

High Performance Schottky Rectifier, 1.0 A



Cathode ————— Anode

SMB



RoHS
COMPLIANT

FEATURES

- Small foot print, surface mountable
- Very low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Designed and qualified for industrial level
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

DESCRIPTION

The VS-10BQ030PbF 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
$I_{F(AV)}$	1.0 A
V_R	30 V
V_F at I_F	0.420 V
I_{RM} max.	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	1.0	A
V_{RRM}		30	V
I_{FSM}	$t_p = 5$ ms sine	430	A
V_F	1.0 A _{pk} , $T_J = 125$ °C	0.30	V
T_J	Range	-55 to +150	°C

VOLTAGE RATINGS			
PARAMETER	SYMBOL	VS-10BQ030PbF	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 $T_L = 106$ °C, rectangular waveform		1.0	A	
Maximum peak one cycle non-repetitive surge current See fig. 6	I_{FSM}	5 μ s sine or 3 μ s rect. pulse	Following any rated load condition and with rated V_{RRM} applied	430	A	
		10 ms sine or 6 ms rect. pulse		90		
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 μ 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⁾	1 A	T _J = 25 °C	0.420	V	
		2 A		0.470		
		1 A	T _J = 125 °C	0.300		
		2 A		0.370		
Maximum reverse leakage current	I _{RM} ⁽¹⁾	T _J = 25 °C	V _R = Rated V _R	0.5	mA	
		T _J = 100 °C		5.0		
		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 %

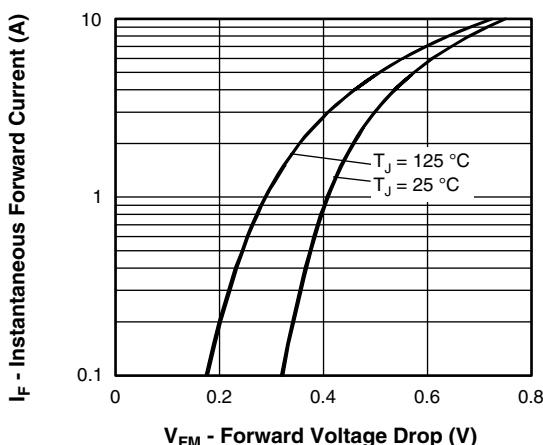
THERMAL - MECHANICAL SPECIFICATIONS

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 (similar DO-214AA)	V1E	

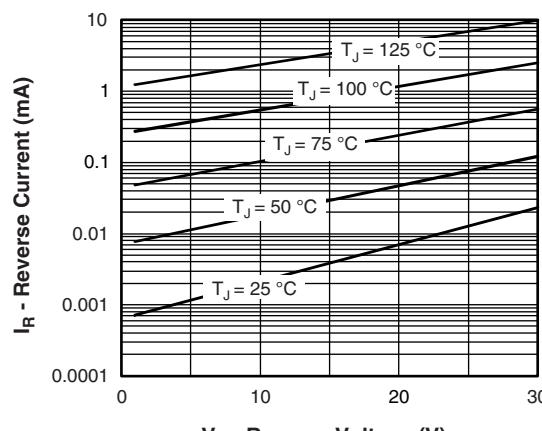
Notes

(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



V_{FM} - Forward Voltage Drop (V)



V_R - Reverse Voltage (V)

