

## High Performance Schottky Rectifier, 1.0 A



SMB (DO-214AA)



### FEATURES

- Low forward voltage drop
- Guard ring for enhanced ruggedness and long term reliability
- 125 °C T<sub>J</sub> operation (V<sub>R</sub> < 5 V)
- Optimized for OR-ing applications
- High frequency operation
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Meets JESD 201 class 2 whisker test
- AEC-Q101 qualified
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

### DESCRIPTION / APPLICATIONS

The VS-10BQ015HM3 surface mount Schottky rectifier has been designed for applications requiring low forward drop and very small foot prints on PC boards. The proprietary barrier technology allows for reliable operation up to 125 °C junction temperature. Typical applications are in disk drives, switching power supplies, converters, freewheeling diodes, battery charging, and reverse battery protection.

PRIMARY CHARACTERISTICS	
I <sub>F(AV)</sub>	1.0 A
V <sub>R</sub>	15 V
V <sub>F</sub> at I <sub>F</sub>	0.21 V
I <sub>RM</sub>	35 mA at 100 °C
T <sub>J</sub> max.	125 °C
E <sub>AS</sub>	1.0 mJ
Package	SMB (DO-214AA)
Circuit configuration	Single

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
I <sub>F(AV)</sub>	Rectangular waveform	1.0	A
V <sub>RRM</sub>		15	V
I <sub>FSM</sub>	t <sub>p</sub> = 5 μs sine	140	A
V <sub>F</sub>	1.0 A <sub>pk</sub> , T <sub>J</sub> = 125 °C	0.21	V
T <sub>J</sub>	Range	-55 to +125	°C

VOLTAGE RATINGS			
PARAMETER	SYMBOL	VS-10BQ015HM3	UNITS
Maximum DC reverse voltage	V <sub>R</sub>	15	V
Maximum working peak reverse voltage	V <sub>RWM</sub>	25	

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current See fig. 5	I <sub>F(AV)</sub>	50 % duty cycle at T <sub>L</sub> = 134 °C, rectangular waveform	1.0	A
Maximum peak one cycle non-repetitive surge current See fig. 7	I <sub>FSM</sub>	5 μs sine or 3 μs rect. pulse	140	A
		10 ms sine or 6 ms rect. pulse	40	
Non-repetitive avalanche energy	E <sub>AS</sub>	T <sub>J</sub> = 25 °C, I <sub>AS</sub> = 1 A, L = 2 mH	1.0	mJ
Repetitive avalanche current	I <sub>AR</sub>	Current decaying linearly to zero in 1 μs Frequency limited by T <sub>J</sub> maximum V <sub>A</sub> = 1.5 x V <sub>R</sub> typical	1.0	A



ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop See fig. 1	$V_{FM}^{(1)}$	1 A	$T_J = 25\text{ }^\circ\text{C}$	0.33	V
		2 A		0.39	
		1 A	$T_J = 125\text{ }^\circ\text{C}$	0.21	
		2 A		0.29	
Maximum reverse leakage current See fig. 2	$I_{RM}$	$T_J = 25\text{ }^\circ\text{C}$	$V_R = \text{Rated } V_R$	0.5	mA
		$T_J = 100\text{ }^\circ\text{C}$		35	
Threshold voltage	$V_{F(TO)}$	$T_J = T_J \text{ maximum}$		-	V
Forward slope resistance	$r_t$			-	m $\Omega$
Typical junction capacitance	$C_T$	$V_R = 5 V_{DC}$ , (test signal range 100 kHz to 1 MHz), $25\text{ }^\circ\text{C}$		390	pF
Typical series inductance	$L_S$	Measured lead to lead 5 mm from package body		2.0	nH
Maximum voltage rate of change	$dV/dt$	Rated $V_R$		10 000	V/ $\mu$ s

