

## High Performance Schottky Rectifier, 175 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
- 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®        |
| $I_{F(AV)}$     | 175 A            |
| $V_R$           | 30 V             |
| $V_F$ at $I_F$  | 0.52 V           |
| $I_{RM}$        | 650 mA at 125 °C |
| $T_J$ max.      | 125 °C           |
| Diode variation | Single die       |
| $E_{AS}$        | 80 mJ            |

### DESCRIPTION

The VS-175BGQ030 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          | 175         | A     |
|                                   | $T_C$                         | 112         | °C    |
| $V_{RRM}$                         |                               | 30          | V     |
| $I_{FSM}$                         | $t_p = 5 \mu s$ sine          | 7400        | A     |
| $V_F$                             | 175 A <sub>pk</sub> (typical) | 0.47        | V     |
|                                   | $T_J$                         | 150         | °C    |
| $T_J$                             | Range                         | -55 to +150 | °C    |

| VOLTAGE RATINGS                      |           |              |       |
|--------------------------------------|-----------|--------------|-------|
| PARAMETER                            | SYMBOL    | VS-175BGQ030 | 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 $T_C = 112$ °C, rectangular waveform   |   | 175    | 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 | 7400   | A     |
|   |             | 10 ms sine or 6 ms rect. pulse  |   | 1400   |       |
| Non-repetitive avalanche energy                     | $E_{AS}$    | $T_J = 25$ °C, $I_{AS} = 12$ A, $L = 1.12$ mH   |   | 80     | 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 |   | 12     | A     |

| ELECTRICAL SPECIFICATIONS      |                |   |                                   |        |      |                  |
|--------------------------------|----------------|---|-----------------------------------|--------|------|------------------|
| PARAMETER                      | SYMBOL         | TEST CONDITIONS   |                                   | TYP.   | MAX. | UNITS            |
| Forward voltage drop           | $V_{FM}^{(1)}$ | 100 A   | $T_J = 25\text{ }^\circ\text{C}$  | 0.47   | 0.49 | V                |
|                                |                | 175 A   |                                   | 0.55   | 0.59 |                  |
|                                |                | 100 A   | $T_J = 150\text{ }^\circ\text{C}$ | 0.36   | 0.39 |                  |
|                                |                | 175 A   |                                   | 0.47   | 0.52 |                  |
| Reverse leakage current        | $I_{RM}^{(1)}$ | $T_J = 125\text{ }^\circ\text{C}, V_R = 15\text{ V}$                                |                                   | 160    | 220  | mA               |
|                                |                | $T_J = 150\text{ }^\circ\text{C}, V_R = 30\text{ V}$                                |                                   | 1400   | 2000 |                  |
|                                |                | $T_J = 25\text{ }^\circ\text{C}$  | $V_R = \text{Rated } V_R$         | 1.3    | 4.5  |                  |
|                                |                | $T_J = 125\text{ }^\circ\text{C}$   |                                   | 450    | 650  |                  |
| Maximum junction capacitance   | $C_T$          | $V_R = 5 V_{DC}$ , (test signal range 100 kHz to 1 MHz), $25\text{ }^\circ\text{C}$ |                                   | 8500   |      | 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 +150 | $^\circ\text{C}$    |
| Maximum thermal resistance, junction to case   | $R_{thJC}$     | DC operation                         | 0.25        | $^\circ\text{C/W}$  |
| Typical thermal resistance, case to heatsink   | $R_{thCS}$     | Mounting surface, smooth and greased | 0.20        |                     |
| 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 <sup>®</sup>     | 175BGQ045   |                     |

