

High Performance Schottky Rectifier, 100 A



PowerTab®


RoHS
COMPLIANT

FEATURES

- 175 °C max. operating junction temperature
- High frequency operation
- Low forward voltage drop
- Continuous high current operation
- Guard ring for enhanced ruggedness and long term reliability
- Screw mounting only
- AEC-Q101 qualified
- PowerTab® package
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

DESCRIPTION

The VS-100BGQ100HF4 Schottky rectifier has been optimized for low reverse leakage at high temperature. The proprietary barrier technology allows for reliable operation up to 175 °C junction temperature. Typical applications are in switching power supplies, converters, reverse battery protection, and redundant power subsystems.

| PRODUCT SUMMARY | |
|-----------------|------------------|
| Package | PowerTab® |
| $I_{F(AV)}$ | 100 A |
| V_R | 100 V |
| V_F at I_F | 0.82 V |
| I_{RM} | 180 mA at 125 °C |
| T_J max. | 175 °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 | 124 | °C |
| V_{RRM} | | 100 | V |
| I_{FSM} | $t_p = 5 \mu s$ sine | 6300 | A |
| V_F | 100 A_{pk} (typical) | 0.77 | V |
| | T_J | 125 | °C |
| T_J | Range | -55 to +175 | °C |

| VOLTAGE RATINGS | | | |
|--------------------------------------|-----------|-----------------|-------|
| PARAMETER | SYMBOL | VS-100BGQ100HF4 | UNITS |
| Maximum DC reverse voltage | V_R | 100 | V |
| Maximum working peak reverse voltage | V_{RWM} | | |

| ABSOLUTE MAXIMUM RATINGS | | | | | |
|---|-------------|---|---|--------|-------|
| PARAMETER | SYMBOL | TEST CONDITIONS | | VALUES | UNITS |
| Maximum average forward current | $I_{F(AV)}$ | 50 % duty cycle at $T_C = 124$ °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 | 6300 | A |
| | | 10 ms sine or 6 ms rect. pulse | | 800 | |
| 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 Frequency limited by T_J maximum $V_A = 1.5 \times V_R$ typical | | 2 | A |



| ELECTRICAL SPECIFICATIONS | | | | | | |
|--------------------------------|----------------|--|-----------------------------------|--------|------|------------------|
| PARAMETER | SYMBOL | TEST CONDITIONS | | VALUES | | UNITS |
| | | | | TYP. | MAX. | |
| Forward voltage drop | $V_{FM}^{(1)}$ | 50 A | $T_J = 25\text{ }^\circ\text{C}$ | 0.83 | 0.86 | V |
| | | 100 A | | 1.01 | 1.08 | |
| | | 50 A | $T_J = 125\text{ }^\circ\text{C}$ | 0.66 | 0.7 | |
| | | 100 A | | 0.77 | 0.82 | |
| Reverse leakage current | $I_{RM}^{(1)}$ | $T_J = 25\text{ }^\circ\text{C}$ | $V_R = \text{Rated } V_R$ | 22 | 300 | μA |
| | | $T_J = 125\text{ }^\circ\text{C}$ | | 14 | 18 | mA |
| Maximum junction capacitance | C_T | $V_R = 5 V_{DC}$, (test signal range 100 kHz to 1 MHz) $25\text{ }^\circ\text{C}$ | | 1320 | | 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 and storage temperature range | T_J, T_{Stg} | | -55 to +175 | $^\circ\text{C}$ |
| Maximum thermal resistance, junction to case | R_{thJC} | DC operation | 0.50 | $^\circ\text{C/W}$ |
| Typical 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 [®] | 100BGQ100H | |

