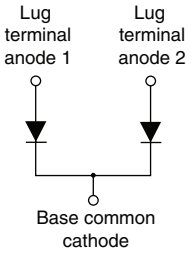
# Schottky Rectifier, 440 A

TO-244




## FEATURES

- 150 °C $T_J$ operation
- Center tap module
- Very low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- Lead (Pb)-free ("PbF" suffix)
- Designed and qualified for industrial level

## DESCRIPTION

The 440CNQ030PbF center tap, high current, Schottky rectifier module has been optimized for very low forward voltage drop, with moderate leakage. The proprietary barrier technology allows for reliable operation up to 150 °C junction temperature. Typical applications are in switching power supplies, converters, freewheeling diodes, welding and reverse battery protection.

| PRODUCT SUMMARY | |
|---|---|
| $I_{F(AV)}$ | 440 A |
| $V_R$ | 30 V |

| MAJOR RATINGS AND CHARACTERISTICS | | | |
|---|---|---|---|
| SYMBOL | CHARACTERISTICS | VALUES | UNITS |
| $I_{F(AV)}$ | Rectangular waveform | 440 | A |
| $V_{RRM}$ | | 30 | V |
| $I_{FSM}$ | $t_p$ = 5 µs sine | 27 000 | A |
| $V_F$ | 220 Apk, $T_J$ = 125 °C (per leg) | 0.41 | V |
| $T_J$ | Range | - 55 to 150 | °C |

| VOLTAGE RATINGS | | | |
|---|---|---|---|
| PARAMETER | SYMBOL | 440CNQ030PbF | 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 per module | $I_{F(AV)}$ | 50 % duty cycle at $T_C$ = 125 °C, rectangular waveform | | 440 | A |
| Maximum average forward current per leg See fig. 5 | | | | 220 | |
| Maximum peak one cycle non-repetitive surge current per leg See fig. 7 | $I_{FSM}$ | 5 µs sine or 3 µs rect. pulse | Following any rated load condition and with rated $V_{RRM}$ applied | 27 000 | |
| | | 10 ms sine or 6 ms rect. pulse | | 3000 | |
| Non-repetitive avalanche energy per leg | $E_{AS}$ | $T_J$ = 25 °C, $I_{AS}$ = 20 A, L = 1 mH | | 198 | mJ |
| Repetitive avalanche current per leg | $I_{AR}$ | Current decaying linearly to zero in 1 µs Frequency limited by $T_J$ maximum $V_A$ = 1.5 x $V_R$ typical | | 44 | A |

## ELECTRICAL SPECIFICATIONS

| PARAMETER | SYMBOL | TEST CONDITIONS | | VALUES | UNITS |
|---|---|---|---|---|---|
| Maximum forward voltage drop per leg See fig. 1 | $V_{FM}$ (1) | 220 A | $T_J$ = 25 °C | 0.51 | V |
| | | 440 A | | 0.63 | |
| | | 220 A | $T_J$ = 125 °C | 0.41 | |
| | | 440 A | | 0.55 | |
| Maximum reverse leakage current per leg See fig. 2 | $I_{RM}$ (1) | $T_J$ = 25 °C | $V_R$ = Rated $V_R$ | 20 | mA |
| | | $T_J$ = 125 °C | | 1120 | |
| Maximum junction capacitance per leg | $C_T$ | $V_R$ = 5 $V_{DC}$ (test signal range 100 kHz to 1 MHz) 25 °C | | 14 800 | pF |
| Typical series inductance per leg | $L_S$ | From top of terminal hole to mounting plane | | 5 | 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 | MIN. | TYP. | MAX. | UNITS |
|---|---|---|---|---|---|
| Maximum junction and storage temperature range | $T_J$, $T_{Stg}$ | - 55 | - | 150 | °C |
| Thermal resistance, junction to case per leg | $R_{thJC}$ | - | - | 0.19 | °C/W |
| Thermal resistance, junction to case per module | | - | - | 0.095 | |
| Thermal resistance, case to heatsink | $R_{thCS}$ | - | 0.10 | - | |
| Weight | | - | 68 | - | g |
| | | - | 2.4 | - | oz. |
| Mounting torque | | 35.4 (4) | - | 53.1 (6) | lbf · in (N · m) |
| Mounting torque center hole | | 30 (3.4) | - | 40 (4.6) | |
| Terminal torque | | 30 (3.4) | - | 44.2 (5) | |
| Vertical pull | | - | - | 80 | lbf · in |
| 2" lever pull | | - | - | 35 | |

