# High Performance Schottky Rectifier, 100 A

PowerTab®


## FEATURES

- Ultralow forward voltage drop
- Optimized for OR-ing applications
- Guard ring for enhanced ruggedness and long term reliability
- Screw mounting only
- AEC-Q101 qualified
- 125 °C max. operating junction temperature ($V_R$ < 5 V)
- High frequency operation
- Continuous high current operation
- PowerTab® package
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free

e4

RoHS COMPLIANT

## DESCRIPTION

The VS-100BGQ015HF4 Schottky rectifier has been optimized for ultralow forward voltage drop specifically for the OR-ing of parallel power supplies. The proprietary barrier technology allows for reliable operation up to 125 °C junction temperature. Typical applications are in parallel switching power supplies, converters, reverse battery protection, and redundant power subsystems.

| PRODUCT SUMMARY | |
|---|---|
| Package | PowerTab® |
| $I_{F(AV)}$ | 100 A |
| $V_R$ | 15 V |
| $V_F$ at $I_F$ | 0.45 V |
| $I_{RM}$ | 870 mA at 100 °C |
| $T_J$ max. | 125 °C |
| Diode variation | Single die |
| $E_{AS}$ | 9 mJ |

| MAJOR RATINGS AND CHARACTERISTICS | | | |
|---|---|---|---|
| SYMBOL | CHARACTERISTICS | VALUES | UNITS |
| $I_{F(AV)}$ | Rectangular waveform | 100 | A |
| | $T_C$ | 88 | °C |
| $V_{RRM}$ | | 15 | V |
| $I_{FSM}$ | $t_p$ = 5 µs sine | 5000 | A |
| $V_F$ | 100 $A_{pk}$ (typical) | 0.39 | V |
| | $T_J$ | 125 | °C |
| $T_J$ | Range | -55 to +125 | °C |

| VOLTAGE RATINGS | | | | |
|---|---|---|---|---|
| PARAMETER | SYMBOL | TEST CONDITIONS | VS-100BGQ015HF4 | UNITS |
| Maximum DC reverse voltage | $V_R$ | $T_J$ = 100 °C | 15 | V |
| | | $T_J$ = 125 °C | 5 | |

| ABSOLUTE MAXIMUM RATINGS | | | | | |
|---|---|---|---|---|---|
| PARAMETER | SYMBOL | TEST CONDITIONS | | VALUES | UNITS |
| Maximum average forward current | $I_{F(AV)}$ | 50 % duty cycle at $T_C$ = 88 °C, rectangular waveform | | 100 | A |
| 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 | 5000 | A |
| | | 10 ms sine or 6 ms rect. pulse | | 1000 | |
| Non-repetitive avalanche energy | $E_{AS}$ | $T_J$ = 25 °C, $I_{AS}$ = 2 A, L = 4.5 mH | | 9 | mJ |
| Repetitive avalanche current | $I_{AR}$ | Current decaying linearly to zero in 1 µs<br>Frequency limited by $T_J$ maximum $V_A$ = 3 x $V_R$ typical | | 2 | A |

## ELECTRICAL SPECIFICATIONS

| PARAMETER | SYMBOL | TEST CONDITIONS | | TYP. | MAX. | UNITS |
|---|---|---|---|---|---|---|
| Forward voltage drop | $V_{FM}$ (1) | 50 A | $T_J$ = 25 °C | 0.36 | 0.4 | V |
| | | 100 A | | 0.45 | 0.52 | |
| | | 50 A | $T_J$ = 125 °C | 0.27 | 0.31 | |
| | | 100 A | | 0.39 | 0.45 | |
| Maximum reverse leakage current | $I_{RM}$ (1) | $T_J$ = 100 °C, $V_R$ = 12 V | | 480 | 700 | mA |
| | | $T_J$ = 125 °C, $V_R$ = 5 V | | 1 | 1.2 | A |
| | | $T_J$ = 25 °C | $V_R$ = Rated $V_R$ | 7 | 18 | mA |
| | | $T_J$ = 100 °C | | 580 | 870 | |
| Maximum junction capacitance | $C_T$ | $V_R$ = 5 $V_{DC}$, (test signal range 100 kHz to 1 MHz), 25 °C | | 3800 | | pF |
| Typical series inductance | $L_S$ | Measured from tab to mounting plane | | 3.5 | | 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 | | $T_J$ | | -55 to +125 | °C |
| Maximum storage temperature range | | $T_{Stg}$ | | -55 to +150 | |
| Maximum thermal resistance, junction to case | | $R_{thJC}$ | DC operation | 0.50 | °C/W |
| Maximum thermal resistance, case to heatsink | | $R_{thCS}$ | Mounting surface, smooth and greased | 0.30 | |
| Approximate weight | | | | 5 | g |
| | | | | 0.18 | oz. |
| Mounting torque | minimum | | | 1.2 (10) | N · m (lbf · in) |
| | maximum | | | 2.4 (20) | |
| Marking device | | | Case style PowerTab® | 100BGQ015H | |

