AUTOMOTIVE

RoHS

COMPLIANT

HALOGEN

FREE



### Vishay General Semiconductor

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



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



PRIMARY CHARACTERISTICS				
I <sub>F(AV)</sub>	3 A			
$V_{RRM}$	60 V			
I <sub>FSM</sub>	80 A			
V <sub>F</sub> at I <sub>F</sub> = 3 A (125 °C)	0.46 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"><u>www.vishay.com/doc?99912</u></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 gualified

ALC-Q 101 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	VSSAF3M6	UNIT	
Device marking code		3M6		
Maximum repetitive peak reverse voltage	$V_{RRM}$	60	V	
Maximum DC forward current	I <sub>F(AV)</sub> (1)	2.5	Α	
	I <sub>F(AV)</sub> (2)	3		
Peak forward surge current 8.3 ms single half sine-wave superimposed on rated load	I <sub>FSM</sub>	80	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 CONDITIONS		SYMBOL	TYP.	MAX.	UNIT
Instantaneous forward voltage	I <sub>F</sub> = 1.5 A	T 05 °C		0.49	-	
	$I_F = 3 \text{ A}$ $T_A = 25 \text{ °C}$	V <sub>E</sub> (1)	0.54	0.62	] <sub>v</sub>	
	I <sub>F</sub> = 1.5 A	T <sub>A</sub> = 125 °C	V <sub>F</sub> ('')	0.39	-	V
	I <sub>F</sub> = 3 A			0.46	0.54	
Reverse current	V <sub>R</sub> = 60 V	$T_A = 25 ^{\circ}\text{C}$ $T_A = 125 ^{\circ}\text{C}$ $I_R^{(2)}$	I <sub>R</sub> <sup>(2)</sup>	-	0.3	mA
	$V_{R} = 60 \text{ V}$ $T_{A} = 125 \text{ °C}$	IR (=/	2.0	6.0	IIIA	
Typical junction capacitance	4.0 V, 1 MHz		CJ	500	-	pF

#### Notes

 $^{(1)}\,$  Pulse test: 300  $\mu s$  pulse width, 1 % duty cycle

(2) Pulse test: pulse width ≤ 5 ms

THERMAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise specified)				
PARAMETER SYMBOL VSSAF3M6				
Typical thermal resistance	R <sub>0</sub> JA (1)(2)	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  $R_{\theta JA}$  - 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	
VSSAF3M6-M3/H	0.032	Н	3500	7" diameter plastic tape and reel	
VSSAF3M6-M3/I	0.032	I	14 000	13" diameter plastic tape and reel	
VSSAF3M6HM3/H (1)	0.032	Н	3500	7" diameter plastic tape and reel	
VSSAF3M6HM3/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)

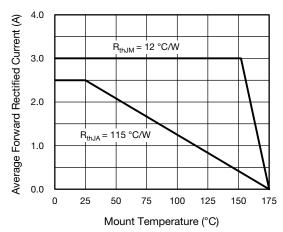


Fig. 1 - Maximum Forward Current Derating Curve

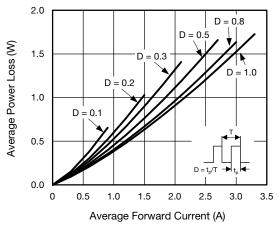


Fig. 2 - Forward Power Loss Characteristics

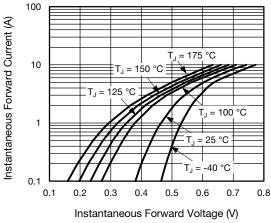


Fig. 3 - Typical Instantaneous Forward Characteristics

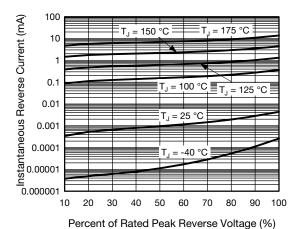


Fig. 4 - Typical Reverse Leakage Characteristics

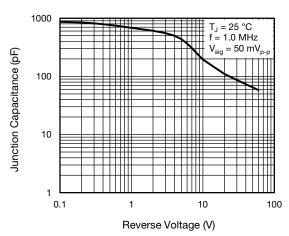


Fig. 5 - Typical Junction Capacitance

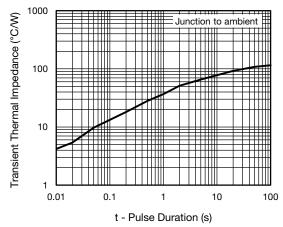


Fig. 6 - Typical Transient Thermal Impedance



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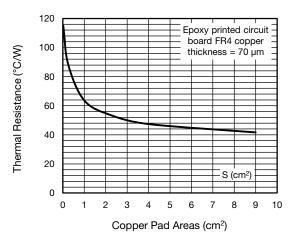
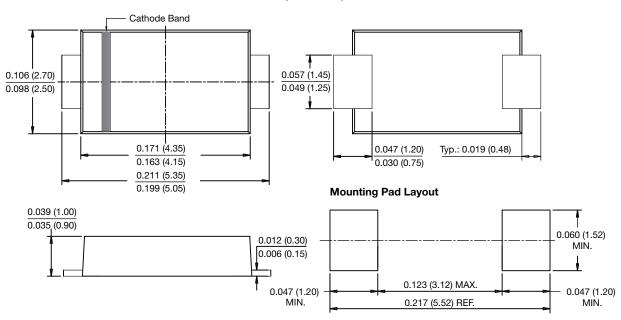


Fig. 7 - Thermal Resistance Junction to Ambient vs. Copper Pad Area

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

#### SlimSMA (DO-221AC)





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