# High Performance Schottky Rectifier, 3.0 A



SMC (DO-214AB)




## FEATURES

- Ultralow forward voltage drop
- Guard ring for enhanced ruggedness and long term reliability
- 125 °C $T_J$ operation ($V_R$ < 5 V)
- 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 www.vishay.com/doc?99912

RoHS COMPLIANT
HALOGEN FREE

## 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.

| PRIMARY CHARACTERISTICS | |
|---|---|
| $I_{F(AV)}$ | 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 |
| $E_{AS}$ | 1.5 mJ |
| Package | SMC (DO-214AB) |
| Circuit configuration | Single |

| MAJOR RATINGS AND CHARACTERISTICS | | | |
|---|---|---|---|
| SYMBOL | CHARACTERISTICS | VALUES | UNITS |
| $I_{F(AV)}$ | Rectangular waveform | 3.0 | A |
| $V_{RRM}$ | | 15 | V |
| $I_{FSM}$ | $t_p$ = 5 µs sine | 650 | A |
| $V_F$ | 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 | |

| ABSOLUTE MAXIMUM RATINGS | | | | | |
|---|---|---|---|---|---|
| PARAMETER | SYMBOL | TEST CONDITIONS | | VALUES | UNITS |
| Maximum average forward current | $I_{F(AV)}$ | 50 % duty cycle at $T_L$ = 83 °C, rectangular waveform | | 3.0 | A |
| | | 50 % duty cycle at $T_L$ = 78 °C, rectangular waveform | | 4.0 | |
| Maximum peak one cycle non-repetitive surge current | $I_{FSM}$ | 5 µs sine or 3 µs rect. pulse | Following any rated load condition and with rated $V_{RRM}$ applied | 650 | |
| | | 10 ms sine or 6 ms rect. pulse | | 75 | |
| Non-repetitive avalanche energy | $E_{AS}$ | $T_J$ = 25 °C, $I_{AS}$ = 0.5 A, L = 12 mH | | 1.5 | 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 | | 0.5 | A |



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## ELECTRICAL SPECIFICATIONS

| PARAMETER | SYMBOL | TEST CONDITIONS | | VALUES | UNITS |
|---|---|---|---|---|---|
| Maximum forward voltage drop | $V_{FM}$ (1) | 3 A | $T_J$ = 25 °C | 0.35 | V |
| | | 6 A | | 0.43 | |
| | | 3 A | $T_J$ = 75 °C | 0.30 | |
| | | 6 A | | 0.38 | |
| Maximum reverse leakage current | $I_{RM}$ | $T_J$ = 25 °C | $V_R$ = Rated $V_R$ | 4 | mA |
| | | $T_J$ = 100 °C | | 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 $V_R$ | | 10 000 | 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 | 12 | °C/W |
| Maximum thermal resistance, junction to ambient | $R_{thJA}$ | | 46 | |
| Approximate weight | | | 0.24 | g |
| | | | 0.008 | oz. |
| Marking device | | Case style SMA (DO-214AC) | 3C | |

**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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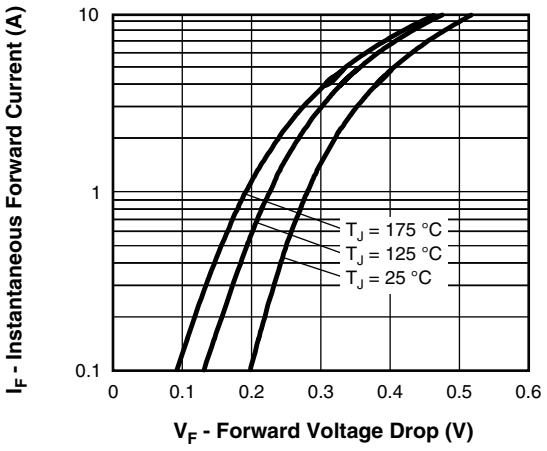



Fig. 1 - Typical Forward Voltage Drop Characteristics (Per Leg)

