

# High Performance Schottky Rectifier, 100 A



PowerTab®



## FEATURES

- 150 °C max. operating junction temperature
- High frequency operation
- Ultralow 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            |
| $V_R$           | 30 V             |
| $V_F$ at $I_F$  | 0.56 V           |
| $I_{RM}$        | 460 mA at 125 °C |
| $T_J$ max.      | 150 °C           |
| Diode variation | Single die       |
| $E_{AS}$        | 9 mJ             |

## DESCRIPTION

The VS-100BGQ030HF4 Schottky rectifier has been optimized for ultralow forward voltage drop specifically for low voltage output in high current AC/DC power supplies. The proprietary barrier technology allows for reliable operation up to 150 °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     |
|             | $T_C$                         | 106         | °C    |
| $V_{RRM}$   |                               | 30          | V     |
| $I_{FSM}$   | $t_p = 5 \mu s$ sine          | 4500        | A     |
| $V_F$       | 100 A <sub>pk</sub> (typical) | 0.49        | V     |
|             | $T_J$                         | 150         | °C    |
| $T_J$       | Range                         | -55 to +150 | °C    |

## VOLTAGE RATINGS

| PARAMETER                            | SYMBOL    | VS-100BGQ030HF4 | UNITS |
|--------------------------------------|-----------|-----------------|-------|
| Maximum DC reverse voltage           | $V_R$     | 30              | 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 $T_C = 106$ °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                                                                             | 4500   | A     |
|                                                     |             | 10 ms sine or 6 ms rect. pulse                                                                                      | 850    |       |
| Non-repetitive avalanche energy                     | $E_{AS}$    | $T_J = 25$ °C, $I_{AS} = 8$ A, $L = 1.12$ mH                                                                        | 36     | 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 | 8      | A     |

**ELECTRICAL SPECIFICATIONS**

| PARAMETER                      | SYMBOL         | TEST CONDITIONS                                                                             |                                     | TYP.   | MAX. | UNITS            |
|--------------------------------|----------------|---------------------------------------------------------------------------------------------|-------------------------------------|--------|------|------------------|
| Forward voltage drop           | $V_{FM}^{(1)}$ | 50 A                                                                                        | $T_J = 25\text{ }^{\circ}\text{C}$  | 0.47   | 0.5  | V                |
|                                |                | 100 A                                                                                       |                                     | 0.56   | 0.63 |                  |
|                                |                | 50 A                                                                                        | $T_J = 150\text{ }^{\circ}\text{C}$ | 0.36   | 0.4  |                  |
|                                |                | 100 A                                                                                       |                                     | 0.49   | 0.56 |                  |
| Reverse leakage current        | $I_{RM}^{(1)}$ | $T_J = 125\text{ }^{\circ}\text{C}$ , $V_R = 15\text{ V}$                                   |                                     | 80     | 160  | mA               |
|                                |                | $T_J = 150\text{ }^{\circ}\text{C}$ , $V_R = 30\text{ V}$                                   |                                     | 800    | 1100 |                  |
|                                |                | $T_J = 25\text{ }^{\circ}\text{C}$                                                          | $V_R = \text{Rated } V_R$           | 0.6    | 2.4  |                  |
|                                |                | $T_J = 125\text{ }^{\circ}\text{C}$                                                         |                                     | 260    | 460  |                  |
| Maximum junction capacitance   | $C_T$          | $V_R = 5\text{ V}_{DC}$ , (test signal range 100 kHz to 1 MHz) $25\text{ }^{\circ}\text{C}$ |                                     | 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/ $\mu\text{s}$ |

**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 <sub>J</sub> , T <sub>Stg</sub> |                                      | -55 to +150 | °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®                 | 100BGQ030H  |                     |