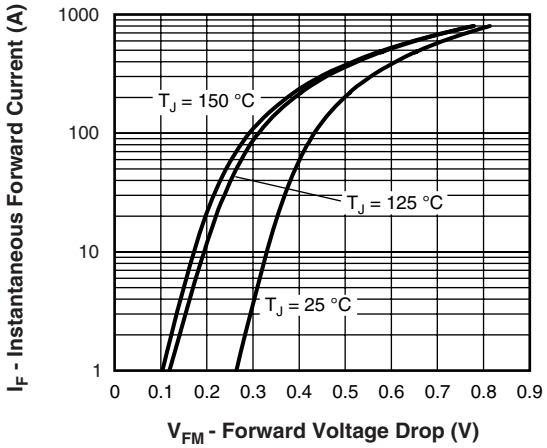



Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

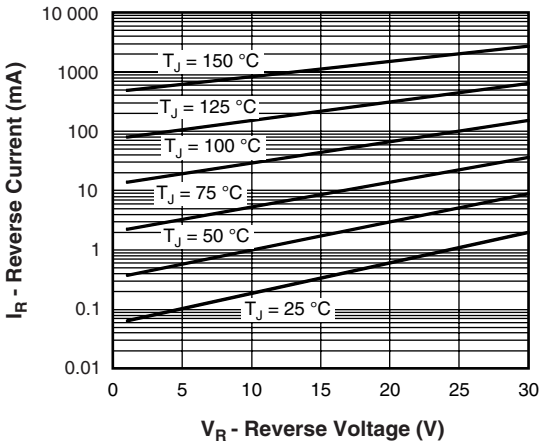



Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

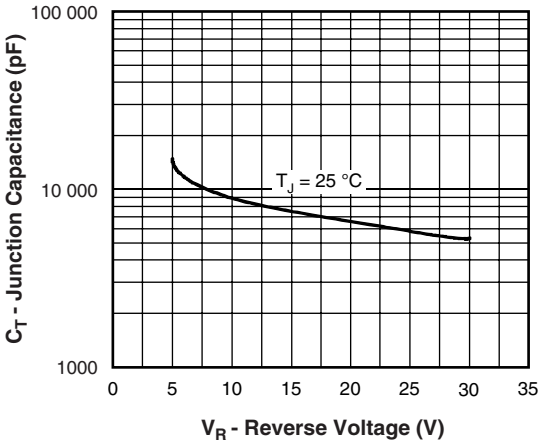



Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

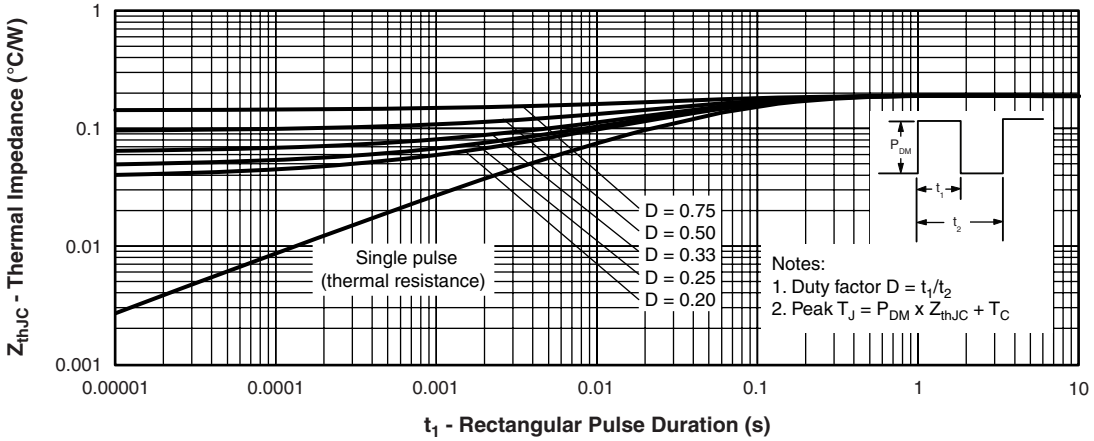



Fig. 4 - Maximum Thermal Impedance $Z_{thJC}$ Characteristics (Per Leg)