**Note**

(1) Pulse width = 300  $\mu$ s, duty cycle = 2 %

THERMAL - MECHANICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum junction temperature range	$T_J^{(1)}$			-55 to +125	$^\circ\text{C}$
Maximum storage temperature range	$T_{Stg}$			-55 to +150	
Maximum thermal resistance, junction to lead	$R_{thJL}^{(2)}$	DC operation See fig. 4		36	$^\circ\text{C/W}$
Maximum thermal resistance, junction to ambient	$R_{thJA}$	DC operation		80	
Approximate weight				0.10	g
				0.003	oz.
Marking device		Case style SMB (DO-214AA)		1C	

**Notes**

(1)  $\frac{dP_{tot}}{dT_J} < \frac{1}{R_{thJA}}$  thermal runaway condition for a diode on its own heatsink

(2) Mounted 1" square PCB

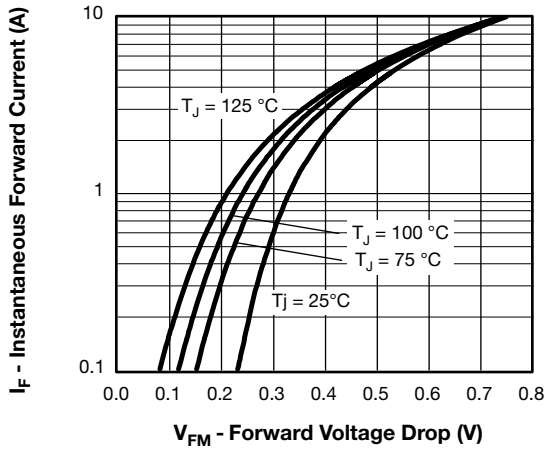


