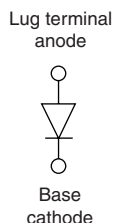


## Schottky Rectifier, 240 A


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


### FEATURES

- 175 °C  $T_J$  operation
- Low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- Lead (Pb)-free
- Designed and qualified for industrial level


**RoHS**  
COMPLIANT

### DESCRIPTION

The 249NQ.. 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 175 °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.

### PRODUCT SUMMARY

|             |       |
|-------------|-------|
| $I_{F(AV)}$ | 240 A |
| $V_R$       | 150 V |

### MAJOR RATINGS AND CHARACTERISTICS

| SYMBOL      | CHARACTERISTICS              | VALUES      | UNITS |
|-------------|------------------------------|-------------|-------|
| $I_{F(AV)}$ | Rectangular waveform         | 240         | A     |
| $V_{RRM}$   |                              | 150         | V     |
| $I_{FSM}$   | $t_p = 5 \mu s$ sine         | 20 000      | A     |
| $V_F$       | 240 Apk, $T_J = 125^\circ C$ | 0.78        | V     |
| $T_J$       | Range                        | - 55 to 175 | °C    |

### VOLTAGE RATINGS

| PARAMETER                            | SYMBOL    | 249NQ150PbF | UNITS |
|--------------------------------------|-----------|-------------|-------|
| Maximum DC reverse voltage           | $V_R$     | 150         | V     |
| Maximum working peak reverse voltage | $V_{RWM}$ |             |       |

### ABSOLUTE MAXIMUM RATINGS

| PARAMETER                                                            | SYMBOL      | TEST CONDITIONS                                                                                                     | VALUES | UNITS |
|----------------------------------------------------------------------|-------------|---------------------------------------------------------------------------------------------------------------------|--------|-------|
| Maximum average forward current<br>See fig. 5                        | $I_{F(AV)}$ | 50 % duty cycle at $T_C = 121^\circ C$ , rectangular waveform                                                       | 240    | A     |
| Maximum peak one cycle<br>non-repetitive surge current<br>See fig. 7 | $I_{FSM}$   | 5 $\mu s$ sine or 3 $\mu s$ rect. pulse                                                                             | 20 000 |       |
|                                                                      |             | 10 ms sine or 6 ms rect. pulse                                                                                      | 2300   |       |
| Non-repetitive avalanche energy                                      | $E_{AS}$    | $T_J = 25^\circ C$ , $I_{AS} = 5.5 A$ , $L = 1 mH$                                                                  | 15     | 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 | 1      | A     |

| ELECTRICAL SPECIFICATIONS                             |                                |                                                                               |                                       |        |       |      |
|-------------------------------------------------------|--------------------------------|-------------------------------------------------------------------------------|---------------------------------------|--------|-------|------|
| PARAMETER                                             | SYMBOL                         | TEST CONDITIONS                                                               |                                       | VALUES | UNITS |      |
| Maximum forward voltage drop per leg<br>See fig. 1    | V <sub>FM</sub> <sup>(1)</sup> | 240 A                                                                         | T <sub>J</sub> = 25 °C                | 1.21   | V     |      |
|                                                       |                                | 480 A                                                                         |                                       | 1.65   |       |      |
|                                                       |                                | 240 A                                                                         | T <sub>J</sub> = 125 °C               | 0.78   |       | 0.94 |
|                                                       |                                | 480 A                                                                         |                                       |        |       |      |
| Maximum reverse leakage current per leg<br>See fig. 2 | I <sub>RM</sub>                | T <sub>J</sub> = 25 °C                                                        | V <sub>R</sub> = Rated V <sub>R</sub> | 6      | mA    |      |
|                                                       |                                | T <sub>J</sub> = 125 °C                                                       |                                       | 85     |       |      |
| 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 |                                       | 6000   | pF    |      |
| Typical series inductance                             | L <sub>S</sub>                 | From top of terminal hole to mounting plane                                   |                                       | 5.0    | nH    |      |
| Maximum voltage rate of change                        | dV/dt                          | Rated V <sub>R</sub>                                                          |                                       | 10 000 | V/μs  |      |

