

## SCHOTTKY RECTIFIER

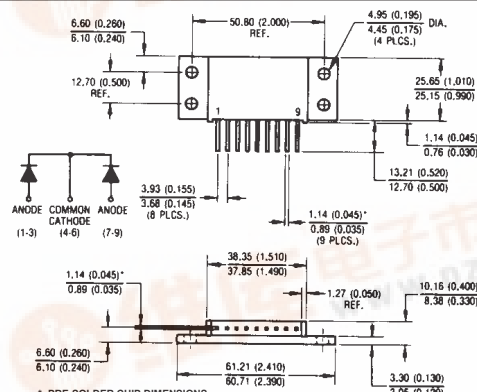
322CNQ030

300 Amp

### Description/ Features

The 322CNQ030 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 switching power supplies, converters, free-wheeling diodes, and reverse battery protection.

- 150 °C T<sub>J</sub> operation
- High Surge Capability
- 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
- Low profile, high current package



**Outline D-60 (Modified JEDEC TO-249AA)**  
Dimensions in millimeters and inches



## Voltage Ratings

|                                                 |           |
|-------------------------------------------------|-----------|
| Part number                                     | 322CNQ030 |
| $V_R$ Max. DC Reverse Voltage (V)               | 30        |
| $V_{RWM}$ Max. Working Peak Reverse Voltage (V) |           |

## Absolute Maximum Ratings

| Parameters                                                           | 322CNQ | Units | Conditions                                                                                                                                      |
|----------------------------------------------------------------------|--------|-------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| $I_{F(AV)}$ Max. Average Forward Current (Per Leg)                   | 300    | A     | 50% duty cycle @ $T_C = 87^\circ\text{C}$ , rectangular wave form                                                                               |
|                                                                      | 150    | A     |                                                                                                                                                 |
| $I_{FSM}$ Max. Peak One Cycle Non-Repetitive Surge Current (Per Leg) | 10000  | A     | 5 $\mu\text{s}$ Sine or 3 $\mu\text{s}$ Rect. pulse                                                                                             |
|                                                                      | 1500   |       | 10ms Sine or 6ms Rect. pulse                                                                                                                    |
| $E_{AS}$ Non-Repetitive Avalanche Energy (Per Leg)                   | 15     | mJ    | Following any rated load condition and with rated $V_{RRM}$ applied<br>$T_J = 25^\circ\text{C}$ , $I_{AS} = 1\text{ Amps}$ , $L = 30\text{ mH}$ |
| $I_{AR}$ 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                                         | 322CNQ | Units            | Conditions                                                            |
|----------------------------------------------------|--------|------------------|-----------------------------------------------------------------------|
| $V_{FM}$ Max. Forward Voltage Drop (Per Leg)       | 0.56   | V                | @ 150A                                                                |
|                                                    | 0.70   | V                | @ 300A                                                                |
|                                                    | 0.49   | V                | @ 150A                                                                |
|                                                    | 0.68   | V                | @ 300A                                                                |
| $I_{RM}$ Max. Reverse Leakage Current (Per Leg)    | 10     | mA               | $T_J = 25^\circ\text{C}$                                              |
|                                                    | 650    | mA               | $T_J = 125^\circ\text{C}$                                             |
| $C_T$ Max. Junction Capacitance (Per Leg)          | 5500   | pF               | $V_R = 5V_{DC}$ (test signal range 100Khz to 1Mhz) $25^\circ\text{C}$ |
| $L_S$ Typical Series Inductance (Per Leg)          | 8.0    | nH               | Measured from terminal hole to terminal hole                          |
| $dv/dt$ 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                                                        | 322CNQ       | 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)     | 0.50         | $^\circ\text{C/W}$ | DC operation                         |
| $R_{thJC}$ Max. Thermal Resistance Junction to Case (Per Package) | 0.25         | $^\circ\text{C/W}$ | DC operation                         |
| $R_{thCS}$ Typical Thermal Resistance, Case to Heatsink           | 0.10         | $^\circ\text{C/W}$ | Mounting surface, smooth and greased |
| wt Approximate Weight                                             | 58 (2.0)     | g (oz.)            |                                      |
| T Mounting Torque                                                 | Min. 40 (35) | Kg-cm (lbf-in)     |                                      |
|                                                                   | Max. 58 (50) |                    |                                      |
| Case Style                                                        | TO-249AA     | JEDEC              |                                      |