Fig. 1 - Maximum Forward Voltage Drop Characteristics

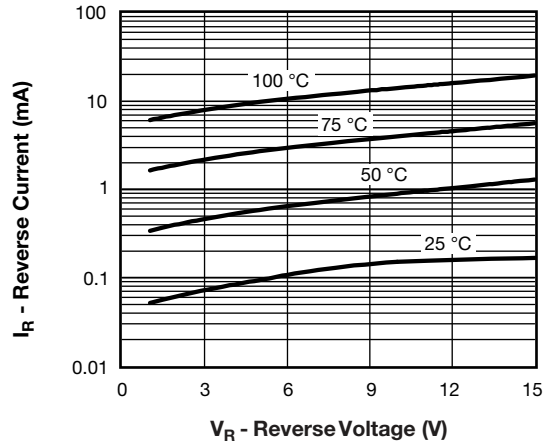


Fig. 2 - Typical Peak Reverse Current vs. Reverse Voltage

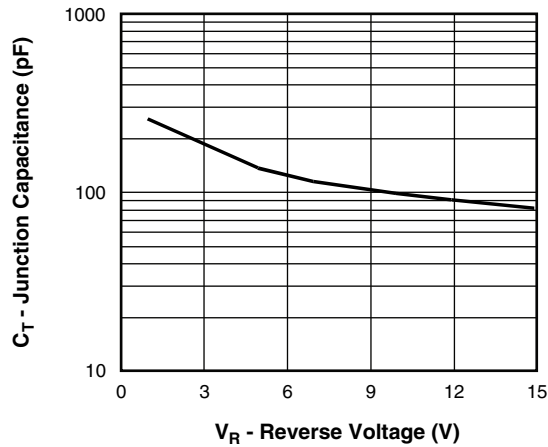


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

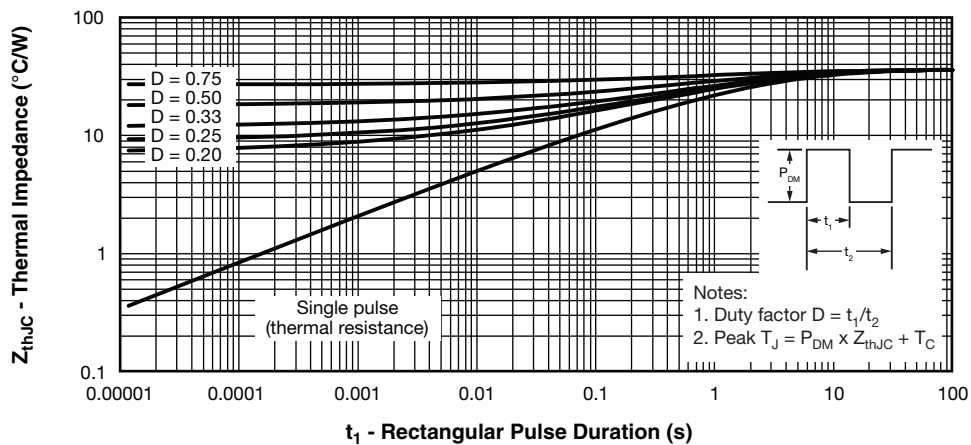


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

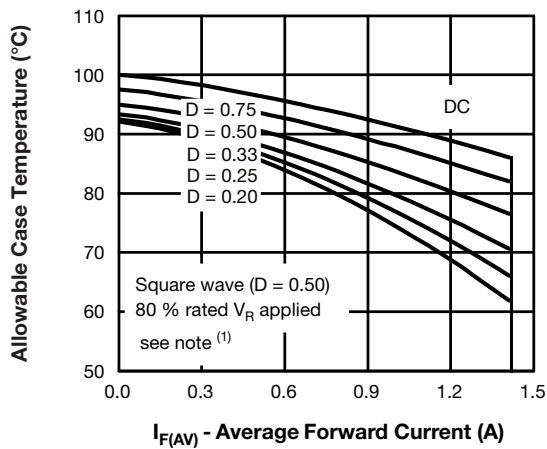


Fig. 5 - Maximum Average Forward Current vs. Allowable Lead Temperature

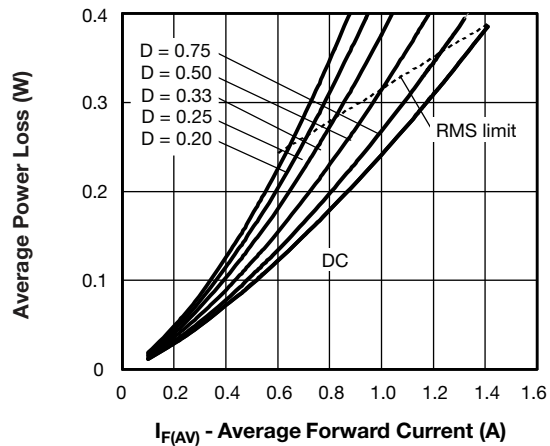


Fig. 6 - Maximum Average Forward Dissipation vs. Average Forward Current

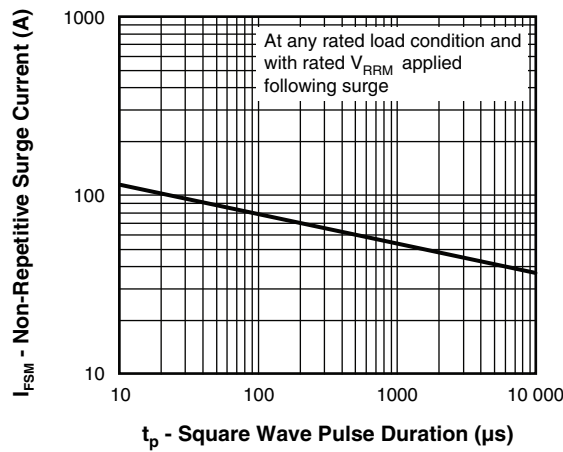


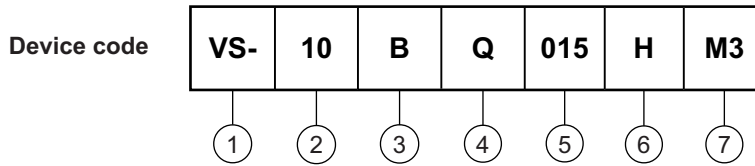
Fig. 7 - Maximum Non-Repetitive Surge Current

