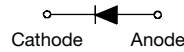


## Schottky Rectifier, 1.0 A



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
- Compliant to RoHS Directive 2002/95/EC
- Designed and qualified for industrial level



**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 Apk, $T_J = 125$ °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 $\mu s$ sine or 3 $\mu s$ 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 $\mu s$ 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 $\Omega$
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/ $\mu\text{s}$

**Note**

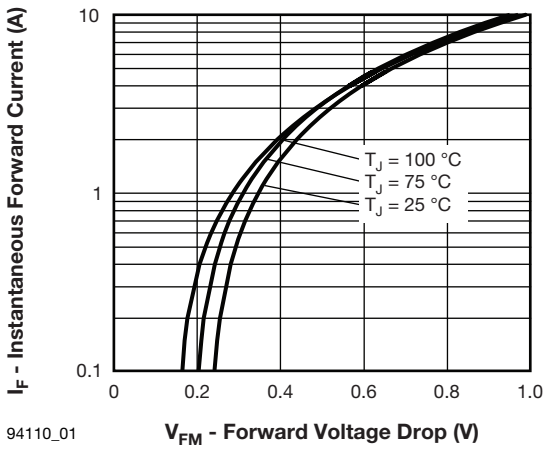
(1) Pulse width < 300  $\mu\text{s}$ , duty cycle < 2 %

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)		V1C	

**Notes**

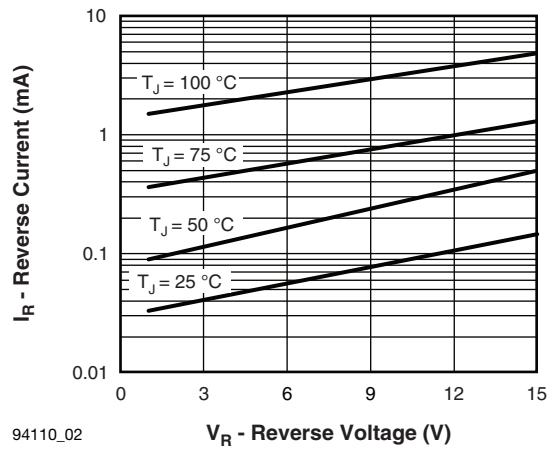
(1)  $\frac{dP_{tot}}{dT_J} < \frac{1}{R_{thJA}}$  thermal runaway condition for a diode on its own heatsink

(2) Mounted 1" square PCB



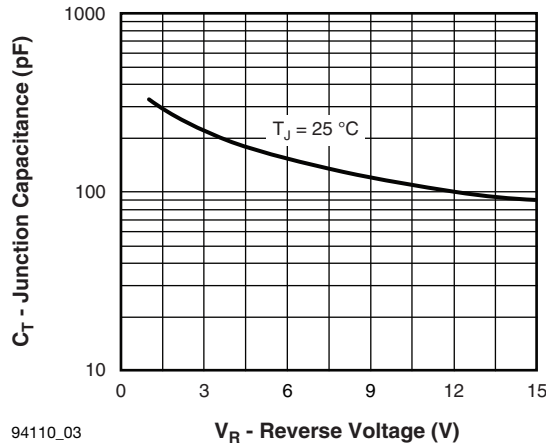
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Fig. 1 - Maximum Forward Voltage Drop Characteristics



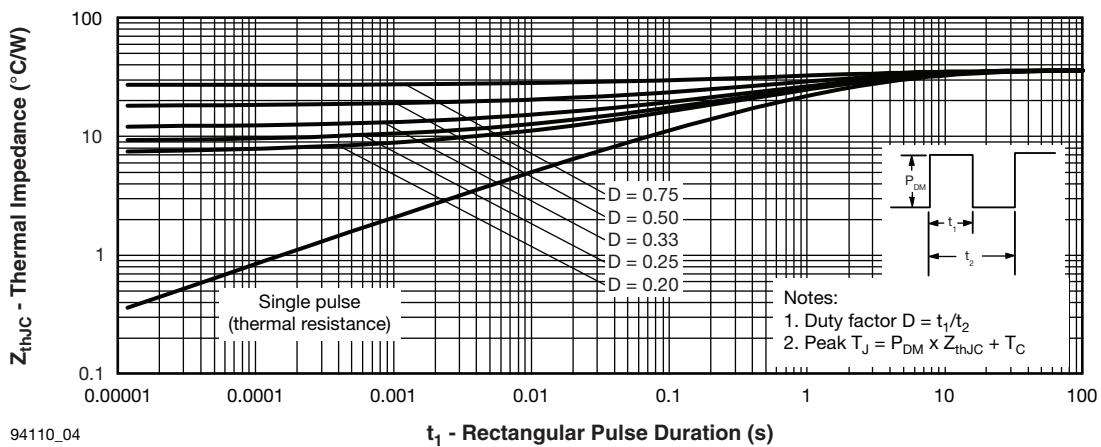
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Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage



