4855452 INTERNATIONAL RECTIFIER 55C 05133 D

Data Sheet No. PD-2.072A

T-23-09

INTERNATIONAL RECTIFIER IOR

200CNQ AND 201CNQ SERIES

200 Amp Schottky Center Tap Rectifier Module

Major Ratings and Characteristics

Characteristic		200CNQ	201CNQ	Units
I_O	Rectangular Waveform	200		A
	Sinusoidal Waveform	180		
I_{FSM}	@ 50 Hz	1530	1900	A
	@ 60 Hz	1600	2000	
I^2t	@ 50 Hz	5800	9100	A^2s
	@ 60 Hz	5300	8300	
$I^2\sqrt{t}$		82,000	129,000	$A^2\sqrt{s}$
V_{RWM}		20 to 45	20 to 45	V
T_J		-55 to 150	-55 to 175	°C
C_t @ –5V		5800		pf

Description/Features

- Dual diode; may be paralleled for higher current output.
- Up to 175°C operating junction temperature.
- High current (200A) at high temperature.
- Guard ring reverse protection.
- Guaranteed reverse avalanche.

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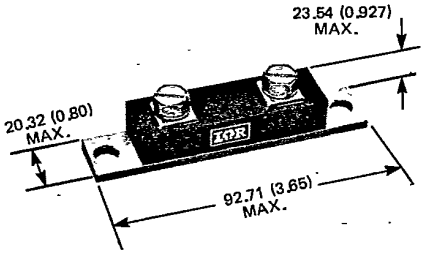
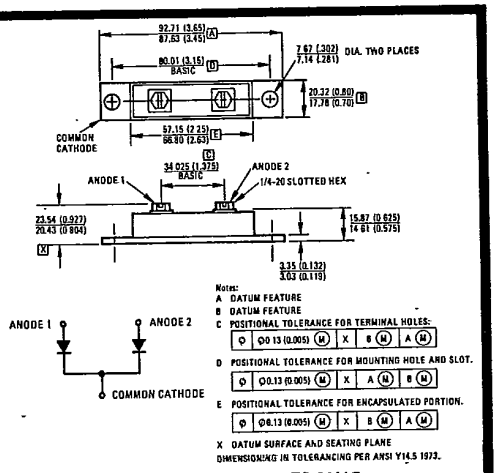
CASE STYLE AND DIMENSIONS





Conforms to JEDEC Outline TO-244AB
Dimensions in Millimeters and (Inches)

200/201 CNQ Series

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VOLTAGE RATINGS

Part Numbers		V_{RWM} – Max. Working Peak Reverse Voltage (V)①②	V_{RRM} – Max. Repetitive Peak Reverse Voltage (V)①③ (t_p = 200 ns Max.)	V_R – Max. Direct Reverse Voltage (V)①④
200CNQ020	201CNQ020	20	24	20
200CNQ030	201CNQ030	30	36	30
200CNQ035	201CNQ035	35	42	35
200CNQ040	201CNQ040	40	48	40
200CNQ045	201CNQ045	45	54	45

① Per circuit element (leg).

② T_C = -55 to 141°C (180° conduction) for 200CNQ series.
T_C = -55 to 169°C (180° conduction) for 201CNQ series.

③ T_C = 0 to 141°C (180° conduction) for 200CNQ series.
T_C = 0 to 169°C (180° conduction) for 201CNQ series.

④ T_C = -55 to 117°C for 200CNQ series.
T_C = -55 to 155°C for 201CNQ series.

