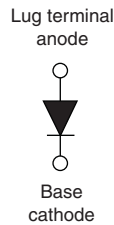


## High Performance Schottky Rectifier, 180 A


**HALF-PAK (D-67)**


### FEATURES

- 150 °C T<sub>J</sub> operation
- Low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- Designed and qualified for industrial level
- UL approved file E222165
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS  
COMPLIANT**

| PRODUCT SUMMARY    |                 |
|--------------------|-----------------|
| I <sub>F(AV)</sub> | 180 A           |
| V <sub>R</sub>     | 30 V            |
| Package            | HALF-PAK (D-67) |
| Circuit            | Single diode    |

### DESCRIPTION

The VS-182NQ.. high current Schottky rectifier module series has been optimized for low reverse leakage at high temperature. The proprietary barrier technology allows for reliable operation up to 150 °C junction temperature. Typical applications are in high current switching power supplies, plating power supplies, UPS systems, converters, freewheeling diodes, welding, and reverse battery protection.

| MAJOR RATINGS AND CHARACTERISTICS |   |             |       |
|-----------------------------------|---|-------------|-------|
| SYMBOL                            | CHARACTERISTICS                               | VALUES      | UNITS |
| I <sub>F(AV)</sub>                | Rectangular waveform                          | 180         | A     |
| V <sub>RRM</sub>                  |   | 30          | V     |
| I <sub>FSM</sub>                  | t <sub>p</sub> = 5 μs sine                    | 20 000      | A     |
| V <sub>F</sub>                    | 180 A <sub>pk</sub> , T <sub>J</sub> = 125 °C | 0.45        | V     |
| T <sub>J</sub>                    | Range   | -55 to +150 | °C    |

| VOLTAGE RATINGS                      |                  |                |       |
|--------------------------------------|------------------|----------------|-------|
| PARAMETER                            | SYMBOL           | VS-182NQ030PbF | UNITS |
| Maximum DC reverse voltage           | V <sub>R</sub>   | 30             | V     |
| Maximum working peak reverse voltage | V <sub>RWM</sub> |                |       |

| ABSOLUTE MAXIMUM RATINGS   |                    |  |  |        |       |
|--|--------------------|--|--|--------|-------|
| PARAMETER  | SYMBOL             | TEST CONDITIONS  |  | VALUES | UNITS |
| Maximum average forward current<br>See fig. 5                        | I <sub>F(AV)</sub> | 50 % duty cycle at T <sub>C</sub> = 108 °C, rectangular waveform   |  | 180    | A     |
| Maximum peak one cycle<br>non-repetitive surge current<br>See fig. 7 | I <sub>FSM</sub>   | 5 μs sine or 3 μs rect. pulse  | Following any rated load<br>condition and with rated<br>V <sub>RRM</sub> applied | 20 000 |       |
|  |                    | 10 ms sine or 6 ms rect. pulse   |  | 2500   |       |
| Non-repetitive avalanche energy                                      | E <sub>AS</sub>    | T <sub>J</sub> = 25 °C, I <sub>AS</sub> = 18 A, L = 1 mH   |  | 162    | 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 |  | 36     | A     |



| ELECTRICAL SPECIFICATIONS                     |                |  |                                   |        |                  |
|---|----------------|--|-----------------------------------|--------|------------------|
| PARAMETER                                     | SYMBOL         | TEST CONDITIONS  |                                   | VALUES | UNITS            |
| Maximum forward voltage drop<br>See fig. 1    | $V_{FM}^{(1)}$ | 180 A  | $T_J = 25\text{ }^\circ\text{C}$  | 0.59   | V                |
|   |                | 360 A  |                                   | 0.8    |                  |
|   |                | 180 A  | $T_J = 125\text{ }^\circ\text{C}$ | 0.45   |                  |
|   |                | 360 A  |                                   | 0.65   |                  |
| Maximum reverse leakage current<br>See fig. 2 | $I_{RM}$       | $T_J = 25\text{ }^\circ\text{C}$   | $V_R = \text{Rated } V_R$         | 15     | mA               |
|   |                | $T_J = 125\text{ }^\circ\text{C}$  |                                   | 840    |                  |
| Maximum junction capacitance                  | $C_T$          | $V_R = 5 V_{DC}$ (test signal range 100 kHz to 1 MHz) $25\text{ }^\circ\text{C}$ |                                   | 7700   | pF               |
| Typical series inductance                     | $L_S$          | From top of terminal hole to mounting plane                                      |                                   | 6.0    | nH               |
| Maximum voltage rate of change                | dV/dt          | Rated $V_R$  |                                   | 10 000 | V/ $\mu\text{s}$ |