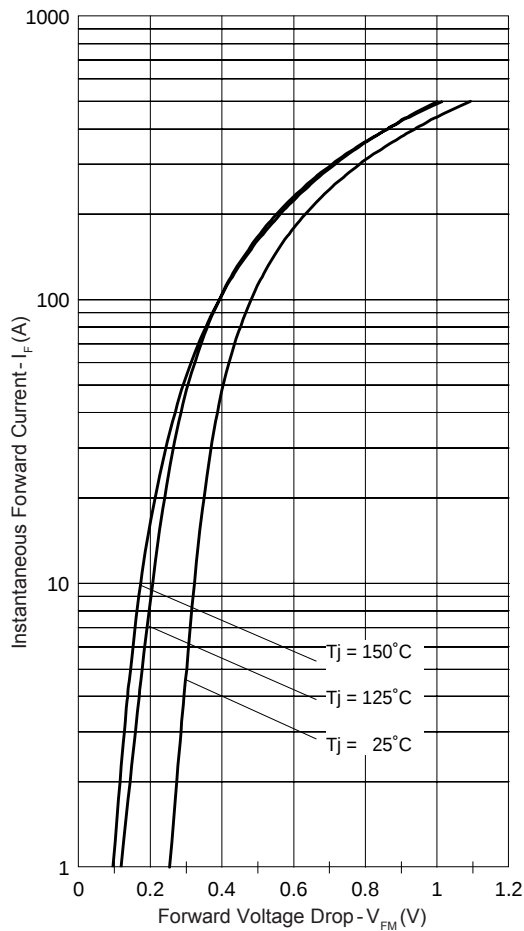


Fig. 1 - Max. Forward Voltage Drop Characteristics

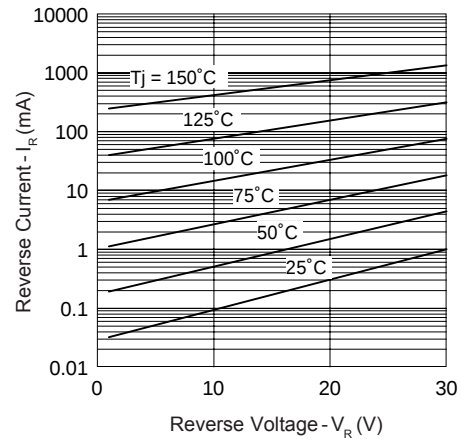


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage

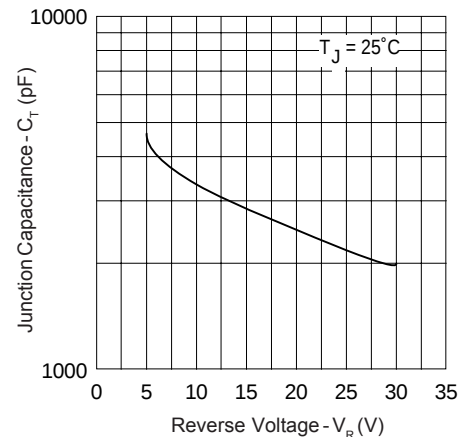


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

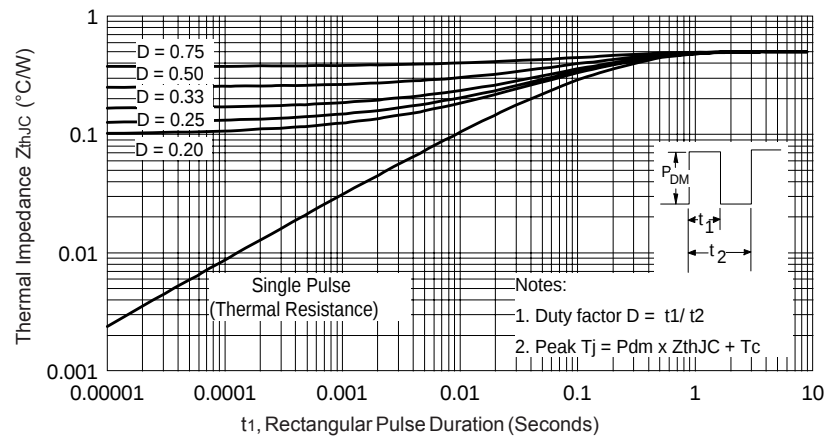