ELECTRICAL SPECIFICATIONS

		200CNQ	201CNQ	Units	Conditions
I_O	Max. average output current from center tap circuit	200		A	180°C conduction @ T_C = -55 to 107°C for 200CNQ, T_C = -55 to 133°C for 201CNQ, rectangular waveform
		180			180°C conduction @ T_C = -55 to 105°C for 200CNQ, T_C = -55 to 132°C for 201CNQ, sinusoidal waveform
I_{FSM}	Max. peak one cycle non-repetitive surge current per circuit element (leg)	1530	1900	A	50 Hz half cycle sine wave or 6 ms rectangular pulse — Following any rated load condition. With rated V_{RWM} applied following surge, initial $T_J \leq 150°C$ for 200CNQ, $T_J \leq 175°C$ for 201CNQ.
		1600	2000		60 Hz half cycle sine wave or 5 ms rectangular pulse
		1820	2300		50 Hz half cycle sine wave or 6 ms rectangular pulse — Following any rated load condition. With V_{RWM} = 0 following surge, initial $T_J \leq 150°C$ for 200CNQ, $T_J \leq 175°C$ for 201CNQ.
		1900	2400		60 Hz half cycle sine wave or 5 ms rectangular pulse
I^2t	Max. I^2t for fusing per circuit element (leg)	5800	9100	A^2s	t = 10 ms — With rated V_{RWM} applied following surge, initial $T_J \leq 150°C$ for 200CNQ, $T_J \leq 175°C$ for 201CNQ.
		5300	8300		t = 8.3 ms
I^2t	Max. I^2t for individual leg fusing	8200	12,900	A^2s	t = 10 ms — With V_{RWM} = 0 following surge, initial $T_J \leq 150°C$ for 200CNQ, $T_J \leq 175°C$ for 201CNQ.
		7500	11,700		t = 8.3 ms
$I^2\sqrt{t}$	Max. $I^2\sqrt{t}$ for individual leg fusing ⑤	82,000	129,000	$A^2\sqrt{s}$	t = 0.1 to 10 ms. With V_{RWM} = 0 following surge, $T_J \leq 150°C$ for 200CNQ, $T_J \leq 175°C$ for 201CNQ.
V_{FM}	Max. peak forward voltage per leg	0.72	0.81	V	T_J = 25°C — Rated $I_{F(AV)}$ (200A peak), 180° rectangular waveform.
		0.61	–		T_J = 150°C
		–	0.65		T_J = 175°C
		0.56	0.67		T_J = 25°C, I_{FM} = 100A.

⑤ I^2t for time $t_x = I^2\sqrt{t} \cdot \sqrt{t_x}$.

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ELECTRICAL SPECIFICATIONS (Continued)

		200CNQ	201CNQ	Units	Conditions
I_{RM}	Max. peak reverse current per leg	75	40	mA	$T_J = 25^oC$
		400	90		$T_J = 125^oC$ Max. rated V_{RWM}.
I_{RRM}	Max. repetitive peak reverse current, per leg ⑤	2.0		A	$T_C = 25^oC$, f = 1 kHz. see fig. 15 for test circuit.
C_t	Max. total capacitance, per leg	5800		pF	$T_C = 25^oC$, V_R = 5 VDC @ 100 kHz to 1 MHz test signal.
dv/dt	Max. rate of application of reverse voltage, per leg	1000		V/μs	$T_C = 25^oC$, V_{RM} = rated V_{RWM}.

THERMAL-MECHANICAL SPECIFICATIONS

T_J	Max. operating junction temperature range	-55 to 150	-55 to 175	°C	
T_{stg}	Max. storage temperature range	-55 to 150	-55 to 175	°C	
R_{thJC}	Max. thermal resistance, junction-to-case, DC operation	0.5		deg. C/W	Based on power dissipated in one leg, both legs operating.
	Max. composite thermal resistance, junction-to-case, DC operation	0.25			Based on power dissipated in both legs.
R_{thCS}	Max. thermal resistance case-to-sink	0.1		deg. C/W	Mounting surface flat, smooth, and greased.
T_M	Mounting torque	4 (36)		N • m (lbf-in.)	Adequate hardware required.
T_T	Terminal torque	Min.: 5.6 (50) Max.: 8.5 (75)		N • m (lbf-in.)	
wt	Approximate weight	113 (4.0)		g (oz.)	
	Case style	TO-244AB			JEDEC