**Note**

(1) Pulse width = 500  $\mu\text{s}$

| 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<br>See fig. 4           |  | 0.28            | $^\circ\text{C/W}$  |
| Typical thermal resistance, case to heatsink   | $R_{thCS}$     | Mounting surface, smooth and greased |  | 0.05            |                     |
| Approximate weight                             |                |                                      |  | 30              | g                   |
|  |                |                                      |  | 1.06            | oz.                 |
| Mounting torque                                | minimum        | Non-lubricated threads               |  | 3 (26.5)        | N · m<br>(lbf · in) |
|  | maximum        |                                      |  | 4 (35.4)        |                     |
| Terminal torque                                | minimum        |                                      |  | 3.4 (30)        |                     |
|  | maximum        |                                      |  | 5 (44.2)        |                     |
| Case style                                     |                |                                      |  | HALF-PAK module |                     |

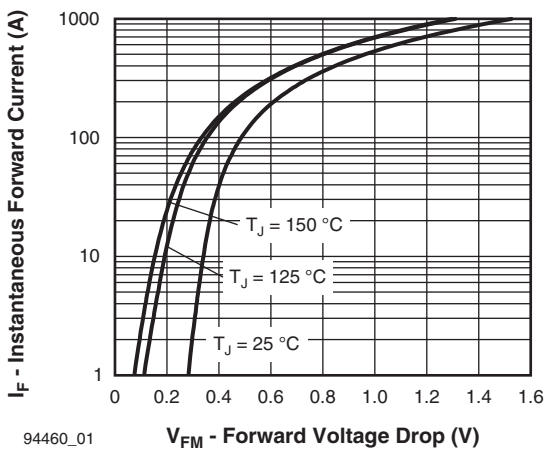


Fig. 1 - Maximum Forward Voltage Drop Characteristics

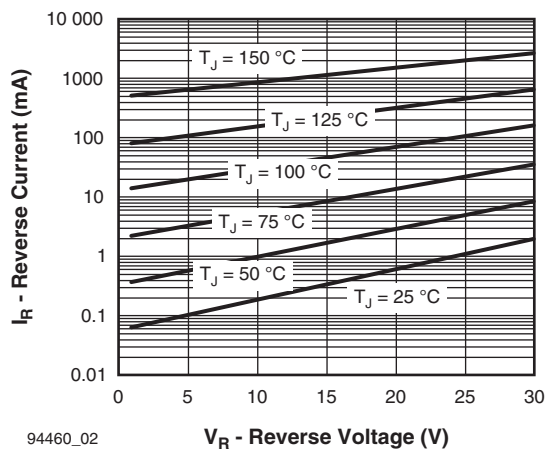


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

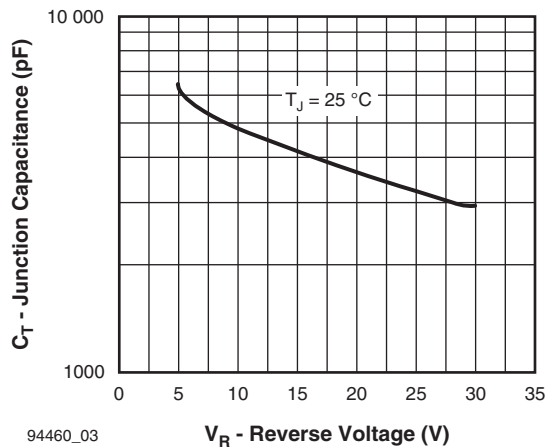


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

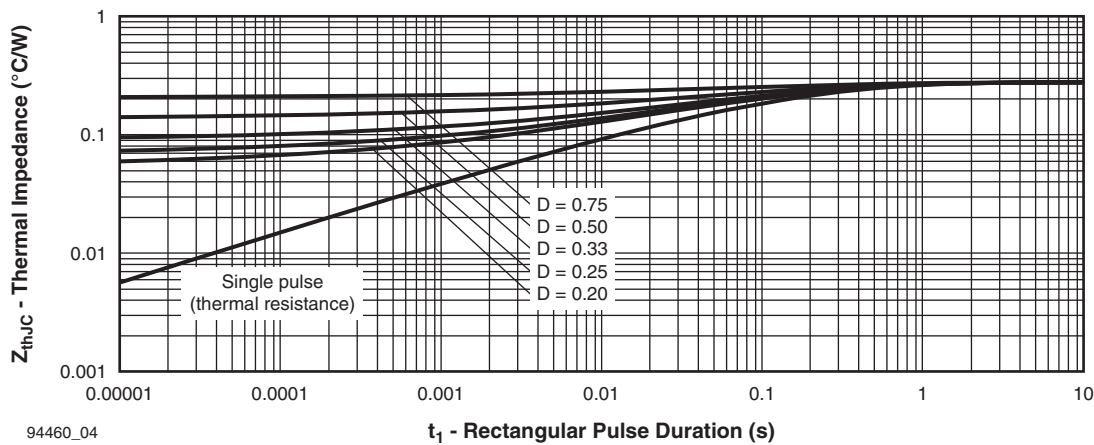


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

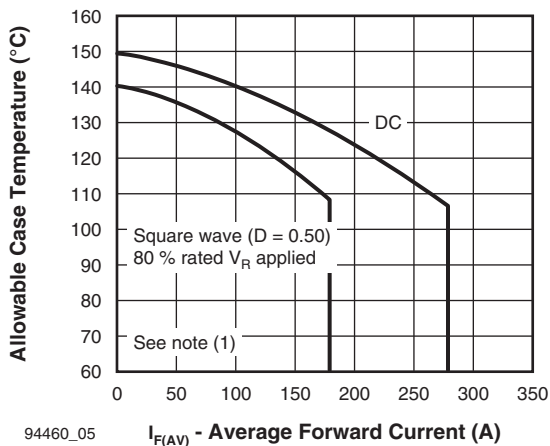


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

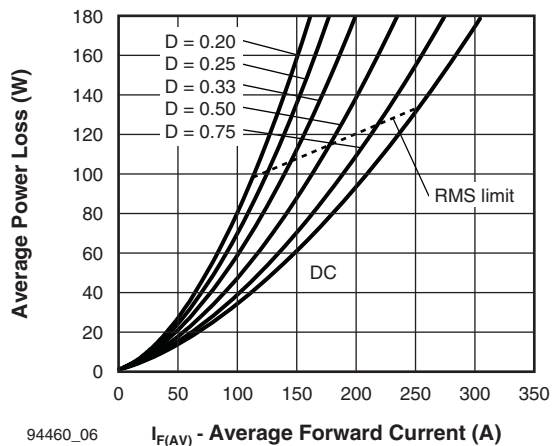


Fig. 6 - Forward Power Loss Characteristics

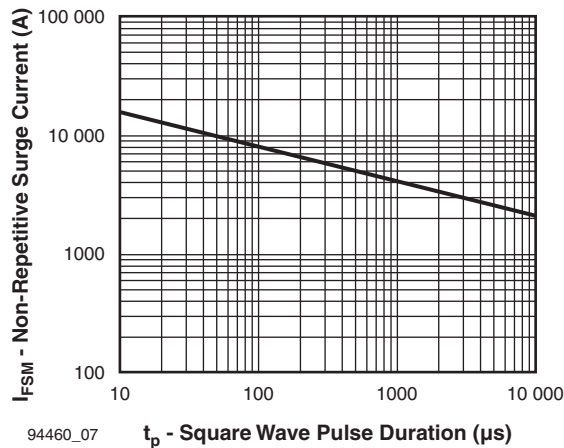


Fig. 7 - Maximum Non-Repitative Surge Current

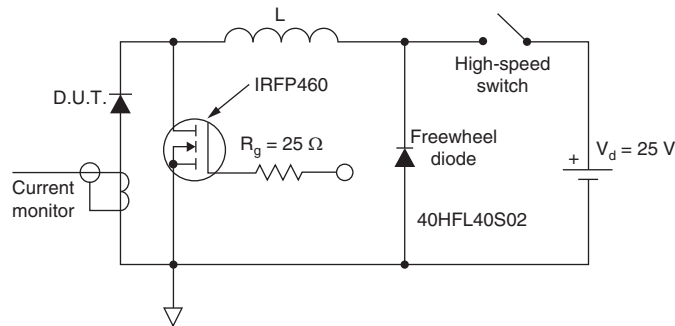


Fig. 8 - Unclamped Inductive Test Circuit

**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  $V_{R1}$  = Rated  $V_R$

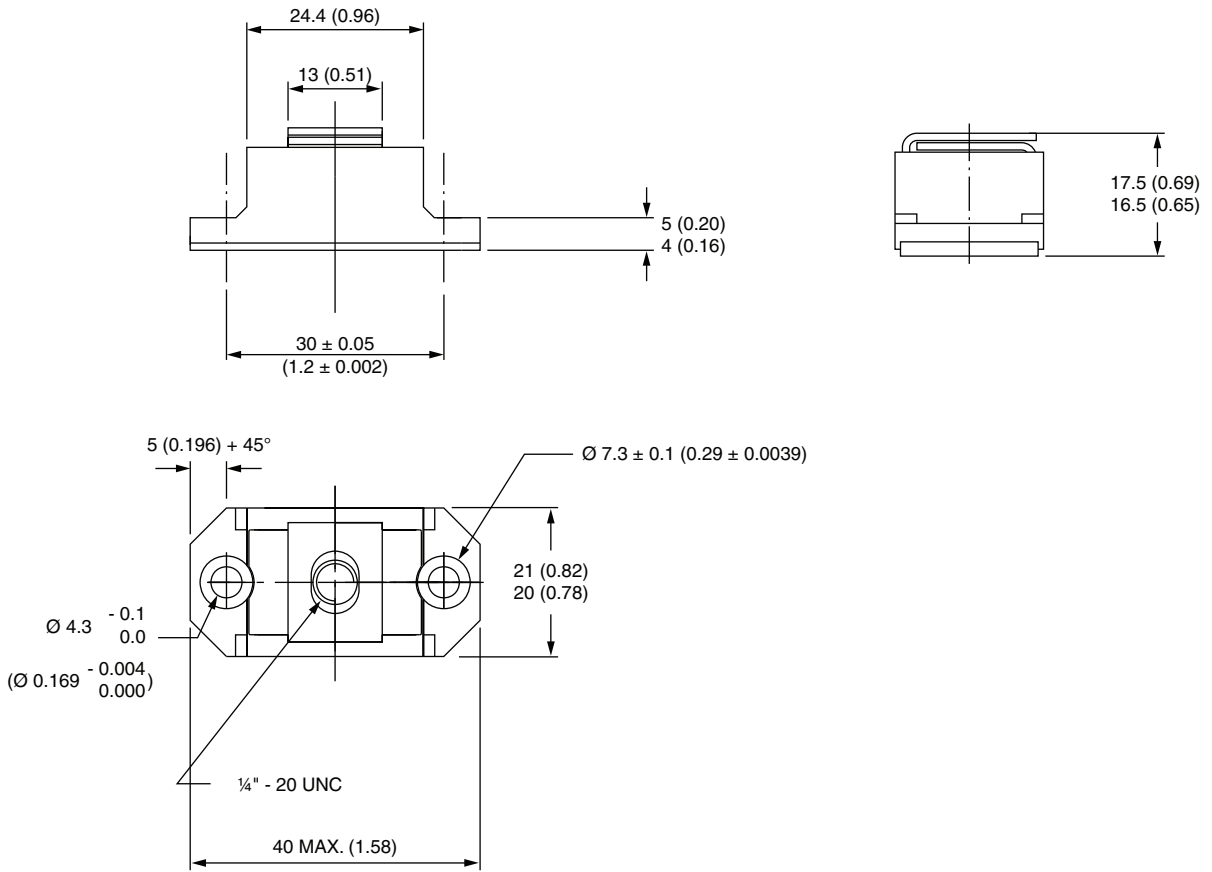
**ORDERING INFORMATION TABLE**

|             |            |           |                               |          |          |                               |            |   |                                |
|-------------|------------|-----------|-------------------------------|----------|----------|-------------------------------|------------|---|--------------------------------|
| Device code | <b>VS-</b> | <b>18</b> | <b>2</b>                      | <b>N</b> | <b>Q</b> | <b>030</b>                    | <b>PbF</b> |   |                                |
|             | ①          | ②         | ③                             | ④        | ⑤        | ⑥                             | ⑦          |   |                                |
|             | <b>1</b>   | -         | Vishay Semiconductors product | <b>2</b> | -        | Average current rating (x 10) | <b>3</b>   | - | Product silicon identification |
|             | <b>4</b>   | -         | N = Not isolated              | <b>5</b> | -        | Q = Schottky rectifier diode  | <b>6</b>   | - | Voltage rating (030 = 30 V)    |
|             | <b>7</b>   | -         | Lead (Pb)-free                |          |          |                               |            |   |                                |

| LINKS TO RELATED DOCUMENTS |  |
|----------------------------|--|
| Dimensions                 | <a href="http://www.vishay.com/doc?95020">www.vishay.com/doc?95020</a> |

## D-67 HALF-PAK

**DIMENSIONS** in millimeters (inches)





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