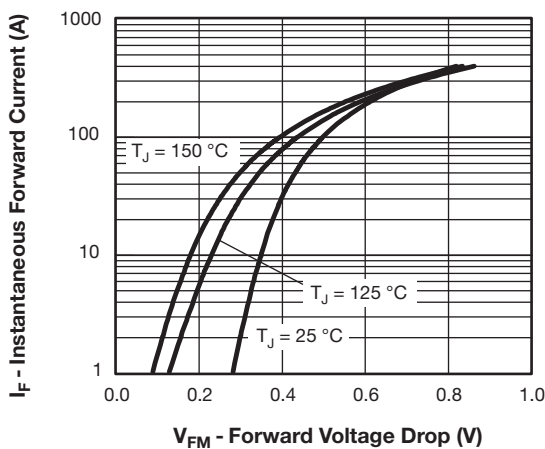


Fig. 1 - Maximum Forward Voltage Drop Characteristics

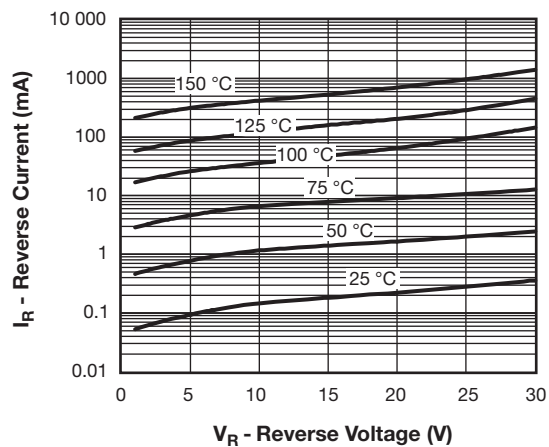


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

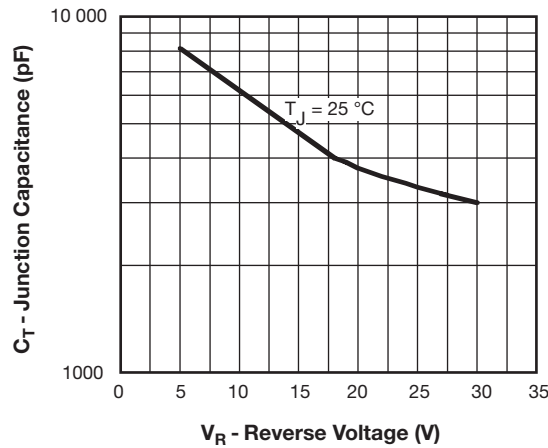


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

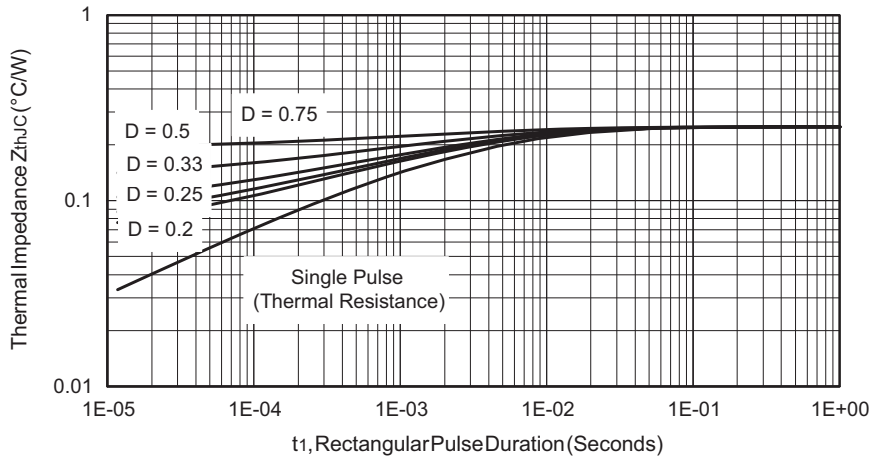


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

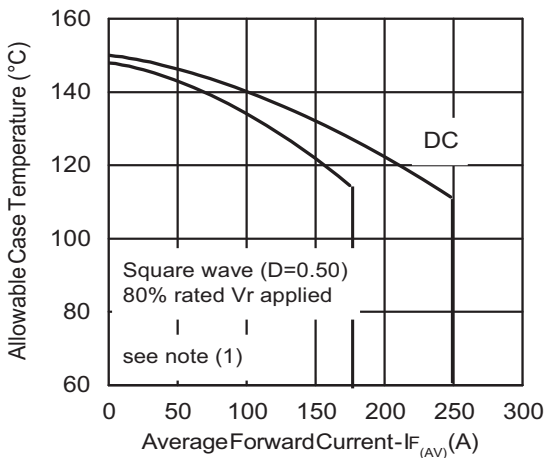


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

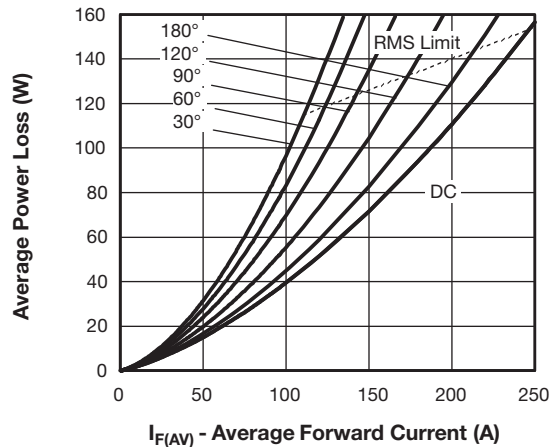


Fig. 6 - Forward Power Loss Characteristics

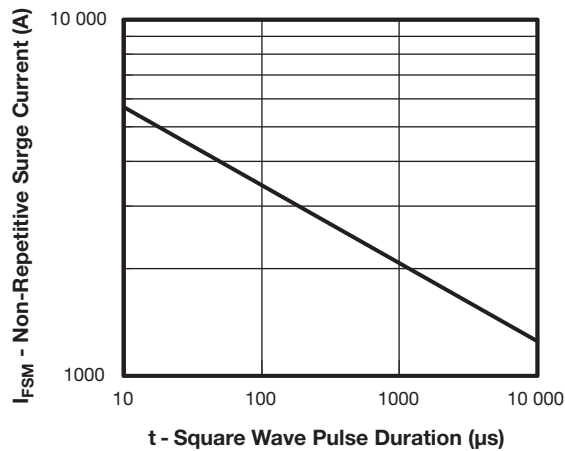


Fig. 7 - Maximum Non-Repetitive Surge Current

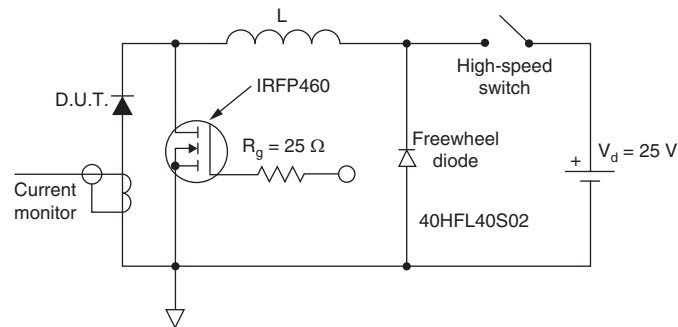


Fig. 8 - Unclamped Inductive Test Circuit

**Note**

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

**ORDERING INFORMATION TABLE**

|             |                               |                |                       |                             |
|-------------|-------------------------------|----------------|-----------------------|-----------------------------|