**Note**(1) Pulse width < 300  $\mu$ 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<br>See fig. 4           | 0.19            | °C/W                |
| Typical thermal resistance, case to heatsink   | R <sub>thCS</sub>                 | 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 |                     |

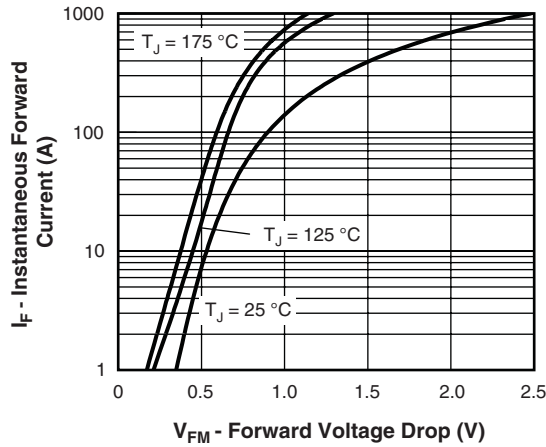


Fig. 1 - Maximum Forward Voltage Drop Characteristics

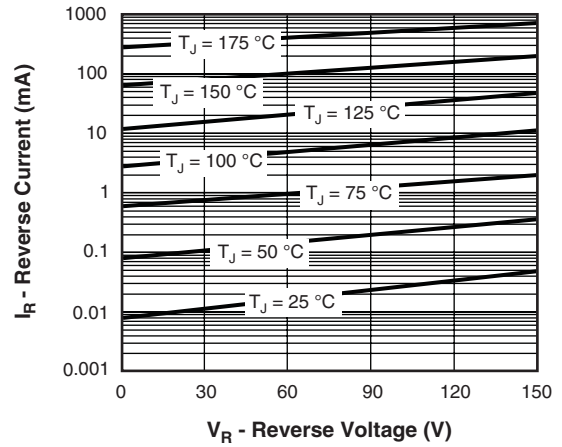


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

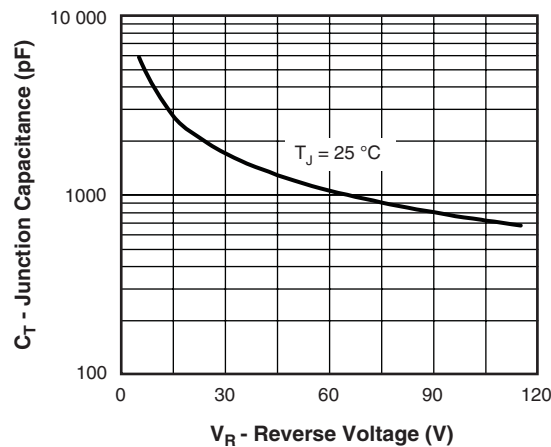
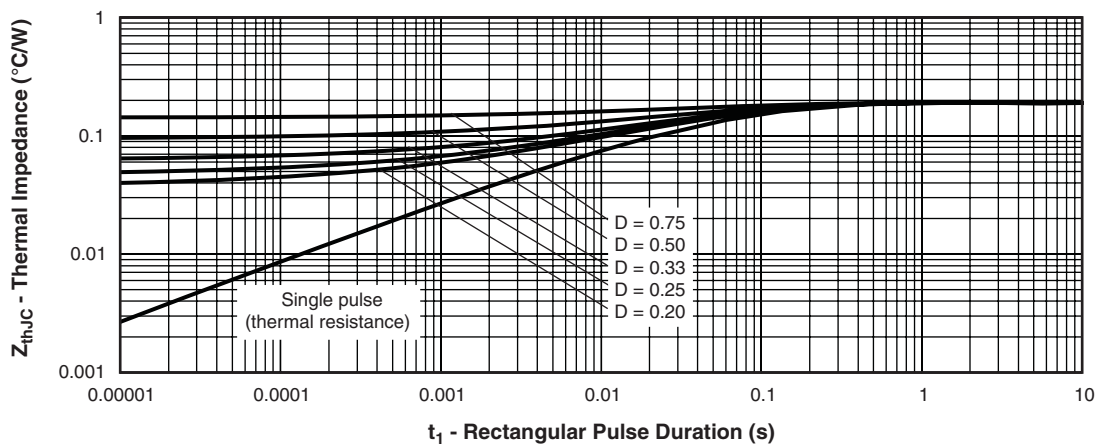


