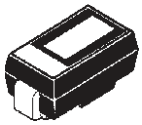
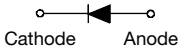
# Schottky Rectifier, 1.0 A



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

## 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.

| 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 |

| 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 µs 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 | A |
| | | 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<br>Frequency limited by $T_J$ maximum $V_A$ = 1.5 x $V_R$ typical | | 1.0 | A |


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## ELECTRICAL SPECIFICATIONS

| PARAMETER | SYMBOL | TEST CONDITIONS | | VALUES | UNITS |
|---|---|---|---|---|---|
| Maximum forward voltage drop See fig. 1 | $V_{FM}$ (1) | 1 A | $T_J$ = 25 °C | 0.35 | V |
| | | 2 A | | 0.44 | |
| | | 1 A | $T_J$ = 125 °C | 0.32 | |
| | | 2 A | | 0.40 | |
| Maximum reverse leakage current See fig. 2 | $I_{RM}$ (1) | $T_J$ = 25 °C | $V_R$ = Rated $V_R$ | 0.5 | mA |
| | | $T_J$ = 100 °C | | 12 | |
| Threshold voltage | $V_{F(TO)}$ | $T_J$ = $T_J$ maximum | | - | V |
| Forward slope resistance | $r_t$ | | | - | mΩ |
| Typical junction capacitance | $C_T$ | $V_R$ = 5 $V_{DC}$, (test signal range 100 kHz to 1 MHz), 25 °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 | °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 | °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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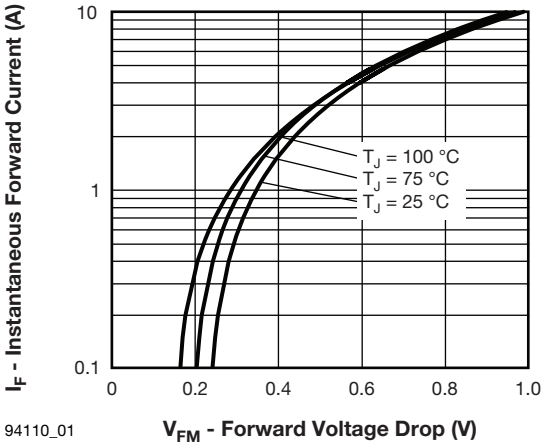



Fig. 1 - Maximum Forward Voltage Drop Characteristics

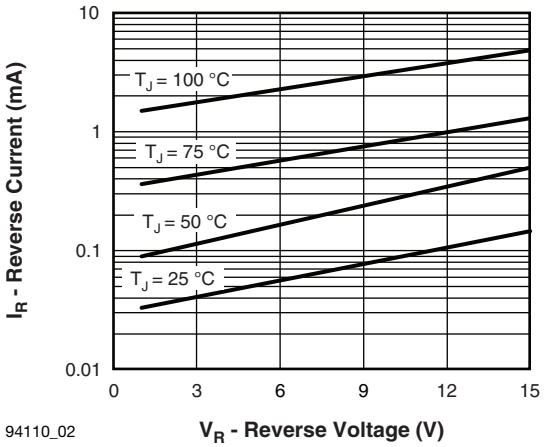



Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

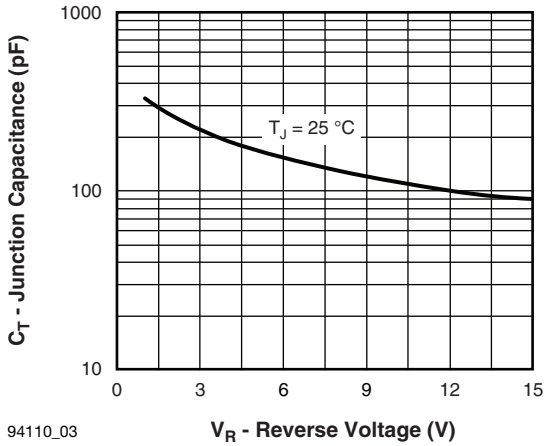



Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

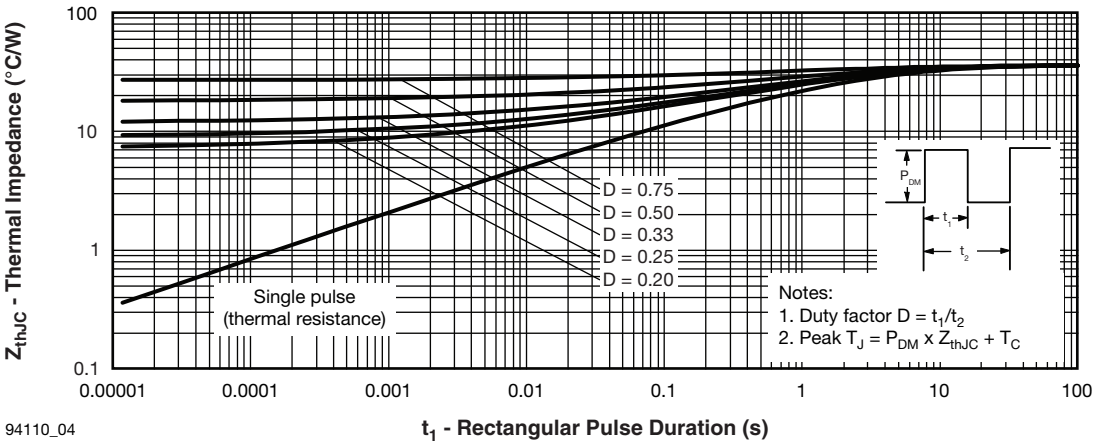



Fig. 4 - Maximum Thermal Impedance $Z_{thJC}$ Characteristics (Per Leg)

