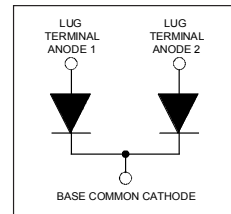


International  
**IR** Rectifier

301CNQ...PbF SERIES

SCHOTTKY RECTIFIER

300 Amp



#### Major Ratings and Characteristics

Characteristics	Values	Units
$I_{F(AV)}$ Rectangular waveform	300	A
$V_{RRM}$ range	40-45	V
$I_{FSM}$ @ tp = 5 $\mu$ s 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  $^\circ\text{C}$  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  $^\circ\text{C}$   $T_J$  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	301CNQ040PbF	301CNQ045PbF
$V_R$ Max. DC Reverse Voltage (V)	40	45
$V_{RWM}$ Max. Working Peak Reverse Voltage (V)		

## Absolute Maximum Ratings

Parameters	301CNQ	Units	Conditions
$F_{(AV)}$ Max. Average Forward Current * See Fig. 5 Per Device Per Leg	300 150	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 3200	A	5 $\mu\text{s}$ Sine or 3 $\mu\text{s}$ Rect. pulse 10ms Sine or 6ms Rect. pulse Following any rated load condition and with rated $V_{RWM}$ applied
$E_{AS}$ Non-Repetitive Avalanche Energy (Per Leg)	202	mJ	$T_J = 25^\circ\text{C}$ , $I_{AS} = 21$ Amps, $L = 1$ 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	10,000	V/ $\mu\text{s}$	(Rated $V_R$ )

(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	-	0.28	$^\circ\text{C}/\text{W}$
	Per Module	-	0.14	K/W
$R_{thCS}$ Thermal Resistance, Case to Heatsink	-	0.10	-	
$Wt$ Weight	-	68 (2.4)	-	g (oz)
Mounting Torque	35.4 (4)	-	53.1 (6)	lb*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	

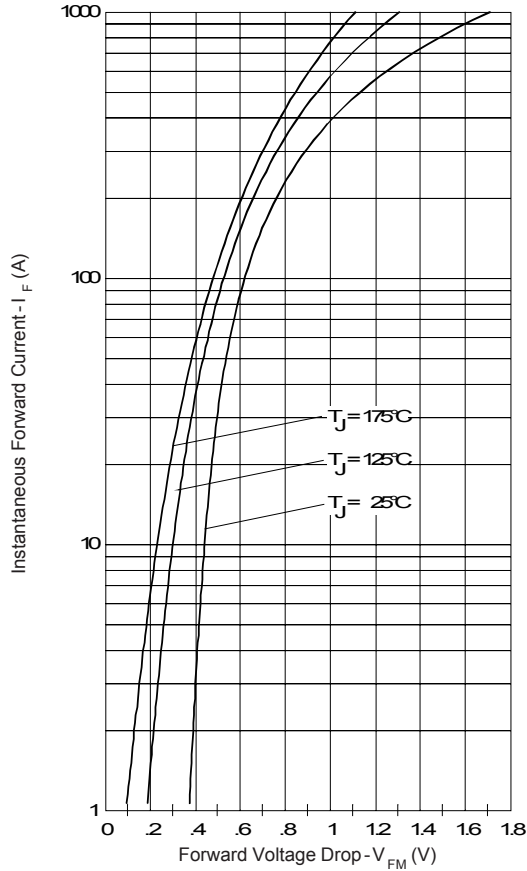


Fig. 1 - Max. Forward Voltage Drop Characteristics (Per Leg)

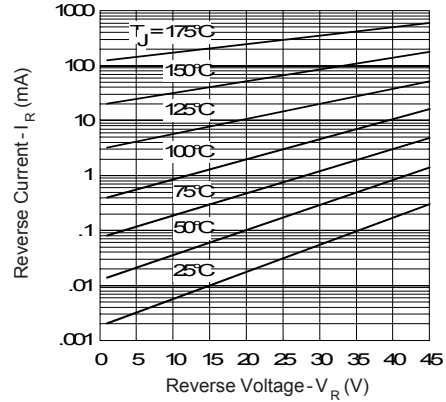


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (Per Leg)

