High Performance Schottky Rectifier, 1 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
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

RoHS COMPLIANT
HALOGEN FREE

DESCRIPTION

The VS-10BQ100-M3 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.

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	1 A
V_R	100 V
V_F at I_F	0.59 V
I_{RM}	1 mA at 125 °C
T_J max.	175 °C
E_{AS}	1.0 mJ
Package	SMB (DO-214AA)
Circuit configuration	Single

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform	1	A
V_{RRM}		100	V
I_{FSM}	t_p = 5 µs sine	780	A
V_F	1.0 Apk, T_J = 125 °C	0.59	V
T_J	Range	-55 to +175	°C

VOLTAGE RATINGS			
PARAMETER	SYMBOL	VS-10BQ100-M3	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 = 143 °C, rectangular waveform		1.0	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	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 x V_R typical		0.5	A

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ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop See fig. 1	V_{FM} (1)	1 A	T_J = 25 °C	0.75	V
		2 A		0.82	
		1 A	T_J = 125 °C	0.59	
		2 A		0.65	
Maximum reverse leakage current See fig. 2	I_{RM}	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		65	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 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 175	°C
Maximum thermal resistance, junction to lead	R_{thJL} (2)	DC operation	36	°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)	1J	

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

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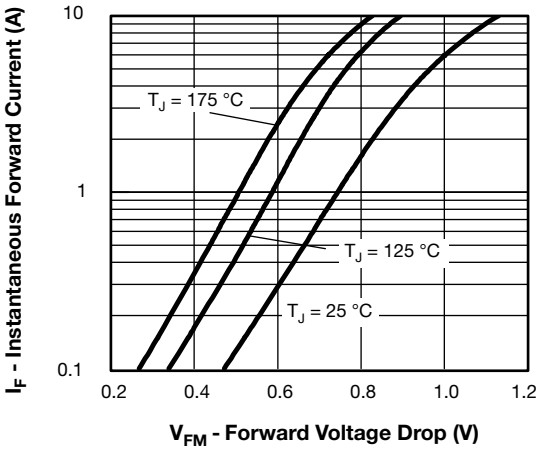