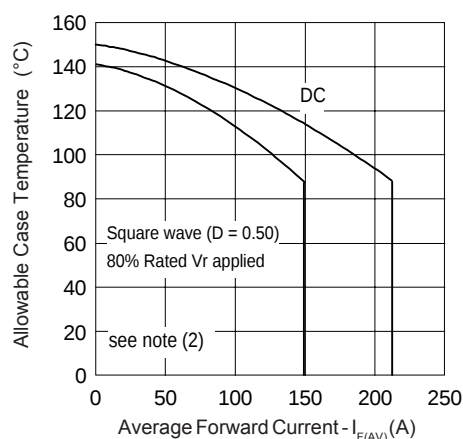
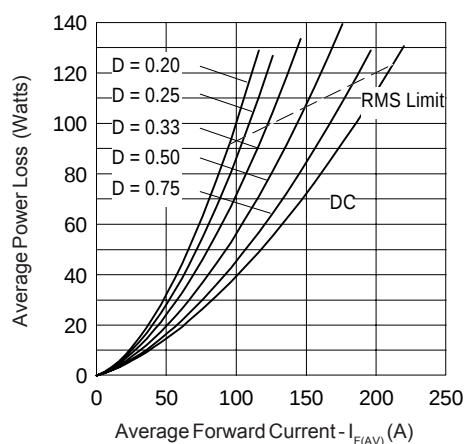


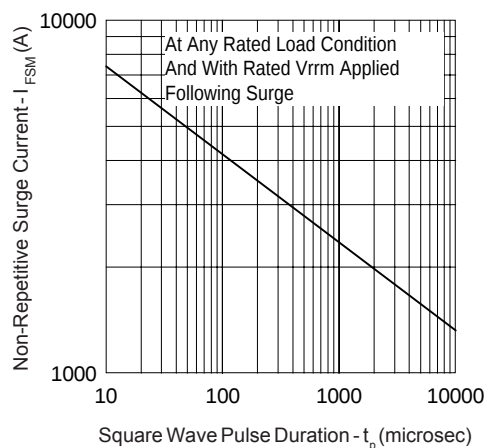
Fig. 4 - Max. Thermal Impedance  $Z_{thJC}$  Characteristics



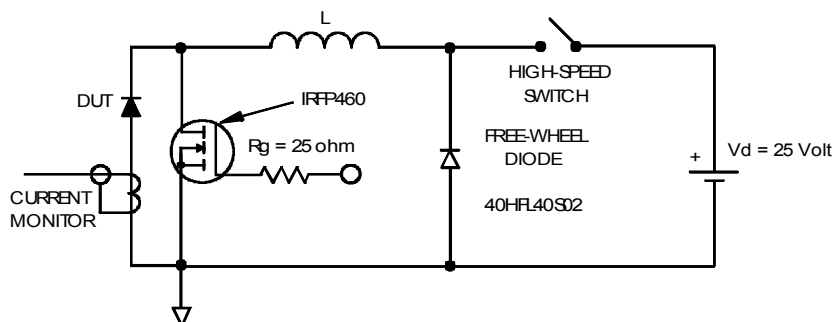
**Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current**



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