

# 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
- AEC-Q101 qualified
- 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-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.

| 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 <sub>pk</sub> (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 <sub>F(AV)</sub> | 50 % duty cycle at T <sub>C</sub> = 124 °C, rectangular waveform                                                                       |                                                                            | 100    | A     |
| Maximum peak one cycle non-repetitive surge current | I <sub>FSM</sub>   | 5 μs sine or 3 μs rect. pulse                                                                                                          | Following any rated load condition and with rated V <sub>RRM</sub> applied | 6300   | A     |
|                                                     |                    | 10 ms sine or 6 ms rect. pulse                                                                                                         |                                                                            | 800    |       |
| Non-repetitive avalanche energy                     | E <sub>AS</sub>    | T <sub>J</sub> = 25 °C, I <sub>AS</sub> = 2 A, L = 4.5 mH                                                                              |                                                                            | 9      | mJ    |
| Repetitive avalanche current                        | I <sub>AR</sub>    | Current decaying linearly to zero in 1 μs<br>Frequency limited by T <sub>J</sub> maximum V <sub>A</sub> = 1.5 x V <sub>R</sub> typical |                                                                            | 2      | A     |

**ELECTRICAL SPECIFICATIONS**

| PARAMETER                      | SYMBOL                         | TEST CONDITIONS                                                                 |                                       | VALUES |        | UNITS |
|--------------------------------|--------------------------------|---------------------------------------------------------------------------------|---------------------------------------|--------|--------|-------|
|                                |                                |                                                                                 |                                       | TYP.   | MAX.   |       |
| Forward voltage drop           | V <sub>FM</sub> <sup>(1)</sup> | 50 A                                                                            | T <sub>J</sub> = 25 °C                | 0.83   | 0.86   | V     |
|                                |                                | 100 A                                                                           |                                       | 1.01   | 1.08   |       |
|                                |                                | 50 A                                                                            | T <sub>J</sub> = 125 °C               | 0.66   | 0.7    |       |
|                                |                                | 100 A                                                                           |                                       | 0.77   | 0.82   |       |
| Reverse leakage current        | I <sub>RM</sub> <sup>(1)</sup> | T <sub>J</sub> = 25 °C                                                          | V <sub>R</sub> = Rated V <sub>R</sub> | 22     | 300    | μA    |
|                                |                                | T <sub>J</sub> = 125 °C                                                         |                                       | 14     | 18     | mA    |
| Maximum junction capacitance   | C <sub>T</sub>                 | V <sub>R</sub> = 5 V <sub>DC</sub> , (test signal range 100 kHz to 1 MHz) 25 °C |                                       |        | 1320   | pF    |
| Typical series inductance      | L <sub>S</sub>                 | Measured from tab to mounting plane                                             |                                       |        | 3.5    | nH    |
| Maximum voltage rate of change | dV/dt                          | Rated V <sub>R</sub>                                                            |                                       |        | 10 000 | V/μs  |

**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 <sub>J</sub> , T <sub>Stg</sub> |                                      | -55 to +175 | °C                  |
| Maximum thermal resistance, junction to case   | R <sub>thJC</sub>                 | DC operation                         | 0.50        | °C/W                |
| Typical thermal resistance, case to heatsink   | R <sub>thCS</sub>                 | 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®                 | 100BGQ100H  |                     |