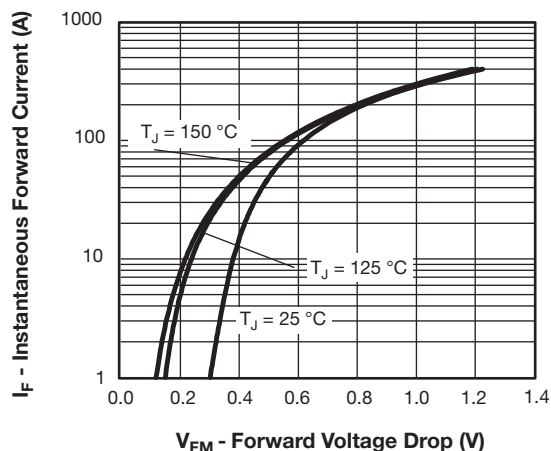


Fig. 1 - Maximum Forward Voltage Drop Characteristics

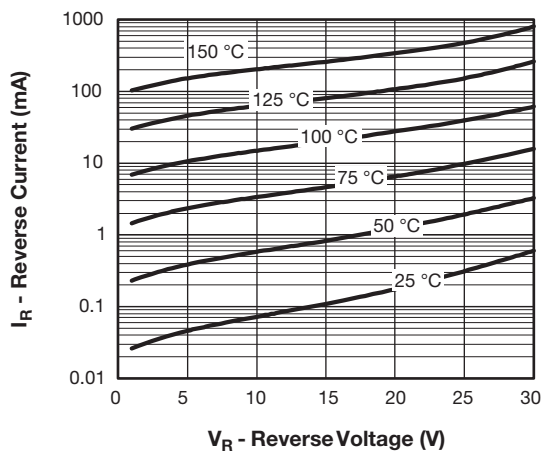


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

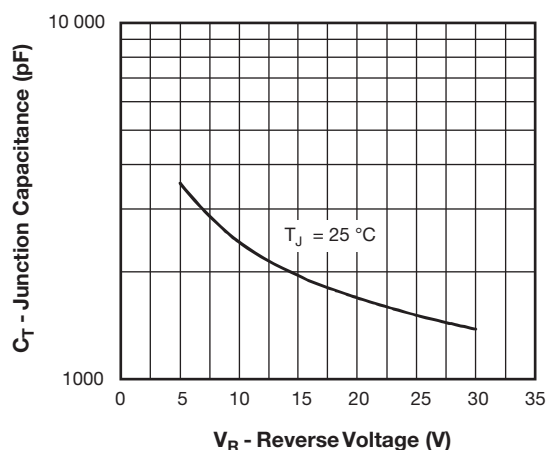


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

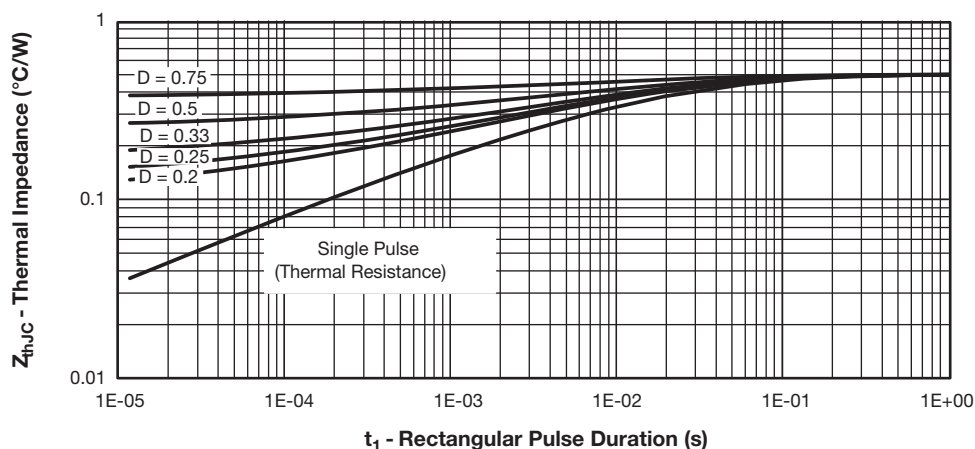
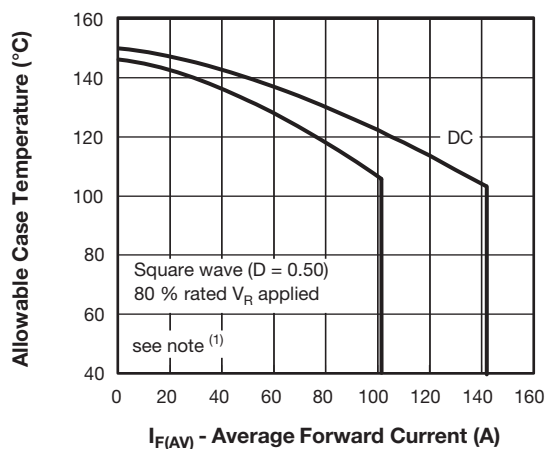

Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics


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

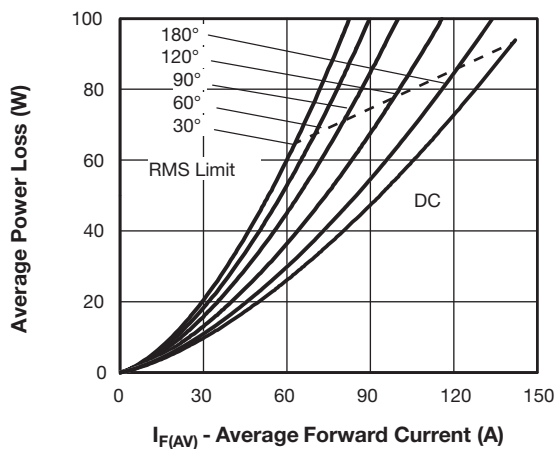


Fig. 6 - Forward Power Loss Characteristics

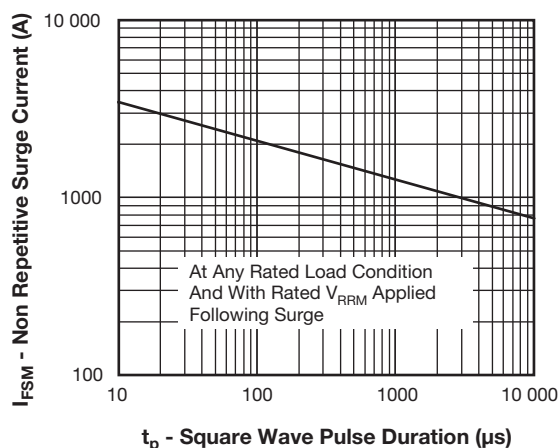


Fig. 7 - Maximum Non-Repetitive Surge Current

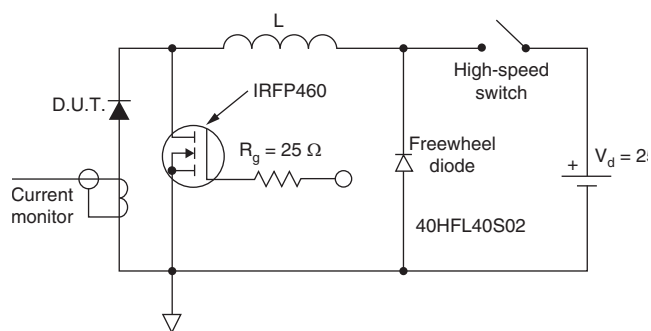


Fig. 8 - Unclamped Inductive Test Circuit

**Note**

- (1) Formula used:  $T_C = T_J - (P_d + P_{dREV}) \times R_{thJC}$ ;  
 $P_d$  = 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  $V_R$

**ORDERING INFORMATION TABLE**

Device code

| VS- | 100 | BGQ | 030 | 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 (030 = 30 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-100BGQ030HF4 | 25               | 375                    | Antistatic plastic tube |

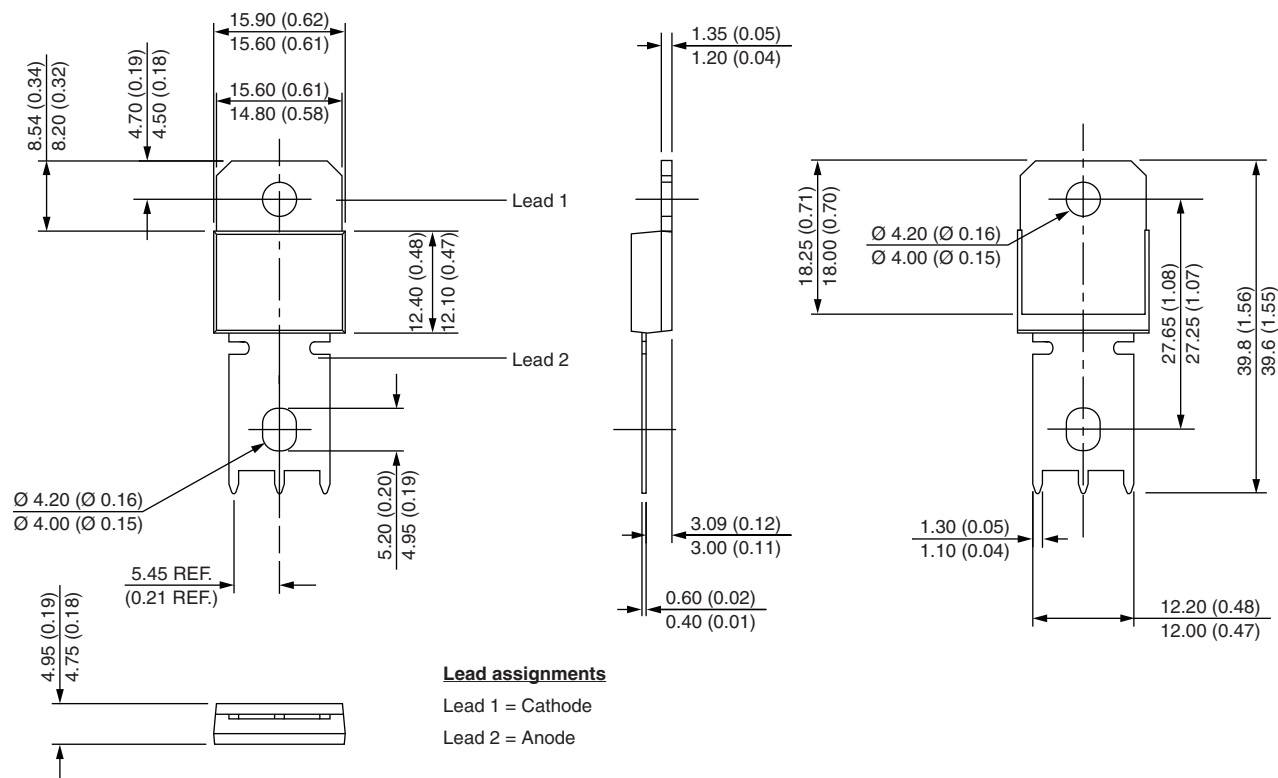
**LINKS TO RELATED DOCUMENTS**

|                          |                                                                        |
|--------------------------|------------------------------------------------------------------------|
| 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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