

#### Major Ratings and Characteristics

| Characteristics                               | Values     | Units      |
|-----------------------------------------------|------------|------------|
| $I_{F(AV)}$ Rectangular waveform              | 200        | A          |
| $V_{RRM}$ range                               | 135 - 150  | V          |
| $I_{FSM}$ @ $t_p = 5 \mu s$ sine              | 10,000     | A          |
| $V_F$ @ 100Apk, $T_J = 125^\circ C$ (per leg) | 0.71       | V          |
| $T_J$ range                                   | -55 to 175 | $^\circ C$ |

#### Description/ Features

The 209CNQ 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 175  $^\circ C$  junction temperature. Typical applications are in high current switching power supplies, plating power supplies, UPS systems, converters, free-wheeling diodes, welding, and reverse battery protection.

- 175  $^\circ C$   $T_J$  operation
- Center tap module
- Low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- Lead-Free

#### Case Styles



TO-244

## Voltage Ratings

| Part number                                     | 209CNQ135PbF | 209CNQ150PbF |
|-------------------------------------------------|--------------|--------------|
| $V_R$ Max. DC Reverse Voltage (V)               | 135          | 150          |
| $V_{RWM}$ Max. Working Peak Reverse Voltage (V) |              |              |

## Absolute Maximum Ratings

| Parameters                                                                        | 209CNQ         | Units | Conditions                                                                                                                                                 |
|-----------------------------------------------------------------------------------|----------------|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| $I_{F(AV)}$ Max. Average Forward Current (Per Leg) * See Fig. 5 (Per Device)      | 100<br>200     | A     | 50% duty cycle @ $T_C = 131^\circ\text{C}$ , rectangular wave form                                                                                         |
| $I_{FSM}$ Max. Peak One Cycle Non-Repetitive Surge Current (Per Leg) * See Fig. 7 | 10,000<br>1200 | A     | 5 $\mu\text{s}$ Sine or 3 $\mu\text{s}$ Rect. pulse<br>10ms Sine or 6ms Rect. pulse<br>Following any rated load condition and with rated $V_{RWM}$ applied |
| $E_{AS}$ Non-Repetitive Avalanche Energy (Per Leg)                                | 15             | mJ    | $T_J = 25^\circ\text{C}$ , $I_{AS} = 13\text{ Amps}$ , $L = 0.2\text{ mH}$                                                                                 |
| $I_{AR}$ Repetitive Avalanche Current (Per Leg)                                   | 1              | A     | Current decaying linearly to zero in 1 $\mu\text{sec}$<br>Frequency limited by $T_J$ max. $V_A = 1.5 \times V_R$ typical                                   |

## Electrical Specifications

| Parameters                                                       | 209CNQ | Units            | Conditions                                                            |
|------------------------------------------------------------------|--------|------------------|-----------------------------------------------------------------------|
| $V_{FM}$ Max. Forward Voltage Drop (Per Leg) * See Fig. 1 (1)    | 1.06   | V                | @ 100A<br>$T_J = 25^\circ\text{C}$                                    |
|                                                                  | 1.33   | V                | @ 200A                                                                |
|                                                                  | 0.74   | V                | @ 100A<br>$T_J = 125^\circ\text{C}$                                   |
|                                                                  | 0.88   | V                | @ 200A                                                                |
| $I_{RM}$ Max. Reverse Leakage Current (Per Leg) * See Fig. 2 (1) | 3      | mA               | $T_J = 25^\circ\text{C}$<br>$V_R = \text{rated } V_R$                 |
|                                                                  | 45     | mA               | $T_J = 125^\circ\text{C}$                                             |
| $C_T$ Max. Junction Capacitance (Per Leg)                        | 3000   | pF               | $V_R = 5V_{DC}$ (test signal range 100Khz to 1Mhz) $25^\circ\text{C}$ |
| $L_S$ Typical Series Inductance (Per Leg)                        | 7.0    | nH               | From top of terminal hole to mounting plane                           |
| $dv/dt$ Max. Voltage Rate of Change (Rated $V_R$ )               | 10000  | V/ $\mu\text{s}$ |                                                                       |