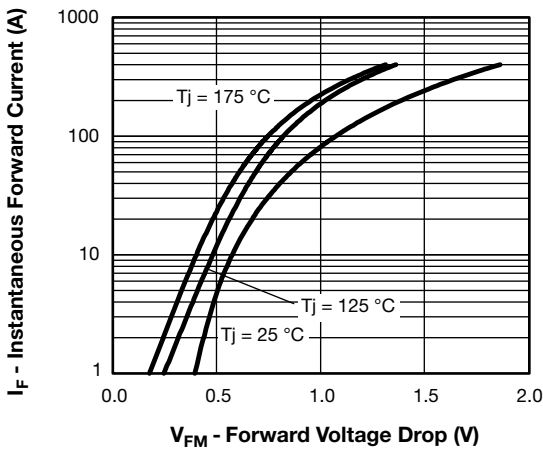


Fig. 1 - Maximum Forward Voltage Drop Characteristics

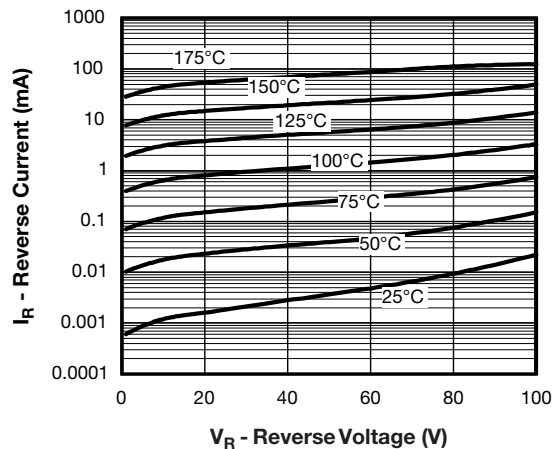


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

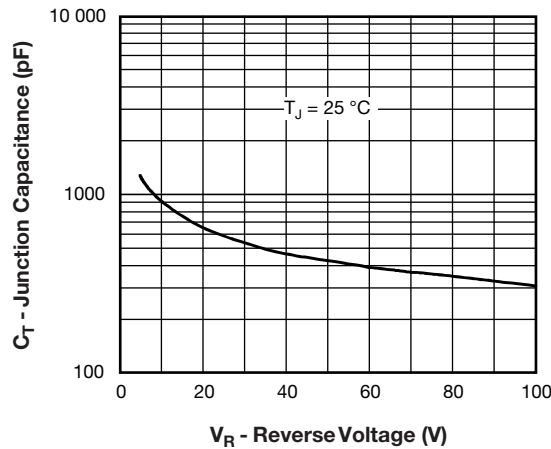


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

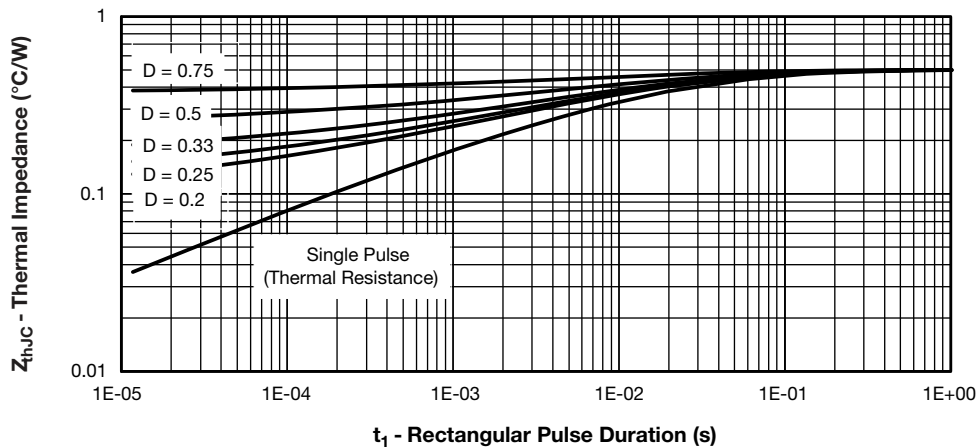


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

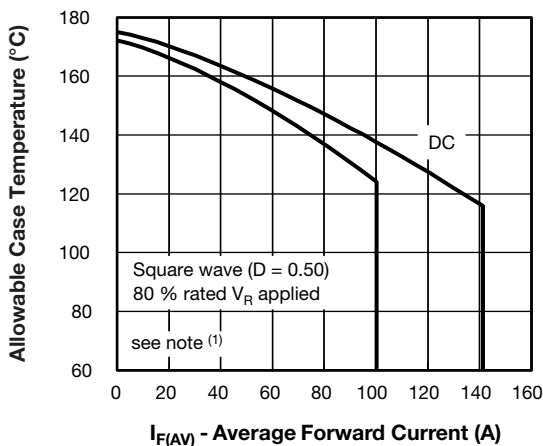


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

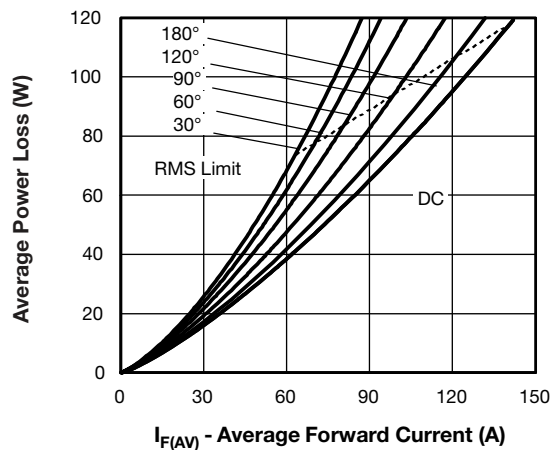


Fig. 6 - Forward Power Loss Characteristics

Note

- (1) Formula used: $T_C = T_J - (P_d + P_{dREV}) \times R_{thJC}$;
 P_d = forward power loss = $I_{F(AV)} \times V_{FM}$ at $(I_{F(AV)}/D)$ (see fig. 6);
 P_{dREV} = inverse power loss = $V_{R1} \times I_R (1 - D)$; I_R at $V_{R1} = 80\%$ rated V_R

