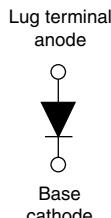


High Performance Schottky Rectifier, 240 A


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
- Designed and qualified for industrial level
- UL approved file E222165 
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912


RoHS
COMPLIANT

| PRIMARY CHARACTERISTICS | |
|-------------------------|-----------------|
| $I_{F(AV)}$ | 240 A |
| V_R | 45 V |
| Package | HALF-PAK (D-67) |
| Circuit configuration | Single |

DESCRIPTION

The VS-241NQ.. 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.

| MAJOR RATINGS AND CHARACTERISTICS | | | |
|-----------------------------------|--------------------------------------|-------------|-------|
| SYMBOL | CHARACTERISTICS | VALUES | UNITS |
| $I_{F(AV)}$ | Rectangular waveform | 240 | A |
| V_{RRM} | | 45 | V |
| I_{FSM} | $t_p = 5 \mu s$ sine | 25 000 | A |
| V_F | 240 A _{pk} , $T_J = 125$ °C | 0.64 | V |
| T_J | Range | -55 to +175 | °C |

| VOLTAGE RATINGS | | | |
|--------------------------------------|-----------|----------------|-------|
| PARAMETER | SYMBOL | VS-241NQ045PbF | UNITS |
| Maximum DC reverse voltage | V_R | 45 | 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 $T_C = 144$ °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 | 25 000 | | |
| | | 10 ms sine or 6 ms rect. pulse | | 3450 | | |
| Non-repetitive avalanche energy | E_{AS} | $T_J = 25$ °C, $I_{AS} = 26$ A, $L = 1$ mH | | 324 | mJ | |
| Repetitive avalanche current | I_{AR} | Current decaying linearly to zero in 1 μs Frequency limited by T_J maximum $V_A = 1.5 \times V_R$ typical | | 48 | A | |

| ELECTRICAL SPECIFICATIONS | | | | | | |
|---|--------------|---|---------------------------|--------|------------|--|
| PARAMETER | SYMBOL | TEST CONDITIONS | | VALUES | UNITS | |
| Maximum forward voltage drop See fig. 1 | V_{FM} (1) | 240 A | $T_J = 25^\circ\text{C}$ | 0.80 | V | |
| | | 480 A | | 1.11 | | |
| | | 240 A | $T_J = 125^\circ\text{C}$ | 0.64 | | |
| | | 480 A | | 0.86 | | |
| Maximum reverse leakage current See fig. 2 | I_{RM} (1) | $T_J = 25^\circ\text{C}$ | $V_R = \text{Rated } V_R$ | 20 | mA | |
| | | $T_J = 125^\circ\text{C}$ | | 1120 | | |
| Maximum junction capacitance | C_T | $V_R = 5 \text{ V}_{\text{DC}}$ (test signal range 100 kHz to 1 MHz) 25°C | | 14 800 | 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/ μ s | |

Note

(1) Pulse width < 500 μ s

| 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 | | | 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 | |

