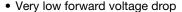


High Performance Schottky Rectifier, 3.0 A



PRODUCT SUMMARY				
Package	SMC			
I _{F(AV)}	3.0 A			
V_{R}	40 V			
V _F at I _F	0.46 V			
I _{RM}	30 mA at 125 °C			
T _J max.	150 °C			
Diode variation	Single die			
E _{AS}	6.0 mJ			

FEATURES





Guard ring for enhanced ruggedness and long term reliability

ROHS COMPLIANT HALOGEN FREE

- · 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.vishav.com/doc?99912

DESCRIPTION

The VS-30BQ040-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.

MAJOR RATINGS AND CHARACTERISTICS				
SYMBOL	CHARACTERISTICS	VALUES	UNITS	
I _{F(AV)}	Rectangular waveform	3.0	А	
V _{RRM}		40	V	
I _{FSM}	t _p = 5 μs sine	2000	А	
V _F	3.0 A _{pk} , T _J = 125 °C	0.46	V	
T _J	Range	-55 to +150	°C	

VOLTAGE RATINGS				
PARAMETER	SYMBOL	VS-30BQ040-M3	UNITS	
Maximum DC reverse voltage	V _R 40		V	
Maximum working peak reverse voltage	V_{RWM}	40		

ABSOLUTE MAXIMUM RATINGS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum average femiliard average		50 % duty cycle at T _L = 115 °C, rectangular waveform		3.0	
Maximum average forward current	I _{F(AV)}	50 % duty cycle at T _L = 104 °C, rectangular waveform		4.0	
Maximum peak one cycle		5 μs sine or 3 μs rect. pulse	Following any rated load condition and with	1600	Α
non-repetitive surge current	I _{FSM}	10 ms sine or 6 ms rect. pulse	rated V _{RRM} applied	90	
Non-repetitive avalanche energy	E _{AS}	T _J = 25 °C, I _{AS} = 1.0 A, L = 12 mH		6.0	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 x V _B typical 1.0		1.0	Α



ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
	V _{FM} ⁽¹⁾	3 A	T _J = 25 °C	0.57	V
Maximum forward voltage drap		6 A		0.76	
Maximum forward voltage drop		3 A	T _J = 125 °C	0.46	
		6 A		0.64	
Maximum reverse leakage current		T _J = 25 °C	V _R = Rated V _R	0.5	- mA
waximum reverse leakage current	I _{RM}	T _J = 125 °C	V _R = nateu V _R	30	IIIA
Maximum junction capacitance	C _T	$V_R = 5 V_{DC}$ (test signal range 100 kHz to 1 MHz), 25 °C		230	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/µs		V/µs	

Note

 $^{^{(1)}\,}$ Pulse width = 300 $\mu s,$ 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 +150	°C
Maximum thermal resistance, junction to lead	R _{thJL} ⁽²⁾	DC aparation	12	°C/W
Maximum thermal resistance, junction to ambient	R _{thJA}	DC operation	46	
Approximate weight			0.24	g
Approximate weight			0.008	OZ.
Marking device		Case style SMC (similar to DO-214AB)	3	F

Notes

 $[\]frac{dP_{tot}}{dT_J} < \frac{1}{R_{thJA}} \quad \text{thermal runaway condition for a diode on its own heatsink}$

⁽²⁾ Mounted 1" square PCB

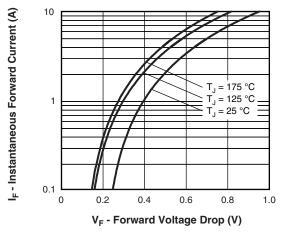


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

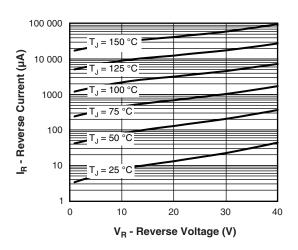


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

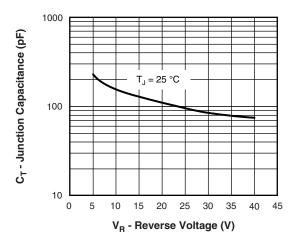


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

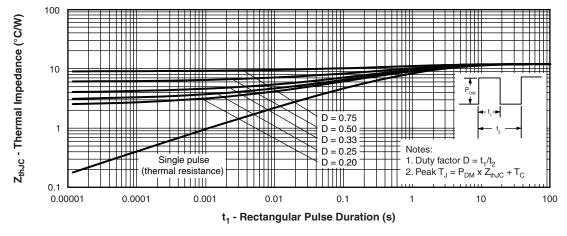


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)



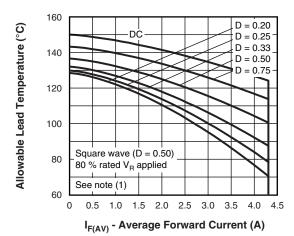


Fig. 5 - Maximum Average Forward Current vs.
Allowable Lead Temperature

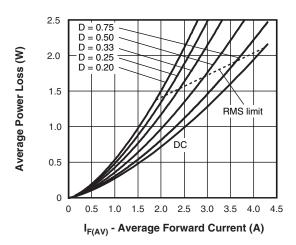


Fig. 6 - Maximum Average Forward Dissipation vs. Average Forward Current

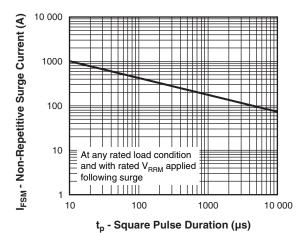


Fig. 7 - Maximum Peak Surge Forward Current vs. Pulse Duration

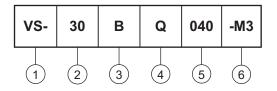
Note

 $\begin{array}{ll} \text{(1)} & \text{Formula used: } T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}; \\ Pd = \text{Forward power loss} = I_{F(AV)} \times V_{FM} \text{ at } (I_{F(AV)}/D) \text{ (see fig. 6);} \\ Pd_{REV} = \text{Inverse power loss} = V_{R1} \times I_R \text{ (1 - D); } I_R \text{ at } V_{R1} = 80 \text{ \% rated } V_R \\ \end{array}$



ORDERING INFORMATION TABLE

Device code



- Vishay Semiconductors product suffix
- 2 Current rating
- 3 B = SMC
- 4 Q = Schottky "Q" series
- 5 Voltage rating (040 = 40 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 DESCRIPT					
VS-30BQ040-M3/9AT	9AT	3500	13" diameter plastic tape and reel		

LINKS TO RELATED DOCUMENTS				
Dimensions www.vishay.com/doc?95402				
Part marking information	www.vishay.com/doc?95403			
Packaging information	www.vishay.com/doc?95404			



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Vishay

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Revision: 02-Oct-12 Document Number: 91000



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Наши контакты:

Телефон: +7 812 627 14 35

Электронная почта: sales@st-electron.ru

Адрес: 198099, Санкт-Петербург,

Промышленная ул, дом № 19, литера Н,

помещение 100-Н Офис 331