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200CNQ Series

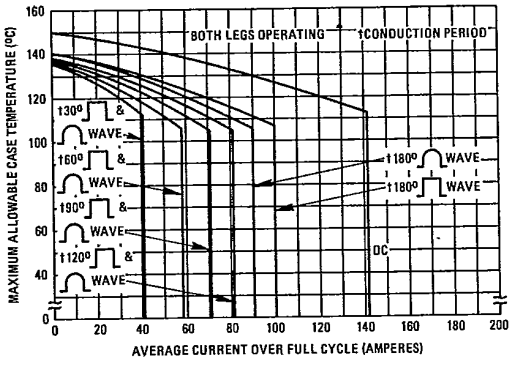

Fig. 1 – Maximum Allowable Case Temperature Vs. Average Forward Current, Per Leg, 200CNQ Series

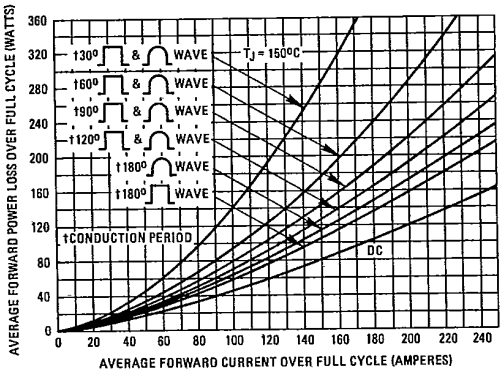

Fig. 2 – Maximum Forward Power Loss Vs. Average Forward Current, Per Leg, 200CNQ Series

200CNQ Series

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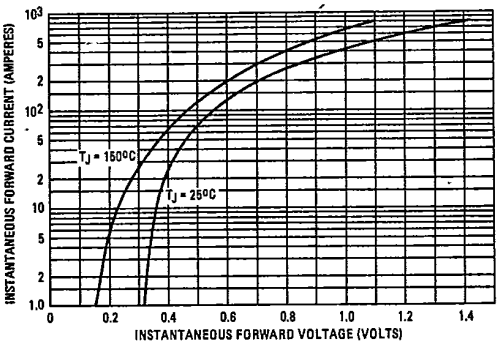

Fig. 3 – Maximum Instantaneous Forward Voltage Vs. Instantaneous Forward Current, Per Leg, 200CNQ Series

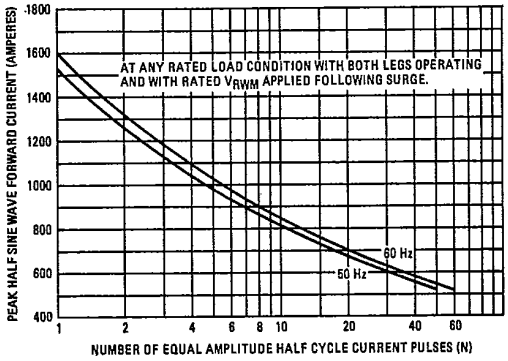

Fig. 4 – Maximum Non-Repetitive Surge Current Vs. Number of Current Pulses, Per Leg, 200CNQ Series

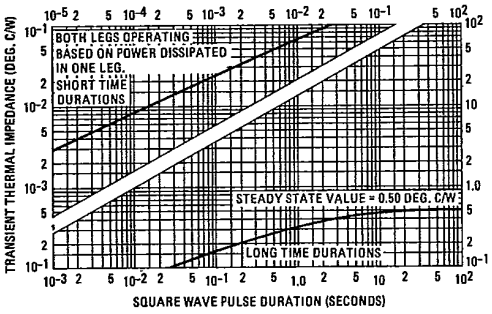

Fig. 5 – Maximum Transient Thermal Impedance, Junction-to-Case Vs. Square Wave Pulse Duration, 200CNQ Series

