

High Performance Schottky Rectifier, 1 A



SMB



FEATURES

- Small foot print, surface mountable
- 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
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912
- Designed and qualified for industrial level



RoHS
COMPLIANT

DESCRIPTION

The VS-10BQ100PbF surface mount Schottky rectifier has been designed for applications requiring low forward drop and very 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	100 V
V_F at I_F	0.78 V
I_{RM}	1 mA at 125 °C
T_J max.	175 °C
Diode variation	Single die
E_{AS}	1.0 mJ

MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform	1.0	A
V_{RRM}		100	V
I_{FSM}	$t_p = 5 \mu s$ sine	780	A
V_F	1.0 A _{pk} , $T_J = 125$ °C	0.62	V
T_J	Range	-55 to +175	°C

VOLTAGE RATINGS

PARAMETER	SYMBOL	VS-10BQ100PbF	UNITS
Maximum DC reverse voltage	V_R	100	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 $T_L = 152$ °C, rectangular waveform	1.0	A
Maximum peak one cycle non-repetitive surge current	I_{FSM}	5 μs sine or 3 μs rect. pulse	780	A
		10 ms sine or 6 ms rect. pulse	38	
Non-repetitive avalanche energy	E_{AS}	$T_J = 25$ °C, $I_{AS} = 0.5$ A, $L = 8$ mH	1.0	mJ
Repetitive avalanche current	I_{AR}	Current decaying linearly to zero in 1 μs Frequency limited by T_J maximum $V_A = 1.5 \times V_R$ typical	0.5	A

ELECTRICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS	
Maximum forward voltage drop See fig. 1	V _{FM} ⁽¹⁾	1 A	T _J = 25 °C	0.78	V	
		2 A		0.89		
		1 A	T _J = 125 °C	0.62		
		2 A		0.72		
Maximum reverse leakage current See fig. 2	I _{RM} ⁽¹⁾	T _J = 25 °C	V _R = Rated V _R	0.5	mA	
		T _J = 125 °C		1		
Typical junction capacitance	C _T	V _R = 5 V _{DC} , (test signal range 100 kHz to 1 MHz), 25 °C		42	pF	
Typical series inductance	L _S	Measured lead to lead 5 mm from package body		2.0	nH	
Maximum voltage rate of charge	dV/dt	Rated V _R		10 000	V/μs	

Note

(1) Pulse width < 300 μ 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 +175	$^{\circ}\text{C}$
Maximum thermal resistance, junction to lead	$R_{thJL}^{(2)}$	DC operation	36	$^{\circ}\text{C/W}$
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)	V1J	

