

Bulletin PD-21007 01/05

International
IR Rectifier

83CNQ...APbF
83CNQ...ASMPbF

SCHOTTKY RECTIFIER
New GenIII D-61 Package

80 Amp

Major Ratings and Characteristics

Characteristics	Values	Units
$I_{F(AV)}$ Rectangular waveform	80	A
V_{RRM} range	80, 100	V
I_{FSM} @ $t_p = 5 \mu s$ sine	7000	A
V_F @ 40 Apk, $T_J = 125^\circ C$ (per leg)	0.67	V
T_J range	-55 to 175	$^\circ C$

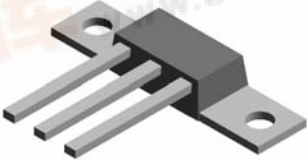
Description/ Features

The 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 $175^\circ C$ junction temperature. Typical applications are in switching power supplies, converters, free-wheeling diodes, and reverse battery protection.

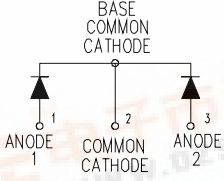
- $175^\circ C$ T_J operation
- Center tap module
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- New fully transfer-mold low profile, small footprint, high current package
- Through-hole versions are currently available for use in Lead-Free applications ("PbF" suffix)

Case Styles

83CNQ...APbF



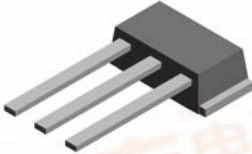
BASE
COMMON
CATHODE



ANODE 1
COMMON CATHODE 2
ANODE 3

D61-8

83CNQ...ASMPbF



ANODE 1
COMMON CATHODE 2
ANODE 3



D61-8-SM



Voltage Ratings

Part number	83CNQ080A..	83CNQ100A..
V_R Max. DC Reverse Voltage (V)	80	100
V_{RWM} Max. Working Peak Reverse Voltage (V)		

Absolute Maximum Ratings

Parameters		83CNQ	Units	Conditions		
I _{F(AV)}	Max. Average Forward Current * See Fig. 5	80	A	50% duty cycle @ T _C = 132 °C, rectangular wave form		
I _{FSM}	Max. Peak One Cycle Non-Repetitive Surge Current (Per Leg) * See Fig. 7	7000	A	5μs Sine or 3μs Rect. pulse	Following any rated load condition and with rated V _{RRM} applied	
		720		10ms Sine or 6ms Rect. pulse		
E _{AS}	Non-Repetitive Avalanche Energy (Per Leg)	15	mJ	T _J = 25 °C, I _{AS} = 1 Amps, L = 30 mH		
I _{AR}	Repetitive Avalanche Current (Per Leg)	1	A	Current decaying linearly to zero in 1 μsec Frequency limited by T _J max. V _A = 1.5 x V _R typical		

Electrical Specifications

Parameters		83CNQ	Units	Conditions	
V _{FM}	Max. Forward Voltage Drop (Per Leg) * See Fig. 1 (1)	0.81	V	@ 40A	T _J = 25 °C
		1.00	V	@ 80A	
		0.67	V	@ 40A	T _J = 125 °C
		0.82	V	@ 80A	
I _{RM}	Max. Reverse Leakage Current (Per Leg) * See Fig. 2 (1)	1.5	mA	T _J = 25 °C	V _R = rated V _R
		35	mA	T _J = 125 °C	
C _T	Max. Junction Capacitance (Per Leg)	1400	pF	V _R = 5V _{DC} ; (test signal range 100Khz to 1Mhz) 25°C	
L _S	Typical Series Inductance (Per Leg)	5.5	nH	Measured lead to lead 5mm from package body	
dv/dt	Max. Voltage Rate of Change (Rated V _O)	10000	V/ μs		