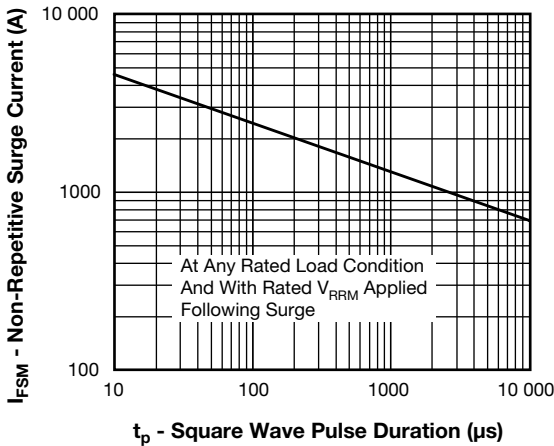


Fig. 7 - Maximum Non-Repetitive Surge Current

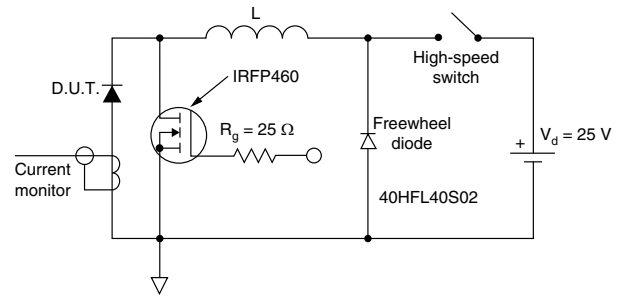


Fig. 8 - Unclamped Inductive Test Circuit

ORDERING INFORMATION TABLE

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

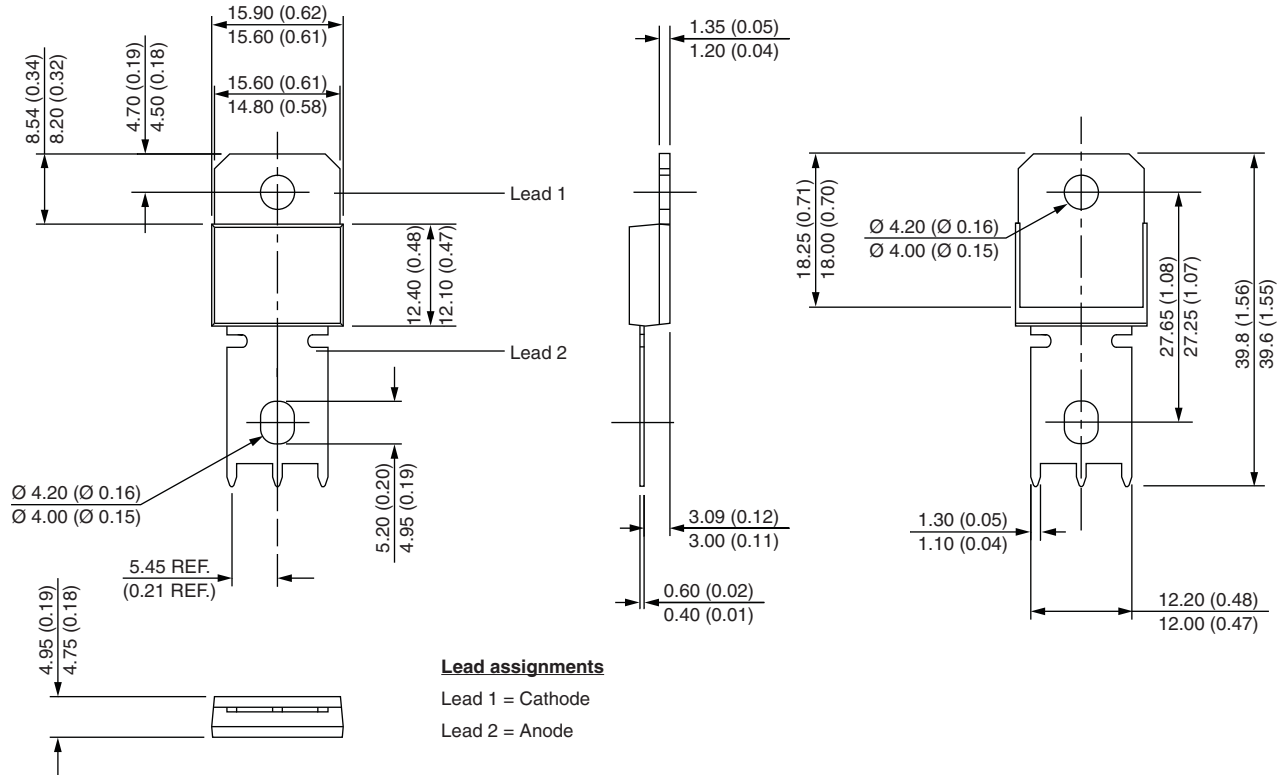
| ORDERING INFORMATION (Example) | | | |
|---------------------------------------|------------------|------------------------|-------------------------|
| PREFERRED P/N | QUANTITY PER T/R | MINIMUM ORDER QUANTITY | PACKAGING DESCRIPTION |
| VS-100BGQ100HF4 | 25 | 375 | Antistatic plastic tube |

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



PowerTab®

DIMENSIONS in millimeters (inches)





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