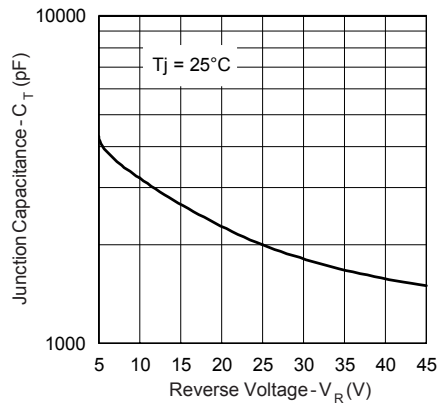


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

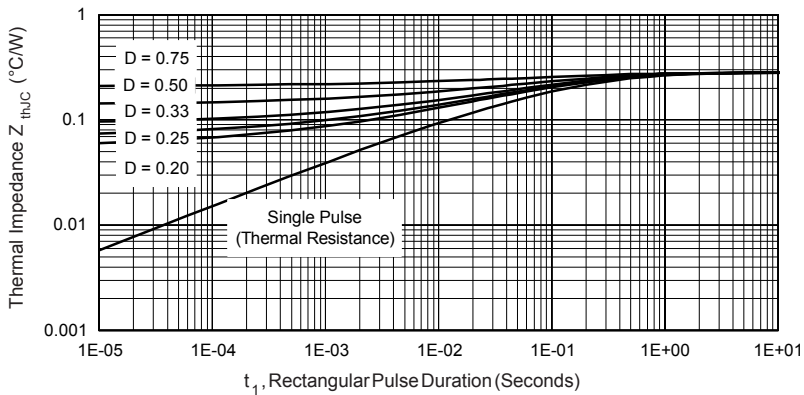


Fig. 4 - Max. Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

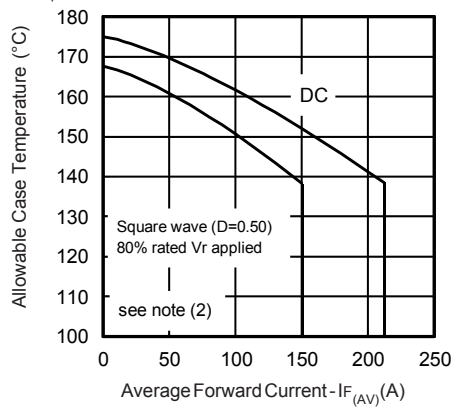


Fig. 5- Max. Allowable Case Temperature Vs. Average Forward Current (Per Leg)

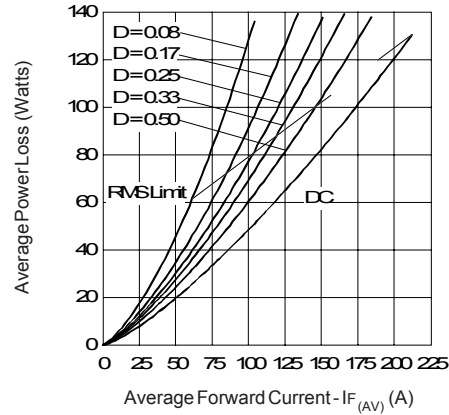


Fig. 6- Forward Power Loss Characteristics (Per Leg)

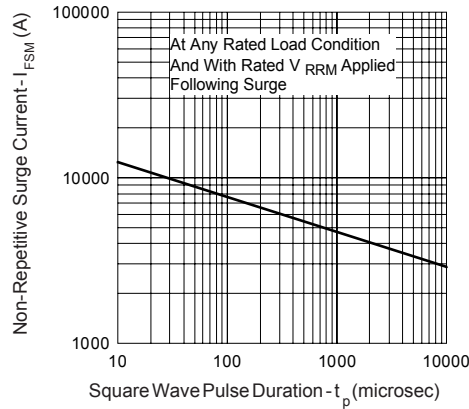


Fig. 7- Max. Non-Repetitive Surge Current (Per Leg)

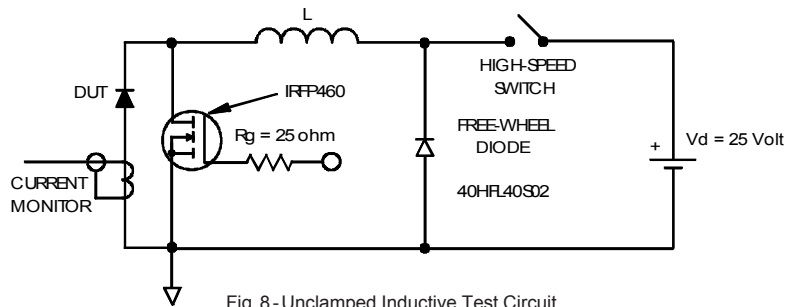


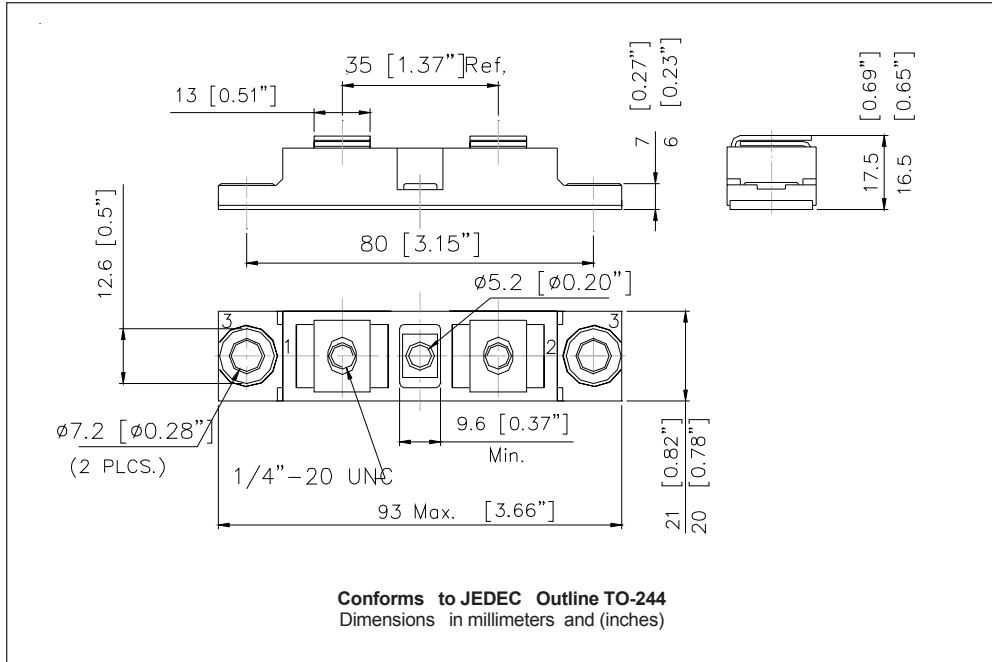
Fig. 8- Unclamped Inductive Test Circuit

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

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

$Pd_{REV}$  = Inverse Power Loss =  $V_{R1} \times I_{R1} (1 - D)$ ;  $I_{R1} @ V_{R1} = 80\%$  rated  $V_R$

Outline Table



Ordering Information Table

Device Code	30	1	C	N	Q	045	PbF
	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				040 = 40V	
<b>7</b>	-	Lead-Free				045 = 45V	

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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