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage


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

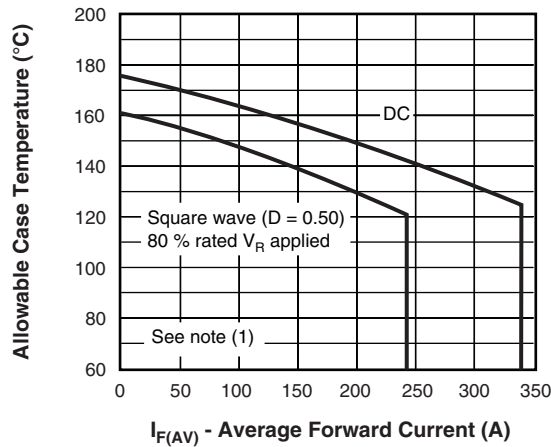


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

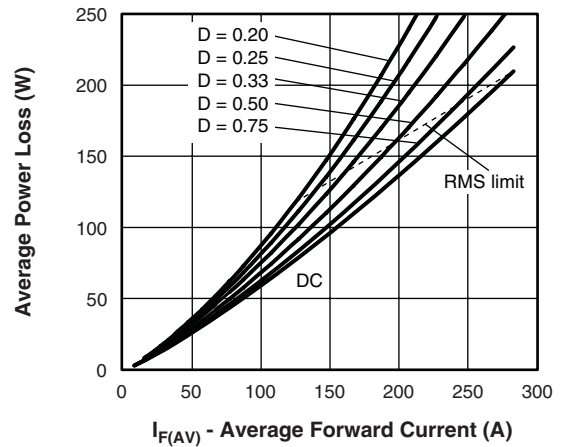


Fig. 6 - Forward Power Loss Characteristics

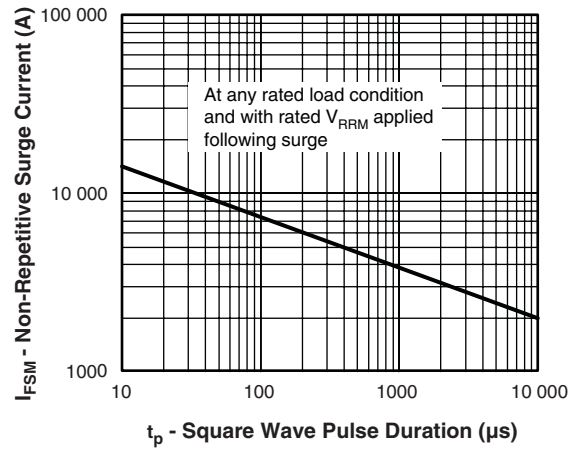


Fig. 7 - Maximum Non-Repetitive Surge Current

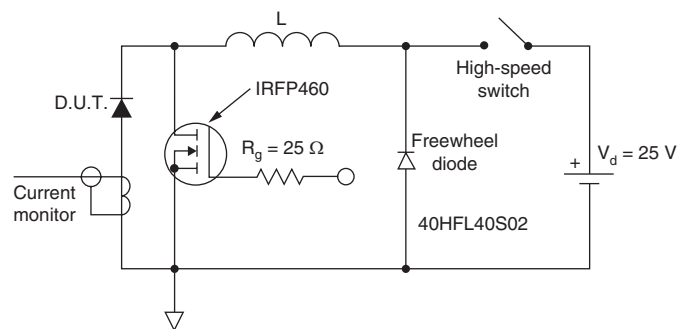


Fig. 8 - Unclamped Inductive Test Circuit

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



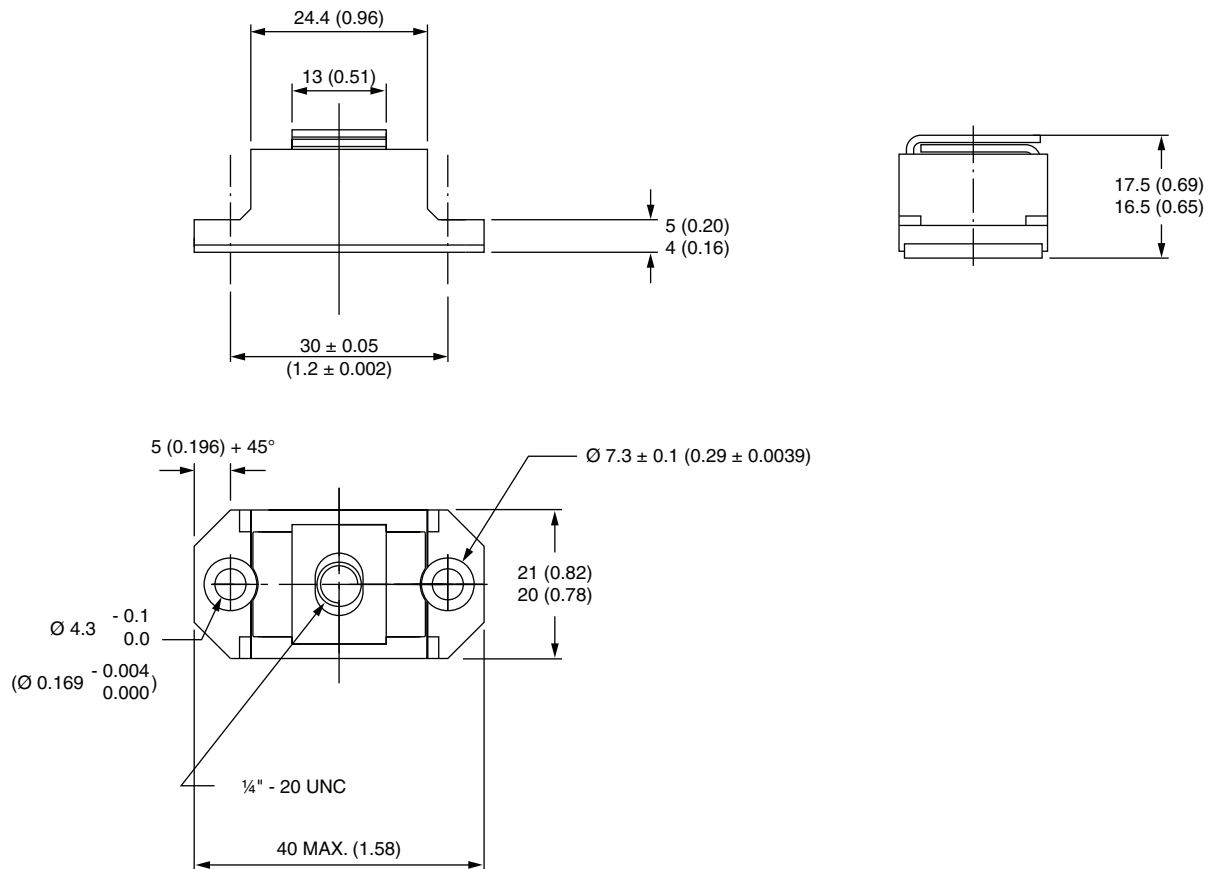
ORDERING INFORMATION TABLE

|             |    |   |                                |   |     |     |
|-------------|----|---|--------------------------------|---|-----|-----|
| Device code | 24 | 9 | N                              | Q | 150 | PbF |
|             | 1  | 2 | 3                              | 4 | 5   | 6   |
|             | 1  | - | Average current rating (x 10)  |   |     |     |
|             | 2  | - | Product silicon identification |   |     |     |
|             | 3  | - | N = Not isolated               |   |     |     |
|             | 4  | - | Q = Schottky rectifier diode   |   |     |     |
|             | 5  | - | Voltage rating (150 = 150 V)   |   |     |     |
|             | 6  | - | Lead (Pb)-free                 |   |     |     |

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

## D-67 HALF-PAK

**DIMENSIONS** in millimeters (inches)





## Disclaimer

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