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

Thermal-Mechanical Specifications

Parameters	83CNQ	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)	0.85	$^\circ\text{C/W}$	DC operation * See Fig. 4
R_{thJC} Max. Thermal Resistance Junction to Case (Per Package)	0.42	$^\circ\text{C/W}$	DC operation
R_{thCS} Typical Thermal Resistance, Case to Heatsink (D61-8 Only)	0.30	$^\circ\text{C/W}$	Mounting surface, smooth and greased Device flatness < 5 mils
wt Approximate Weight	7.8 (0.28)	g (oz.)	
T Mounting Torque	Min. 12 (10) Max. 24 (20)	Kg-cm (lbf-in)	(*)

(*) Recommended hardware 3M stainless screw

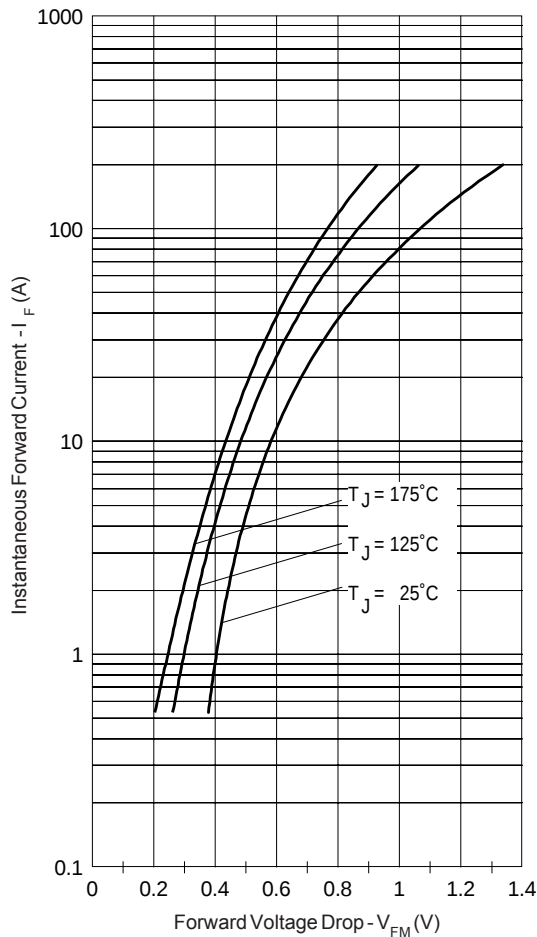


Fig. 1 - Max. Forward Voltage Drop Characteristics (Per Leg)

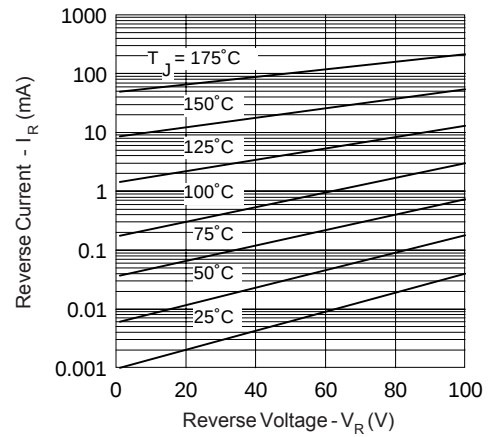


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (Per Leg)