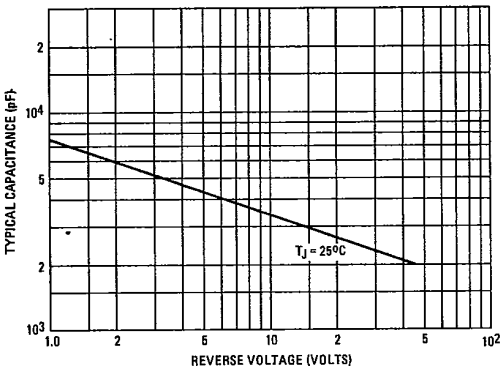

Fig. 6 – Typical Total Capacitance Vs. Reverse Voltage, Per Leg, 200CNQ Series

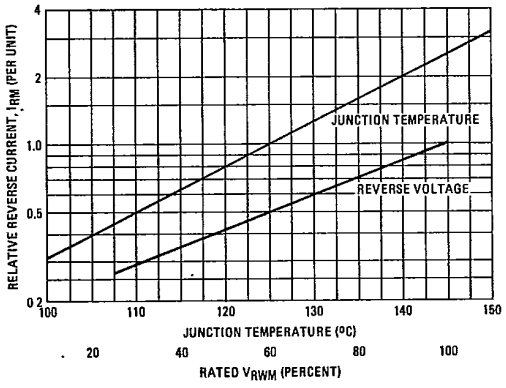

Fig. 7 – Typical Variation of Reverse Current Vs. Junction Temperature and Reverse Voltage, Per Leg, 200CNQ Series

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201CNQ Series

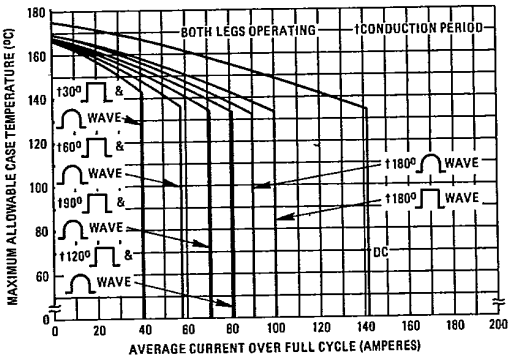

Fig. 8 – Maximum Allowable Case Temperature Vs. Average Forward Current, Per Leg, 201CNQ Series

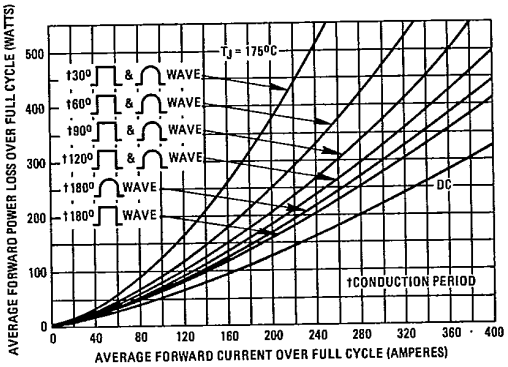

Fig. 9 – Maximum Forward Power Loss Vs. Average Forward Current, Per Leg, 201CNQ Series

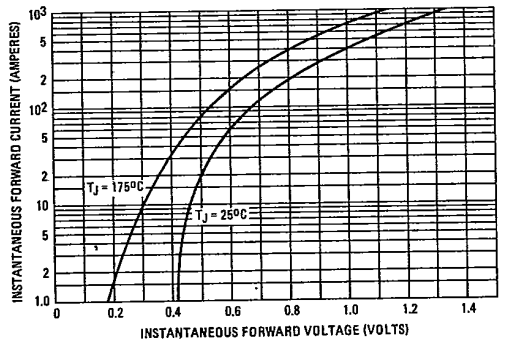

Fig. 10 – Maximum Instantaneous Forward Voltage Vs. Instantaneous Forward Current, Per Leg, 201CNQ Series

