

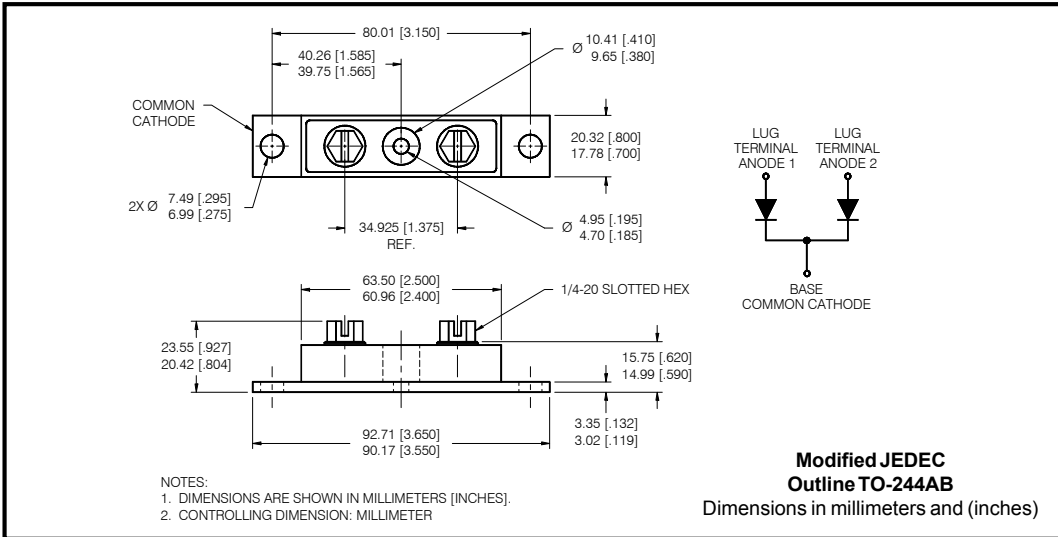
Major Ratings and Characteristics

| Characteristics                               | 408CNQ...  | Units      |
|-----------------------------------------------|------------|------------|
| $I_{F(AV)}$ Rectangular waveform              | 400        | A          |
| $V_{RRM}$ range                               | 60         | V          |
| $I_{FSM}$ @ $t_p = 5 \mu s$ sine              | 25,500     | A          |
| $V_F$ @ 200Apk, $T_J = 125^\circ C$ (per leg) | 0.59       | V          |
| $T_J$ range                                   | -55 to 150 | $^\circ C$ |

Description/Features

The 408CNQ 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  $150^\circ C$  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.

- $150^\circ C$   $T_J$  operation
- Center tap module
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability



## 408CNQ060

Bulletin PD-20581 rev. A 07/01

International  
IR Rectifier

### Voltage Ratings

| Part number                                     | 408CNQ060 |
|-------------------------------------------------|-----------|
| $V_R$ Max. DC Reverse Voltage (V)               | 60        |
| $V_{RWM}$ Max. Working Peak Reverse Voltage (V) |           |

### Absolute Maximum Ratings

| Parameters                                                                        | 408CNQ          | Units | Conditions                                                                                                                                                 |
|-----------------------------------------------------------------------------------|-----------------|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| $I_{F(AV)}$ Max. Average Forward Current (Per Leg) * See Fig. 5 (Per Device)      | 200<br>400      | A     | 50% duty cycle @ $T_C = 115^\circ\text{C}$ , rectangular waveform                                                                                          |
| $I_{FSM}$ Max. Peak One Cycle Non-Repetitive Surge Current (Per Leg) * See Fig. 7 | 25,500<br>3,300 | 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    | $T_J = 25^\circ\text{C}$ , $I_{AS} = 1\text{ Amps}$ , $L = 30\text{ mH}$                                                                                   |
| $I_{AR}$ 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                                                       | 408CNQ | Units            | Conditions                                                              |
|------------------------------------------------------------------|--------|------------------|-------------------------------------------------------------------------|
| $V_{FM}$ Max. Forward Voltage Drop (Per Leg) * See Fig. 1 (1)    | 0.68   | V                | @ 200A<br>$T_J = 25^\circ\text{C}$                                      |
|                                                                  | 0.83   | V                | @ 400A                                                                  |
|                                                                  | 0.59   | V                | @ 200A<br>$T_J = 125^\circ\text{C}$                                     |
|                                                                  | 0.76   | V                | @ 400A                                                                  |
| $I_{RM}$ Max. Reverse Leakage Current (Per Leg) * See Fig. 2 (1) | 2.2    | mA               | $T_J = 25^\circ\text{C}$                                                |
|                                                                  | 600    | mA               | $T_J = 125^\circ\text{C}$<br>$V_R = \text{rated } V_R$                  |
| $C_T$ Max. Junction Capacitance (Per Leg)                        | 11000  | pF               | $V_R = 5V_{DC}$ , (test signal range 100Khz to 1Mhz) $25^\circ\text{C}$ |
| $L_S$ Typical Series Inductance (Per Leg)                        | 5.0    | 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 Specifications

