

## High Performance Schottky Rectifier, 100 A



PowerTab®



### 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
- Designed and qualified according to JEDEC®-JESD 47
- PowerTab® package
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

| 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             |

### DESCRIPTION

The VS-100BGQ100 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.

| 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    | 100BGQ100 | 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 $\mu s$ sine or 3 $\mu s$ 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 $\mu s$<br>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  | $\mu\text{A}$    |
|                                |                | $T_J = 125\text{ }^\circ\text{C}$                             |                                   | 14     | 18   | mA               |
| Maximum junction capacitance   | $C_T$          | $V_R = 5 V_{DC}$ , (test signal range 100 kHz to 1 MHz) 25 °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/ $\mu\text{s}$ |

Note

(1) Pulse width < 300  $\mu\text{s}$ , 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<br>(lbf · in) |
|                                                | maximum        |                                      | 2.4 (20)    |                     |
| Marking device                                 |                | Case style PowerTab®                 | 100BGQ100   |                     |

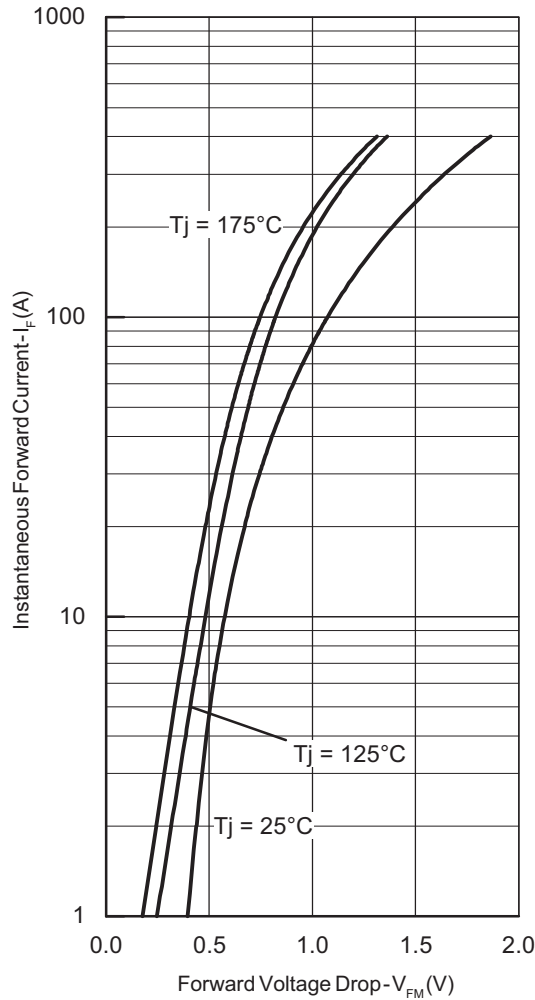


Fig. 1 - Maximum Forward Voltage Drop Characteristics

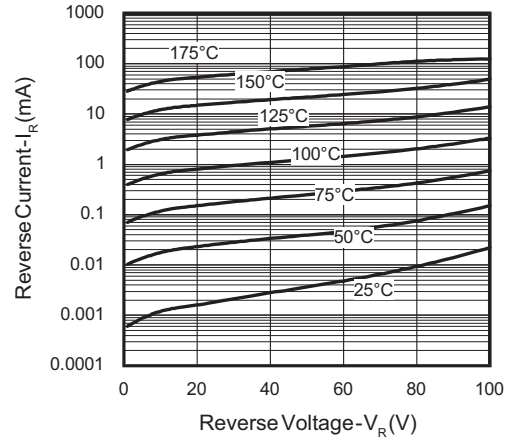


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

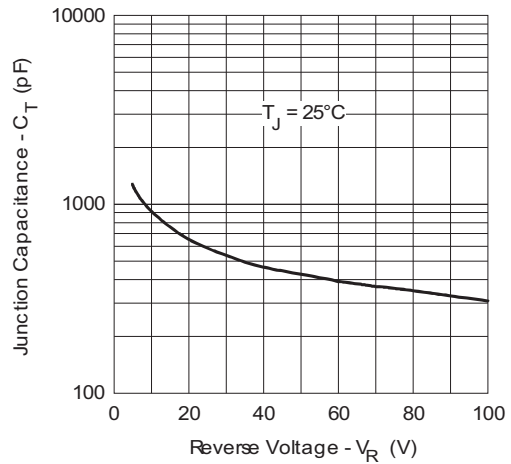


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

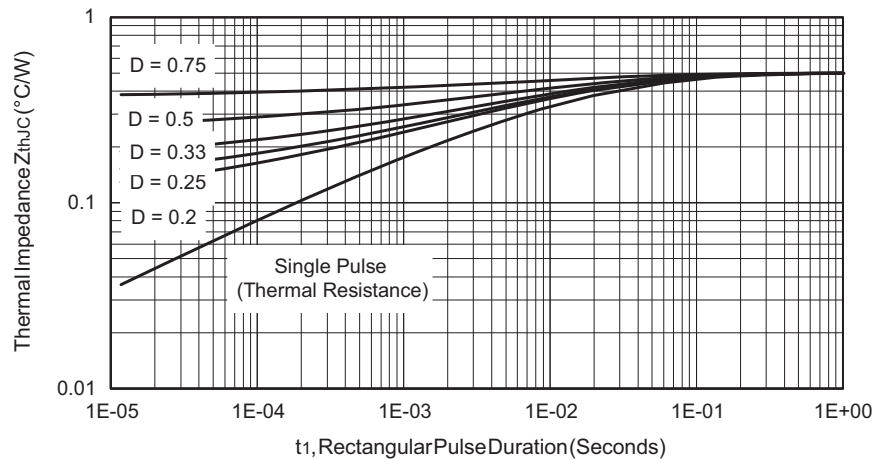


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

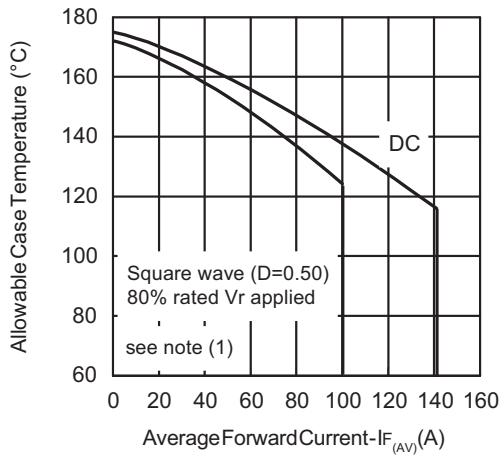


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

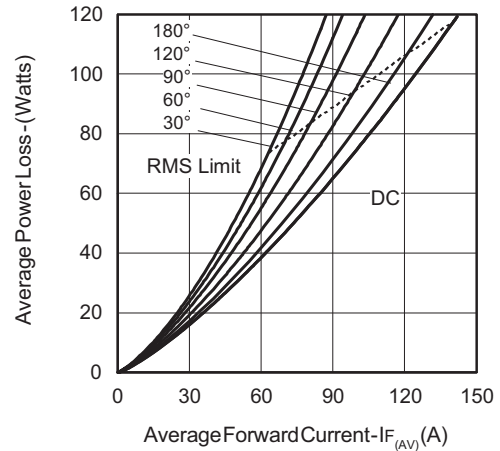


Fig. 6 - Forward Power Loss Characteristics

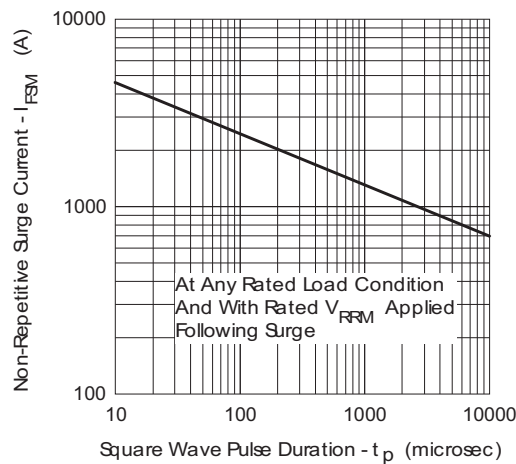


Fig. 7 - Maximum Non-Repetitive Surge Current

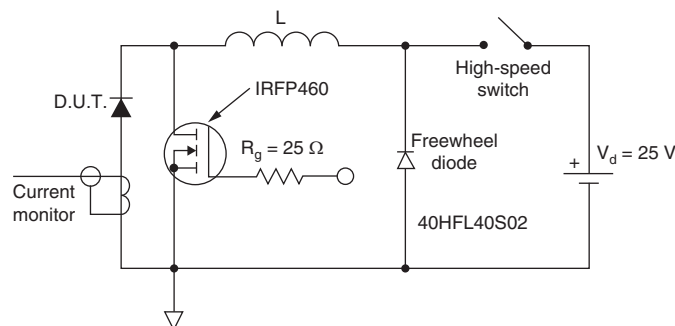


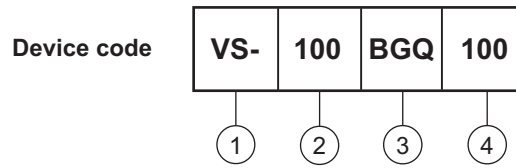
Fig. 8 - Unclamped Inductive Test Circuit