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

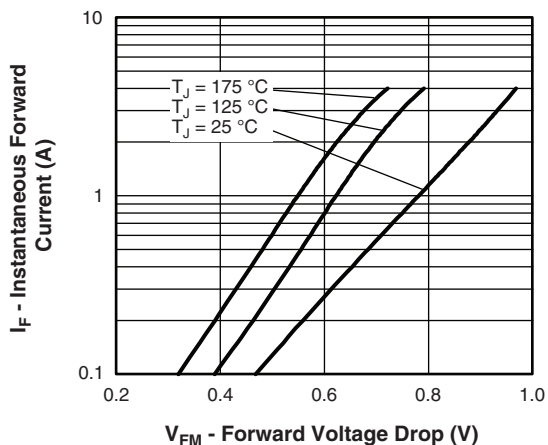


Fig. 1 - Maximum Forward Voltage Drop Characteristics

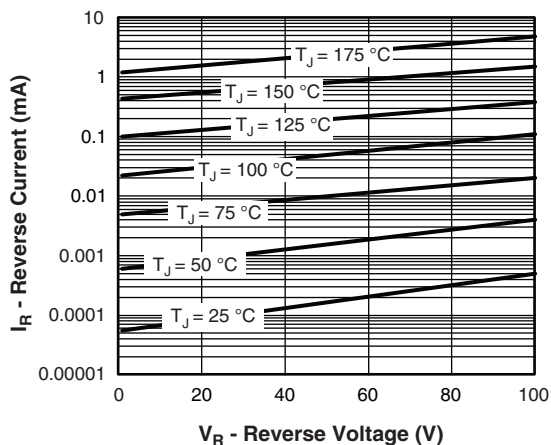


Fig. 2 - Typical Peak Reverse Current vs. Reverse Voltage

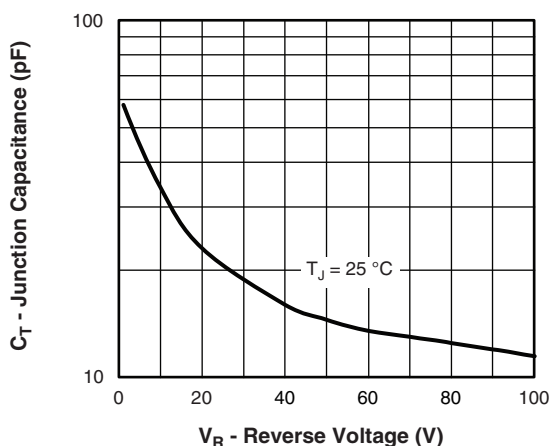


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

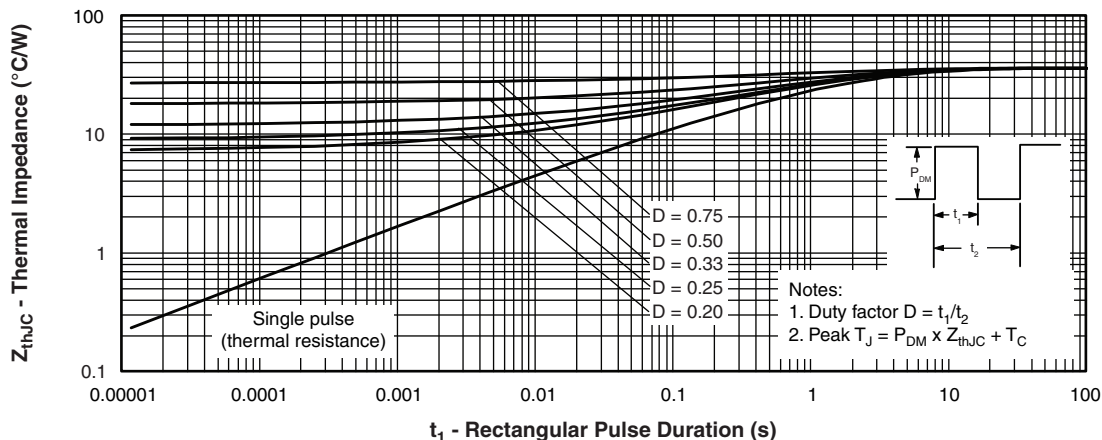


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)