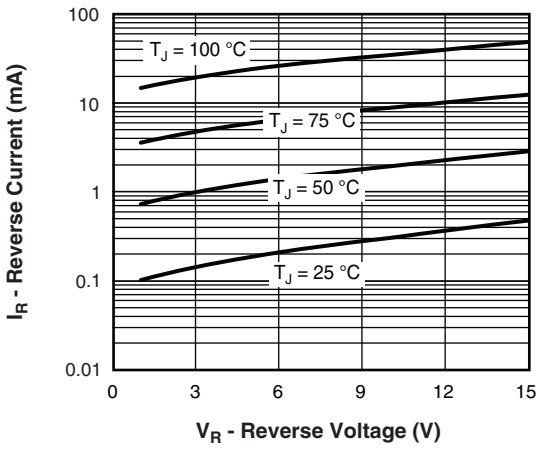



Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

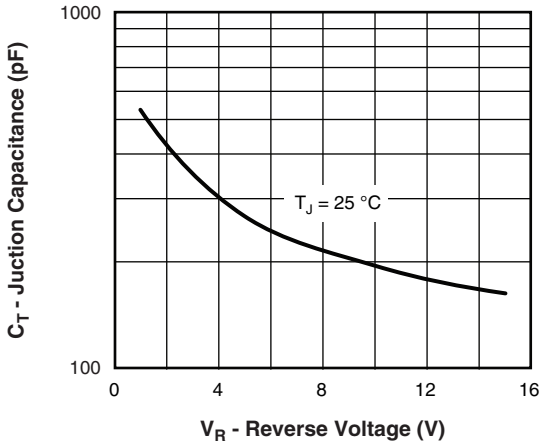



Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

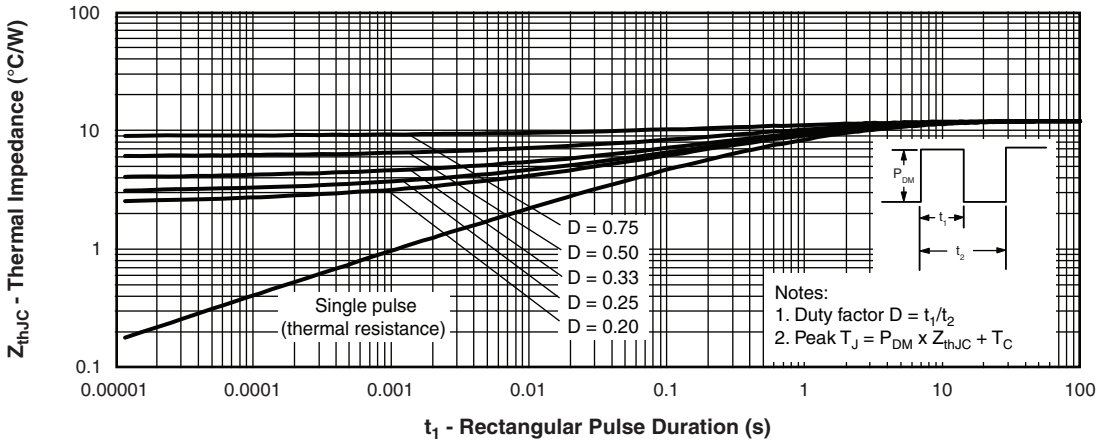



Fig. 4 - Maximum Thermal Impedance $Z_{thJC}$ Characteristics (Per Leg)


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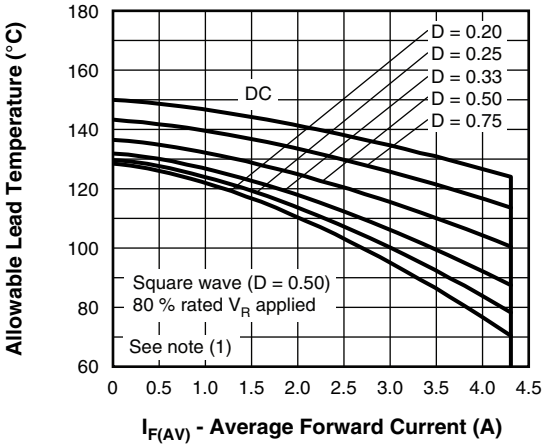



