HALOGEN

FREE



## Vishay General Semiconductor

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



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



PRIMARY CHARACTERISTICS			
I <sub>F(AV)</sub>	4.0 A		
$V_{RRM}$	100 V		
I <sub>FSM</sub>	80 A		
E <sub>AS</sub>	50 mJ		
$V_F$ at $I_F = 4.0 A$	0.61 V		
T <sub>J</sub> max.	150 °C		
Package	SMB (DO-214AA)		
Circuit configuration	Single		

#### **FEATURES**

- Low profile package
- · 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
- 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 applications.

#### **MECHANICAL DATA**

Case: SMB (DO-214AA)

Molding compound meets UL 94 V-0 flammability rating

Base P/N-M3 - RoHS-compliant, commercial grade

Terminals: matte tin plated leads, solderable per

J-STD-002 and JESD 22-B102

M3 suffix meets JESD 201 class 2 whisker test **Polarity:** color band denotes the cathode end

<b>MAXIMUM RATINGS</b> (T <sub>A</sub> = 25 °C unless otherwise noted)				
PARAMETER	SYMBOL	VSSB410S	UNIT	
Device marking code		V4B		
Maximum repetitive peak reverse voltage	$V_{RRM}$	100	V	
Maximum DC forward current	I <sub>F</sub> <sup>(1)</sup>	4.0		
	I <sub>F</sub> <sup>(2)</sup>	1.9	_ A	
Peak forward surge current 10 ms single half sine-wave superimposed on rated load	I <sub>FSM</sub> 80		А	
Non-repetitive avalanche energy at $T_J = 25$ °C, $L = 60$ mH	E <sub>AS</sub>	50	mJ	
Peak repetitive reverse current at $t_p$ = 2 $\mu$ s, 1 kHz, $T_J$ = 38 °C $\pm$ 2 °C	I <sub>RRM</sub>	1.0	А	
Operating junction and storage temperature range	T <sub>J</sub> , T <sub>STG</sub>	-40 to +150	°C	

#### Notes

<sup>(1)</sup> Mounted on 14 mm x 14 mm pad areas, 1 oz. FR4 P.C.B.

<sup>(2)</sup> Free air, mounted on recommended copper 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
Breakdown voltage	I <sub>R</sub> = 1.0 mA	T <sub>A</sub> = 25 °C	$V_{BR}$	100 (minimum)	-	V
Instantaneous forward voltage	I <sub>E</sub> = 4.0 A	T <sub>A</sub> = 25 °C	V <sub>F</sub> <sup>(1)</sup>	0.68	0.77	- V
	IF = 4.0 A	T <sub>A</sub> = 125 °C		0.61	0.69	
Reverse current	V <sub>R</sub> = 70 V	T <sub>A</sub> = 25 °C	I <sub>R</sub> <sup>(2)</sup>	1.5	-	μA
	v <sub>R</sub> = 70 v	T <sub>A</sub> = 125 °C		1.2	-	mA
	V <sub>R</sub> = 100 V	T <sub>A</sub> = 25 °C		7.0	250	μA
	V <sub>R</sub> = 100 V	T <sub>A</sub> = 125 °C		3.6	20	mA
Typical junction capacitance	4.0 V, 1 MHz		CJ	230	-	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 noted)				
PARAMETER	SYMBOL	VSSB410S	UNIT	
Typical thermal resistance	R <sub>θJA</sub> <sup>(1)</sup>	120	°C/W	
	R <sub>0JM</sub> (2)	15		

#### **Notes**

 $^{(1)}$  Free air, mounted on recommended P.C.B. 1 oz. pad area. Thermal resistance  $R_{\theta JA}$  - junction to ambient

 $^{(2)}$  Units mounted on P.C.B. with 14 mm x 14 mm copper pad areas.  $R_{\theta JM}$  - junction to mount

ORDERING INFORMATION (Example)					
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE	
VSSB410S-M3/52T	0.096	52T	750	7" diameter plastic tape and reel	
VSSB410S-M3/5BT	0.096	5BT	3200	13" diameter plastic tape and reel	

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

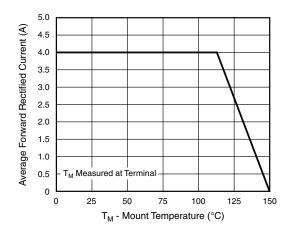


Fig. 1 - Maximum Forward Current Derating Curve

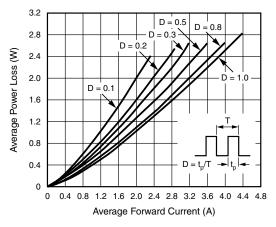


Fig. 2 - Forward Power Loss Characteristics

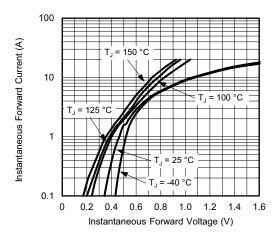


Fig. 3 - Typical Instantaneous Forward Characteristics

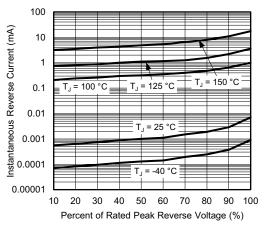


Fig. 4 - Typical Reverse Characteristics

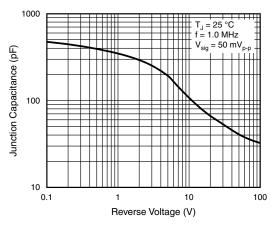


Fig. 5 - Typical Junction Capacitance

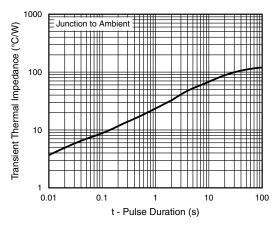


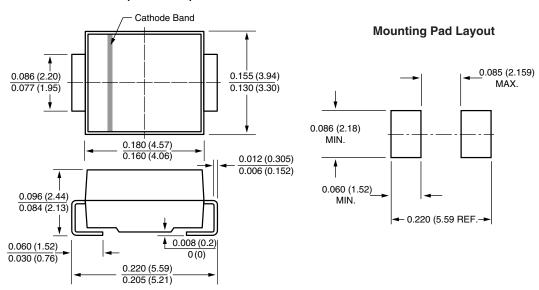
Fig. 6 - Typical Transient Thermal Impedance



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

### **SMB (DO-214AA)**





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