AUTOMOTIVE

RoHS

COMPLIANT HALOGEN

FREE



## Vishay General Semiconductor

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



SlimSMA (DO-221AC)



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



PRIMARY CHARACTERISTICS			
I <sub>F(AV)</sub>	5.0 A		
$V_{RRM}$	100 V		
I <sub>FSM</sub>	100 A		
$V_F$ at $I_F = 5.0$ A (125 °C)	0.62 V		
T <sub>J</sub> max.	175 °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

<b>MAXIMUM RATINGS</b> (T <sub>A</sub> = 25 °C unless otherwise noted)					
PARAMETER	SYMBOL	VSSAF5M10	UNIT		
Device marking code		5M10			
Maximum repetitive peak reverse voltage	V <sub>RRM</sub>	100	V		
Marriago um DC formulard or umant	I <sub>F(AV)</sub> (1)	2.6			
Maximum DC forward current	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 +175	°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> <sup>(1)</sup>	0.59	-	V
	$I_F = 5.0 A$			0.71	0.79	
	I <sub>F</sub> = 2.5 A	T <sub>A</sub> = 125 °C		0.51	-	
	I <sub>F</sub> = 5.0 A			0.62	0.7	
Reverse current	V <sub>R</sub> = 70 V	T <sub>A</sub> = 25 °C T <sub>A</sub> = 125 °C	I <sub>R</sub> <sup>(2)</sup>	0.01	-	- mA
	v <sub>R</sub> = 70 v	T <sub>A</sub> = 125 °C		0.8	-	
	V <sub>R</sub> = 100 V	T <sub>A</sub> = 25 °C T <sub>A</sub> = 125 °C	I <sub>R</sub> <sup>(2)</sup>	-	0.4	- mA
	V <sub>R</sub> = 100 V	T <sub>A</sub> = 125 °C		1.5	4	
Typical junction capacitance	4.0 V, 1 MF	4.0 V, 1 MHz		470	-	pF

#### **Notes**

 $^{(1)}$  Pulse test: 300  $\mu$ s 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 VSSAF5M10		VSSAF5M10	UNIT	
Typical thormal registance	R <sub>θJA</sub> (1)(2)	115	°C/W	
Typical thermal resistance	R <sub>0JM</sub> (3)	12	C/VV	

#### 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
- 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		
VSSAF5M10-M3/H	0.032	Н	3500	7" diameter plastic tape and reel		
VSSAF5M10-M3/I	0.032	I	14 000	13" diameter plastic tape and reel		
VSSAF5M10HM3/H (1)	0.032	Н	3500	7" diameter plastic tape and reel		
VSSAF5M10HM3/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)

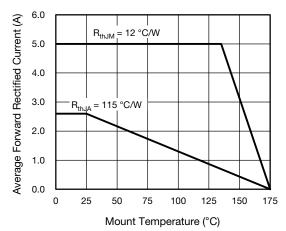


Fig. 1 - Maximum Forward Current Derating Curve

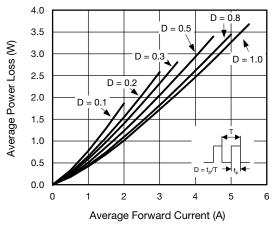


Fig. 2 - Forward Power Loss Characteristics

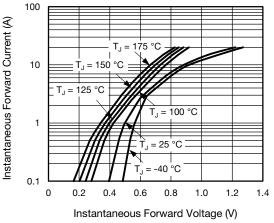


Fig. 3 - Typical Instantaneous Forward Characteristics

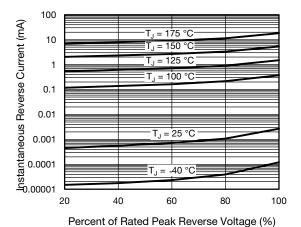


Fig. 4 - Typical Reverse Leakage Characteristics

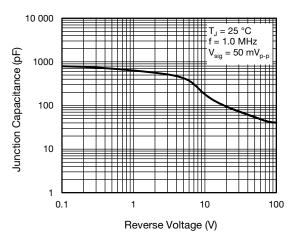


Fig. 5 - Typical Junction Capacitance

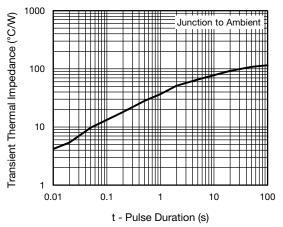


Fig. 6 - Typical Transient Thermal Impedance

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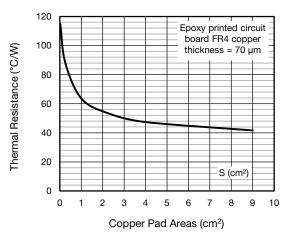
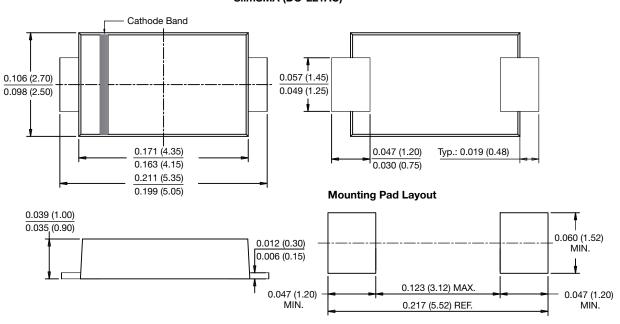


Fig. 7 - Thermal Resistance Junction to Ambient vs. Copper Pad Area

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

#### SlimSMA (DO-221AC)





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