| Device code | <b>VS-</b>                    | <b>175</b>     | <b>BGQ</b>            | <b>030</b>                  |
|             | ①                             | ②              | ③                     | ④                           |
|             | ①                             | ②              | ③                     | ④                           |
|             | -                             | -              | -                     | -                           |
|             | Vishay Semiconductors product | Current rating | Essential part number | Voltage code = $V_{R_{RM}}$ |

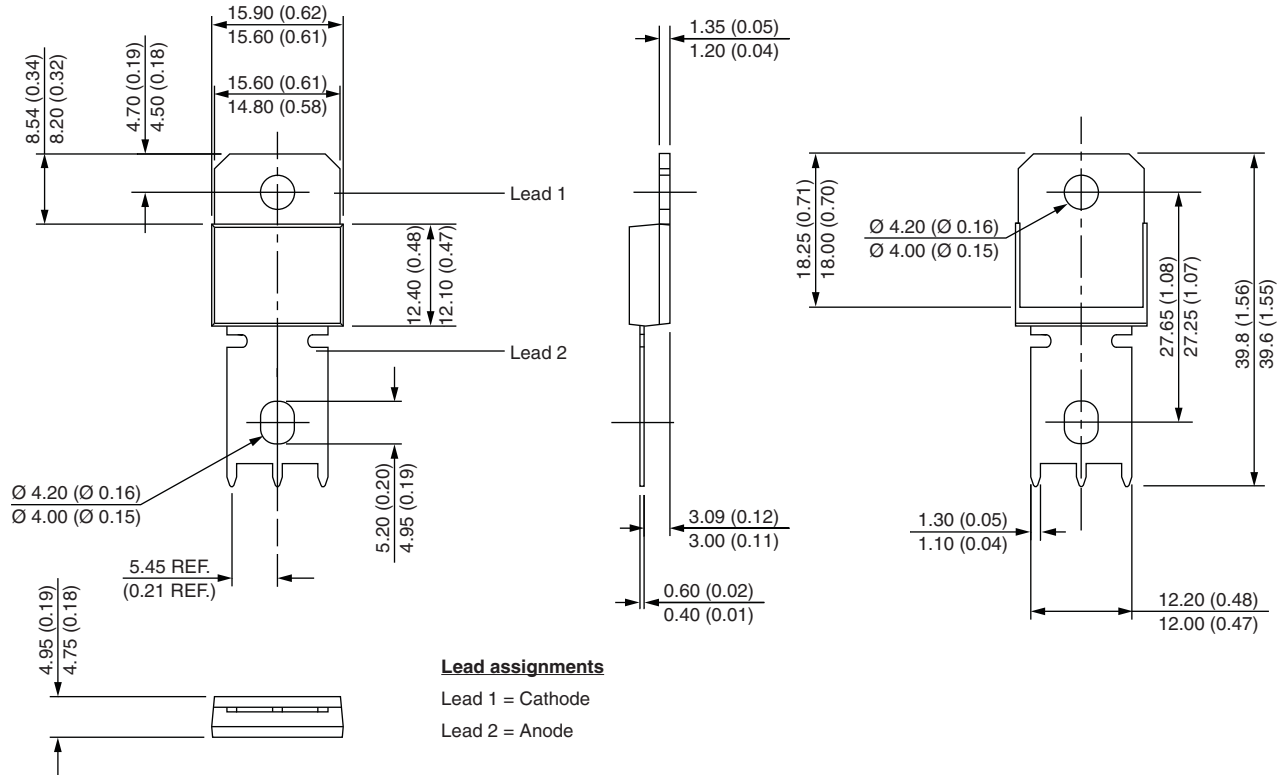
**LINKS TO RELATED DOCUMENTS**

|                          |  |
|--------------------------|--|
| 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> |
| SPIICE model             | <a href="http://www.vishay.com/doc?95427">www.vishay.com/doc?95427</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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Тел: +7 (812) 336 43 04 (многоканальный)

Email: [org@lifeelectronics.ru](mailto:org@lifeelectronics.ru)