**Note**

- (1) Formula used:  $T_C = T_J - (P_d + P_{d_{REV}}) \times R_{thJC}$ ;
- $P_d$  = Forward power loss =  $I_{F(AV)} \times V_{FM}$  at  $(I_{F(AV)}/D)$  (see fig. 6);
- $P_{d_{REV}}$  = Inverse power loss =  $V_{R1} \times I_R (1 - D)$ ;  $I_R$  at  $V_{R1} = 80\%$  rated  $V_R$



**ORDERING INFORMATION TABLE**



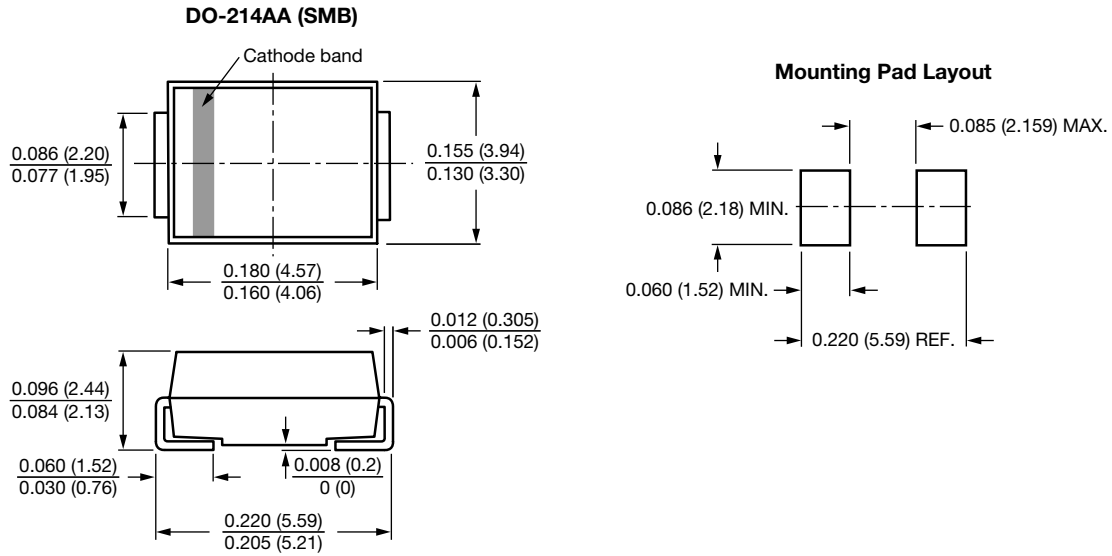
- 1** - Vishay Semiconductors product
- 2** - Current rating
- 3** - B = SMB
- 4** - Q = Schottky "Q" series
- 5** - Voltage rating (015 = 15 V)
- 6** - H = AEC-Q101 qualified
- 7** - Environmental digit:  
M3 = halogen-free, RoHS compliant and terminations lead (Pb)-free

<b>ORDERING INFORMATION</b> (Example)			
PREFERRED P/N	PREFERRED PACKAGE CODE	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-10BQ015HM3/5BT	5BT	3200	13" diameter plastic tape and reel

<b>LINKS TO RELATED DOCUMENTS</b>	
Dimensions	<a href="http://www.vishay.com/doc?95401">www.vishay.com/doc?95401</a>
Part marking information	<a href="http://www.vishay.com/doc?95403">www.vishay.com/doc?95403</a>
Packaging information	<a href="http://www.vishay.com/doc?95404">www.vishay.com/doc?95404</a>
SPIICE model	<a href="http://www.vishay.com/doc?95666">www.vishay.com/doc?95666</a>

## SMB

**DIMENSIONS** in inches (millimeters)





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