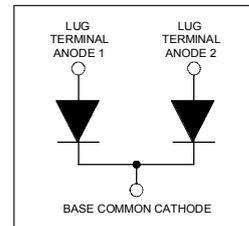


International  
**IOR** Rectifier

# 400CNQ045PbF

## SCHOTTKY RECTIFIER

## 400 Amp



### Major Ratings and Characteristics

Characteristics	Values	Units
$I_{F(AV)}$ Rectangular waveform	400	A
$V_{RRM}$	45	V
$I_{FSM}$ @tp = 5 $\mu$ s sine	29,000	A
$V_F$ @200Apk, $T_J=125^\circ\text{C}$ (per leg)	0.52	V
$T_J$ range	-55 to 150	$^\circ\text{C}$

### Description/ Features

The 400CNQ.. center tap, high current, Schottky rectifier module series has been optimized for very low forward voltage drop, with moderate leakage. The proprietary barrier technology allows for reliable operation up to 150  $^\circ\text{C}$  junction temperature. Typical applications are in switching power supplies, converters, free-wheeling diodes, welding, and reverse battery protection.

- 150  $^\circ\text{C}$   $T_J$  operation
- Center tap module
- Very 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	400CNQ045PbF
V <sub>R</sub> Max. DC Reverse Voltage (V)	45
V <sub>RWM</sub> Max. Working Peak Reverse Voltage (V)	

### Absolute Maximum Ratings

Parameters	400CNQ	Units	Conditions
I <sub>F(AV)</sub> Max. Average Forward Current (Per Leg) * See Fig. 5 (Per Device)	200 400	A	50% duty cycle @ T <sub>C</sub> = 114 °C, rectangular wave form
I <sub>FSM</sub> Max. Peak One Cycle Non-Repetitive Surge Current (Per Leg) * See Fig. 7	29,000 3400	A	5µs Sine or 3µs Rect. pulse 10ms Sine or 6ms Rect. pulse Following any rated load condition and with rated V <sub>RRM</sub> applied
E <sub>AS</sub> Non-Repetitive Avalanche Energy (Per Leg)	180	mJ	T <sub>J</sub> = 25 °C, I <sub>AS</sub> = 19 Amps, L = 1 mH
I <sub>AR</sub> Repetitive Avalanche Current (Per Leg)	40	A	Current decaying linearly to zero in 1µsec Frequency limited by T <sub>J</sub> max. V <sub>A</sub> = 1.5 x V <sub>R</sub> typical

### Electrical Specifications

Parameters	400CNQ	Units	Conditions
V <sub>FM</sub> Max. Forward Voltage Drop (Per Leg) * See Fig. 1 (1)	0.57	V	@ 200A T <sub>J</sub> = 25 °C
	0.73	V	@ 400A
	0.52	V	@ 200A T <sub>J</sub> = 125 °C
	0.7	V	@ 400A
I <sub>RM</sub> Max. Reverse Leakage Current (Per Leg) * See Fig. 2 (1)	20	mA	T <sub>J</sub> = 25 °C
	1.2	A	T <sub>J</sub> = 125 °C V <sub>R</sub> = rated V <sub>R</sub>
V <sub>F(TO)</sub> Threshold Voltage	0.32	V	T <sub>J</sub> = T <sub>J</sub> max.
r <sub>f</sub> Forward Slope Resistance	0.81	mΩ	
C <sub>T</sub> Max. Junction Capacitance (Per Leg)	10,300	pF	V <sub>R</sub> = 5V <sub>DC</sub> (test signal range 100Khz to 1Mhz) 25°C
L <sub>S</sub> Typical Series Inductance (Per Leg)	5.0	nH	From top of terminal hole to mounting plane
dv/dt Max. Voltage Rate of Change	10000	V/µs	(Rated V <sub>R</sub> )

(1) Pulse Width < 300µs, Duty Cycle <2%

### Thermal - Mechanical Characteristics

Parameters	Min	Typ	Max	Units
T <sub>J</sub> Max. Junction Temperature Range	- 55	-	150	°C
T <sub>Stg</sub> Max. Storage Temperature Range	- 55	-	150	
R <sub>thJC</sub> Thermal Resistance, Junction to Case	Per Leg	-	0.19	°C/W
	Per Module	-	0.095	K/W
R <sub>thCS</sub> 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
	30 (3.4)	-	40 (4.6)	(Nm)
	30 (3.4)	-	44.2 (5)	
Vertical Pull	-	-	80	lbf.in
2 inch Lever Pull	-	-	35	