**Note**

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



**ORDERING INFORMATION TABLE**



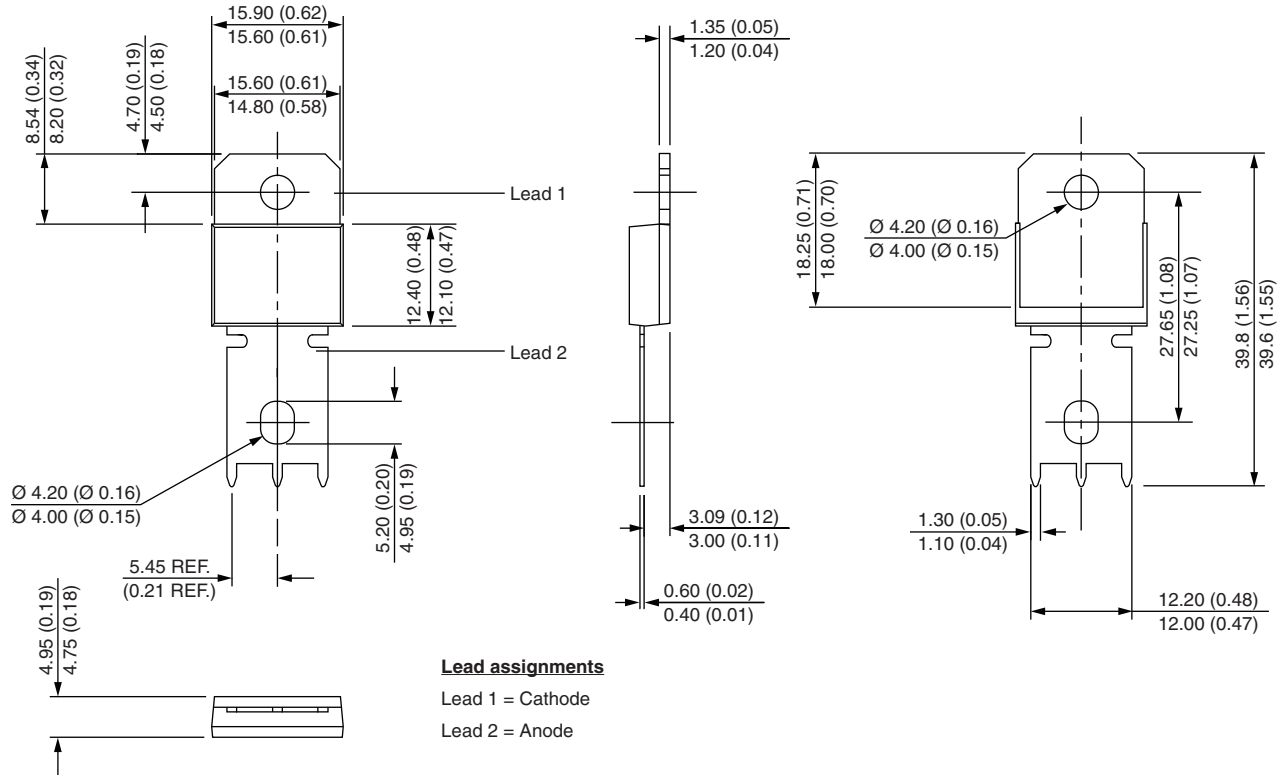
- 1 - Vishay Semiconductors product
- 2 - Current rating
- 3 - Essential part number
- 4 - Voltage code =  $V_{RRM}$

| LINKS TO RELATED DOCUMENTS |                                                                        |
|----------------------------|------------------------------------------------------------------------|
| Dimensions                 | <a href="http://www.vishay.com/doc?95240">www.vishay.com/doc?95240</a> |
| Part marking information   | <a href="http://www.vishay.com/doc?95370">www.vishay.com/doc?95370</a> |
| Application note           | <a href="http://www.vishay.com/doc?95179">www.vishay.com/doc?95179</a> |



## PowerTab®

**DIMENSIONS** in millimeters (inches)





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