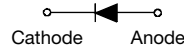


Schottky Rectifier, 1.0 A



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 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 | $V_R = 5\text{ }V_{DC}$, (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) | | 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

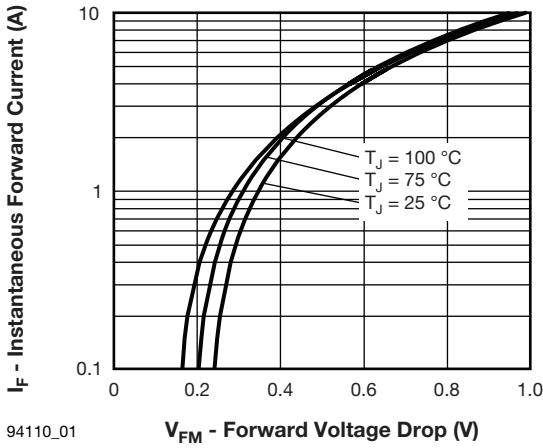


Fig. 1 - Maximum Forward Voltage Drop Characteristics

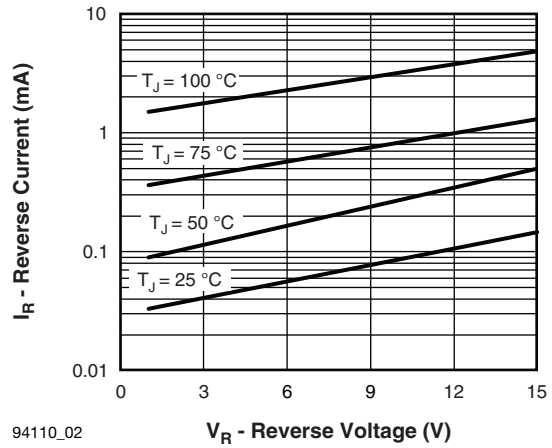


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

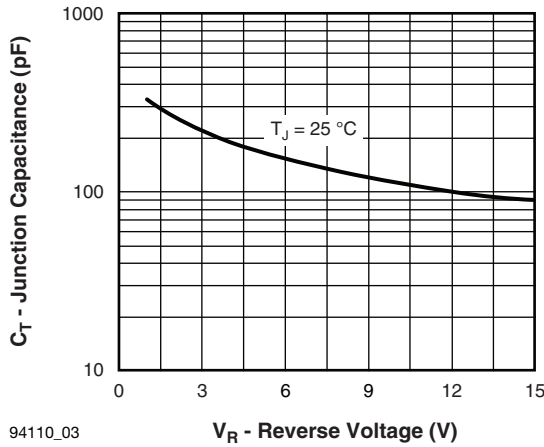


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

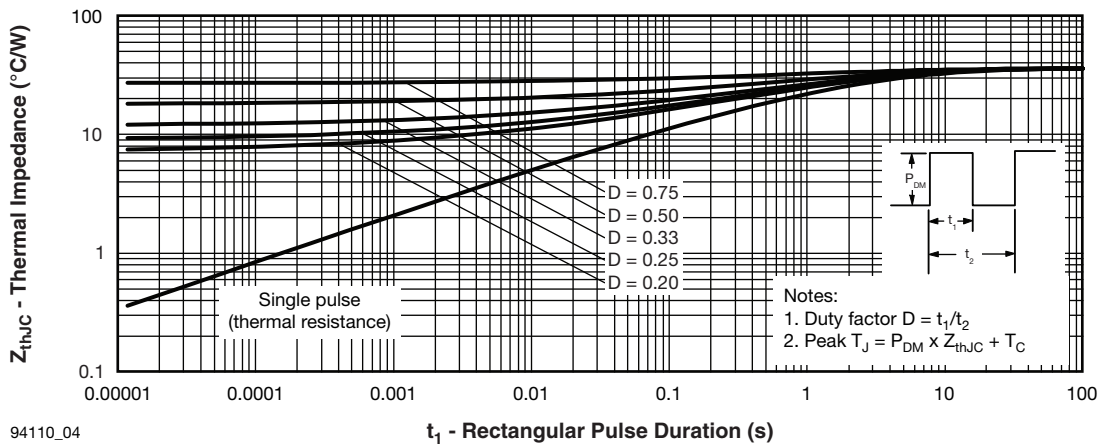
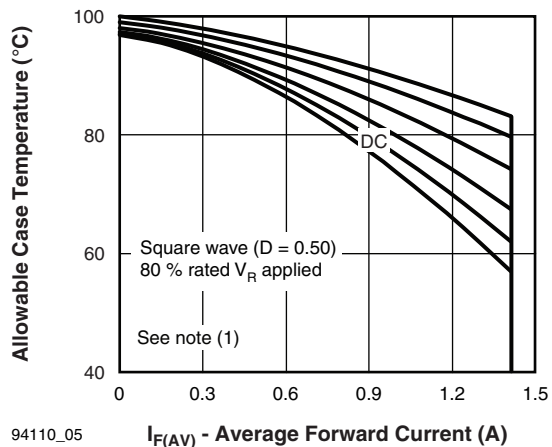
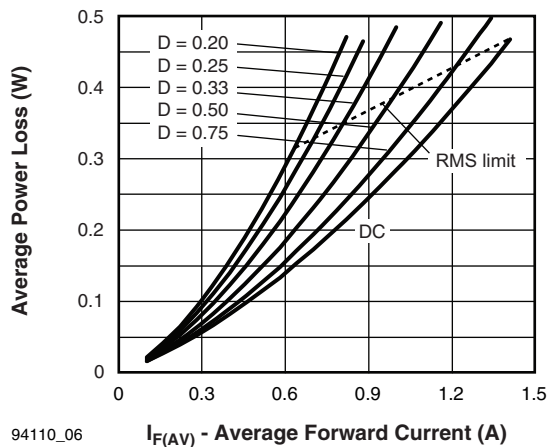