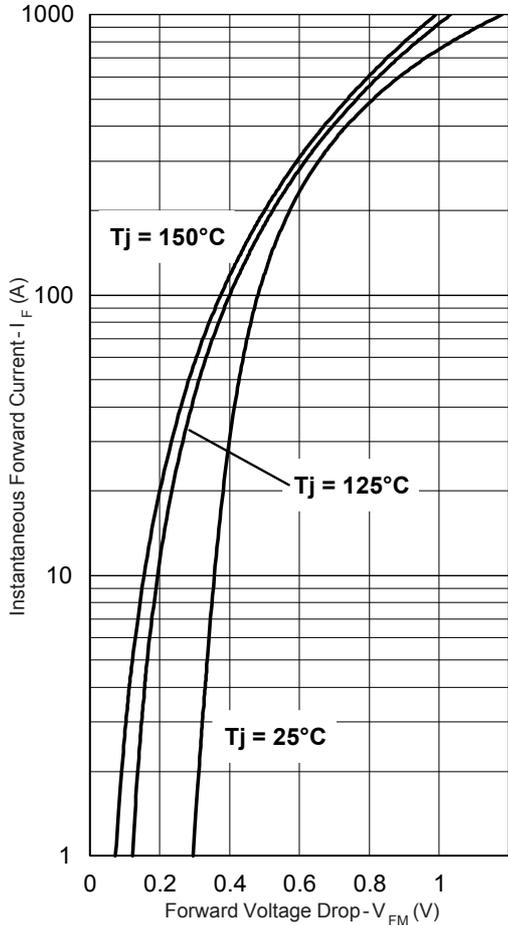


Fig. 1 - Max. Forward Voltage Drop Characteristics (Per Leg)

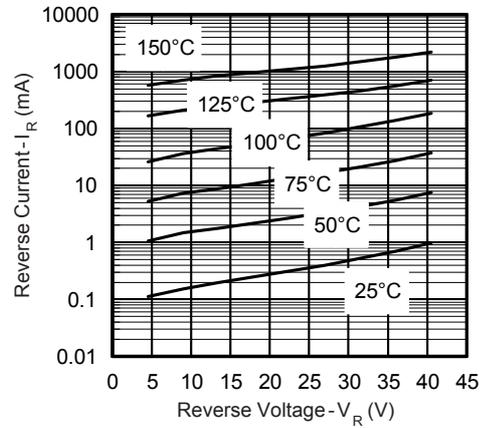


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (Per Leg)

