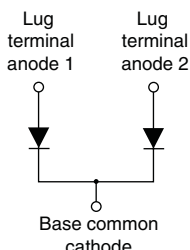


Schottky Rectifier, 300 A


TO-244


FEATURES

- 150 °C T_J operation
- Center tap module
- 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 300CNQ... center tap 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.

PRODUCT SUMMARY

| | |
|-------------|-------|
| $I_{F(AV)}$ | 300 A |
| V_R | 45 V |

MAJOR RATINGS AND CHARACTERISTICS

| SYMBOL | CHARACTERISTICS | VALUES | UNITS |
|-------------|--|-------------|-------|
| $I_{F(AV)}$ | Rectangular waveform | 300 | A |
| V_{RRM} | | 45 | V |
| I_{FSM} | $t_p = 5 \mu s$ sine | 27 000 | A |
| V_F | 150 Apk, $T_J = 125^\circ C$ (per leg) | 0.56 | V |
| T_J | Range | - 55 to 150 | °C |

VOLTAGE RATINGS

| PARAMETER | SYMBOL | 300CNQ045PbF | 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 $T_C = 111^\circ C$, rectangular waveform | 150 | A |
| | | | 300 | |
| Maximum peak one cycle non-repetitive surge current per leg See fig. 7 | I_{FSM} | 5 μs sine or 3 μs rect. pulse | 27 000 | |
| | | 10 ms sine or 6 ms rect. pulse | 2400 | |
| Non-repetitive avalanche energy per leg | E_{AS} | $T_J = 25^\circ C$, $I_{AS} = 18 A$, $L = 1 mH$ | 150 | mJ |
| Repetitive avalanche current per leg | I_{AR} | Current decaying linearly to zero in 1 μs Frequency limited by T_J maximum $V_A = 1.5 \times V_R$ typical | 30 | A |

| ELECTRICAL SPECIFICATIONS | | | | | |
|---|--------------------------------|---|---------------------------------------|--------|-------|
| PARAMETER | SYMBOL | TEST CONDITIONS | | VALUES | UNITS |
| Maximum forward voltage drop per leg See fig. 1 | V _{FM} ⁽¹⁾ | 150 A | T _J = 25 °C | 0.61 | V |
| | | 300 A | | 0.77 | |
| | | 150 A | T _J = 125 °C | 0.56 | |
| | | 300 A | | 0.75 | |
| Maximum reverse leakage current per leg See fig. 2 | I _{RM} ⁽¹⁾ | T _J = 25 °C | V _R = Rated V _R | 15 | mA |
| | | T _J = 125 °C | | 1100 | |
| Maximum junction capacitance per leg | C _T | V _R = 5 V _{DC} (test signal range 100 kHz to 1 MHz) 25 °C | | 7750 | pF |
| Typical series inductance per leg | 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/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, per leg | R_{thJC} | - | - | 0.28 | °C/W |
| junction to case per module | | - | - | 0.14 | |
| 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 | |

