



**THE DATASHEET OF  
VS-20BQ030HM3/5BT**



## High Performance Schottky Rectifier, 2 A



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

### FEATURES

- Low forward voltage drop
- Guard ring for enhanced ruggedness and long term reliability
- Small foot print, surface mountable
- High frequency operation
- 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

The VS-20BQ030HM3 surface mount Schottky rectifier has been designed for applications requiring low forward drop and small foot prints on PC boards. Typical applications are in disk drives, switching power supplies, converters, freewheeling diodes, battery charging, and reverse battery protection.

PRODUCT SUMMARY	
Package	SMB
$I_{F(AV)}$	2 A
$V_R$	30 V
$V_F$ at $I_F$	0.37 V
$I_{RM}$	15 mA at 125 °C
$T_J$ max.	150 °C
Diode variation	Single die
$E_{AS}$	3.0 mJ

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform	2	A
$V_{RRM}$		30	V
$I_{FSM}$	$t_p = 5 \mu s$ sine	350	A
$V_F$	$2.0 A_{pk}$ , $T_J = 125 \text{ }^\circ\text{C}$	0.37	V
$T_J$	Range	-55 to +150	°C

VOLTAGE RATINGS			
PARAMETER	SYMBOL	VS-20BQ030HM3	UNITS
Maximum DC reverse voltage	$V_R$	30	V
Maximum working peak reverse voltage	$V_{RWM}$		

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current	$I_{F(AV)}$	50 % duty cycle at $T_L = 119 \text{ }^\circ\text{C}$ , rectangular waveform	2.0	A
Maximum peak one cycle non-repetitive surge current	$I_{FSM}$	5 $\mu s$ sine or 3 $\mu s$ rect. pulse	350	
		10 ms sine or 6 ms rect. pulse	75	
Non-repetitive avalanche energy	$E_{AS}$	$T_J = 25 \text{ }^\circ\text{C}$ , $I_{AS} = 1 \text{ A}$ , $L = 6 \text{ mH}$	3.0	mJ
Repetitive avalanche current	$I_{AR}$	Current decaying linearly to zero in 1 $\mu s$ Frequency limited by $T_J$ maximum $V_A = 1.5 \times V_R$ typical	1.0	A



ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop	$V_{FM}^{(1)}$	2 A	$T_J = 25\text{ }^\circ\text{C}$	0.47	V
		4 A		0.55	
		2 A	$T_J = 125\text{ }^\circ\text{C}$	0.37	
		4 A		0.47	
Maximum reverse leakage current	$I_{RM}$	$T_J = 25\text{ }^\circ\text{C}$	$V_R = \text{Rated } V_R$	0.5	mA
		$T_J = 125\text{ }^\circ\text{C}$		15	
Maximum junction capacitance	$C_T$	$V_R = 5 V_{DC}$ , (test signal range 100 kHz to 1 MHz), $25\text{ }^\circ\text{C}$		200	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 and storage temperature range	$T_J^{(1)}$ , $T_{Stg}$			-55 to +150	$^\circ\text{C}$
Maximum thermal resistance, junction to lead	$R_{thJL}^{(2)}$	DC operation		25	$^\circ\text{C/W}$
Maximum thermal resistance, junction to ambient	$R_{thJA}$			80	
Approximate weight				0.10	g
				0.003	oz.
Marking device		Case style SMB (similar DO-214AA)		2E	