(1) Pulse Width < 300 $\mu\text{s}$ , Duty Cycle < 2%

## Thermal - Mechanical Characteristics

| Parameters                                              | Min      | Typ      | Max      | Units              |
|---------------------------------------------------------|----------|----------|----------|--------------------|
| $T_J$ Max. Junction Temperature Range                   | - 55     | -        | 175      | $^\circ\text{C}$   |
| $T_{Stg}$ Max. Storage Temperature Range                | - 55     | -        | 175      |                    |
| $R_{thJC}$ Thermal Resistance, Junction to Case Per Leg | -        | -        | 0.38     | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction to Case Per Module         | -        | -        | 0.19     | K/W                |
| $R_{thCS}$ Thermal Resistance, Case to Heatsink         | -        | 0.10     | -        |                    |
| $Wt$ Weight                                             | -        | 68 (2.4) | -        | g (oz)             |
| $T$ Mounting Torque                                     | 35.4 (4) | -        | 53.1 (6) | lbf*in             |
| Mounting Torque Center Hole                             | 30 (3.4) | -        | 40 (4.6) | (Nm)               |
| Terminal Torque                                         | 30 (3.4) | -        | 44.2 (5) |                    |
| Vertical Pull                                           | -        | -        | 80       | lbf.in             |
| 2 inch Lever Pull                                       | -        | -        | 35       |                    |