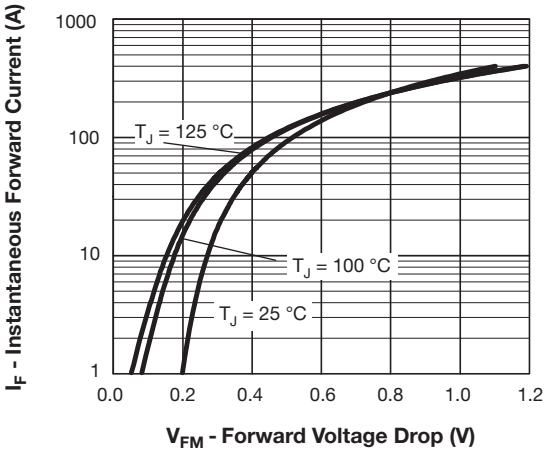



Fig. 1 - Maximum Forward Voltage Drop Characteristics

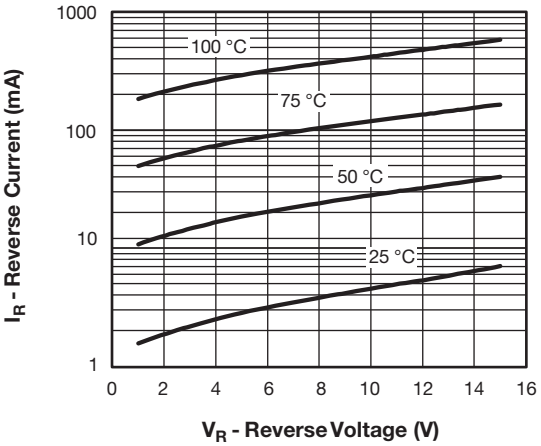



Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

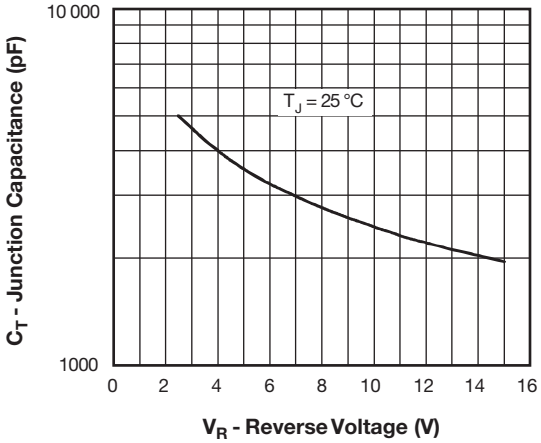



Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

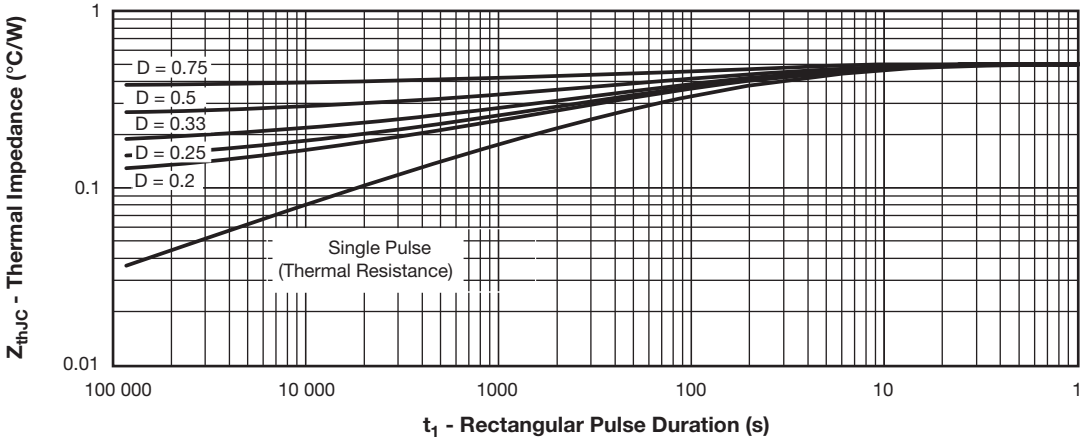



Fig. 4 - Maximum Thermal Impedance $Z_{thJC}$ Characteristics

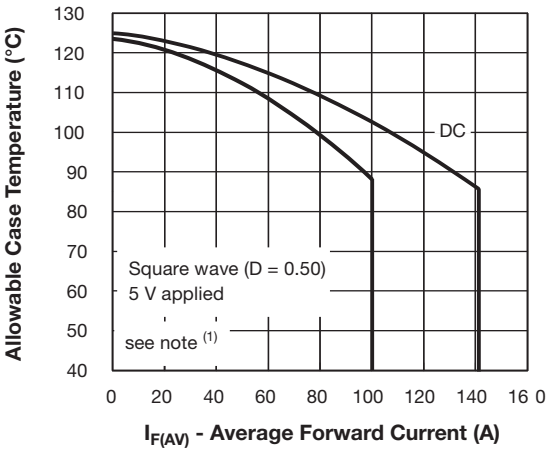



Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

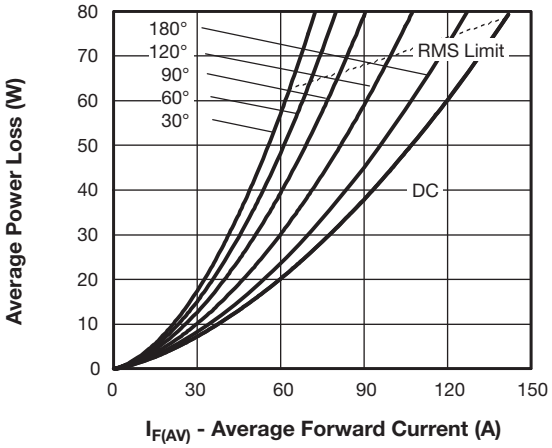



Fig. 6 - Forward Power Loss Characteristics

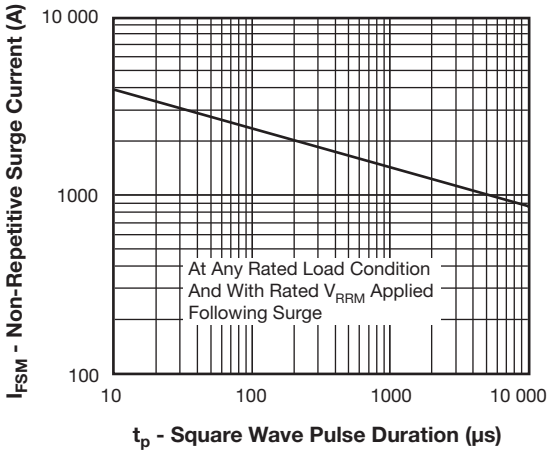