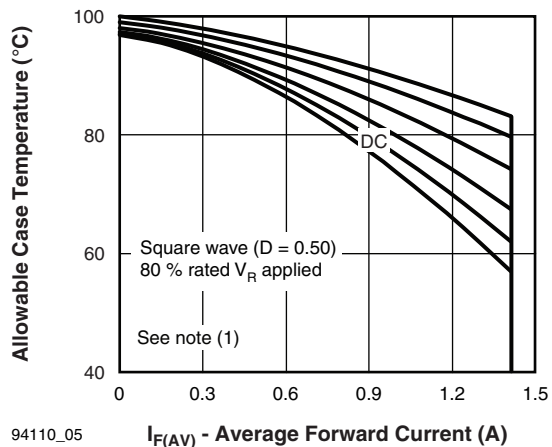
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Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

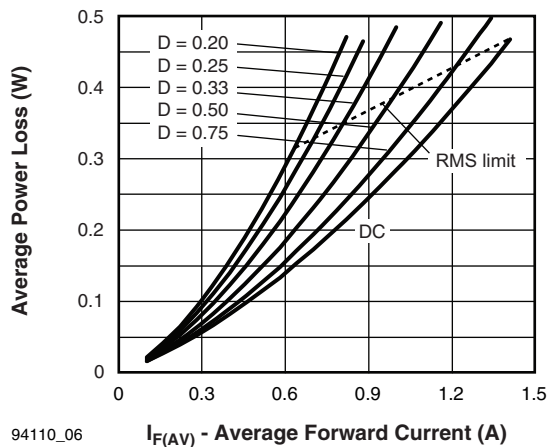


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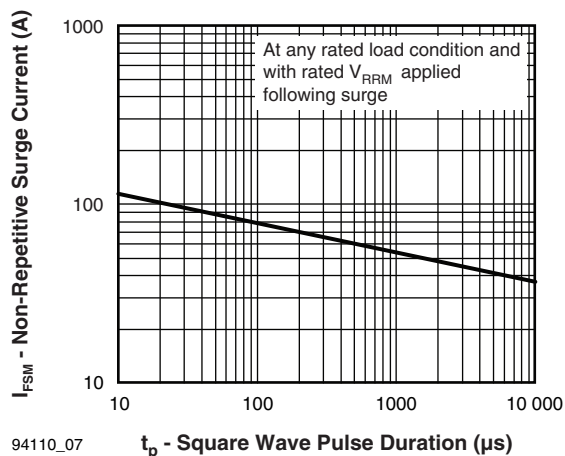
Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)



94110\_05 **I<sub>F(AV)</sub> - Average Forward Current (A)**  
 Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current



94110\_06 **I<sub>F(AV)</sub> - Average Forward Current (A)**  
 Fig. 6 - Forward Power Loss Characteristics



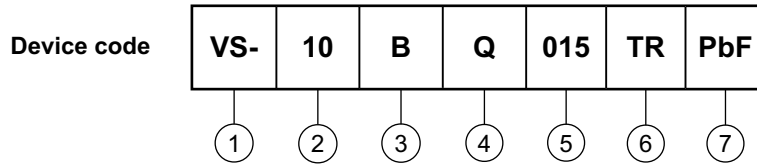
94110\_07 **t<sub>p</sub> - Square Wave Pulse Duration (µs)**  
 Fig. 7 - Maximum Non-Repetitive Surge Current

**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**

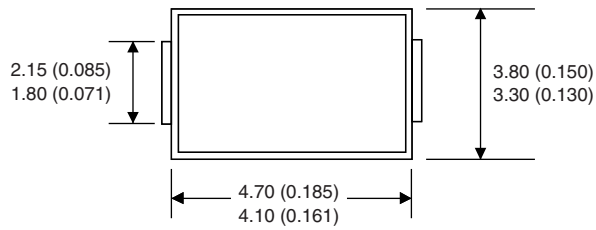


- 1** - HPP product suffix
- 2** - Current rating
- 3** - B = Single lead diode
- 4** - Q = Schottky "Q" series
- 5** - Voltage rating (015 = 15 V)
- 6** -
  - None = Box (1000 pieces)
  - TR = Tape and reel (3000 pieces)
- 7** - PbF = Lead (Pb)-free

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95017">www.vishay.com/doc?95017</a>
Part marking information	<a href="http://www.vishay.com/doc?95029">www.vishay.com/doc?95029</a>
Packaging information	Tape and reel <a href="http://www.vishay.com/doc?95034">www.vishay.com/doc?95034</a>
	Bulk <a href="http://www.vishay.com/doc?95397">www.vishay.com/doc?95397</a>
SPICE model	<a href="http://www.vishay.com/doc?95355">www.vishay.com/doc?95355</a>

## SMB

**DIMENSIONS** in millimeters (inches)





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