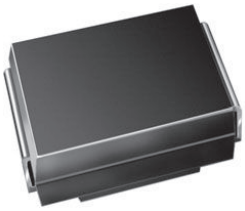
High Performance Schottky Rectifier, 2 A



SMB (DO-214AA)

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

AUTOMOTIVE GRADE

RoHS COMPLIANT

HALOGEN FREE

DESCRIPTION / APPLICATIONS

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.

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	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
E_{AS}	3.0 mJ
Package	SMB (DO-214AA)
Circuit configuration	Single

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform	2	A
V_{RRM}		30	V
I_{FSM}	t_p = 5 µs sine	350	A
V_F	2.0 A_{pk}, T_J = 125 °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 °C, rectangular waveform		2.0	A
Maximum peak one cycle non-repetitive surge current	I_{FSM}	5 µs sine or 3 µs rect. pulse	Following any rated load condition and with rated V_{RRM} applied	350	
		10 ms sine or 6 ms rect. pulse		75	
Non-repetitive avalanche energy	E_{AS}	T_J = 25 °C, I_{AS} = 1 A, L = 6 mH		3.0	mJ
Repetitive avalanche current	I_{AR}	Current decaying linearly to zero in 1 µs Frequency limited by T_J maximum V_A = 1.5 x 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 °C	0.47	V
		4 A		0.55	
		2 A	T_J = 125 °C	0.37	
		4 A		0.47	
Maximum reverse leakage current	I_{RM}	T_J = 25 °C	V_R = Rated V_R	0.5	mA
		T_J = 125 °C		15	
Maximum junction capacitance	C_T	V_R = 5 V_{DC}, (test signal range 100 kHz to 1 MHz), 25 °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/µs

Note

(1) Pulse width = 300 µs, 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	°C
Maximum thermal resistance, junction to lead	R_{thJL} (2)	DC operation	25	°C/W
Maximum thermal resistance, junction to ambient	R_{thJA}		80	
Approximate weight			0.10	g
			0.003	oz.
Marking device		Case style SMB (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

