

Schottky Rectifier, 3 A


SMC


FEATURES

- Low forward voltage drop
- Guard ring for enhanced ruggedness and long term reliability
- Halogen-free according to IEC 61249-2-21 definition
- Small foot print, surface mountable
- High frequency operation
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Compliant to RoHS directive 2002/95/EC

DESCRIPTION

The VS-30BQ100-M3 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	SMC
$I_{F(AV)}$	3.0 A
V_R	100 V
V_F at I_F	0.62 V
I_{RM}	5 mA at 125 °C
T_J max.	175 °C
Diode variation	Single die
E_{AS}	3.0 mJ

MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform	3.0	A
V_{RRM}		100	V
I_{FSM}	$t_p = 5 \mu s$ sine	800	A
V_F	3.0 Apk, $T_J = 125 \text{ °C}$	0.62	V
T_J	Range	- 55 to 175	°C

VOLTAGE RATINGS

PARAMETER	SYMBOL	VS-30BQ100-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 $T_L = 148 \text{ °C}$, rectangular waveform	3.0	A
		50 % duty cycle at $T_L = 138 \text{ °C}$, rectangular waveform	4.0	
Maximum peak one cycle non-repetitive surge current	I_{FSM}	5 μs sine or 3 μs rect. pulse	800	A
		10 ms sine or 6 ms rect. pulse		
Non-repetitive avalanche energy	E_{AS}	$T_J = 25 \text{ °C}$, $I_{AS} = 1.0 \text{ A}$, $L = 6 \text{ mH}$	3.0	mJ
Repetitive avalanche current	I_{AR}	Current decaying linearly to zero in 1 μs Frequency limited by T_J maximum $V_A = 1.5 \times V_R$ typical	0.5	A

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ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop	$V_{FM}^{(1)}$	3 A	$T_J = 25\text{ }^\circ\text{C}$	0.79	V
		6 A		0.90	
		3 A	$T_J = 125\text{ }^\circ\text{C}$	0.62	
		6 A		0.70	
Maximum reverse leakage current	I_{RM}	$T_J = 25\text{ }^\circ\text{C}$	$V_R = \text{Rated } V_R$	0.5	mA
		$T_J = 125\text{ }^\circ\text{C}$		5.0	
Maximum junction capacitance	C_T	$V_R = 5\text{ }V_{DC}$ (test signal range 100 kHz to 1 MHz), $25\text{ }^\circ\text{C}$		115	pF
Typical series inductance	L_S	Measured lead to lead 5 mm from package body		3.0	nH
Maximum voltage rate of change	dV/dt	Rated V_R		10 000	V/ μ s

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		12	$^\circ\text{C}/\text{W}$
Maximum thermal resistance, junction to ambient	R_{thJA}			46	
Approximate weight				0.24	g
				0.008	oz.
Marking device		Case style SMC (similar to DO-214AB)		3J	

