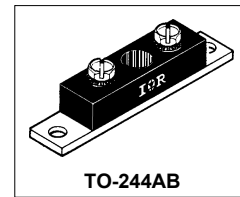




# THE DATASHEET OF 301CNQ050





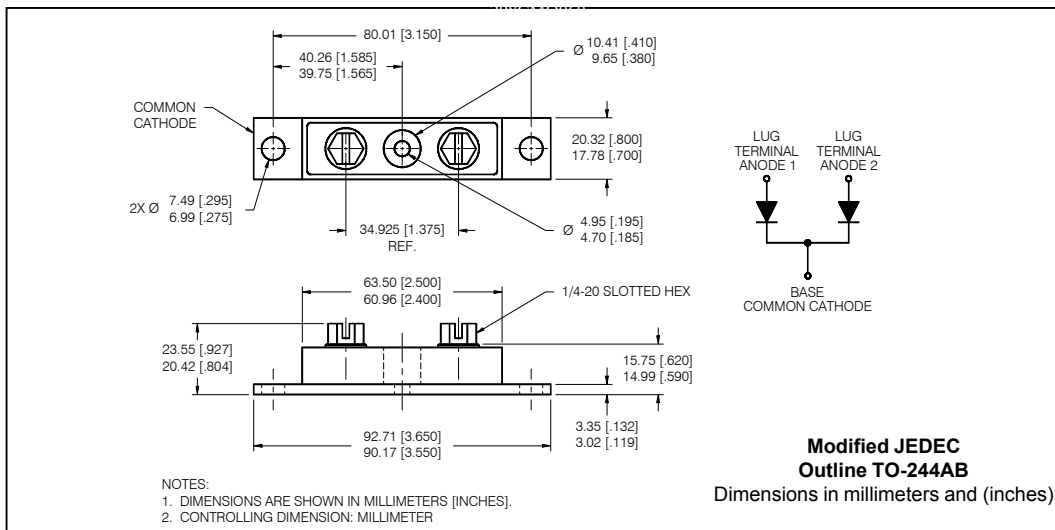
**Major Ratings and Characteristics**

Characteristics	301CNQ...	Units
$I_{F(AV)}$ Rectangular waveform	300	A
$V_{RRM}$ range	35 to 45	V
$I_{FSM}$ @tp=5µs sine	16,000	A
$V_F$ @150Apk, $T_J=125^\circ\text{C}$ (per leg)	0.59	V
$T_J$ range	-55 to 175	$^\circ\text{C}$

**Description/Features**

The 301CNQ 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 °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 °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



## Voltage Ratings

Part number	301CNQ035	301CNQ040	301CNQ045
$V_R$ Max. DC Reverse Voltage (V)	35	40	45
$V_{RWM}$ Max. Working Peak Reverse Voltage (V)			

## Absolute Maximum Ratings

Parameters	301CNQ	Units	Conditions
$I_{F(AV)}$ Max. Average Forward Current * See Fig. 5	300	A	50% duty cycle @ $T_C = 81^\circ\text{C}$ , rectangular wave form
$I_{FSM}$ Max. Peak One Cycle Non-Repetitive Surge Current (Per Leg) * See Fig. 7	16,000	A	Following any rated load condition and with rated $V_{RWM}$ applied
	3200		
$E_{AS}$ Non-Repetitive Avalanche Energy (Per Leg)	202	mJ	$T_J = 25^\circ\text{C}$ , $I_{AS} = 40$ Amps, $L = 0.34$ mH
$I_{AR}$ Repetitive Avalanche Current (Per Leg)	30	A	Current decaying linearly to zero in 1 $\mu\text{sec}$ Frequency limited by $T_J$ max. $V_A = 1.5 \times V_R$ typical

## Electrical Specifications

Parameters	301CNQ	Units	Conditions	
$V_{FM}$ Max. Forward Voltage Drop (Per Leg) * See Fig. 1 (1)	0.69	V	@ 150A	$T_J = 25^\circ\text{C}$
	0.90	V	@ 300A	
	0.59	V	@ 150A	$T_J = 100^\circ\text{C}$
	0.76	V	@ 300A	
$I_{RM}$ Max. Reverse Leakage Current (Per Leg) * See Fig. 2 (1)	10	mA	$T_J = 25^\circ\text{C}$	$V_R = \text{rated } V_R$
	90	mA	$T_J = 125^\circ\text{C}$	
$C_T$ Max. Junction Capacitance (Per Leg)	5200	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 $V_R$ )	10,000	V/ $\mu\text{s}$		