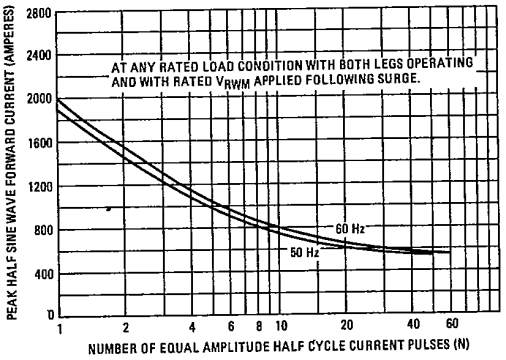

Fig. 11 – Maximum Non-Repetitive Surge Current Vs. Number of Current Pulses, Per Leg, 201CNQ Series

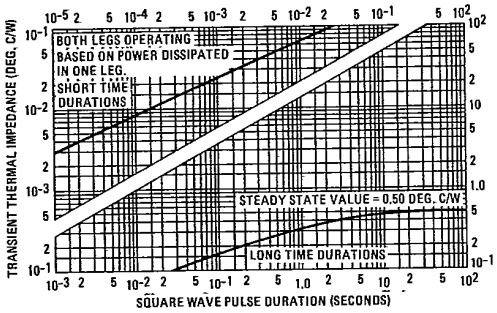

Fig. 12 – Maximum Transient Thermal Impedance, Junction-to-Case Vs. Square Wave Pulse Duration, 201CNQ Series

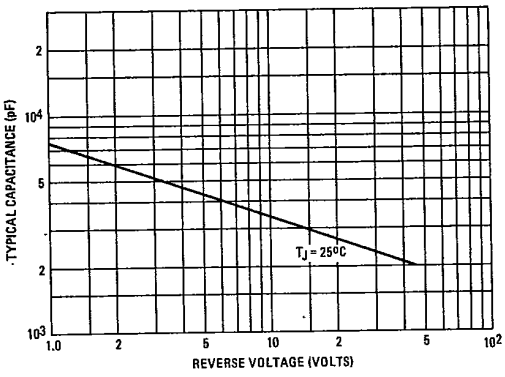

Fig. 13 – Typical Total Capacitance Vs. Reverse Voltage, Per Leg, 201CNQ Series

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201CNQ Series

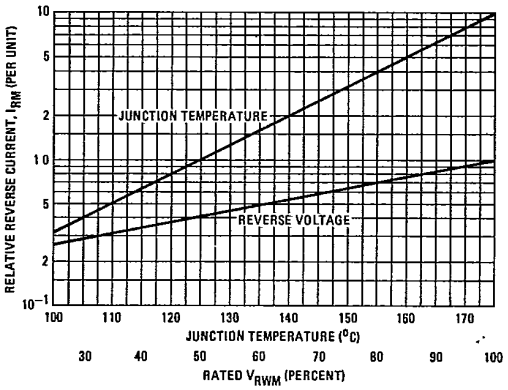

Fig. 14 – Typical Variation of Reverse Current Vs. Junction Temperature and Reverse Voltage, Per Leg, 201CNQ Series

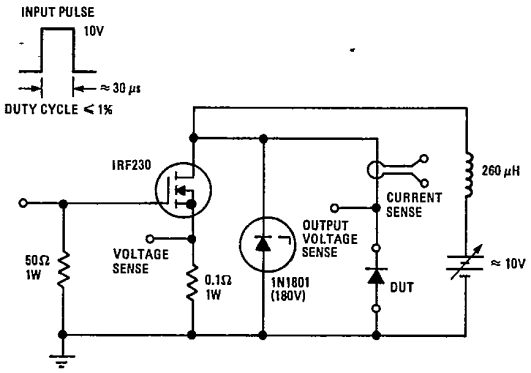

Fig. 15 – I_{RRM} Test Circuit