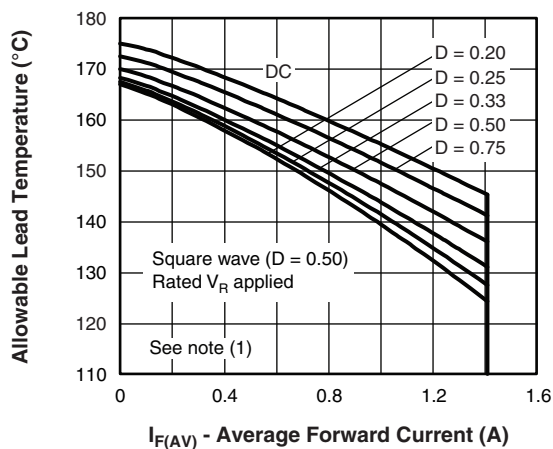


Fig. 5 - Maximum Average Forward Current vs. Allowable Lead Temperature

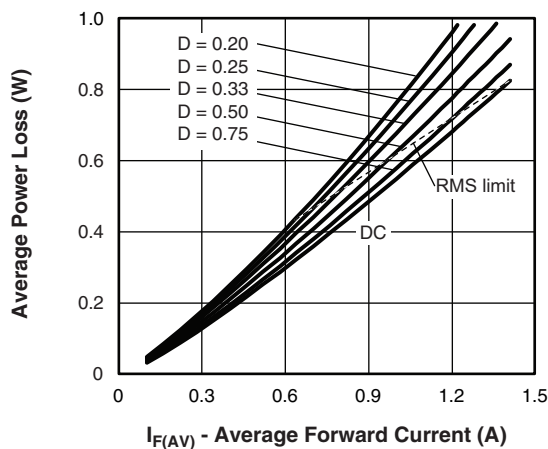


Fig. 6 - Maximum Average Forward Dissipation vs. Average Forward Current

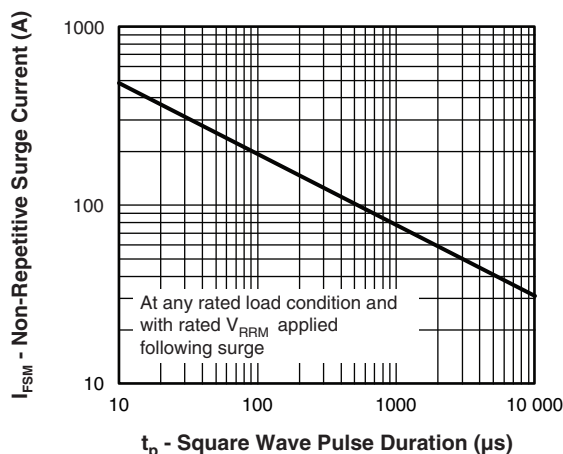


Fig. 7 - Maximum Peak Surge Forward Current vs. Pulse Duration

Note

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

ORDERING INFORMATION TABLE

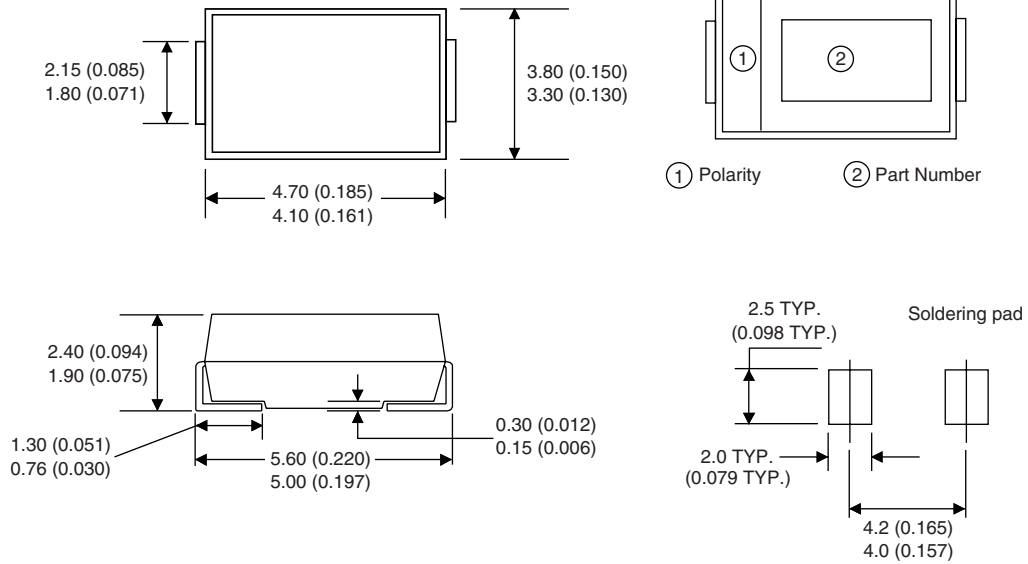
Device code	VS-	10	B	Q	100	TR	PbF
	1	2	3	4	5	6	7
1	Vishay Semiconductors product						
2	Current rating						
3	B = single lead diode						
4	Q = Schottky "Q" series						
5	Voltage rating (100 = 100 V)						
6	- None = box (1000 pieces) - TR = tape and reel (3000 pieces)						
7	PbF = lead (Pb)-free						

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95017
Part marking information	www.vishay.com/doc?95029
Packaging information	Tape and reel www.vishay.com/doc?95034
	Bulk www.vishay.com/doc?95397
SPICE model	www.vishay.com/doc?95276



SMB

DIMENSIONS in millimeters (inches)





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