Fig. 5 - Maximum Average Forward Current vs. Allowable Lead Temperature

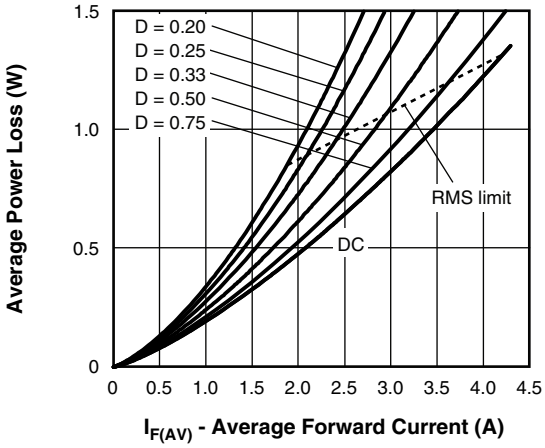



Fig. 6 - Maximum Average Forward Dissipation vs. Average Forward Current

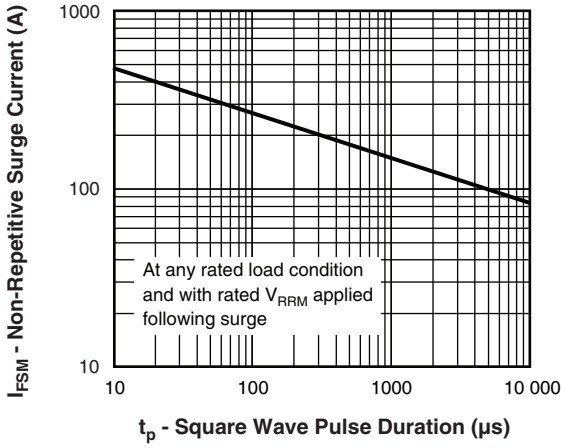



Fig. 7 - Maximum Peak Surge Forward Current vs. Pulse Duration

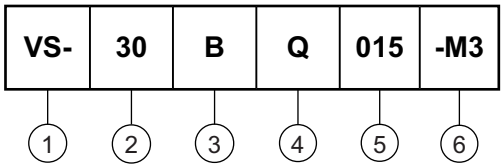
**Note**

(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




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 |

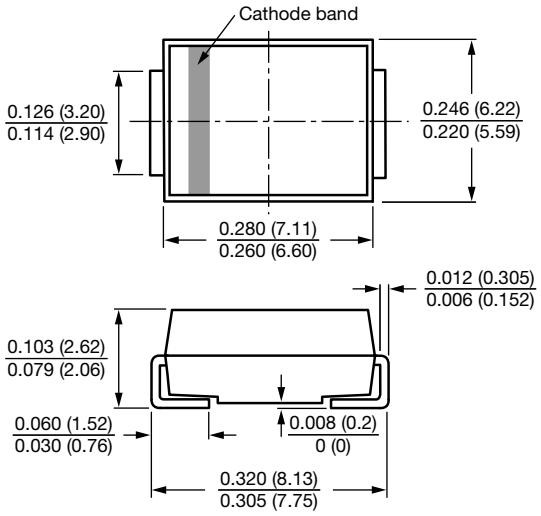
| **LINKS TO RELATED DOCUMENTS** | |
|---|---|
| Dimensions | www.vishay.com/doc?95402 |
| Part marking information | www.vishay.com/doc?95403 |
| Packaging information | www.vishay.com/doc?95404 |
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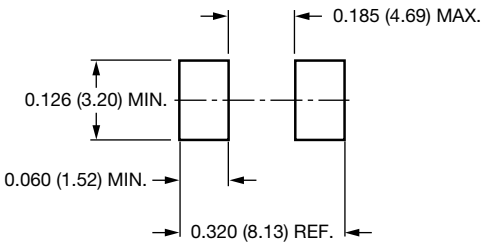
# SMC

**DIMENSIONS** in inches (millimeters)

**DO-214AB (SMC)**




**Mounting Pad Layout**



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