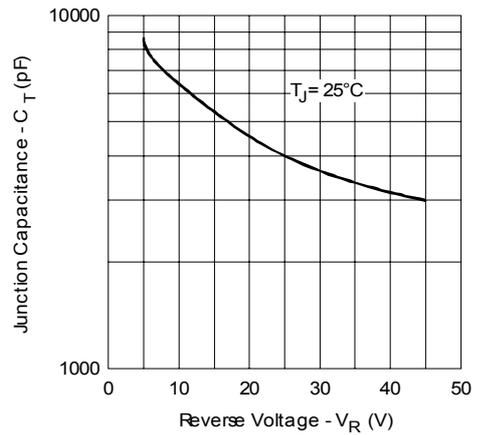


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

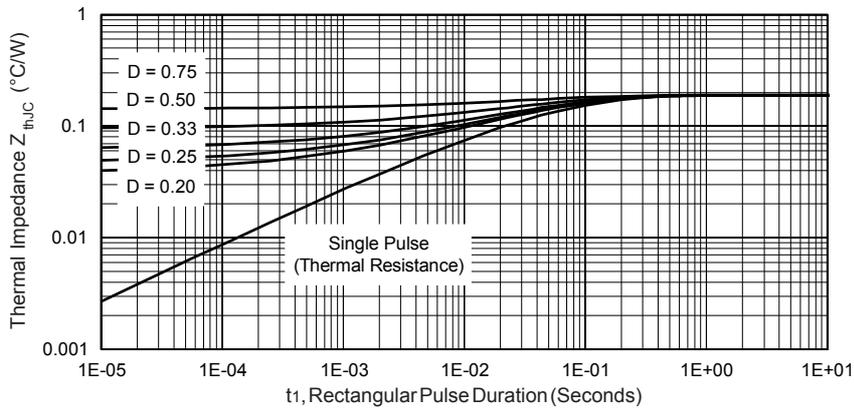


Fig. 4 - Max. Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

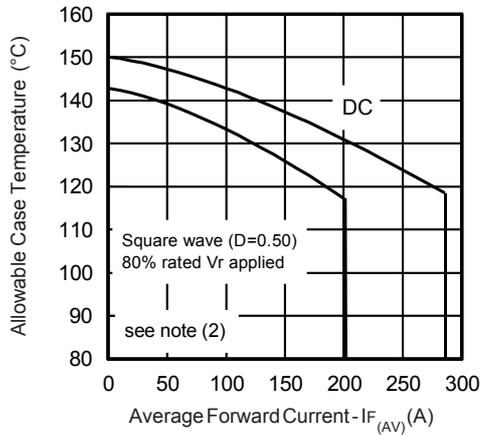


Fig. 5- Max. Allowable Case Temperature Vs. Average Forward Current (Per Leg)

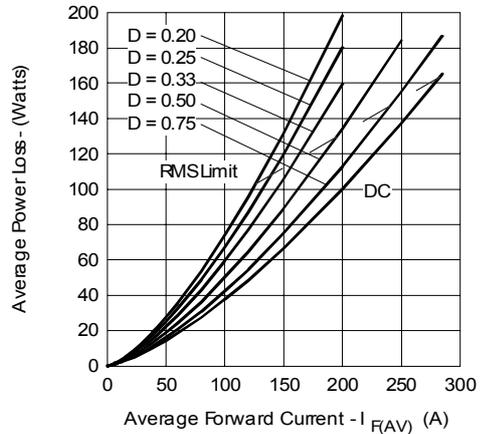


Fig.6- Forward Power Loss Characteristics (Per Leg)

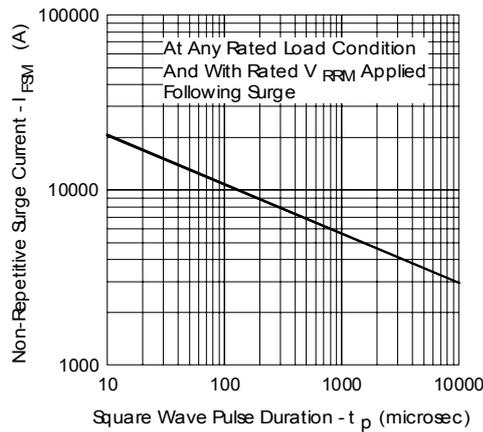


Fig. 7- Max. Non-Repetitive Surge Current (Per Leg)

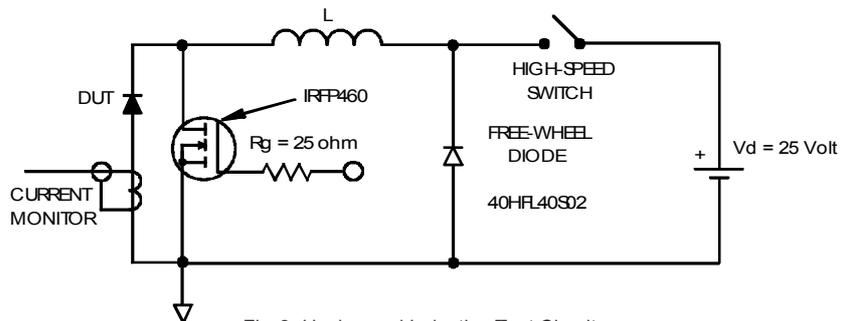


Fig. 8- Unclamped Inductive Test Circuit

- (2) Formula used:  $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$ ;  
 $Pd = \text{Forward Power Loss} = I_{F(AV)} \times V_{FM} @ (I_{F(AV)}/D)$  (see Fig. 6);  
 $Pd_{REV} = \text{Inverse Power Loss} = V_{R1} \times I_R (1-D)$ ;  $I_R @ V_{R1} = 80\% \text{ rated } V_R$



400CNQ045PbF

Bulletin PD-21107 12/05

International  
**IR** Rectifier

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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  
**IR** Rectifier

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12/05

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