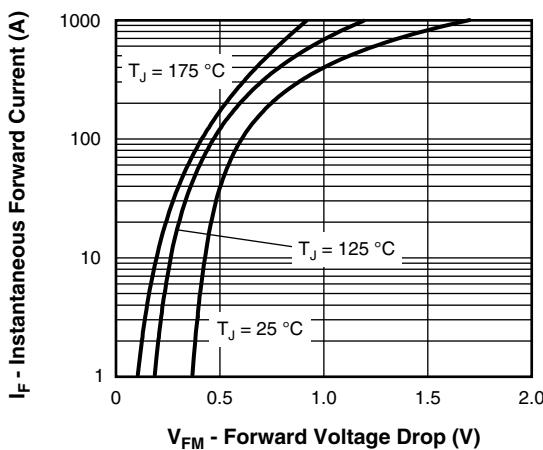


Fig. 1 - Maximum Forward Voltage Drop Characteristics

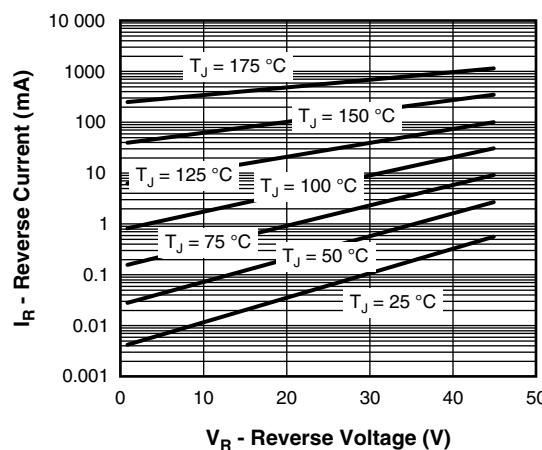


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

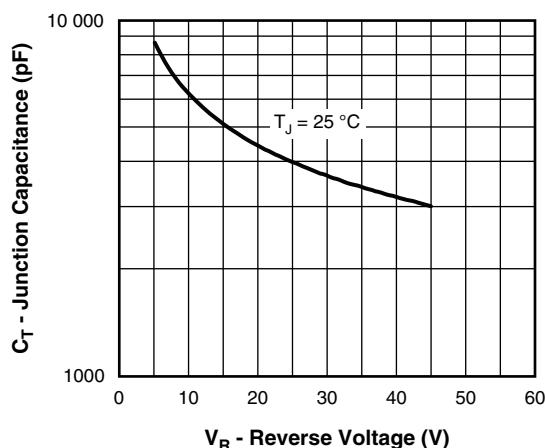


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

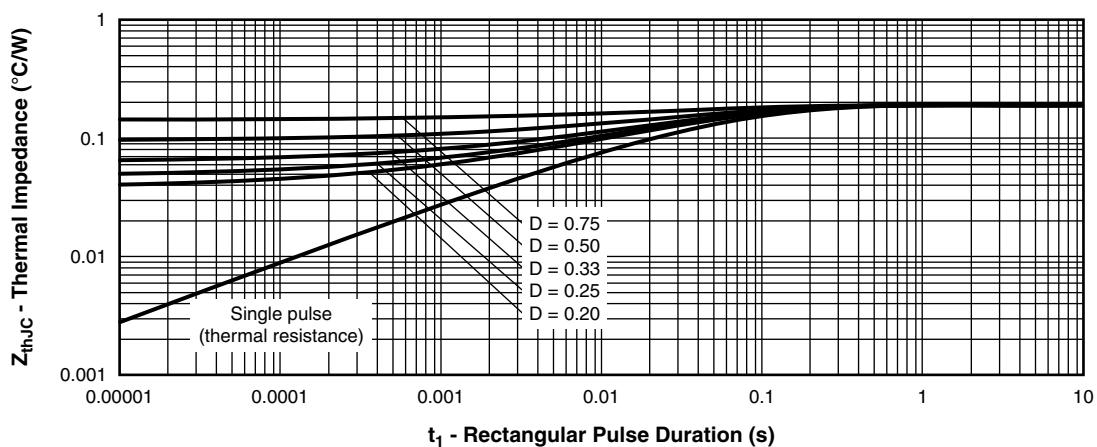


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

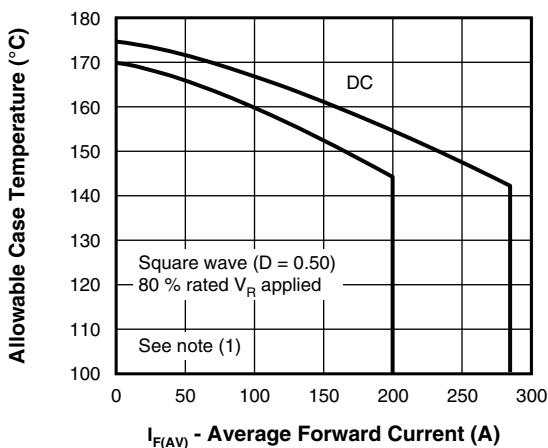


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

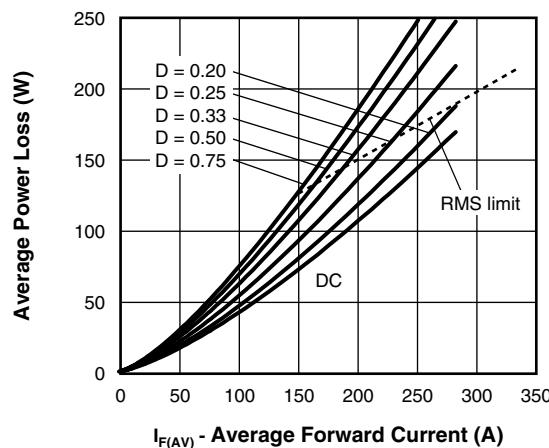


Fig. 6 - Forward Power Loss Characteristics

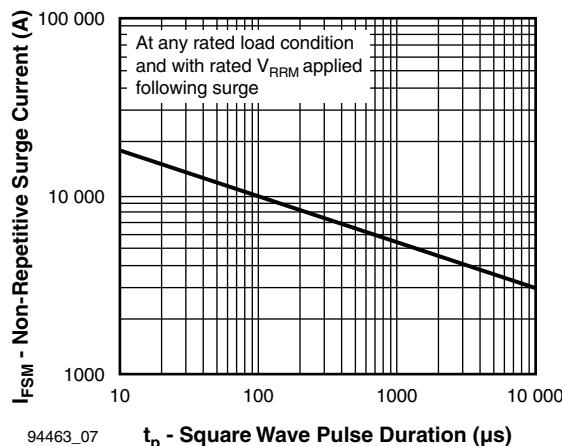


Fig. 7 - Maximum Non-Repetitive Surge Current

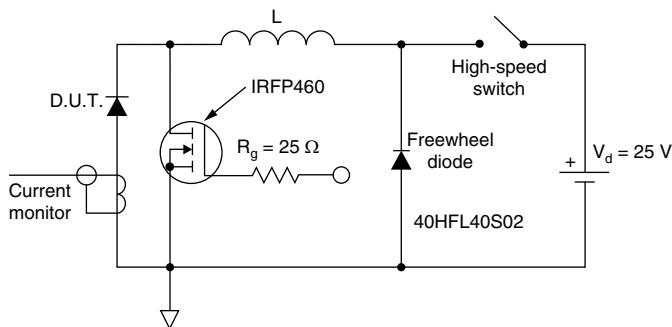


Fig. 8 - Unclamped Inductive Test Circuit

Note

(1) Formula used: $T_C = T_J - (P_d + P_{dREV}) \times R_{thJC}$
 $P_d = \text{forward power loss} = I_{F(AV)} \times V_{FM}$ at $(I_{F(AV)}/D)$ (see fig. 6);