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

## Thermal-Mechanical Specifications

Parameters	301CNQ	Units	Conditions
$T_J$ Max. Junction Temperature Range	-55 to 175	$^\circ\text{C}$	
$T_{stg}$ Max. Storage Temperature Range	-55 to 175	$^\circ\text{C}$	
$R_{thJC}$ Max. Thermal Resistance Junction to Case (Per Leg)	0.40	$^\circ\text{C/W}$	DC operation * See Fig. 4
$R_{thJC}$ Max. Thermal Resistance Junction to Case (Per Package)	0.20	$^\circ\text{C/W}$	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	Base	Min.	24 (20)
		Max.	35 (30)
	Center Hole	Typ.	13.5 (12)
		Terminal Torque	Min.
	Max.	46 (40)	
Case Style	TO-244AB		Modified JEDEC

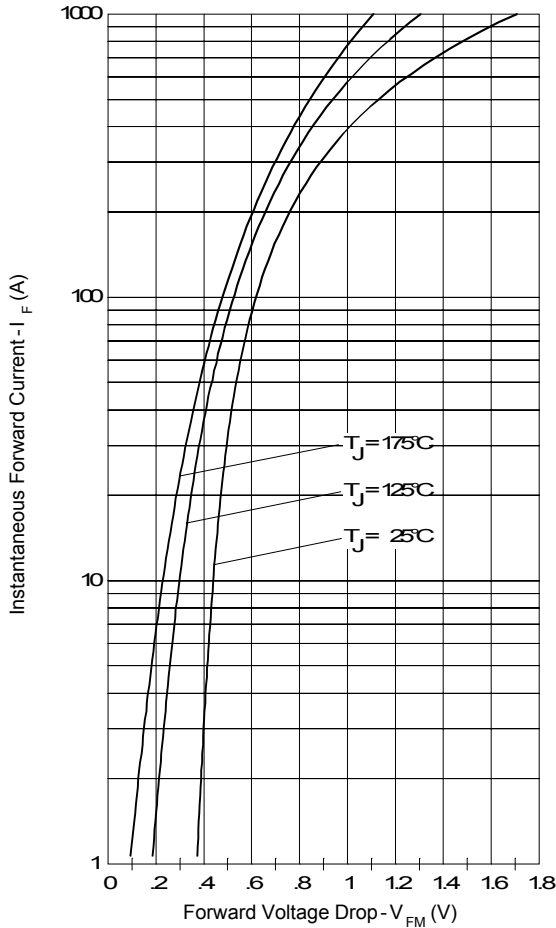


Fig. 1 - Max. Forward Voltage Drop Characteristics (Per Leg)

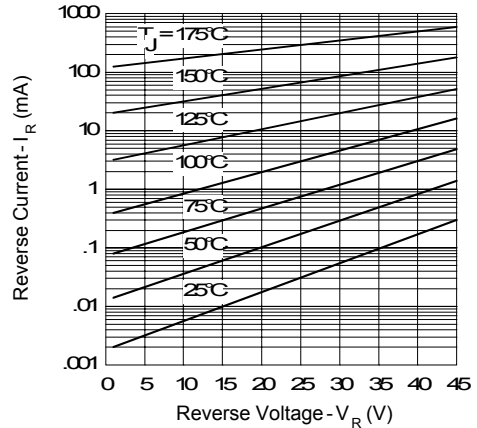


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (Per Leg)

