

High Performance Schottky Rectifier, 1.0 A



SMB



FEATURES

- Ultralow forward voltage drop
- Optimized for OR-ing applications
- Guard ring for enhanced ruggedness and long term reliability
- 125 °C T_J operation ($V_R < 5$ V)
- 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
- Designed and qualified for industrial level
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT

PRODUCT SUMMARY	
Package	SMB (DO-214AA)
$I_{F(AV)}$	1 A
V_R	15 V
V_F at I_F	0.32 V
I_{RM}	12 mA at 100 °C
T_J max.	125 °C
Diode variation	Single die
E_{AS}	1 mJ

DESCRIPTION

The VS-10BQ015PbF 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	1.0	A
V_{RRM}		15	V
I_{FSM}	$t_p = 5 \mu s$ sine	140	A
V_F	1.0 A _{pk} , $T_J = 125$ °C	0.32	V
T_J	Range	-55 to +125	°C

VOLTAGE RATINGS			
PARAMETER	SYMBOL	VS-10BQ015PbF	UNITS
Maximum DC reverse voltage	V_R	15	V
Maximum working peak reverse voltage	V_{RWM}	25	

ABSOLUTE MAXIMUM RATINGS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum average forward current See fig. 5	$I_{F(AV)}$	50 % duty cycle at $T_L = 84$ °C, rectangular waveform		1.0	A
Maximum peak one cycle non-repetitive surge current See fig. 7	I_{FSM}	5 μs sine or 3 μs rect. pulse	Following any rated load condition and with rated V_{RRM} applied	140	
		10 ms sine or 6 ms rect. pulse		40	
Non-repetitive avalanche energy	E_{AS}	$T_J = 25$ °C, $I_{AS} = 1$ A, $L = 2$ 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		1.0	A



ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop See fig. 1	$V_{FM}^{(1)}$	1 A	$T_J = 25\text{ }^\circ\text{C}$	0.35	V
		2 A		0.44	
		1 A	$T_J = 125\text{ }^\circ\text{C}$	0.32	
		2 A		0.40	
Maximum reverse leakage current See fig. 2	$I_{RM}^{(1)}$	$T_J = 25\text{ }^\circ\text{C}$	$V_R = \text{Rated } V_R$	0.5	mA
		$T_J = 100\text{ }^\circ\text{C}$		12	
Threshold voltage	$V_{F(TO)}$	$T_J = T_J \text{ maximum}$		-	V
Forward slope resistance	r_t			-	m Ω
Typical junction capacitance	C_T	$V_R = 5 V_{DC}$, (test signal range 100 kHz to 1 MHz), 25 $^\circ\text{C}$		390	pF
Typical series inductance	L_S	Measured lead to lead 5 mm from package body		2.0	nH
Maximum voltage rate of change	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 temperature range	$T_J^{(1)}$			-55 to +125	$^\circ\text{C}$
Maximum storage temperature range	T_{Stg}			-55 to +150	
Maximum thermal resistance, junction to lead	$R_{thJL}^{(2)}$	DC operation See fig. 4		36	$^\circ\text{C/W}$
Maximum thermal resistance, junction to ambient	R_{thJA}	DC operation		80	
Approximate weight				0.10	g
				0.003	oz.
Marking device		Case style SMB (similar to DO-214AA)		1C	