Fig. 1 - Maximum Forward Voltage Drop Characteristics

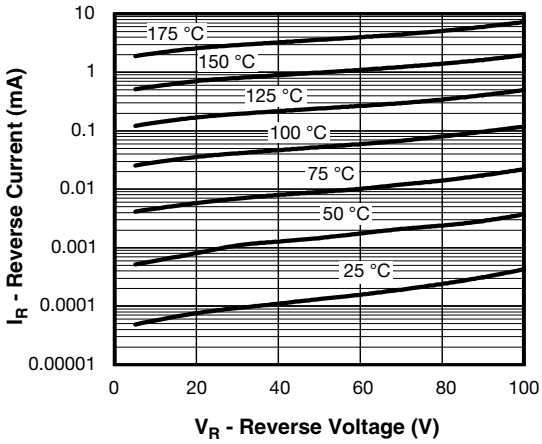


Fig. 2 - Typical Peak Reverse Current vs. Reverse Voltage

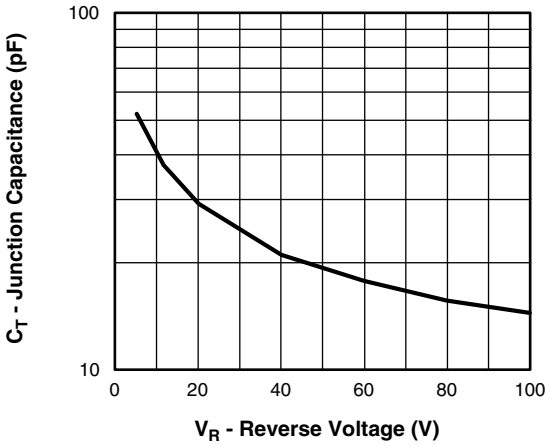


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

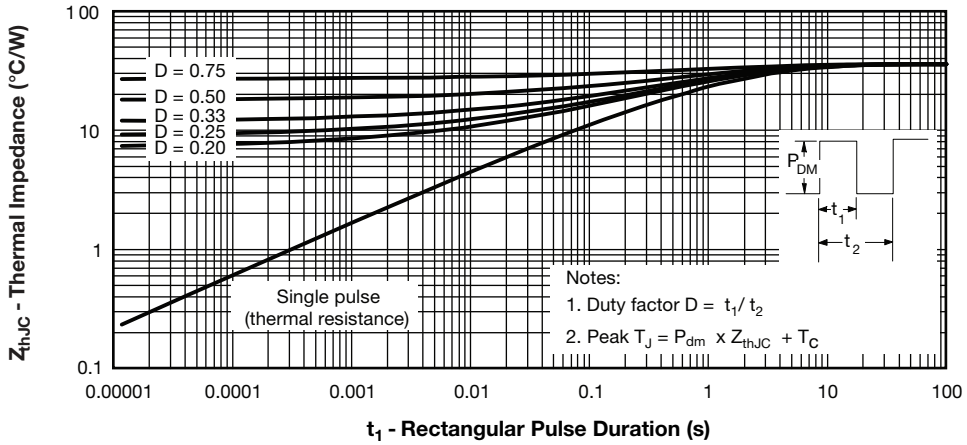


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)

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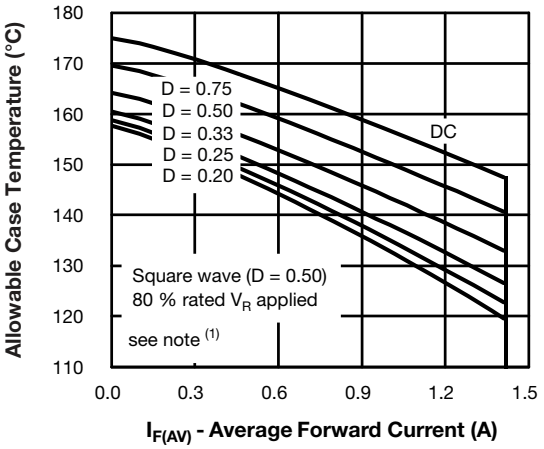


Fig. 5 - Maximum Average Forward Current vs. Allowable Lead Temperature

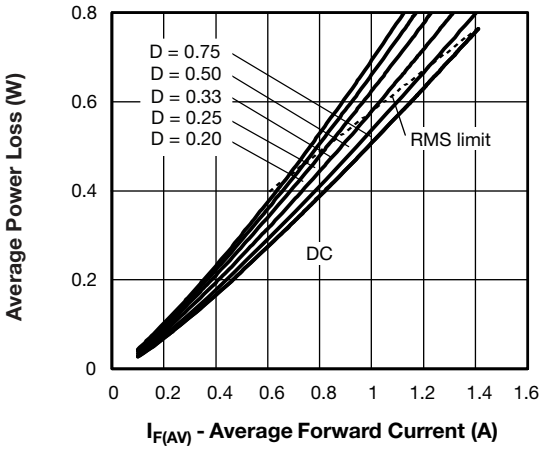


Fig. 6 - Maximum Average Forward Dissipation vs. Average Forward Current

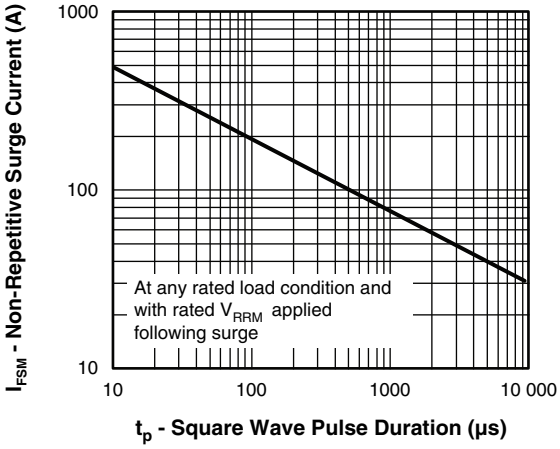


Fig. 7 - Maximum Peak Surge Forward Current vs. Pulse Duration

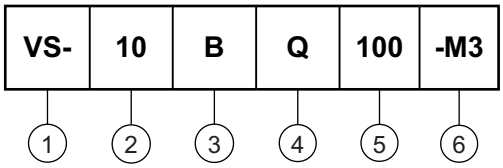
Note

(1) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;
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

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ORDERING INFORMATION TABLE

Device code



1 - Vishay Semiconductors product
2 - Current rating
3 - B = SMB
4 - Q = Schottky “Q” series
5 - Voltage rating (100 = 100 V)
6 - 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-10BQ100-M3/5BT	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
SPICE model	www.vishay.com/doc?96603

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