**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

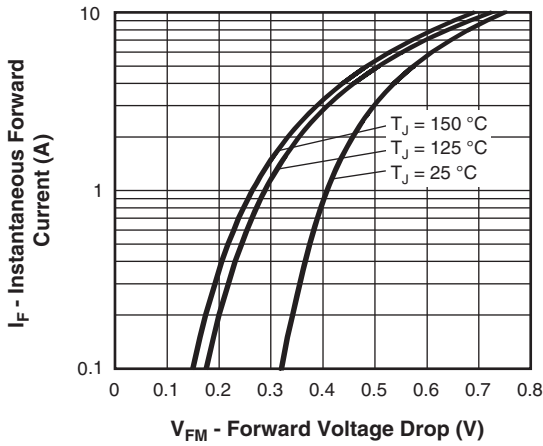


Fig. 1 - Maximum Forward Voltage Drop Characteristics

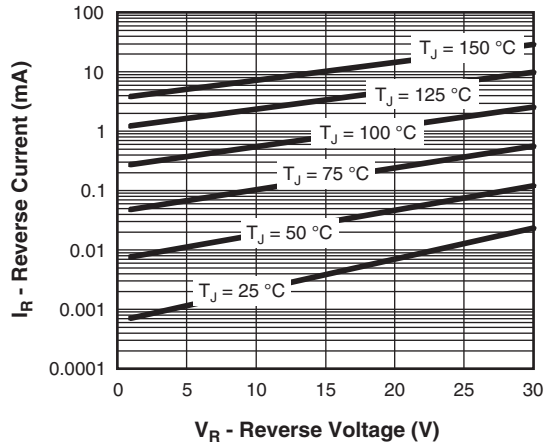


Fig. 2 - Typical Peak Reverse Current vs. Reverse Voltage

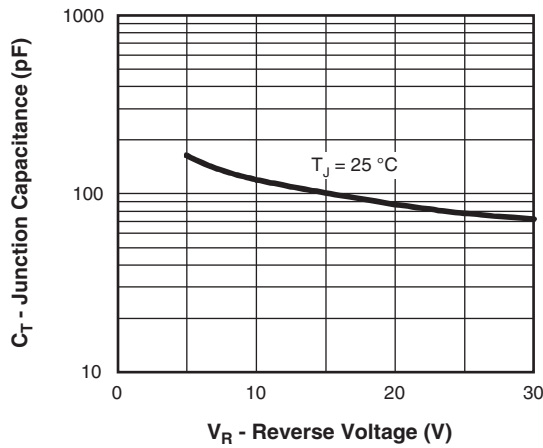


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

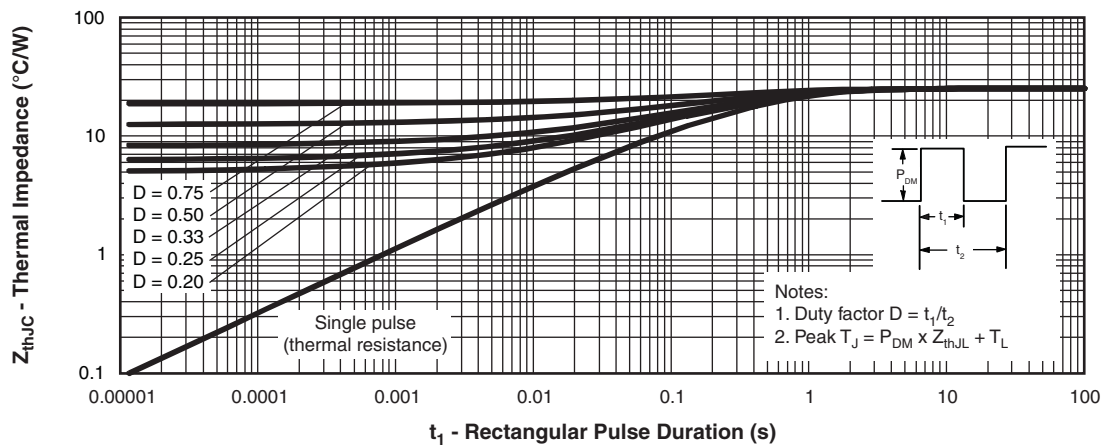


Fig. 4 - Maximum Thermal Impedance  $Z_{thJL}$  Characteristics

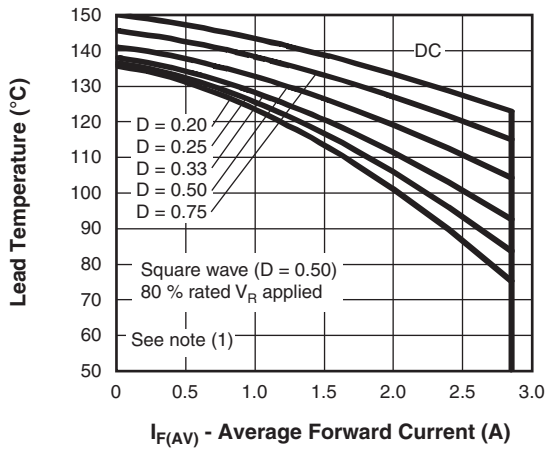


Fig. 5 - Maximum Average Forward Current vs. Allowable Lead Temperature

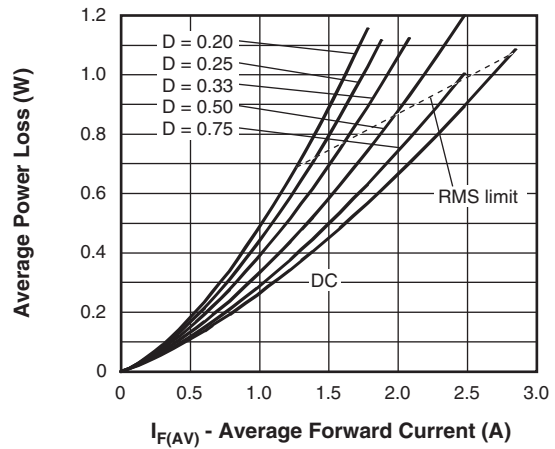


Fig. 6 - Maximum Average Forward Dissipation vs. Average Forward Current

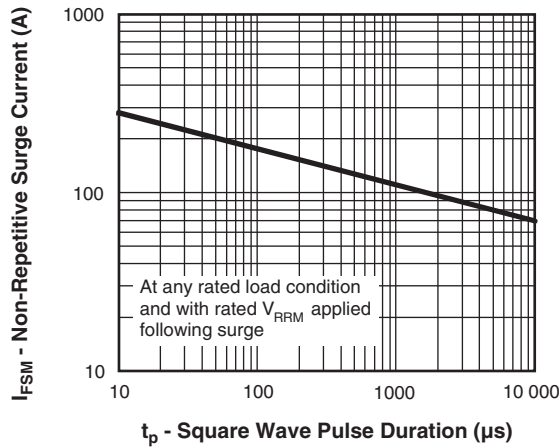


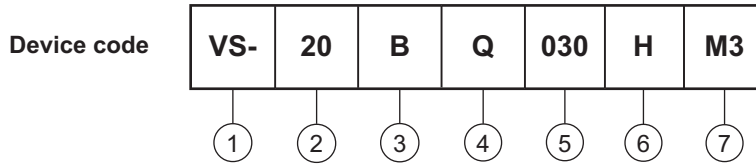
Fig. 7 - Maximum Peak Surge Forward Current vs. Pulse Duration

