HALOGEN

FREE



### Vishay General Semiconductor

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



**SMB (DO-214AA)** 



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



PRIMARY CHARACTERISTICS				
I <sub>F(AV)</sub>	4.0 A			
V <sub>RRM</sub>	200 V			
I <sub>FSM</sub>	40 A			
V <sub>F</sub> at I <sub>F</sub> = 4.0 A	0.71 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"><u>www.vishay.com/doc?99912</u></a>

#### **TYPICAL APPLICATIONS**

For use in high frequency converters, freewheeling diodes, 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 - halogen-free and 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

MAXIMUM RATINGS (T <sub>A</sub> = 25 °C unless otherwise noted)					
PARAMETER	SYMBOL	VSSB420S	UNIT		
Device marking code		V4D			
Maximum repetitive peak reverse voltage	$V_{RRM}$	200	V		
Maximum DC forward current	I <sub>F</sub> <sup>(1)</sup>	4.0	۸		
	I <sub>F</sub> <sup>(2)</sup>	1.8	A		
Peak forward surge current 10 ms single half sine-wave superimposed on rated load	I <sub>FSM</sub>	40	А		
Voltage rate of change (rated V <sub>R</sub> )	dV/dt	10 000	V/µs		
Operating junction and storage temperature range	T <sub>J</sub> , T <sub>STG</sub>	-40 to +150	°C		

#### Notes

- (1) Units mounted on PCB with 20 mm x 20 mm pad areas
- (2) Free air, mounted on recommended PCB 1 oz. 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> = 4.0 A	T <sub>A</sub> = 25 °C	V <sub>F</sub> <sup>(1)</sup>	1.44	1.90	V
		T <sub>A</sub> = 125 °C		0.71	0.80	
	V <sub>R</sub> = 180 V	T <sub>A</sub> = 25 °C	I <sub>R</sub> <sup>(2)</sup>	3	-	μA
Payaraa aurrant par diada		T <sub>A</sub> = 125 °C		0.7	-	mA
Reverse current per diode	V <sub>R</sub> = 200 V	T <sub>A</sub> = 25 °C		4	150	μA
		T <sub>A</sub> = 125 °C		1.1	10	mA
Typical junction capacitance	4.0 V, 1 MHz		CJ	120	-	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	ETER SYMBOL VSSB420S			
Typical thermal resistance	R <sub>0JA</sub> (1)	R <sub>0JA</sub> <sup>(1)</sup> 120		
Typical trieffial resistance	R <sub>0JM</sub> (2)	15	°C/W	

#### Notes

 $^{(1)}$  Free air, mounted on recommended PCB 1 oz. pad area; thermal resistance  $R_{\theta JA}$  - junction to ambient

 $^{(2)}$  Units mounted on PCB with 20 mm x 20 mm copper pad areas; thermal resistance  $R_{\theta JM}$  - junction to mount

ORDERING INFORMATION (Example)					
PREFERRED P/N UNIT WEIGHT (g) PREFERRED PACKAGE CODE BASI		BASE QUANTITY	DELIVERY MODE		
VSSB420S-M3/52T	0.096	52T	750	7" diameter plastic tape and reel	
VSSB420S-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)

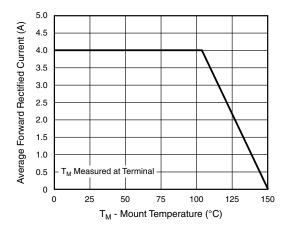


Fig. 1 - Maximum Forward Current Derating Curve

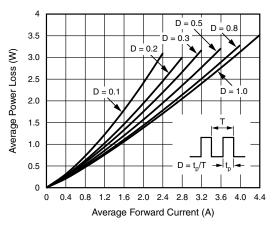


Fig. 2 - Forward Power Loss Characteristics

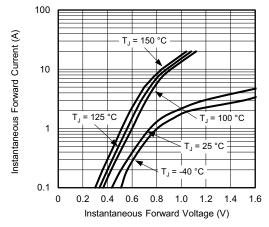


Fig. 3 - Typical Instantaneous Forward Characteristics

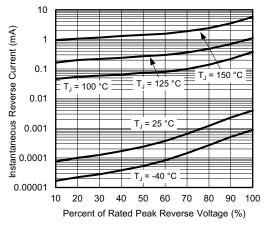


Fig. 4 - Typical Reverse Characteristics

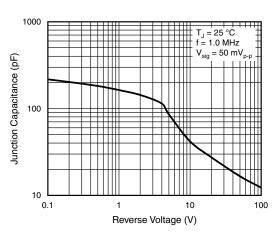


Fig. 5 - Typical Junction Capacitance

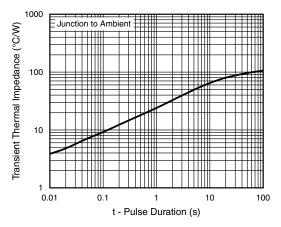


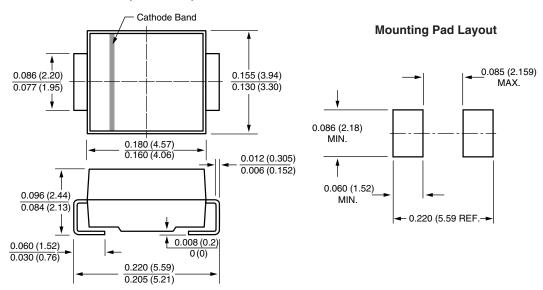
Fig. 6 - Typical Transient Thermal Impedance



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

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





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