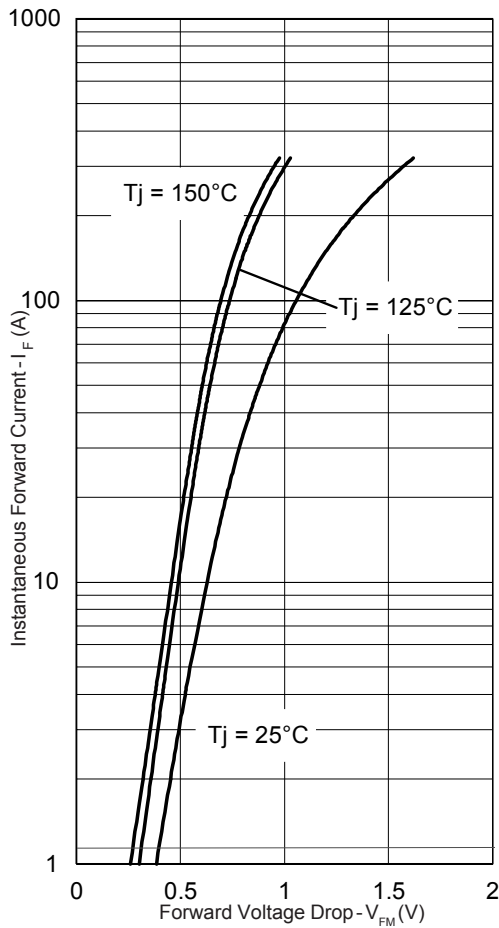


Fig. 1 - Max. Forward Voltage Drop Characteristics

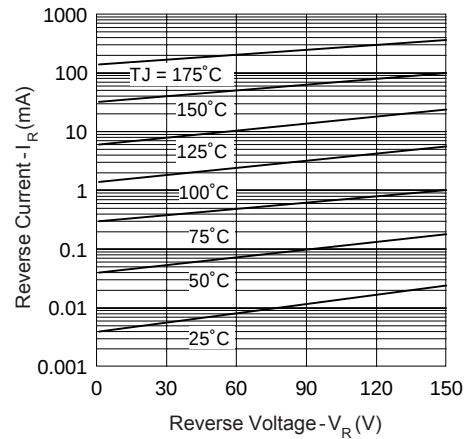


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage

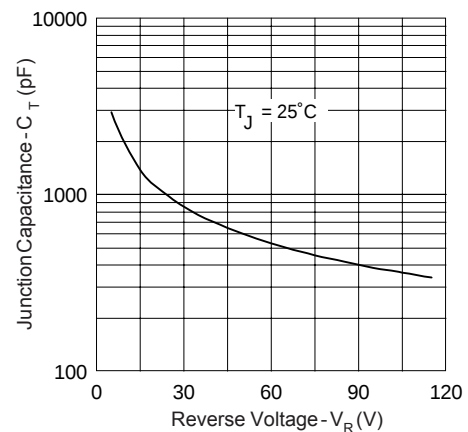


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

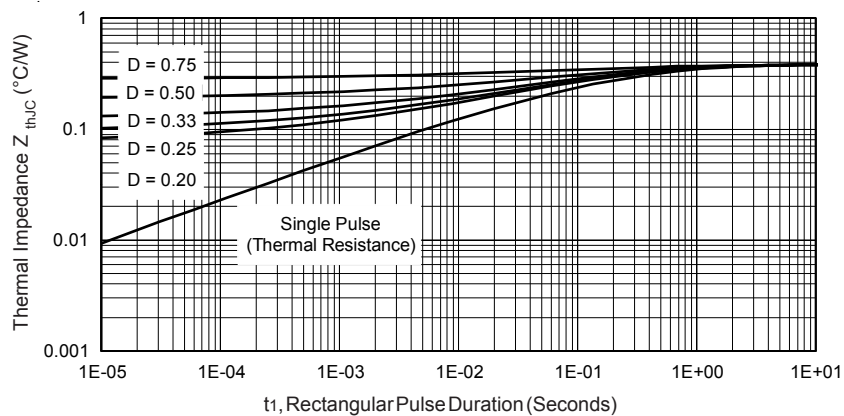


Fig. 4 - Max. Thermal Impedance  $Z_{thJC}$  Characteristics

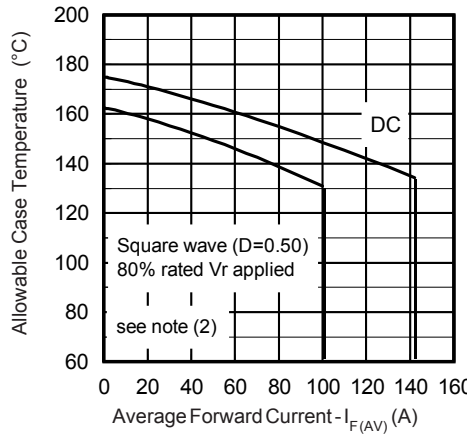


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current

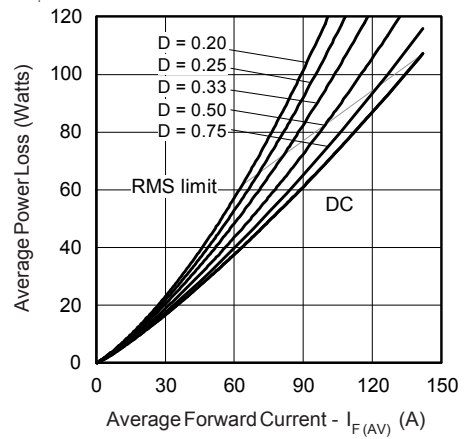


Fig. 6 - Forward Power Loss Characteristics

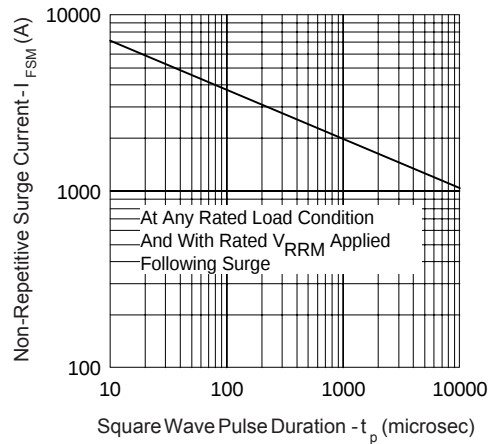


Fig. 7 - Max. Non-Repetitive Surge Current

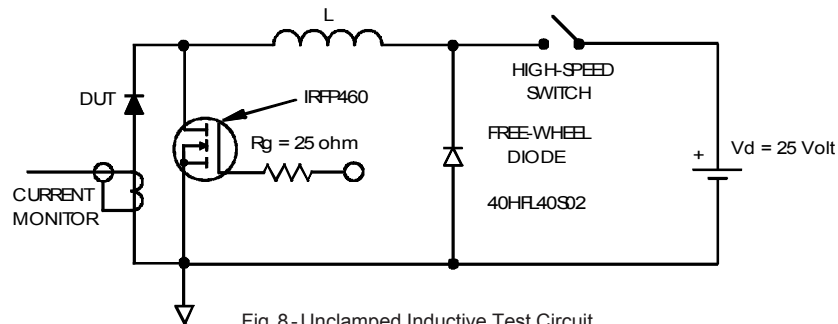


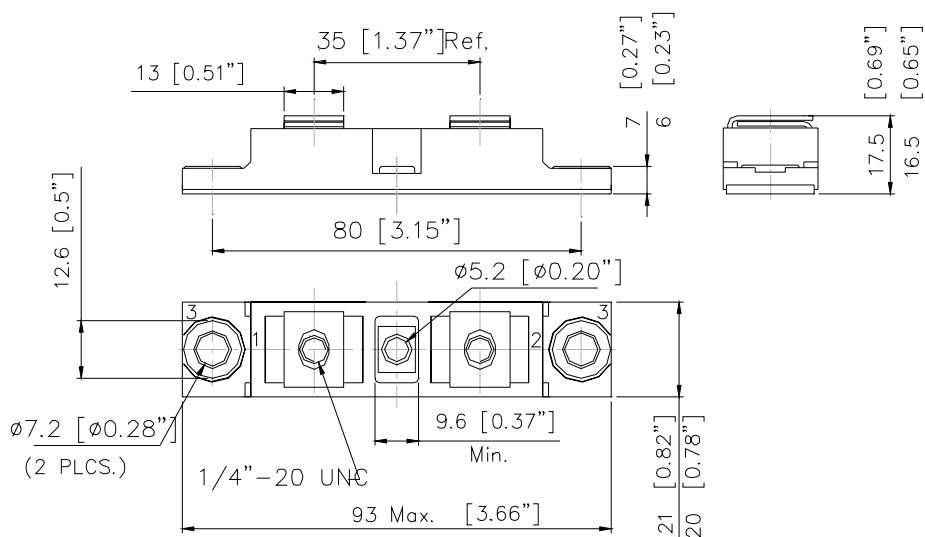
Fig. 8 - Unclamped Inductive Test Circuit

(2) Formula used:  $T_C = T_J - (P_d + P_{d_{REV}}) \times R_{thJC}$ ;

$P_d$  = Forward Power Loss =  $I_{F(AV)} \times V_{FM} @ (I_{F(AV)} / D)$  (see Fig. 6);

$P_{d_{REV}}$  = Inverse Power Loss =  $V_{R1} \times I_R (1 - D)$ ;  $I_R @ V_{R1} = 80\% \text{ rated } V_R$

## Outline Table



### Ordering Information Table

**Device Code**

|           |          |          |          |          |            |            |
|-----------|----------|----------|----------|----------|------------|------------|
| <b>20</b> | <b>9</b> | <b>C</b> | <b>N</b> | <b>Q</b> | <b>150</b> | <b>PbF</b> |
| 1         | 2        | 3        | 4        | 5        | 6          | 7          |

|          |   |                                |
|----------|---|--------------------------------|
| <b>1</b> | - | Average Current Rating (x 10)  |
| <b>2</b> | - | Product Silicon Identification |
| <b>3</b> | - | C = Circuit Configuration      |
| <b>4</b> | - | N = NOT Isolated               |
| <b>5</b> | - | Q = Schottky Rectifier Diode   |
| <b>6</b> | - | Voltage Ratings                |
| <b>7</b> | - | Lead-Free                      |

135 = 135V  
 150 = 150V

Data and specifications subject to change without notice.  
This product has been designed and qualified for Industrial Level and Lead-Free.  
Qualification Standards can be found on IR's Web site.

International  
**IOR** Rectifier

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