| Parameters                                                        | 408CNQ        | Units              | Conditions                           |
|-------------------------------------------------------------------|---------------|--------------------|--------------------------------------|
| $T_J$ Max. Junction Temperature Range                             | -55 to 150    | $^\circ\text{C}$   |                                      |
| $T_{stg}$ Max. Storage Temperature Range                          | -55 to 150    | $^\circ\text{C}$   |                                      |
| $R_{thJC}$ Max. Thermal Resistance Junction to Case (Per Leg)     | 0.20          | $^\circ\text{C/W}$ | DC operation * See Fig. 4            |
| $R_{thJC}$ Max. Thermal Resistance Junction to Case (Per Package) | 0.10          | $^\circ\text{C/W}$ | DC operation                         |
| $R_{thCS}$ Typical Thermal Resistance, Case to Heatsink           | 0.10          | $^\circ\text{C/W}$ | Mounting surface, smooth and greased |
| wt Approximate Weight                                             | 79(2.80)      | g(oz.)             |                                      |
| T Mounting Torque                                                 | Min. 24(20)   | Kg-cm<br>(lbf-in)  |                                      |
|                                                                   | Max. 35(30)   |                    |                                      |
|                                                                   | Typ. 13.5(12) |                    |                                      |
|                                                                   | Min. 35(30)   |                    |                                      |
|                                                                   | Max. 46(40)   |                    |                                      |
| Case Style                                                        | TO-244AB      |                    | Modified JEDEC                       |