Fig. 7 - Maximum Non-Repetitive Surge Current

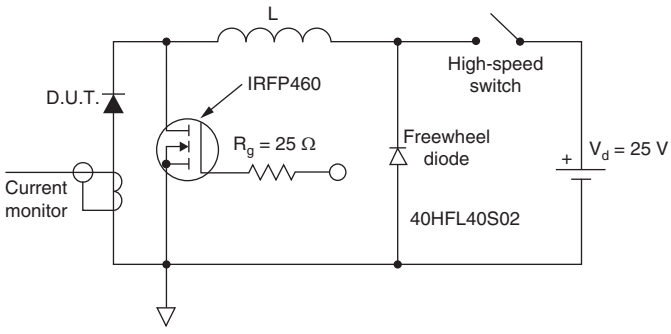


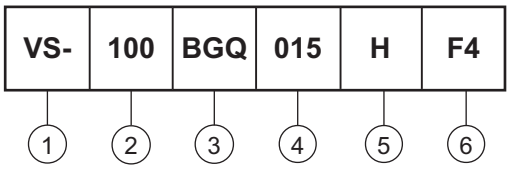

Fig. 8 - Unclamped Inductive Test Circuit

**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 $V_{R1}$ = 5 V

## ORDERING INFORMATION TABLE

Device code



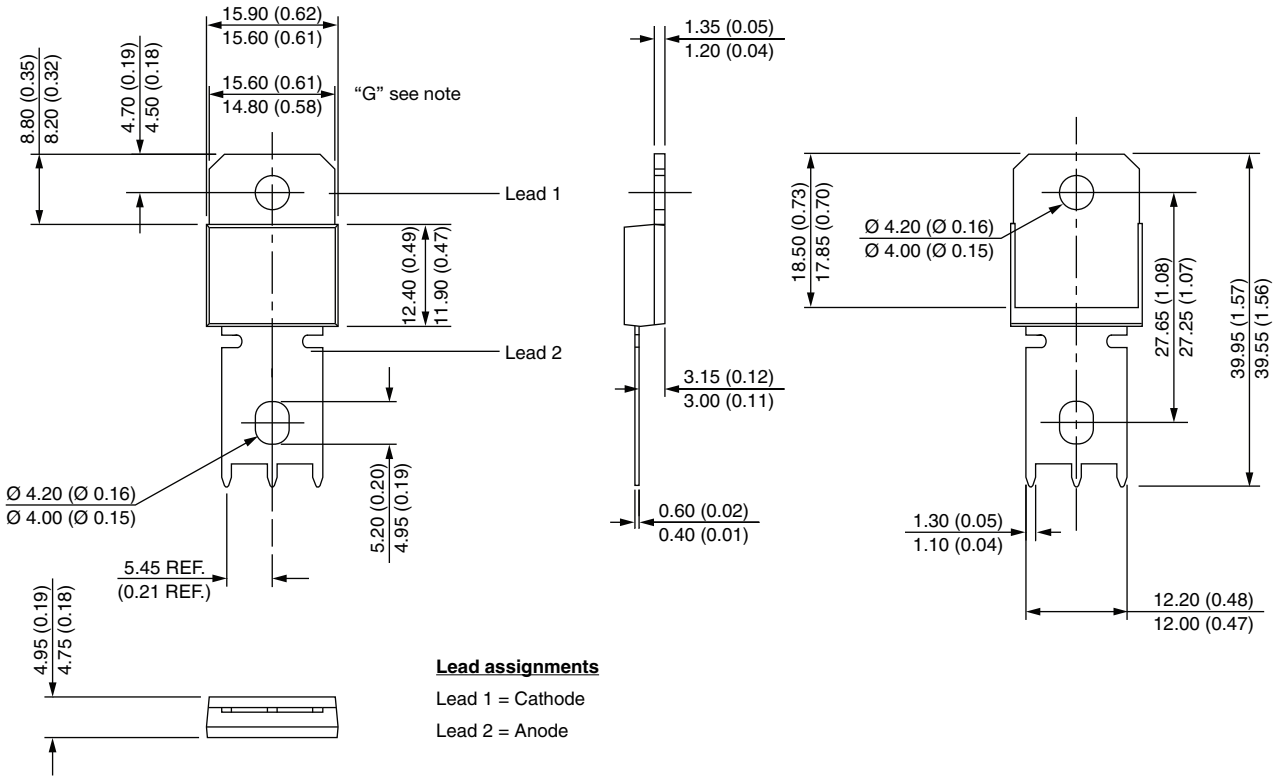

1 - Vishay Semiconductors product
2 - Current rating (100 = 100 A)
3 - Essential part number
4 - Voltage rating (015 = 15 V)
5 - H = AEC-Q101 qualified
6 - Environmental digit:
- F4 = RoHS compliant and totally lead (Pb)-free

| **ORDERING INFORMATION** (Example) | | | |
|---|---|---|---|
| **PREFERRED P/N** | **QUANTITY PER T/R** | **MINIMUM ORDER QUANTITY** | **PACKAGING DESCRIPTION** |
| VS-100BGQ015HF4 | 25 | 375 | Antistatic plastic tube |

| **LINKS TO RELATED DOCUMENTS** | |
|---|---|
| Dimensions | www.vishay.com/doc?95240 |
| Part marking information | www.vishay.com/doc?95467 |
| SPICE model | www.vishay.com/doc?95428 |
| Application note | www.vishay.com/doc?95179 |

## PowerTab®

**DIMENSIONS** in millimeters (inches)




**Lead assignments**

Lead 1 = Cathode

Lead 2 = Anode

**Note:**
Outline conform to JEDEC® TO-275, except for dimension "G" only

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