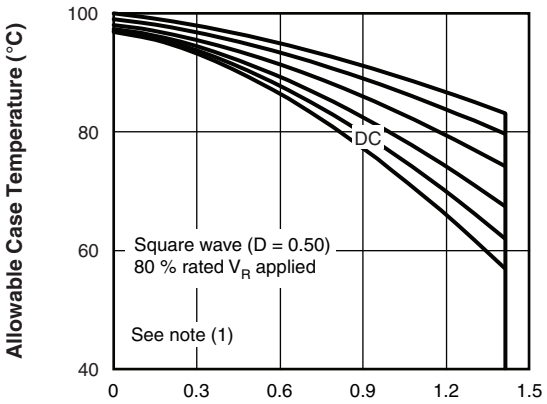



Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

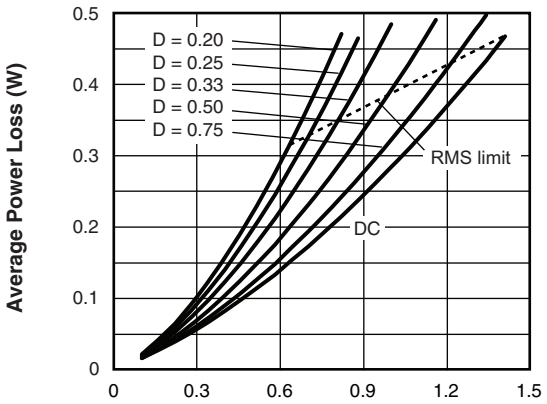



Fig. 6 - Forward Power Loss Characteristics

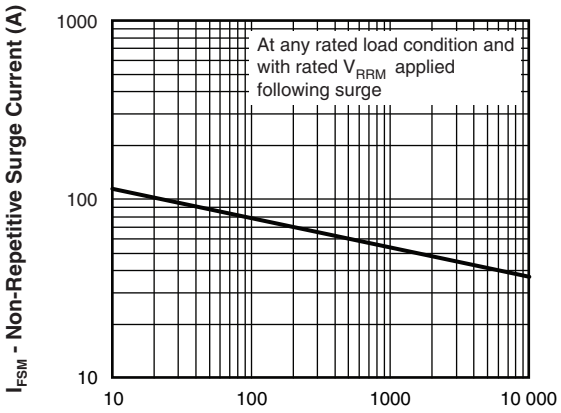



Fig. 7 - Maximum Non-Repetitive Surge Current

**Note**

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



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## ORDERING INFORMATION TABLE

**Device code**

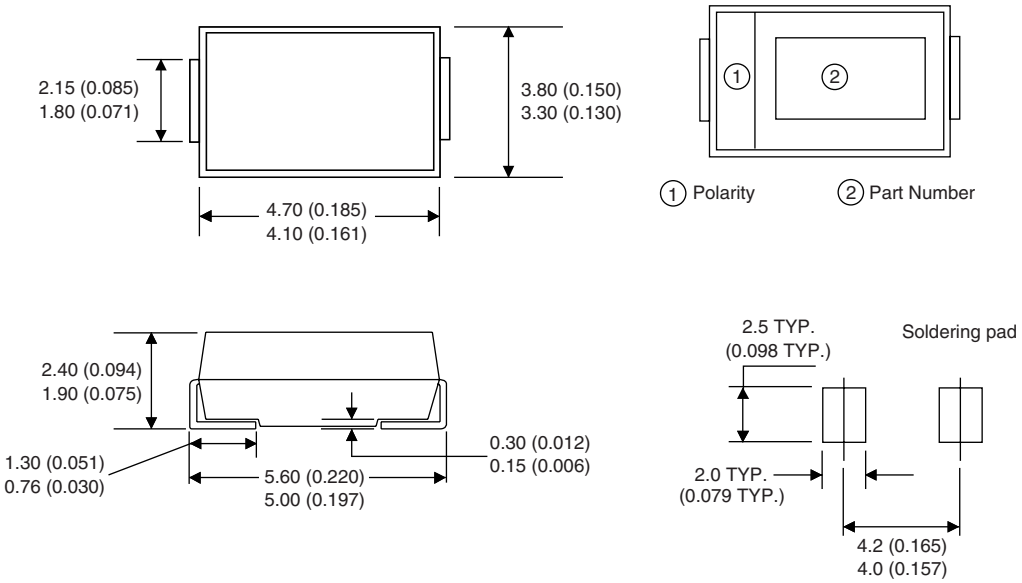
| VS- | 10 | B | Q | 015 | TR | PbF |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

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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