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

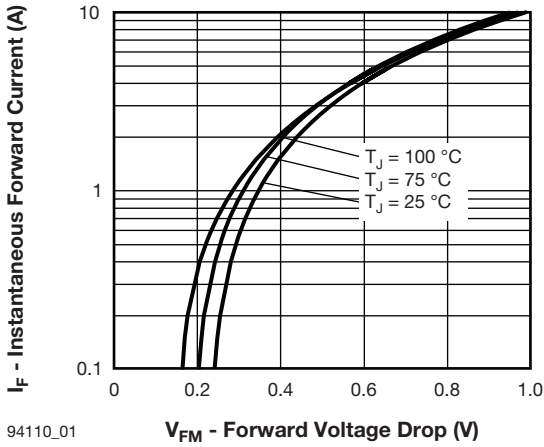


Fig. 1 - Maximum Forward Voltage Drop Characteristics

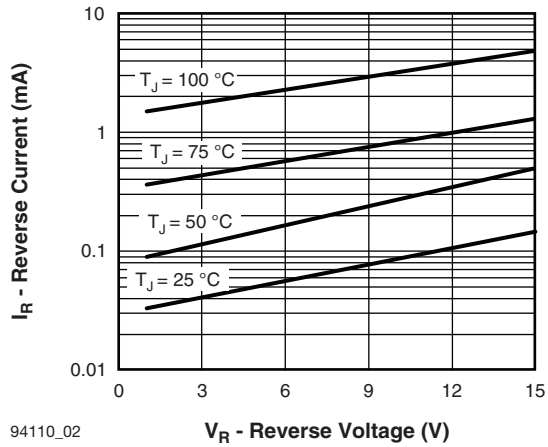


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

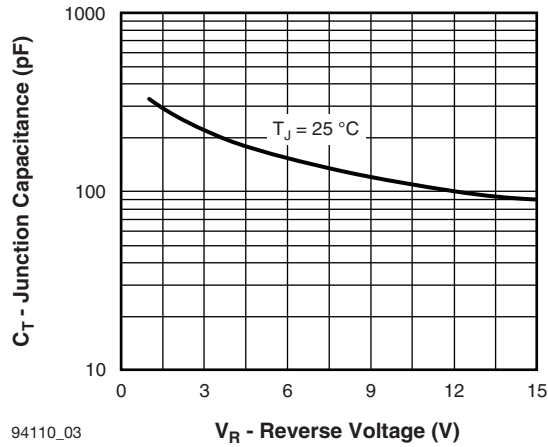


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

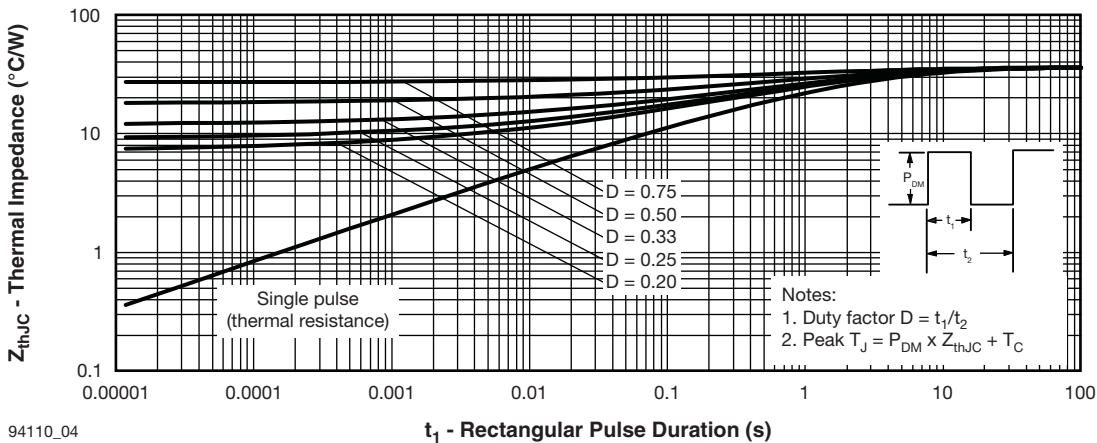
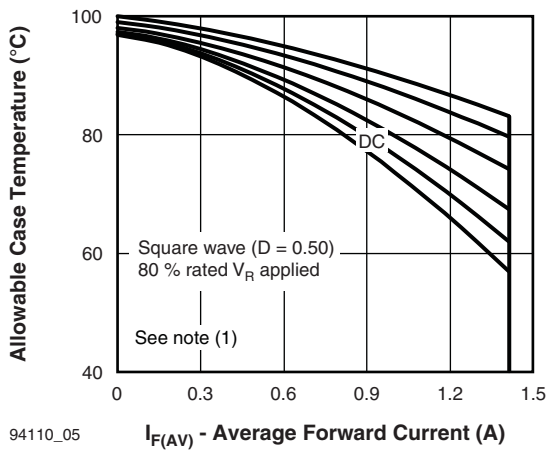


