# 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

Pb-free

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 µs sine | 20 000 | A |
| $V_F$ | 240 Apk, $T_J$ = 125 °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 See fig. 5 | $I_{F(AV)}$ | 50 % duty cycle at $T_C$ = 121 °C, rectangular waveform | | 240 | A |
| Maximum peak one cycle non-repetitive surge current See fig. 7 | $I_{FSM}$ | 5 µs sine or 3 µs rect. pulse | Following any rated load condition and with rated $V_{RRM}$ applied | 20 000 | |
| | | 10 ms sine or 6 ms rect. pulse | | 2300 | |
| Non-repetitive avalanche energy | $E_{AS}$ | $T_J$ = 25 °C, $I_{AS}$ = 5.5 A, L = 1 mH | | 15 | mJ |
| Repetitive avalanche current | $I_{AR}$ | Current decaying linearly to zero in 1 µs Frequency limited by $T_J$ maximum $V_A$ = 1.5 x $V_R$ typical | | 1 | A |

## ELECTRICAL SPECIFICATIONS

| PARAMETER | SYMBOL | TEST CONDITIONS | | VALUES | UNITS |
|---|---|---|---|---|---|
| Maximum forward voltage drop per leg See fig. 1 | $V_{FM}$ (1) | 240 A | $T_J$ = 25 °C | 1.21 | V |
| | | 480 A | | 1.65 | |
| | | 240 A | $T_J$ = 125 °C | 0.78 | |
| | | 480 A | | 0.94 | |
| Maximum reverse leakage current per leg See fig. 2 | $I_{RM}$ | $T_J$ = 25 °C | $V_R$ = Rated $V_R$ | 6 | mA |
| | | $T_J$ = 125 °C | | 85 | |
| Maximum junction capacitance | $C_T$ | $V_R$ = 5 $V_{DC}$ (test signal range 100 kHz to 1 MHz) 25 °C | | 6000 | pF |
| Typical series inductance | $L_S$ | From top of terminal hole to mounting plane | | 5.0 | nH |
| Maximum voltage rate of change | dV/dt | Rated $V_R$ | | 10 000 | V/µs |

**Note**

(1) Pulse width < 300 µs, duty cycle < 2 %

## THERMAL - MECHANICAL SPECIFICATIONS

| PARAMETER | | SYMBOL | TEST CONDITIONS | VALUES | UNITS |
|---|---|---|---|---|---|
| Maximum junction and storage temperature range | | $T_J$, $T_{Stg}$ | | - 55 to 175 | °C |
| Maximum thermal resistance, junction to case | | $R_{thJC}$ | DC operation See fig. 4 | 0.19 | °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 (lbf · in) |
| | maximum | | | 4 (35.4) | |
| Terminal torque | minimum | | | 3.4 (30) | |
| | maximum | | | 5 (44.2) | |
| Case style | | | | HALF-PAK module | |