Fig. 1 - Maximum Forward Voltage Drop Characteristics

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

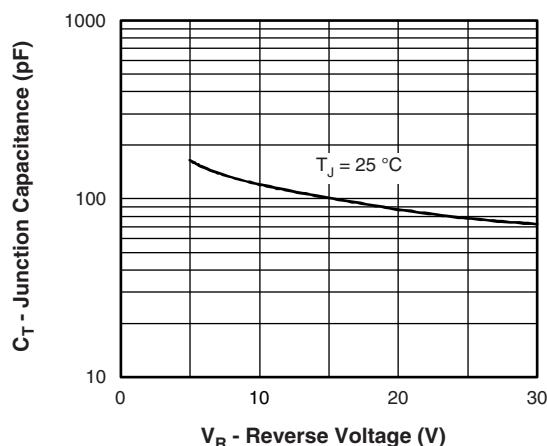


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

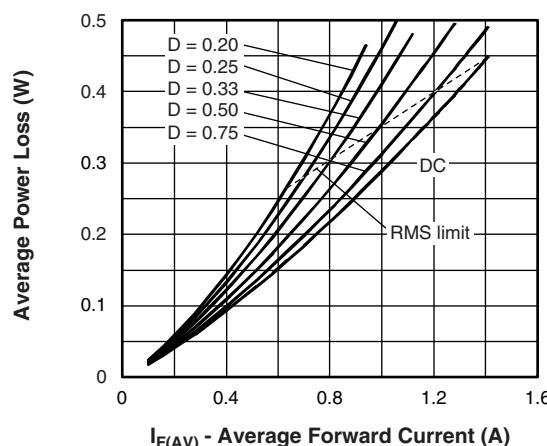


Fig. 5 - Maximum Average Forward Dissipation vs. Average Forward Current

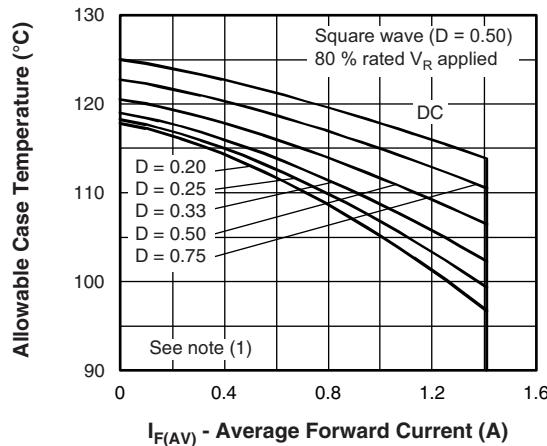


Fig. 4 - Maximum Average Forward Current vs. Allowable Lead Temperature

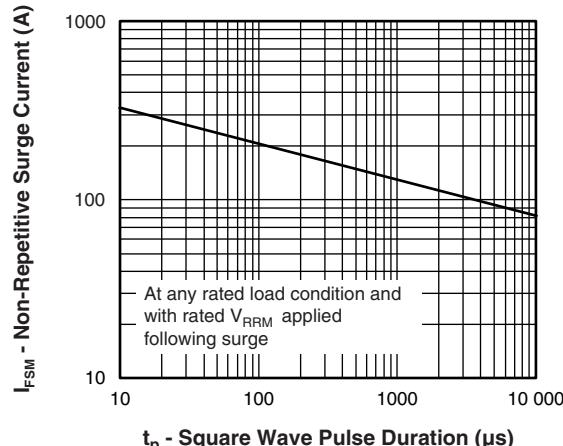


Fig. 6 - Maximum Peak Surge Forward Current vs. Pulse Duration

Note

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

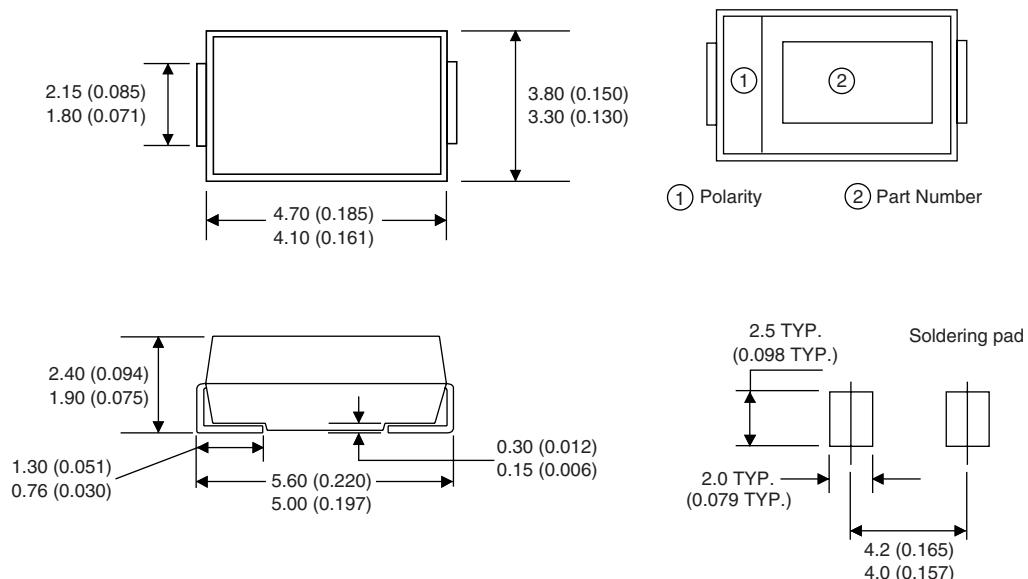
ORDERING INFORMATION TABLE

Device code	VS-	10	B	Q	030	TR	PbF
	1	2	3	4	5	6	7
1 - Vishay Semiconductors product							
2 - Current rating							
3 - B = single lead diode							
4 - Q = Schottky "Q" series							
5 - Voltage rating (030 = 30 V)							
6 - • None = box (1000 pieces) • TR = tape and reel (3000 pieces)							
7 - PbF = lead (Pb)-free							

LINKS TO RELATED DOCUMENTS					
Dimensions					
Part marking information	www.vishay.com/doc?95029				
Packaging information	<table> <tr> <td>Tape and reel</td><td>www.vishay.com/doc?95034</td></tr> <tr> <td>Bulk</td><td>www.vishay.com/doc?95397</td></tr> </table>	Tape and reel	www.vishay.com/doc?95034	Bulk	www.vishay.com/doc?95397
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Bulk	www.vishay.com/doc?95397				

SMB

DIMENSIONS in millimeters (inches)



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