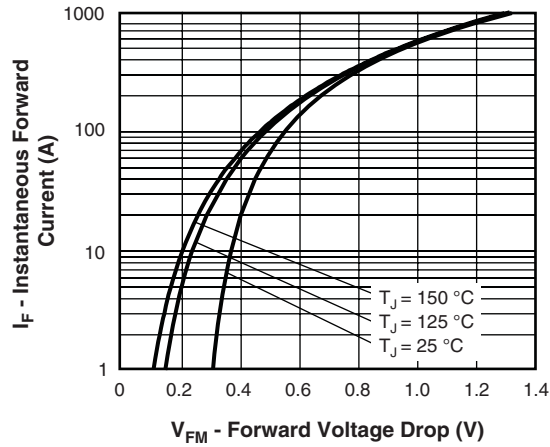


Fig. 1 - Maximum Forward Voltage Drop Characteristics

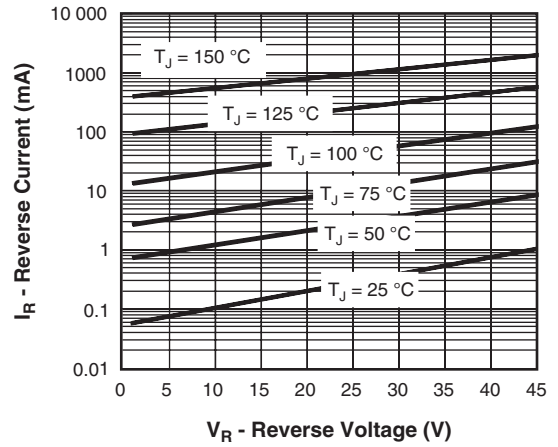


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

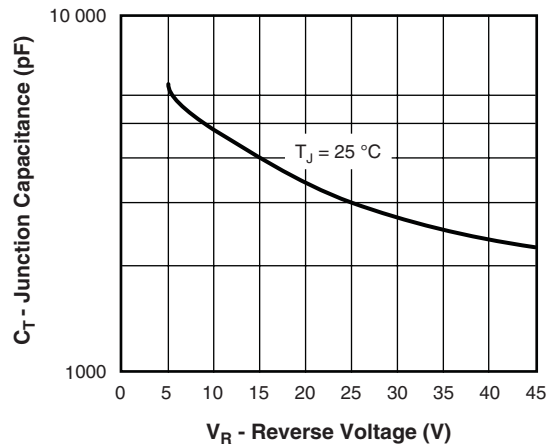


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

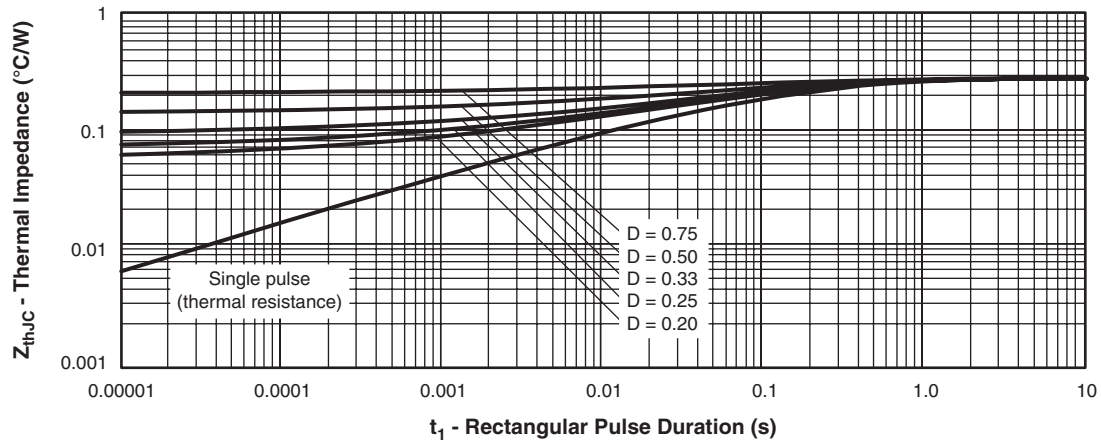


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

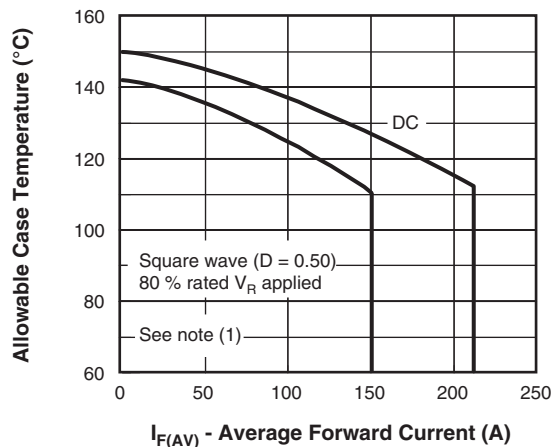


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

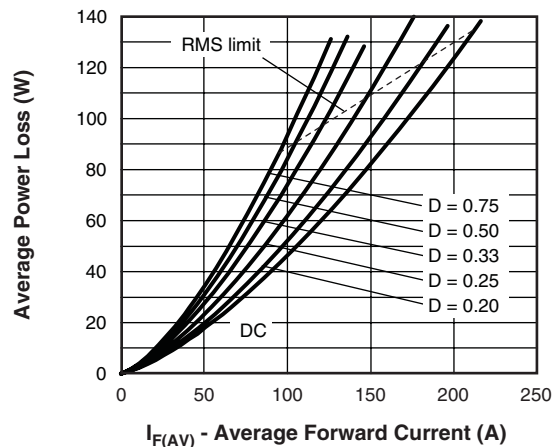


Fig. 6 - Forward Power Loss Characteristics

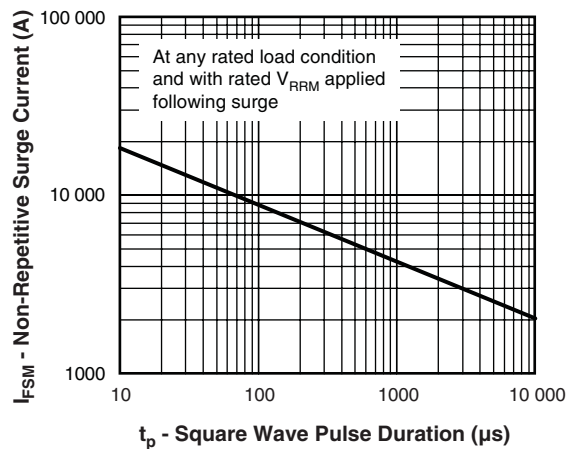


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

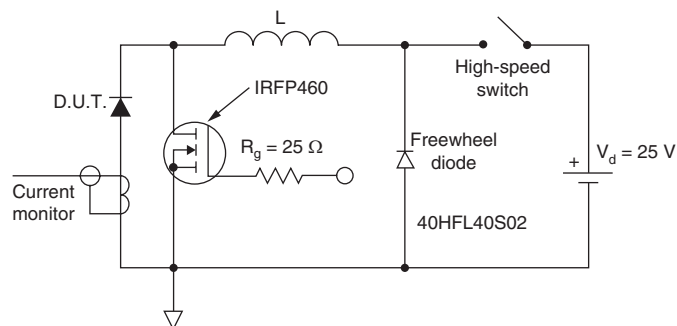


Fig. 8 - Unclamped Inductive Test Circuit

Note