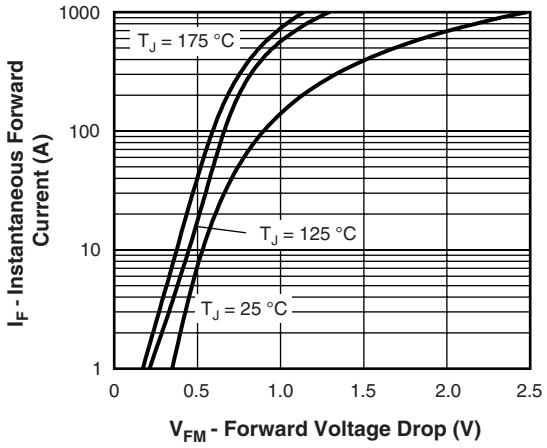


Fig. 1 - Maximum Forward Voltage Drop Characteristics

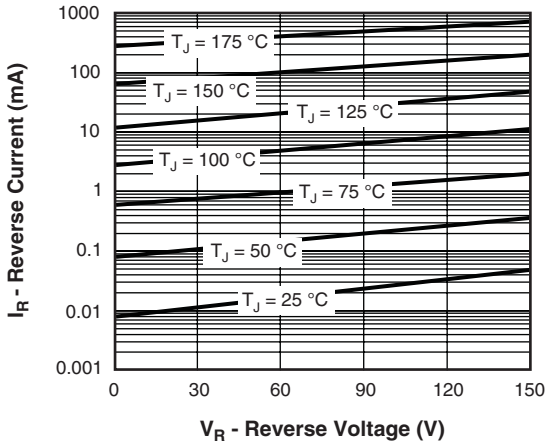


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

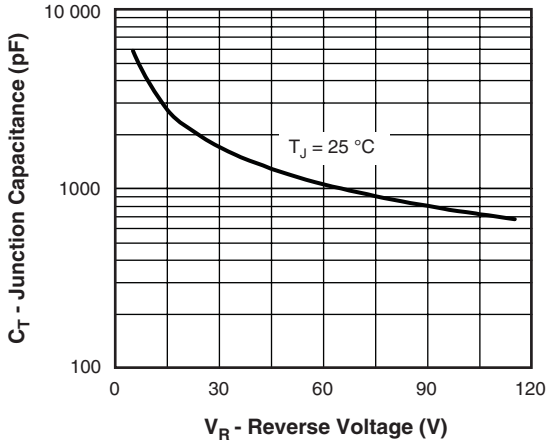


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

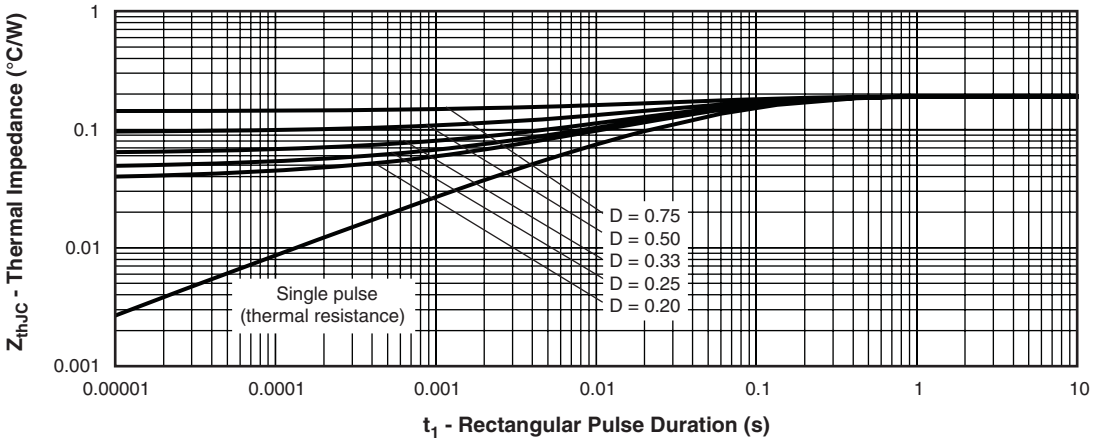


Fig. 4 - Maximum Thermal Impedance $Z_{thJC}$ Characteristics

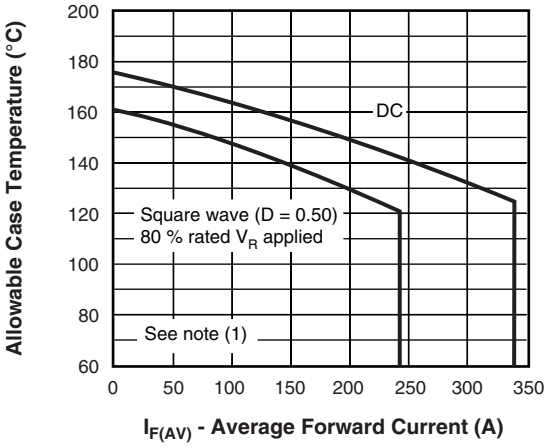


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

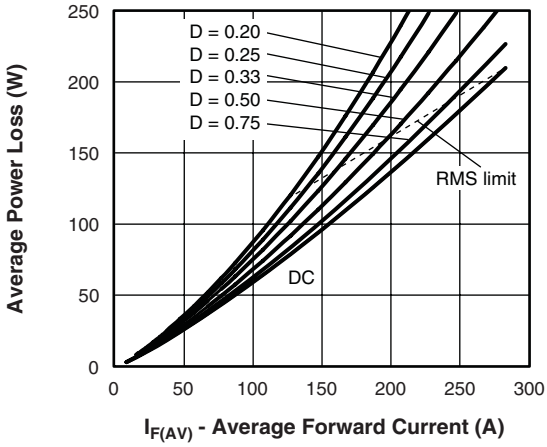


Fig. 6 - Forward Power Loss Characteristics

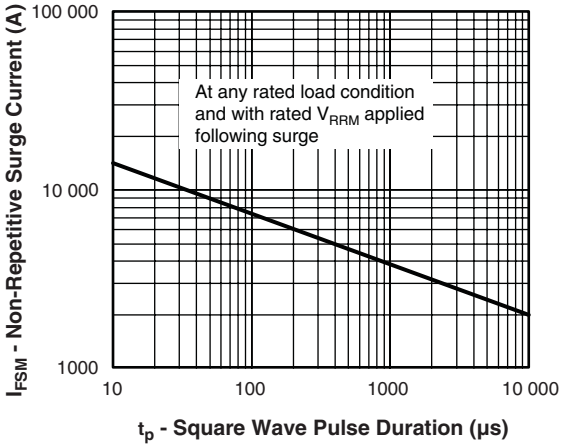


Fig. 7 - Maximum Non-Repetitive Surge Current

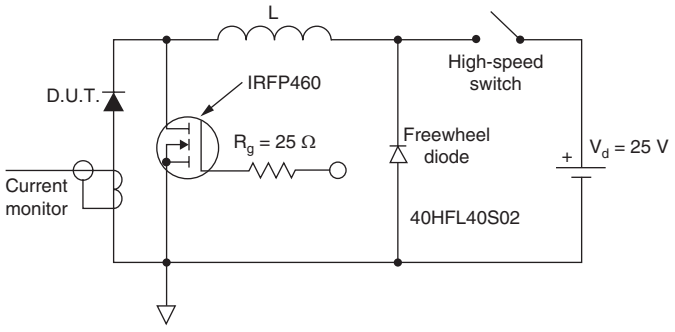


Fig. 8 - Unclamped Inductive Test Circuit

**Note**

(1) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;
Pd = Forward power loss = $I_{F(AV)} \times V_{FM}$ at ($I_{F(AV)}$/D) (see fig. 6);
$Pd_{REV}$ = 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 | http://www.vishay.com/doc?95020 |

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