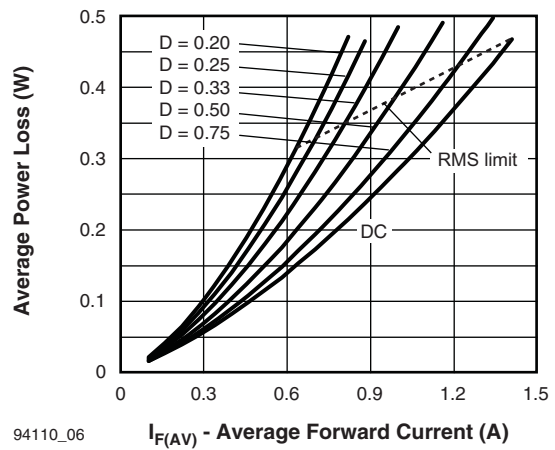
Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)



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$I_{F(AV)}$ - Average Forward Current (A)

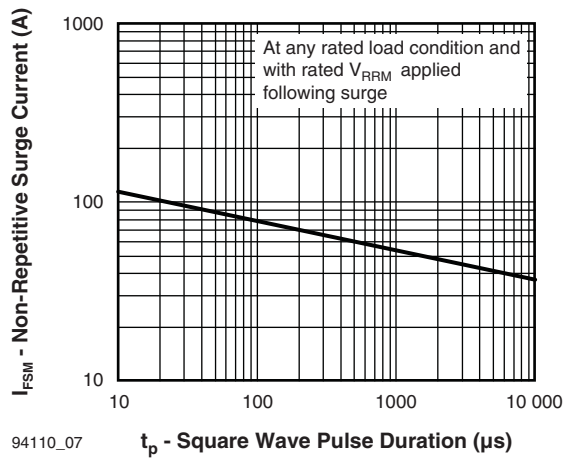
Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current



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$I_{F(AV)}$ - Average Forward Current (A)

Fig. 6 - Forward Power Loss Characteristics



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t_p - Square Wave Pulse Duration (μ s)

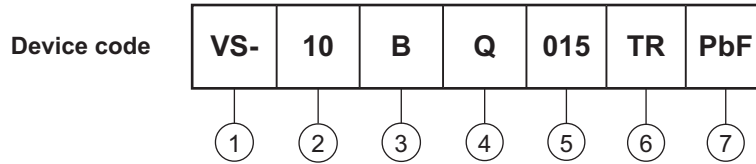
Fig. 7 - Maximum Non-Repetitive Surge Current

Note

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



ORDERING INFORMATION TABLE



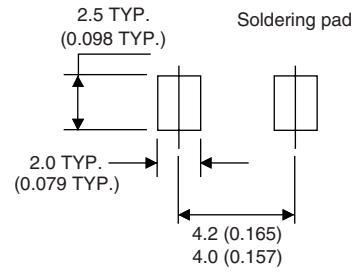
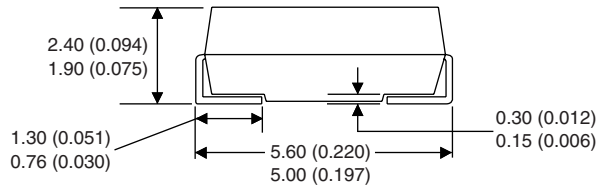
- 1** - Vishay Semiconductors product
- 2** - Current rating
- 3** - B = single lead diode
- 4** - Q = Schottky "Q" series
- 5** - Voltage rating (015 = 15 V)
- 6** - TR = tape and reel
- 7** - PbF = lead (Pb)-free

ORDERING INFORMATION (Example)			
PREFERRED P/N	PREFERRED PACKAGE CODE	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-10BQ015TRPbF	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?95355

SMB

DIMENSIONS in millimeters (inches)





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