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

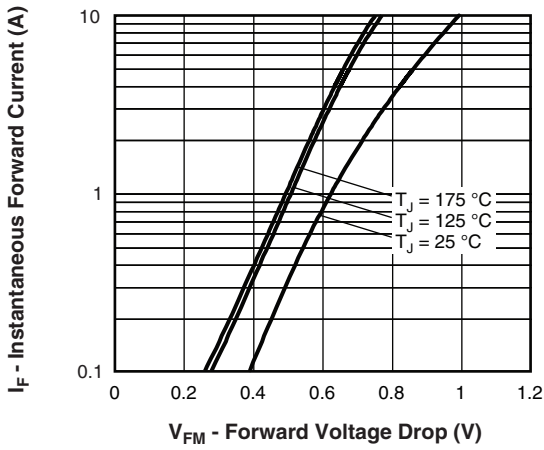


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

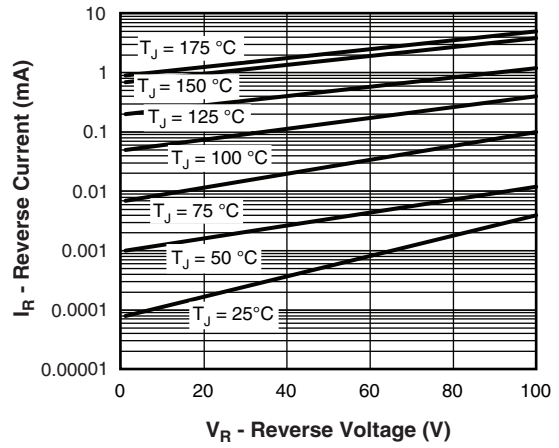


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

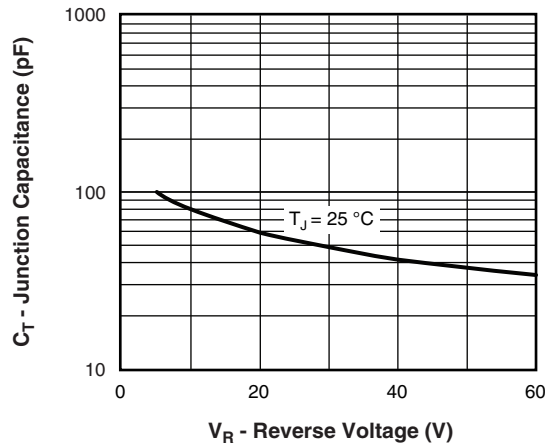


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

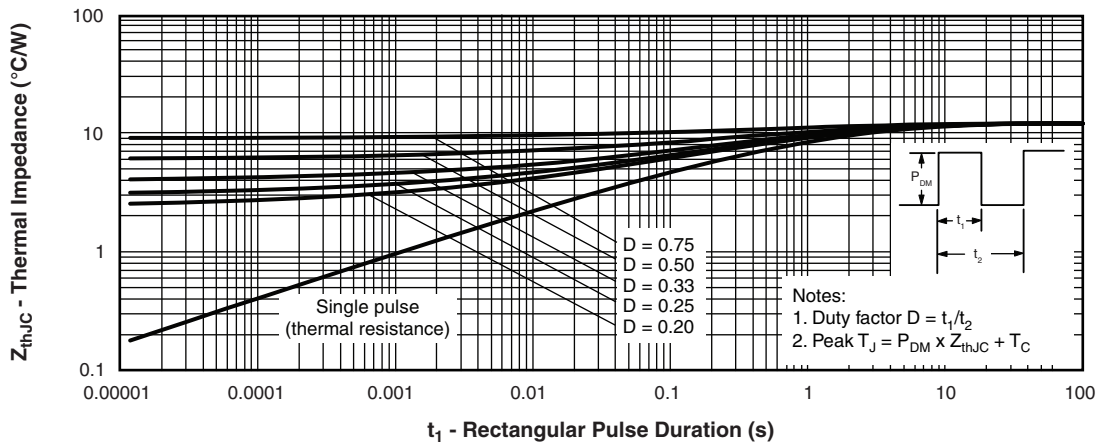


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)

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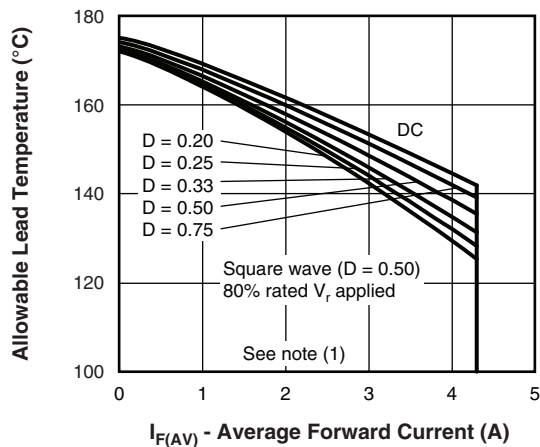


Fig. 5 - Maximum Average Forward Current vs. Allowable Lead Temperature

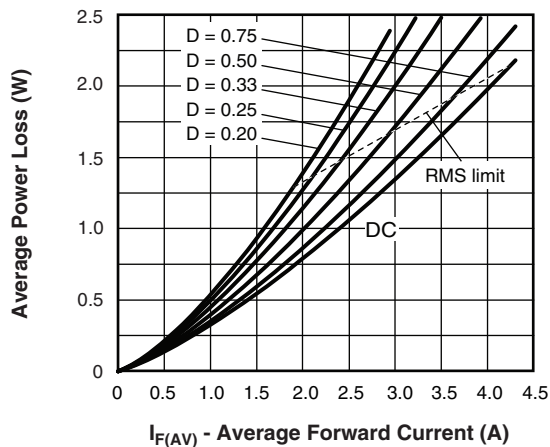


Fig. 6 - Maximum Average Forward Dissipation vs. Average Forward Current

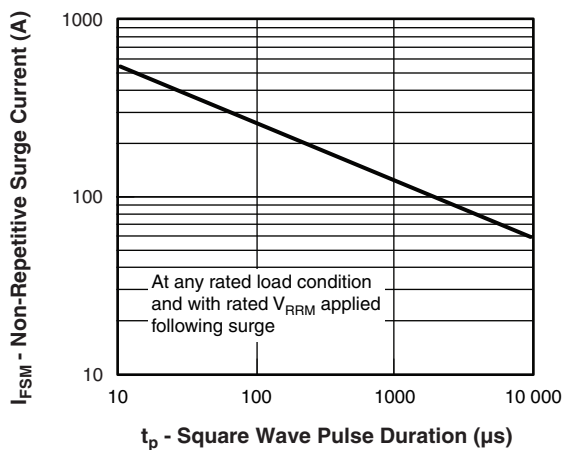


Fig. 7 - Maximum Peak Surge Forward Current vs. Pulse Duration

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