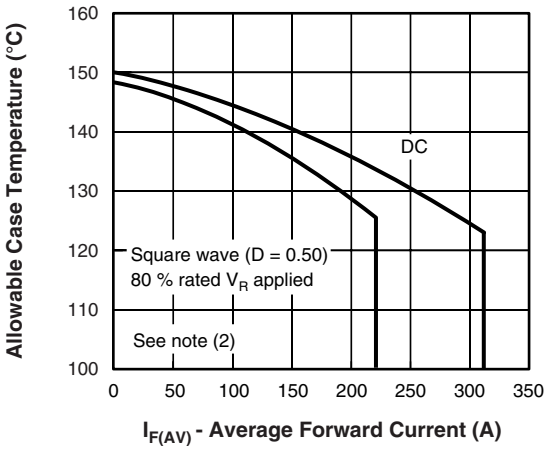



Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

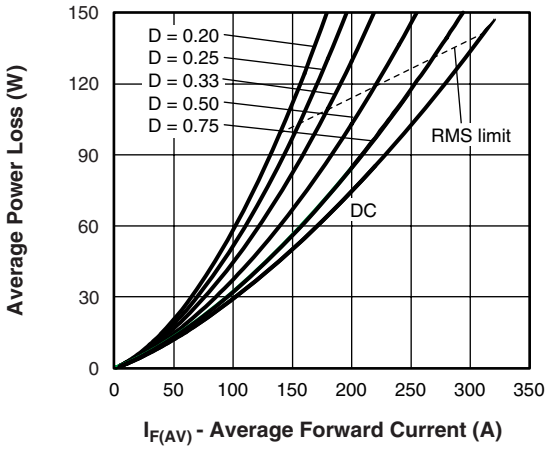



Fig. 6 - Forward Power Loss Characteristics (Per Leg)

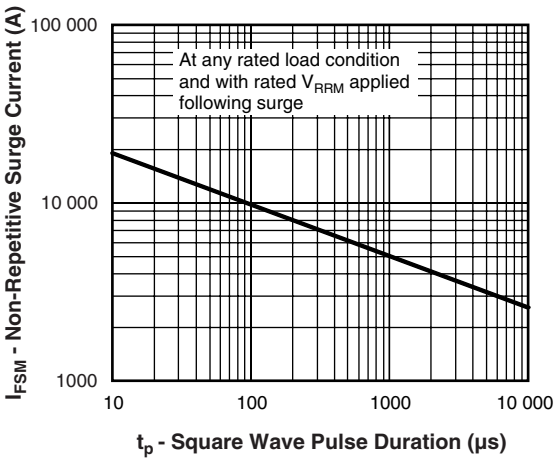



Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

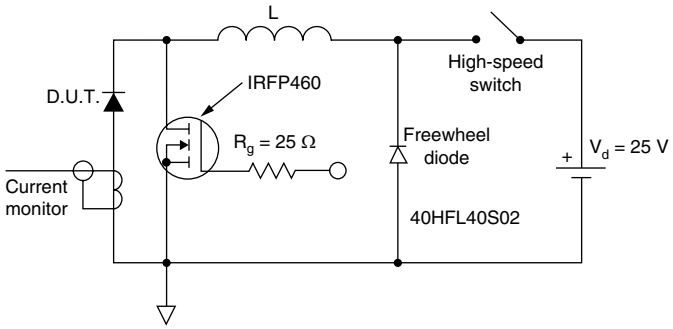


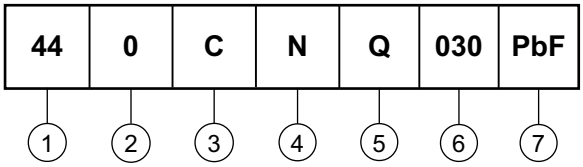

Fig. 8 - Unclamped Inductive Test Circuit

**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 $V_{R1}$ = 80 % rated $V_R$

## ORDERING INFORMATION TABLE

**Device code**




1 - Average current rating (x 10)
2 - Product silicon identification
3 - C = Circuit configuration
4 - N = Not isolated
5 - Q = Schottky rectifier diode
6 - Voltage rating (030 = 30 V)
7 - Lead (Pb)-free

Tube standard pack quantity: 25 pieces

| LINKS TO RELATED DOCUMENTS | |
|---|---|
| Dimensions | http://www.vishay.com/doc?95021 |

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