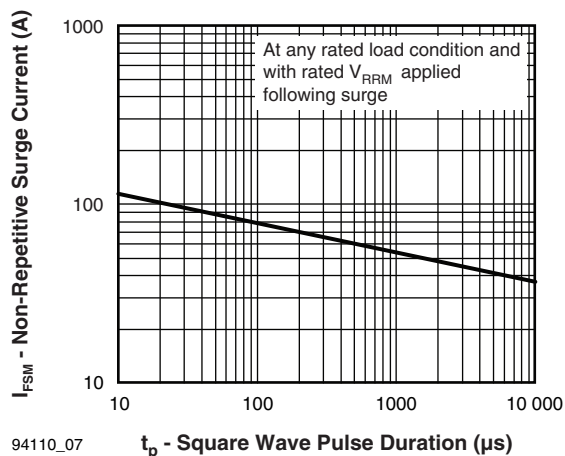
Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)



94110_05 **I_{F(AV)} - Average Forward Current (A)**
 Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current



94110_06 **I_{F(AV)} - Average Forward Current (A)**
 Fig. 6 - Forward Power Loss Characteristics



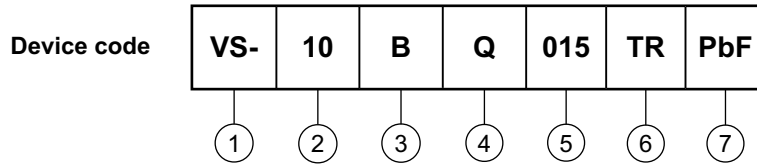
94110_07 **t_p - Square Wave Pulse Duration (μs)**
 Fig. 7 - Maximum Non-Repetitive Surge Current

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

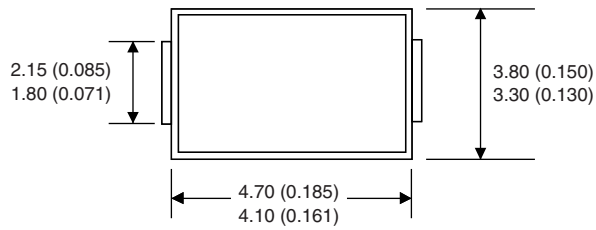


- 1** - HPP product suffix
- 2** - Current rating
- 3** - B = Single lead diode
- 4** - Q = Schottky "Q" series
- 5** - Voltage rating (015 = 15 V)
- 6** -
 - None = Box (1000 pieces)
 - TR = Tape and reel (3000 pieces)
- 7** - PbF = Lead (Pb)-free

| LINKS TO RELATED DOCUMENTS | |
|----------------------------|--|
| Dimensions | www.vishay.com/doc?95017 |
| Part marking information | www.vishay.com/doc?95029 |
| Packaging information | Tape and reel www.vishay.com/doc?95034 |
| | Bulk www.vishay.com/doc?95397 |
| SPICE model | www.vishay.com/doc?95355 |

SMB

DIMENSIONS in millimeters (inches)





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