V			
T <sub>J</sub> max.	150 °C			
Package	SlimSMA (DO-221AC)			
Circuit configuration	Single			

#### **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 <a href="https://www.vishay.com/doc?99912">www.vishay.com/doc?99912</a>

#### **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 <sub>A</sub> = 25 °C unless otherwise noted)				
PARAMETER	SYMBOL	VSSAF515	UNIT	
Device marking code		V515		
Maximum repetitive peak reverse voltage	V <sub>RRM</sub>	150	V	
Maximum average forward rectified current	I <sub>F(AV)</sub> (1) 1.8			
	I <sub>F(AV)</sub> (2)	5.0	A	
Peak forward surge current 10 ms single half sine-wave superimposed on rated load	I <sub>FSM</sub>	100	А	
Operating junction and storage temperature range	T <sub>J</sub> , T <sub>STG</sub>	-40 to +150	°C	

#### Notes

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



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<b>ELECTRICAL CHARACTERISTICS</b> (T <sub>A</sub> = 25 °C unless otherwise noted)						
PARAMETER	TEST CO	TEST CONDITIONS		TYP.	MAX.	UNIT
Instantaneous forward voltage	I <sub>F</sub> = 2.5 A	T <sub>A</sub> = 25 °C	- V <sub>F</sub> (1)	0.77	-	V
	$I_F = 5.0 A$			1.02	1.10	
	$I_F = 2.5 A$	T <sub>A</sub> = 125 °C		0.58	-	
	$I_F = 5.0 A$			0.66	0.75	
Reverse current	V <sub>R</sub> = 100 V	$V_R = 100 \text{ V}$ $T_A = 25 \text{ °C}$ $T_A = 125 \text{ °C}$	I <sub>R</sub> <sup>(2)</sup>	0.01	-	mA
	v <sub>R</sub> = 100 v	T <sub>A</sub> = 125 °C		0.6	-	
	V <sub>R</sub> = 150 V	T <sub>A</sub> = 25 °C T <sub>A</sub> = 125 °C		-	0.2	IIIA
	v <sub>R</sub> = 150 v	T <sub>A</sub> = 125 °C		2	5	
Typical junction capacitance	4.0 V, 1 MF	4.0 V, 1 MHz		280	-	pF

#### Notes

(1) Pulse test: 300 µs pulse width, 1 % duty cycle

(2) Pulse test: Pulse width  $\leq$  40 ms

THERMAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise specified)				
PARAMETER	SYMBOL VSSAF515 UNIT			
Typical thermal resistance	R <sub>0</sub> JA (1)(2)	115	°C/W	
Typical trieffial resistance	R <sub>θJM</sub> <sup>(3)</sup>	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		
VSSAF515-M3/H	0.032	Н	3500	7" diameter plastic tape and reel		
VSSAF515-M3/I	0.032	I	14 000	13" diameter plastic tape and reel		
VSSAF515HM3/H (1)	0.032	Н	3500	7" diameter plastic tape and reel		
VSSAF515HM3/I (1)	0.032	I	14 000	13" diameter plastic tape and reel		

#### Note

(1) AEC-Q101 qualified

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### **RATINGS AND CHARACTERISTICS CURVES** (T<sub>A</sub> = 25 °C unless otherwise noted)

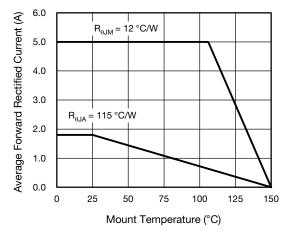


Fig. 1 - Maximum Forward Current Derating Curve

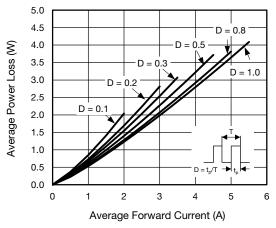


Fig. 2 - Forward Power Loss Characteristics

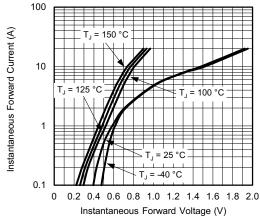


Fig. 3 - Typical Instantaneous Forward Characteristics

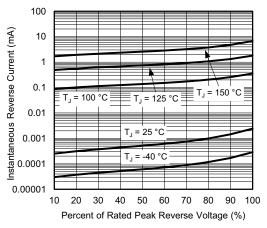


Fig. 4 - Typical Reverse Leakage Characteristics

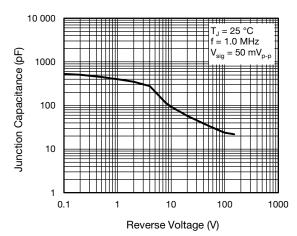


Fig. 5 - Typical Junction Capacitance

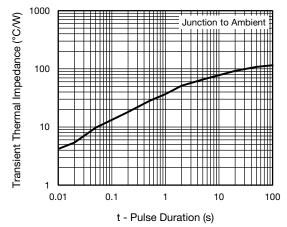


Fig. 6 - Typical Transient Thermal Impedance



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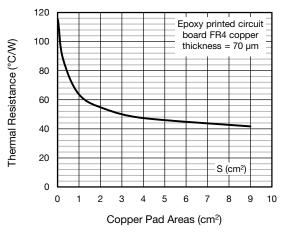


Fig. 7 - Thermal Resistance Junction to Ambient vs. Copper Pad Area

### PACKAGE OUTLINE DIMENSIONS in inches (millimeters)

#### SlimSMA (DO-221AC) Cathode Band 0.057 (1.45) 0.106 (2.70) 0.098 (2.50) 0.049 (1.25) 0.171 (4.35) Typ.: 0.019 (0.48) 0.047 (1.20) 0.163 (4.15) 0.030 (0.75) 0.211 (5.35) 0.199 (5.05) **Mounting Pad Layout** 0.039 (1.00) 0.035 (0.90) 0.060 (1.52) 0.012 (0.30) MIN. 0.006 (0.15) 0.123 (3.12) MAX 0.047 (1.20) 0.047 (1.20) MIN. 0.217 (5.52) REF. MIN.



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