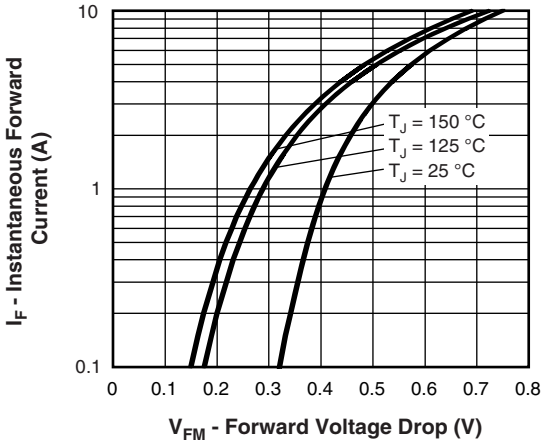


Fig. 1 - Maximum Forward Voltage Drop Characteristics

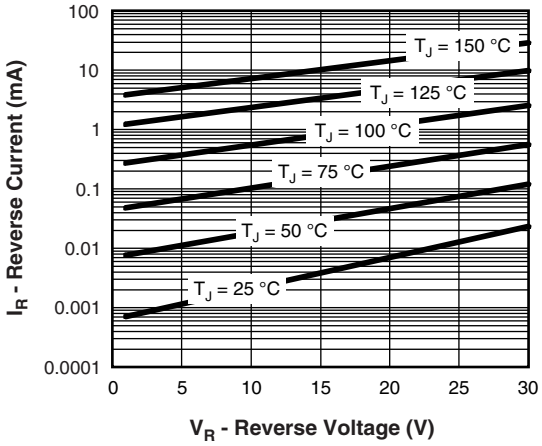


Fig. 2 - Typical Peak Reverse Current vs. Reverse Voltage

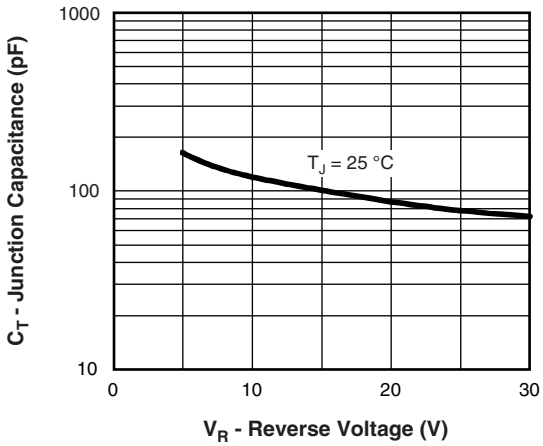


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

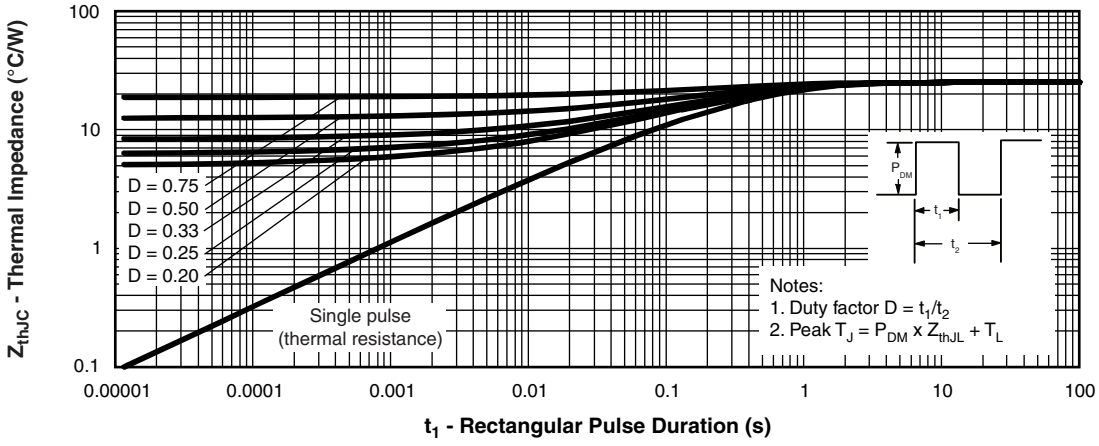


Fig. 4 - Maximum Thermal Impedance Z_{thJL} Characteristics

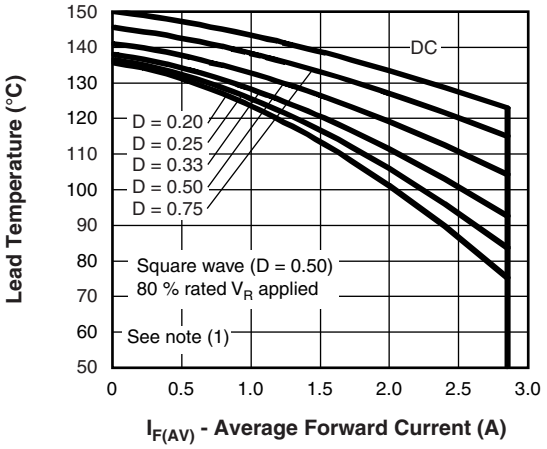


Fig. 5 - Maximum Average Forward Current vs. Allowable Lead Temperature

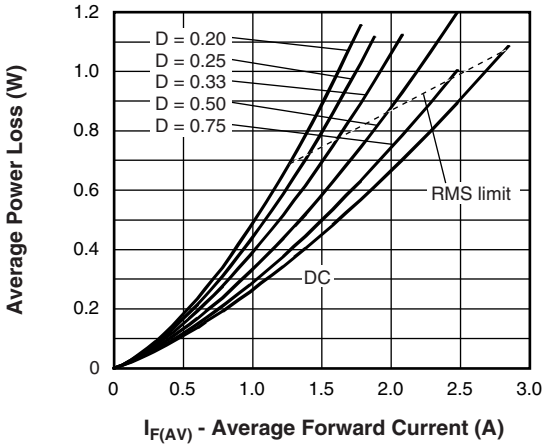


Fig. 6 - Maximum Average Forward Dissipation vs. Average Forward Current

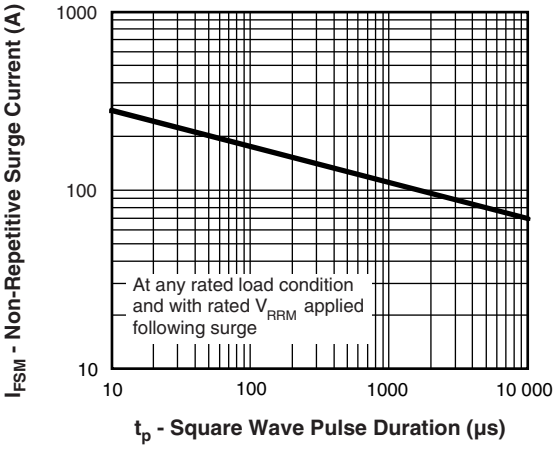


Fig. 7 - Maximum Peak Surge Forward Current vs. Pulse Duration

Note

(1) Formula used: $T_L = T_J - (Pd + Pd_{REV}) \times R_{thJL}$; Pd = forward power loss = $I_{F(AV)} \times V_{FM}$ at ($I_{F(AV)}$/D) (see fig. 6); Pd_{REV} = inverse power loss = $V_{R1} \times I_R$ (1 - D); I_R at V_{R1} = 80 % rated V_R

ORDERING INFORMATION TABLE

Device code

VS-	20	B	Q	030	H	M3
1	2	3	4	5	6	7

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

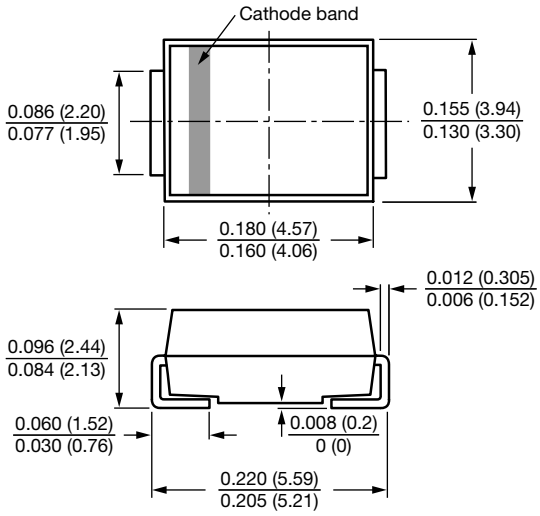
ORDERING INFORMATION (Example)			
PREFERRED P/N	**PREFERRED PACKAGE CODE**	**MINIMUM ORDER QUANTITY**	**PACKAGING DESCRIPTION**
VS-20BQ030HM3/5BT	5BT	3200	13" diameter plastic tape and reel

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95401
Part marking information	www.vishay.com/doc?95403
Packaging information	www.vishay.com/doc?95404

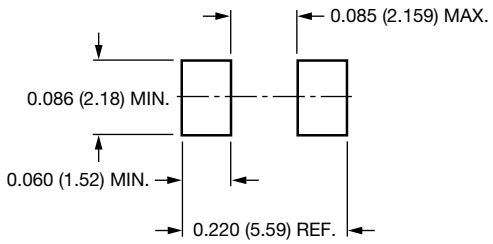
SMB

DIMENSIONS in inches (millimeters)

DO-214AA (SMB)



Mounting Pad Layout



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