AUTOMOTIVE

ROHS

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>	3.0 A		
$V_{RRM}$	45 V		
I <sub>FSM</sub>	80 A		
$I_R$ at $V_R = 45 \text{ V } (125 \text{ °C})$	5 mA		
V <sub>F</sub> at I <sub>F</sub> = 3.0 A (125 °C)	0.37 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 low voltage, 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, and

commercial grade

Base  $P/NHM3_X$  - halogen-free, RoHS-compliant, and

AEC-Q101 qualified

("\_X" denotes revision code e.g. A, B,....)

Terminals: matte tin plated leads, solderable per

J-STD-002 and JESD22-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	VSSAF3L45	UNIT	
Device marking code		3L45		
Maximum repetitive peak reverse voltage	V <sub>RRM</sub>	45	V	
Maximum DC forward rectified current	I <sub>F(AV)</sub> (1)	3.0	А	
Peak forward surge current 10 ms single half sine-wave superimposed on rated load	I <sub>FSM</sub>	I <sub>FSM</sub> 80		
Operating junction and storage temperature range	T <sub>J</sub> <sup>(2)</sup> , T <sub>STG</sub>	-40 to +150	°C	

#### Note

- (1) Mounted on 10 mm x 10 mm pad areas, 2 oz. FR4 PCB
- $^{(2)}$  The heat generated must be less than thermal conductivity from junction to ambient:  $dP_D/DT_J < 1/R_{\theta JA}$



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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	1	V <sub>F</sub> <sup>(1)</sup>	0.41	-	V
	$I_F = 3.0 \text{ A}$			0.46	0.54	
	I <sub>F</sub> = 1.5 A	T <sub>A</sub> = 125 °C		0.31	-	
	I <sub>F</sub> = 3.0 A			0.37	0.46	
Reverse current	V <sub>R</sub> = 45 V	T <sub>A</sub> = 25 °C	$T_A = 25 ^{\circ}\text{C}$ $T_A = 125 ^{\circ}\text{C}$ $I_R^{(2)}$	-	450	μΑ
	v <sub>R</sub> = 45 v	$T_A = 45 \text{ °C}$		5	25	mA
Typical junction capacitance	4.0 V, 1 MHz		CJ	425	-	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 VSSAF3L45		UNIT	
Typical thermal resistance	R <sub>0</sub> JA (1)(2)	115	°C/W	
Typical thermal resistance	R <sub>0JM</sub> (2)(3)	12		

#### Notes

- $^{(1)}\,$  Free air, mounted on recommended PCB, 2 oz. pad area; thermal resistance  $R_{\theta JA}$  junction to ambient
- (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 10 mm x 10 mm pad areas, 2 oz. FR4 PCB,  $R_{\theta JM}$  junction to mount

ORDERING INFORMATION (Example)					
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE	
VSSAF3L45-M3/6A	0.032	6A	3500	7" diameter plastic tape and reel	
VSSAF3L45-M3/6B	0.032	6B	14 000	13" diameter plastic tape and reel	
VSSAF3L45HM3_A/H (1)	0.032	Н	3500	7" diameter plastic tape and reel	
VSSAF3L45HM3_A/I (1)	0.032	I	14 000	13" diameter plastic tape and reel	

#### Note

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

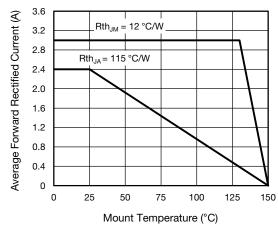


Fig. 1 - Maximum Forward Current Derating Curve

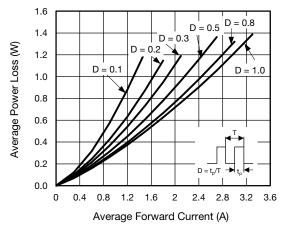


Fig. 2 - Average Power Loss Characteristics

<sup>(1)</sup> AEC-Q101 qualified



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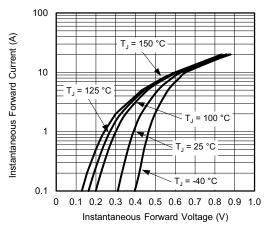


Fig. 3 - Typical Instantaneous Forward Characteristics

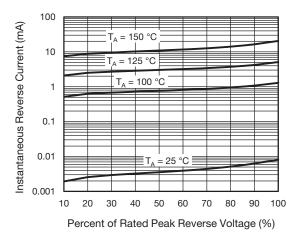


Fig. 4 - Typical Reverse Leakage Characteristics

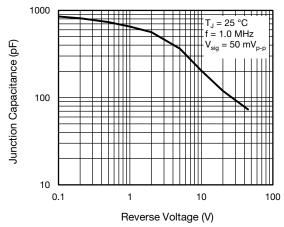


Fig. 5 - Typical Junction Capacitance

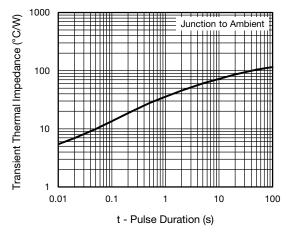


Fig. 6 - Typical Transient Thermal Impedance

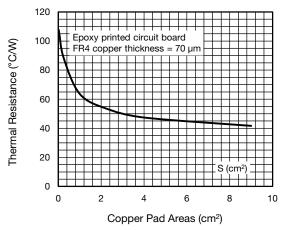


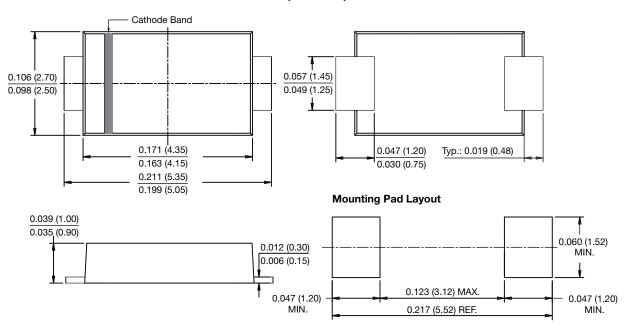
Fig. 7 - Thermal Resistance Junction to Ambient vs. Copper Pad Areas



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

#### SlimSMA (DO-221AC)





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