**Note**

- (1) Formula used:  $T_L = T_J - (P_d + P_{d_{REV}}) \times R_{thJL}$ ;  
 $P_d$  = 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**



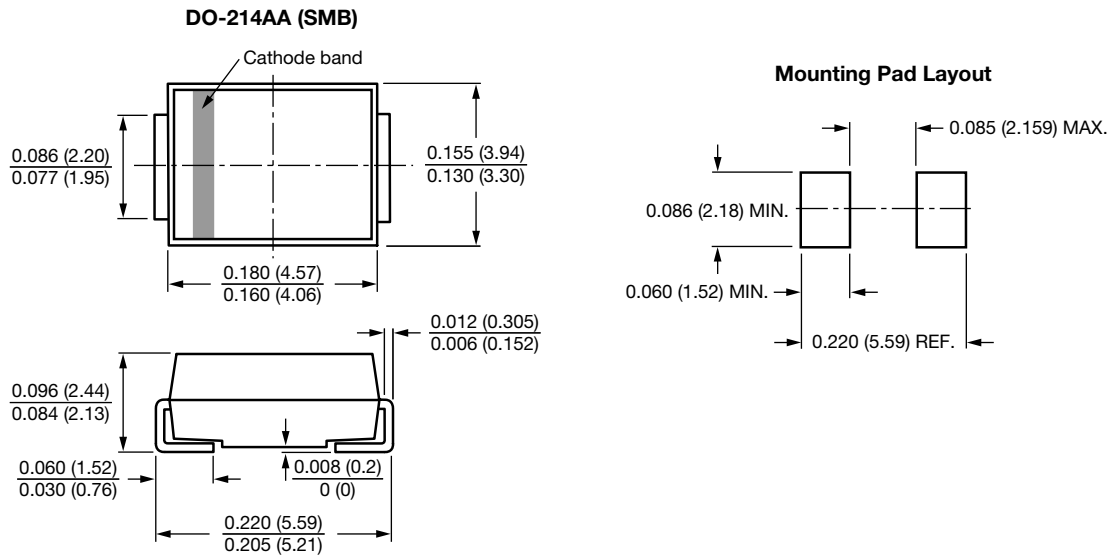
- 1** - Vishay Semiconductors product
- 2** - Current rating
- 3** - B = SMB
- 4** - Q = Schottky "Q" series
- 5** - Voltage rating (030 = 30 V)
- 6** - H = AEC-Q101 qualified
- 7** - Environmental digit:  
M3 = halogen-free, RoHS compliant and terminations lead (Pb)-free

<b>ORDERING INFORMATION (Example)</b>			
<b>PREFERRED P/N</b>	<b>PREFERRED PACKAGE CODE</b>	<b>MINIMUM ORDER QUANTITY</b>	<b>PACKAGING DESCRIPTION</b>
VS-20BQ030HM3/5BT	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>

## SMB

**DIMENSIONS** in inches (millimeters)





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