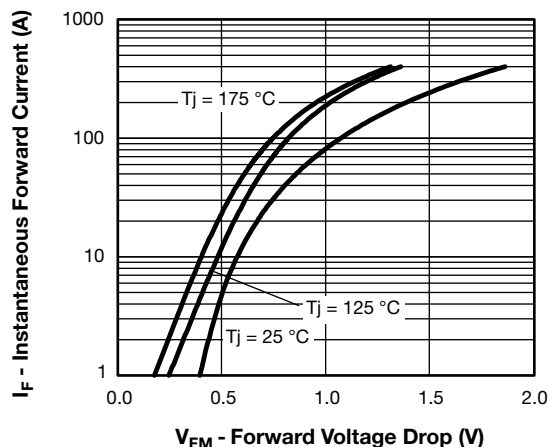


Fig. 1 - Maximum Forward Voltage Drop Characteristics

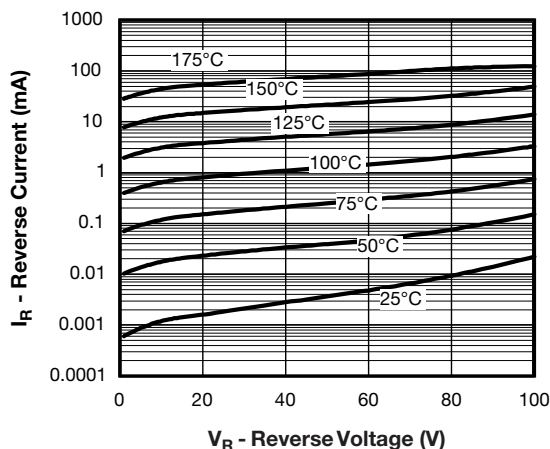


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

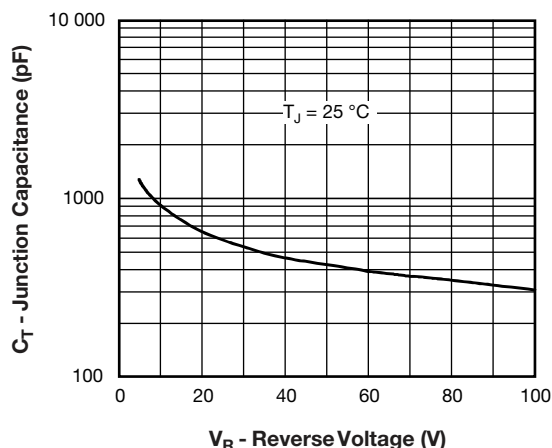


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

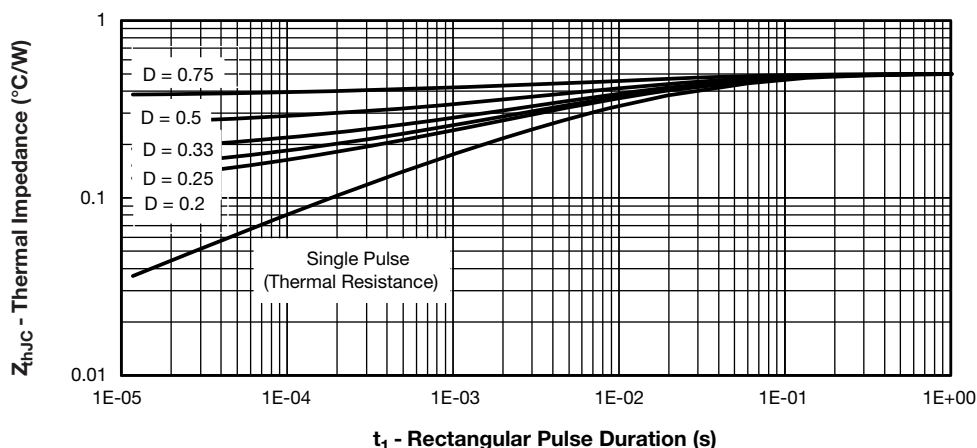
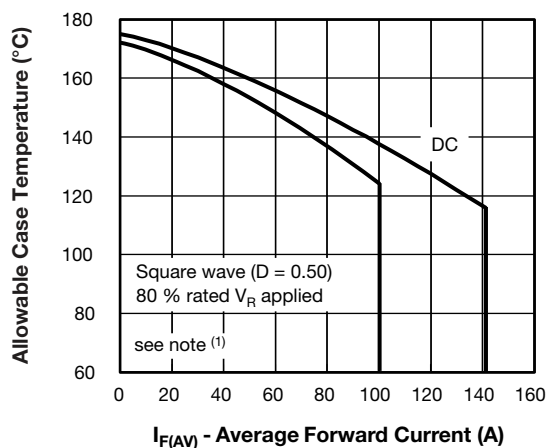

Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics


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

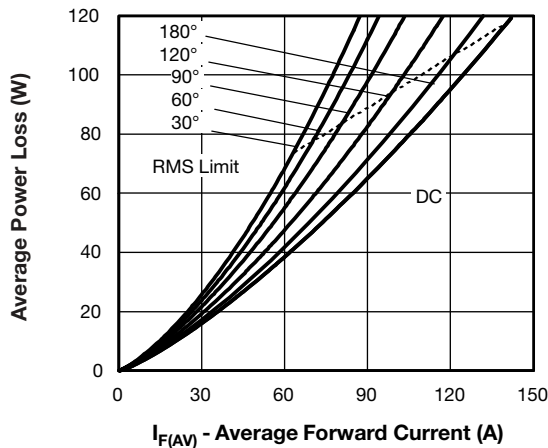


Fig. 6 - Forward Power Loss Characteristics

#### 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  $V_R$

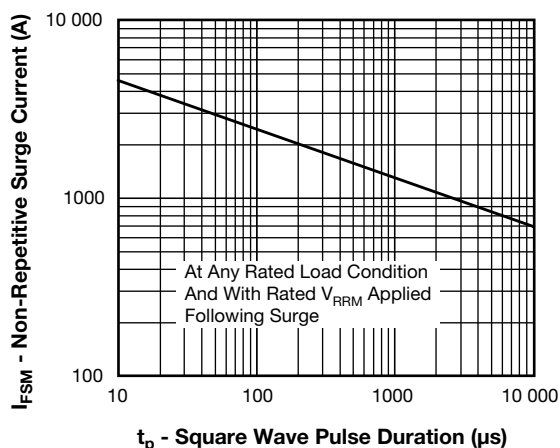


Fig. 7 - Maximum Non-Repetitive Surge Current

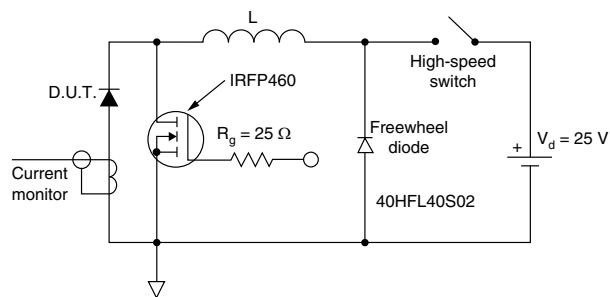


Fig. 8 - Unclamped Inductive Test Circuit

## ORDERING INFORMATION TABLE

Device code

| VS- | 100 | BGQ | 100 | H | F4 |
|-----|-----|-----|-----|---|----|
|-----|-----|-----|-----|---|----|

① ② ③ ④ ⑤ ⑥

- 1** - Vishay Semiconductors product
- 2** - Current rating (100 = 100 A)
- 3** - Essential part number
- 4** - Voltage rating (100 = 100 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-100BGQ100HF4 | 25               | 375                    | Antistatic plastic tube |

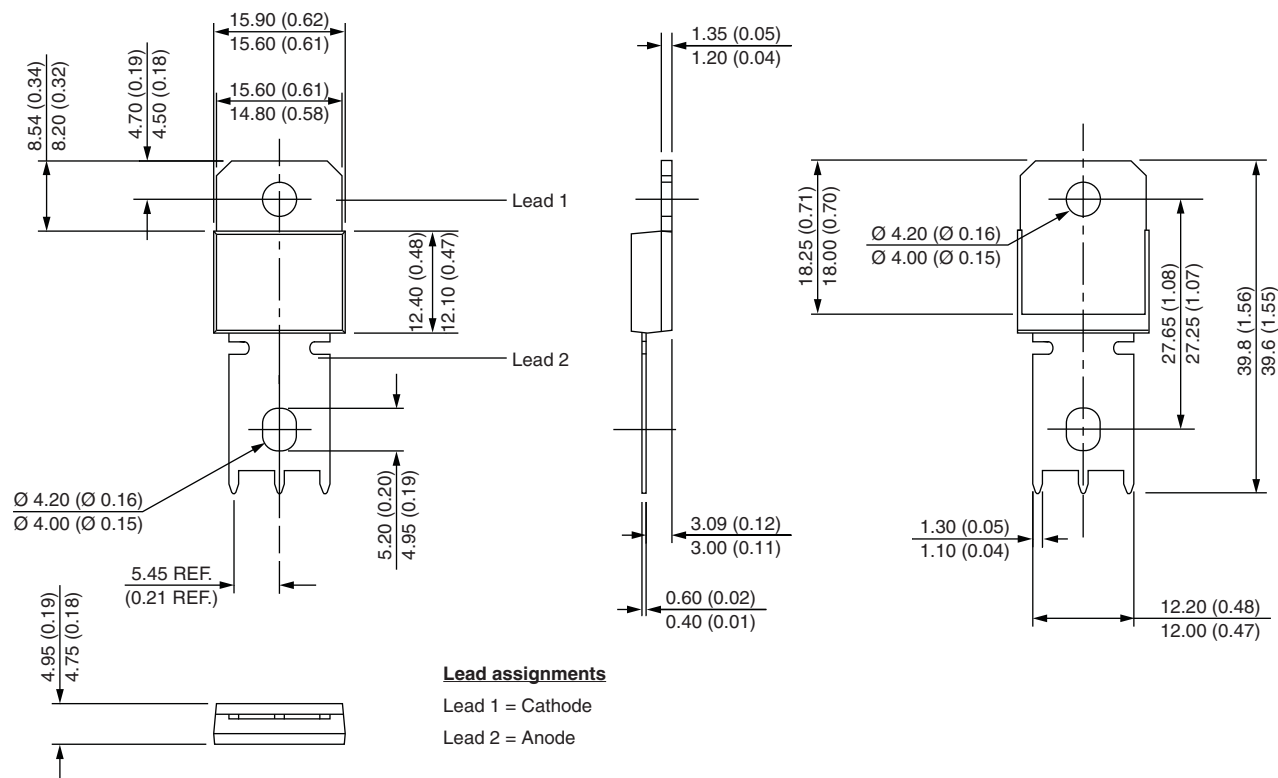
## LINKS TO RELATED DOCUMENTS

|                          |                                                                        |
|--------------------------|------------------------------------------------------------------------|
| 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?95467">www.vishay.com/doc?95467</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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