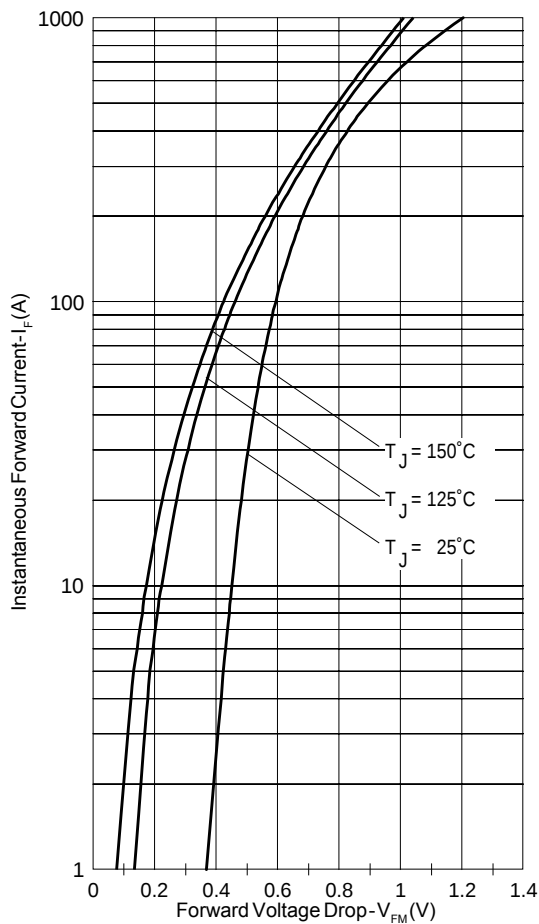


Fig. 1 - Max. Forward Voltage Drop Characteristics

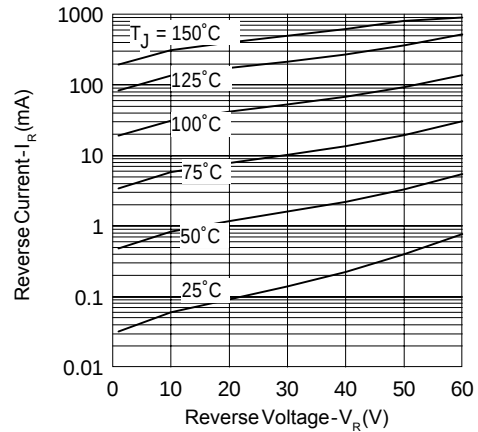


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage

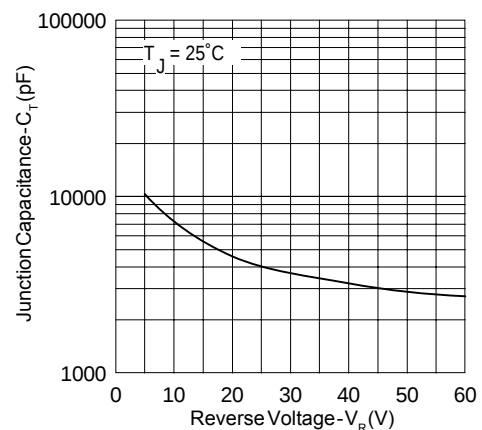


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

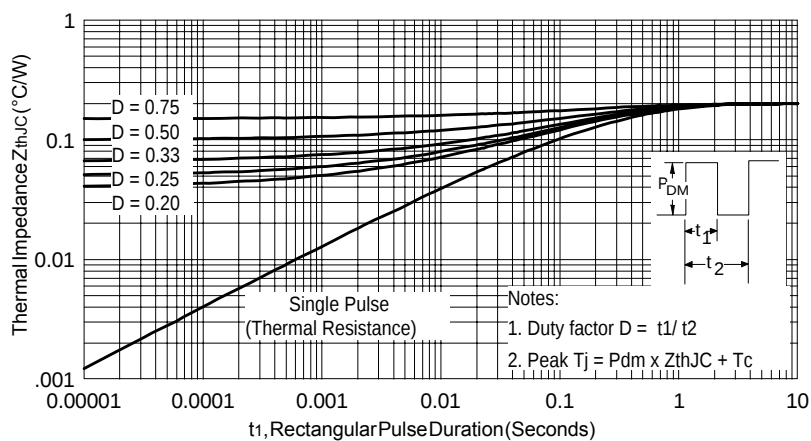
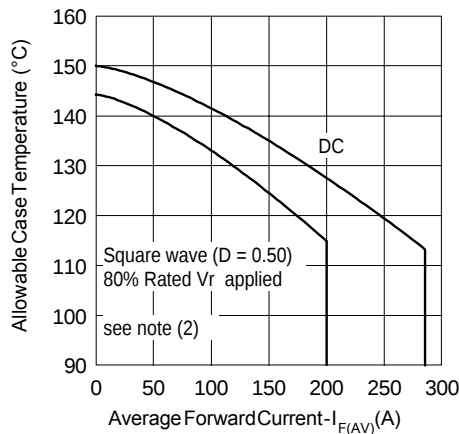
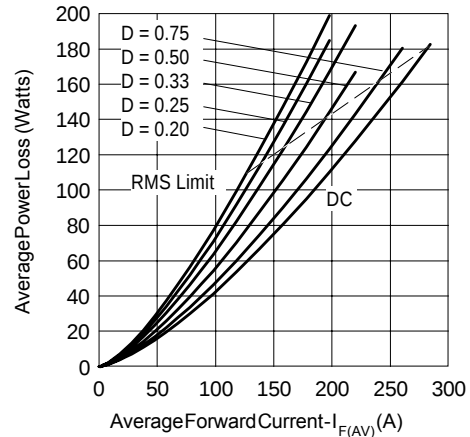


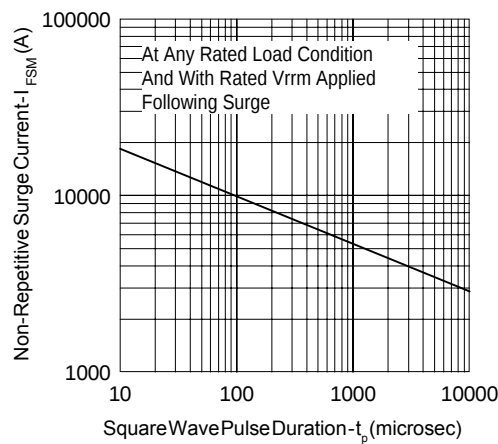
Fig. 4 - Max. Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)



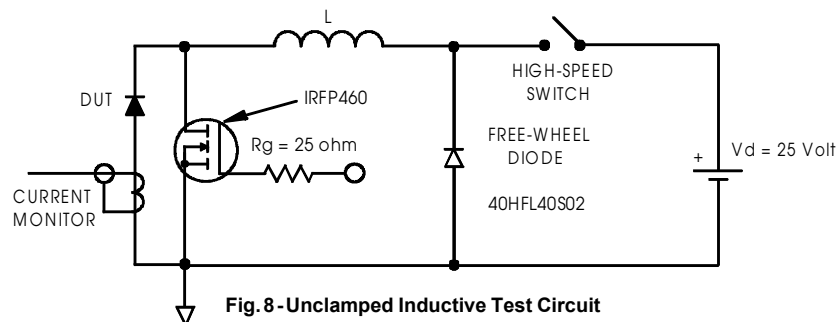
**Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current**



**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 =  $V_{R1} \times I_R (1 - D)$ ;  $I_R @ V_{R1} = 80\% \text{ rated } V_R$

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

International  
**IOR** Rectifier

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