COMPLIANT

HALOGEN FREE



Vishay Semiconductors

High Performance Schottky Rectifier, 3.0 A



PRODUCT SUMMARY				
Package	SMC			
I _{F(AV)}	3.0 A			
V_{R}	15 V			
V _F at I _F	0.3 V			
I _{RM}	50 mA at 100 °C			
T _J max.	125 °C			
Diode variation	Single die			
E _{AS}	1.5 mJ			

FEATURES

- Ultralow forward voltage drop
- Guard ring for enhanced ruggedness and long term reliability



- · Optimized for OR-ing applications
- High frequency operation
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Material categorization: for definitions of compliance please see <u>www.vishay.com/doc?99912</u>

DESCRIPTION

The VS-30BQ015-M3 surface mount Schottky rectifier has been designed for applications requiring low forward drop and very small foot prints on PC boards. The proprietary barrier technology allows for reliable operation up to 125 °C junction temperature. 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	Α		
V _{RRM}		15	V		
I _{FSM}	t _p = 5 μs sine	650	Α		
V _F	1.0 A _{pk} , T _J = 75 °C	0.30	V		
T _J	Range	-55 to +125	°C		

VOLTAGE RATINGS			
PARAMETER	SYMBOL	VS-30BQ015-M3	UNITS
Maximum DC reverse voltage	V_R	15	V
Maximum working peak reverse voltage	V_{RWM}	25	V

ABSOLUTE MAXIMUM RATINGS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
M. i.e. and a second		50 % duty cycle at T _L = 83 °C, rectangular waveform		3.0	
Maximum average forward current	I _{F(AV)}	50 % duty cycle at T _L = 78 °C, rectangular waveform		4.0	
Maximum peak one cycle	FCM	5 μs sine or 3 μs rect. pulse	Following any rated load condition and with rated V _{RRM} applied	650	A
non-repetitive surge current		10 ms sine or 6 ms rect. pulse		75	
Non-repetitive avalanche energy	E _{AS}	$T_J = 25 ^{\circ}\text{C}, I_{AS} = 0.5 \text{A}, L = 12 \text{mH}$		1.5	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_R typical		0.5	А



ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
		3 A	T _J = 25 °C	0.35	V
Maximum forward voltage drop	V _{FM} ⁽¹⁾	6 A		0.43	
Maximum forward voltage drop	VFM(1)	3 A	T _J = 75 °C	0.30	
		6 A		0.38	
Manipular Indiana Indi	1	T _J = 25 °C	V _B = Rated V _B	4	mA
Maximum reverse leakage current	Maximum reverse leakage current I _{RM}	T _J = 100 °C	V _R = nateu v _R	50	
Maximum junction capacitance	C _T	$V_R = 5 V_{DC}$ (test signal range 100 kHz to 1 MHz), 25 °C		1120	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 00		10 000	V/µs

Note

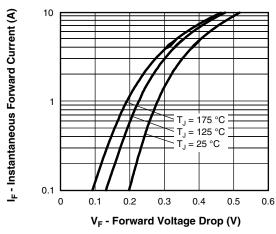
 $^{^{(1)}\,}$ Pulse width = 300 $\mu s,$ duty cycle = 2 %

THERMAL - MECHANICAL SPECIFICATIONS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction temperature range	T _J ⁽¹⁾		-55 to +125	°C
Maximum storage temperature range	T _{Stg}		-55 to +150	C
Maximum thermal resistance, junction to lead	R _{thJL} (2)	DC operation	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)	30	0

Notes

 $[\]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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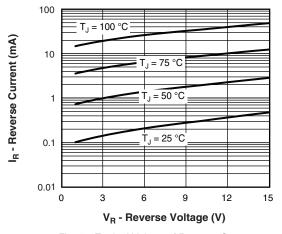


Fig. 1 - Typical Forward Voltage Drop Characteristics (Per Leg)

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

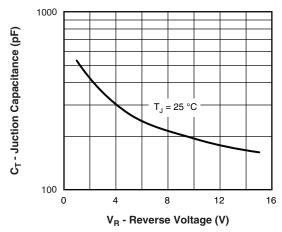


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

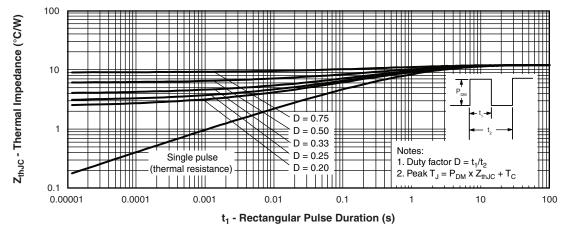


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)

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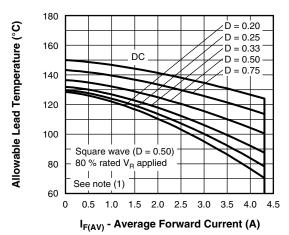


Fig. 5 - Maximum Average Forward Current vs. Allowable Lead Temperature

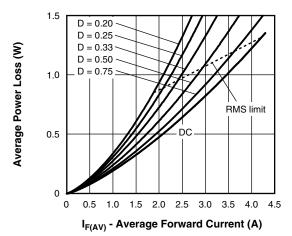


Fig. 6 - Maximum Average Forward Dissipation vs. Average Forward Current

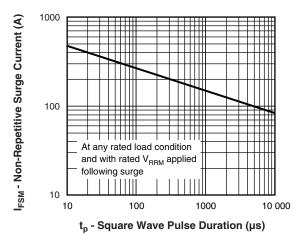


Fig. 7 - Maximum Peak Surge Forward Current vs. Pulse Duration

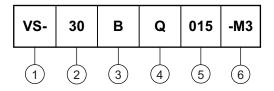
Note

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



ORDERING INFORMATION TABLE





- 1 Vishay Semiconductors product
- 2 Current rating
- 3 B = SMC
- 4 Q = Schottky "Q" series
- 5 Voltage rating (015 = 15 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-30BQ015-M3/9AT	9AT	3500	13" diameter plastic tape and reel		

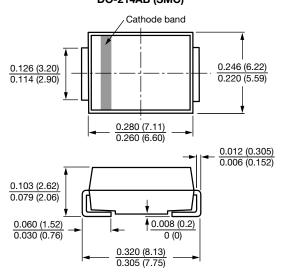
LINKS TO RELATED DOCUMENTS				
Dimensions <u>www.vishay.com/doc?95402</u>				
Part marking information	www.vishay.com/doc?95403			
Packaging information	www.vishay.com/doc?95404			



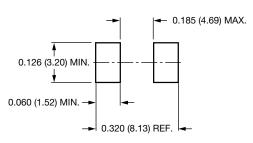
SMC

DIMENSIONS in inches (millimeters)

DO-214AB (SMC)



Mounting Pad Layout





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