 $P_{dREV} = \text{inverse power loss} = V_{R1} \times I_R (1 - D)$; I_R at V_{R1} = rated V_R

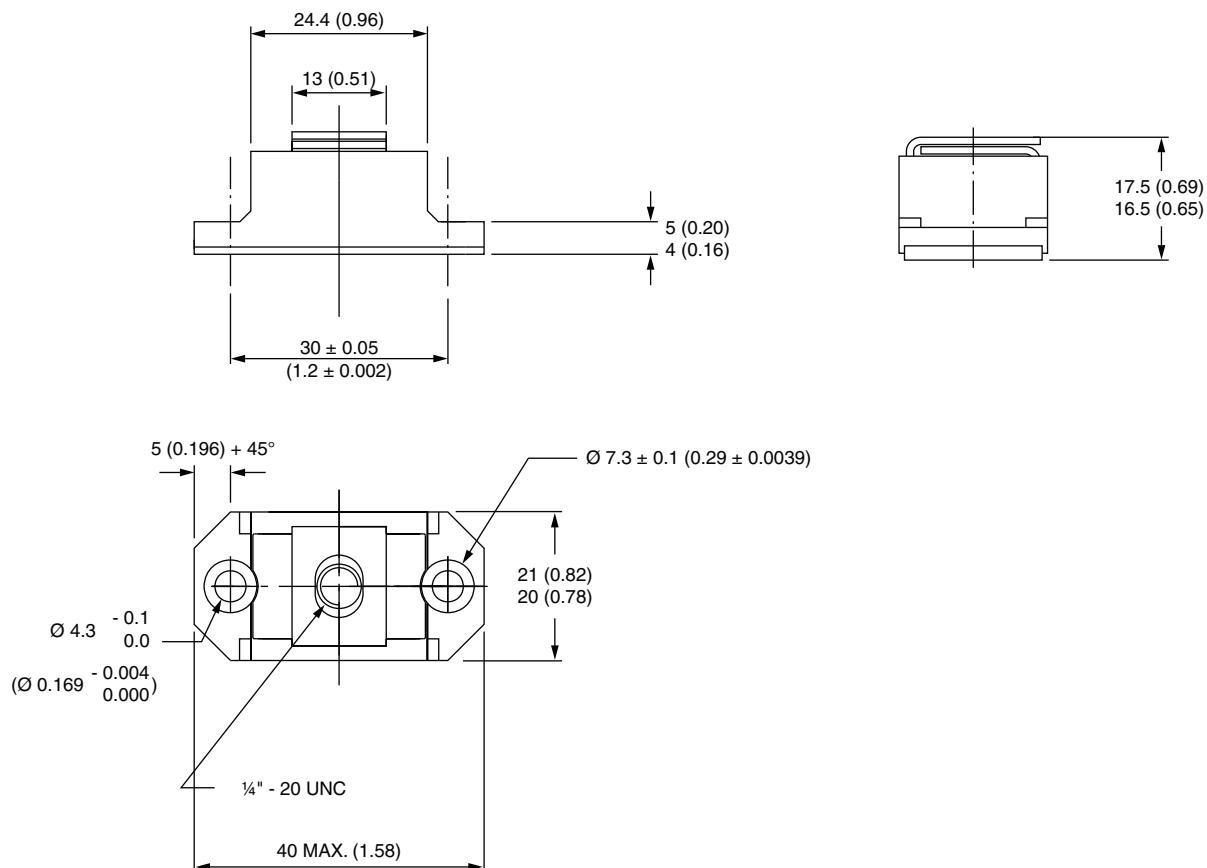
ORDERING INFORMATION TABLE

| Device code | VS- | 24 | 1 | N | Q | 045 | PbF |
|-------------|-----|----|---|---|---|-----|----------------------------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 1 | | | | | | | - Vishay Semiconductors product |
| 2 | | | | | | | - Average current rating (x 10) |
| 3 | | | | | | | - Product silicon identification |
| 4 | | | | | | | - N = not isolated |
| 5 | | | | | | | - Q = Schottky rectifier diode |
| 6 | | | | | | | - Voltage rating (045 = 45 V) |
| 7 | | | | | | | - Lead (Pb)-free |

| LINKS TO RELATED DOCUMENTS | |
|----------------------------|--|
| Dimensions | www.vishay.com/doc?95020 |

D-67 HALF-PAK

DIMENSIONS in millimeters (inches)



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