- (1) Formula used: $T_C = T_J - (P_d + P_{dREV}) \times R_{thJC}$;
 P_d = Forward power loss = $I_{F(AV)} \times V_{FM}$ at $(I_{F(AV)}/D)$ (see fig. 6);
 P_{dREV} = Inverse power loss = $V_{R1} \times I_R (1 - D)$; I_R at $V_{R1} = 80\%$ rated V_R



ORDERING INFORMATION TABLE

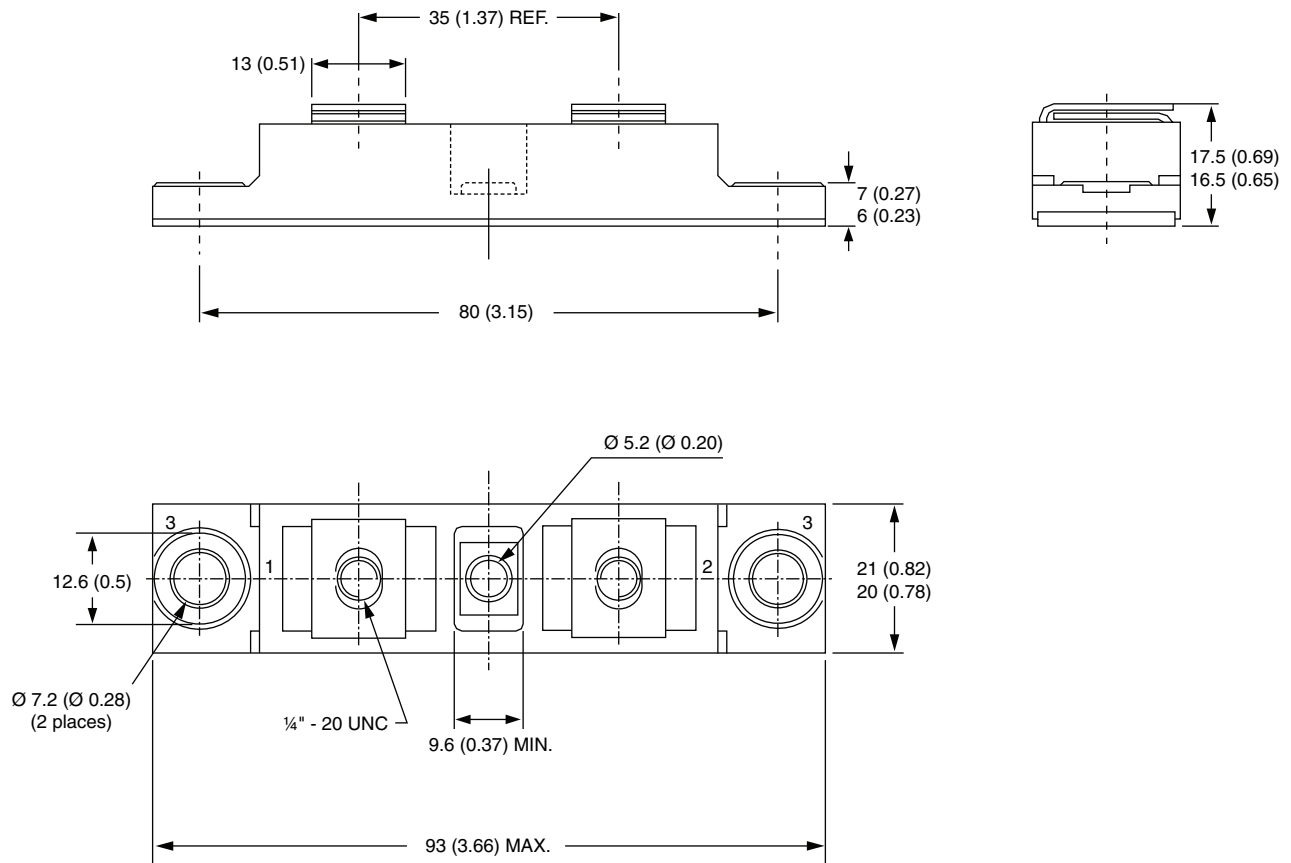
| | | | | | | | |
|-------------|----|---|---|---|---|-----|-----|
| Device code | 30 | 0 | C | N | Q | 045 | PbF |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

- | | | |
|---|---|--------------------------------|
| 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 (045 = 45 V) |
| 7 | - | Lead (Pb)-free |

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

TO-244

DIMENSIONS in millimeters (inches)





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