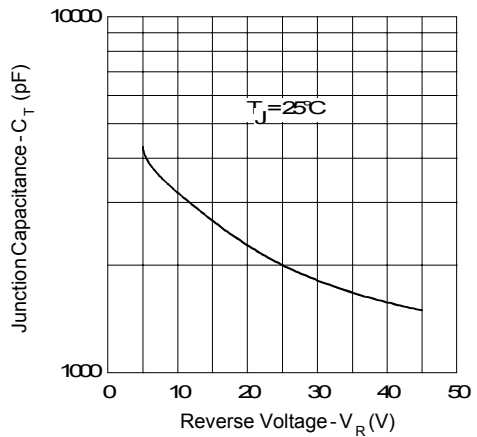


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

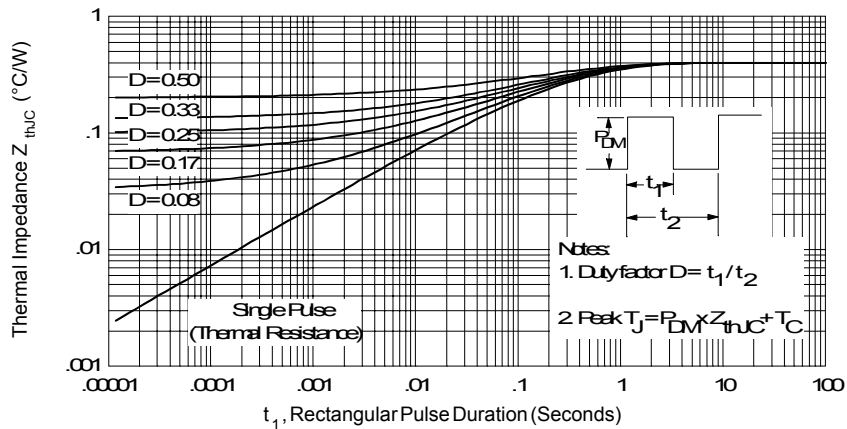


Fig. 4 - Max. Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

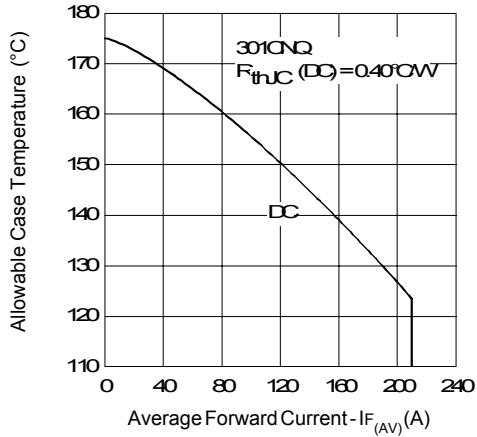


Fig. 5- Max. Allowable Case Temperature Vs. Average Forward Current (Per Leg)

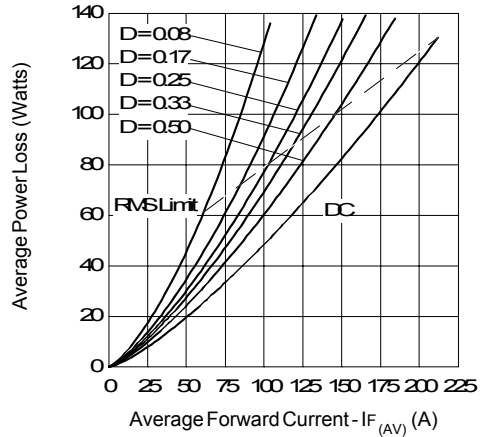


Fig. 6- Forward Power Loss Characteristics (Per Leg)

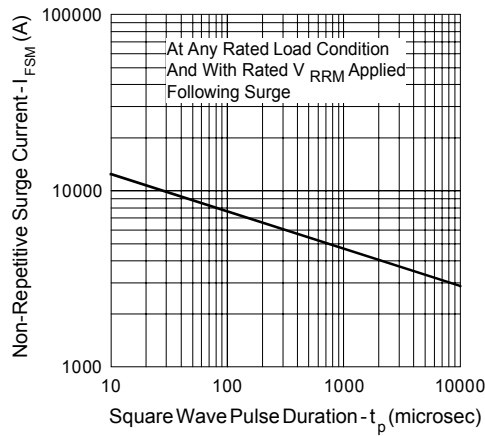


Fig. 7- Max. Non-Repetitive Surge Current (Per Leg)

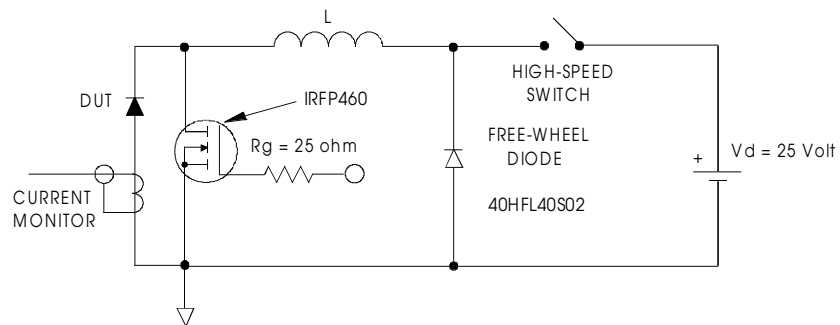


Fig. 8- Unclamped Inductive Test Circuit

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.

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**IOR** Rectifier

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