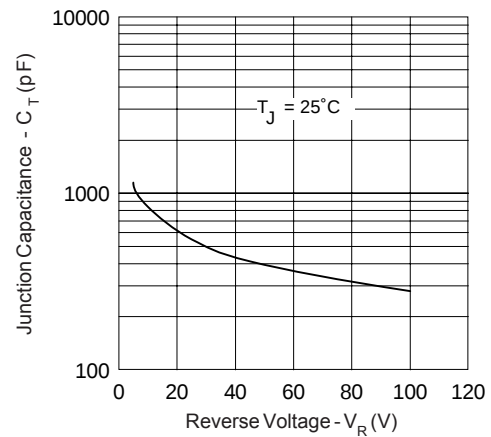


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

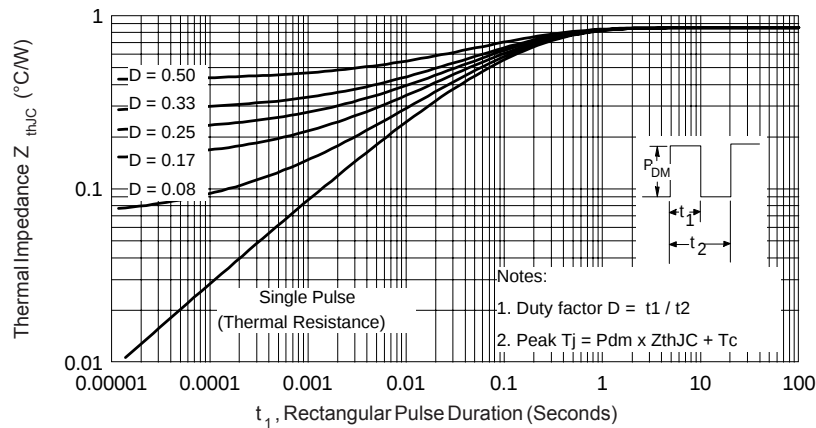


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics (Per Leg)

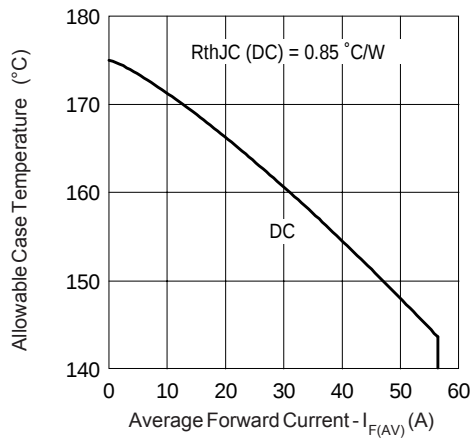


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current (Per Leg)

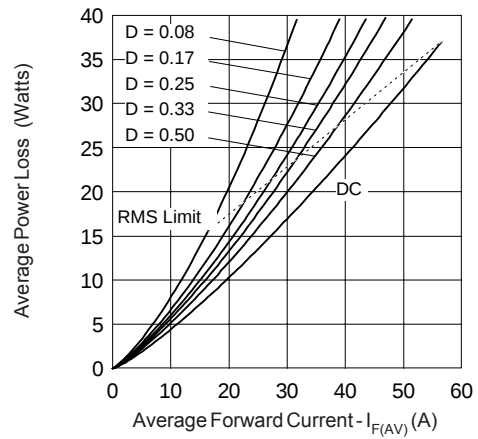


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

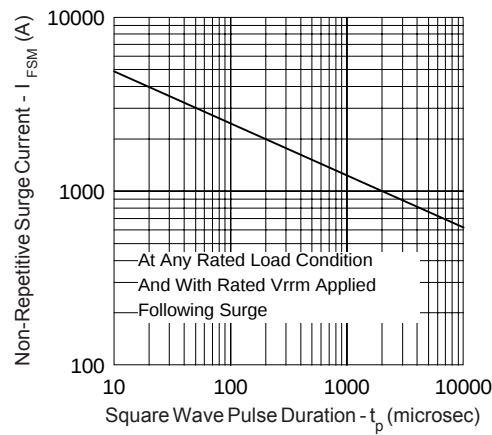


Fig. 7 - Max. Non-Repetitive Surge Current (Per Leg)

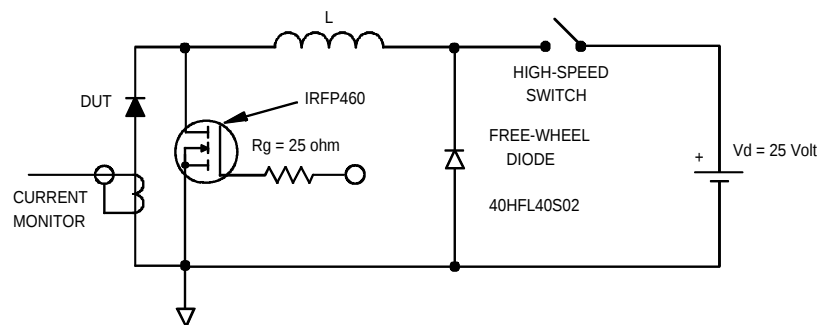
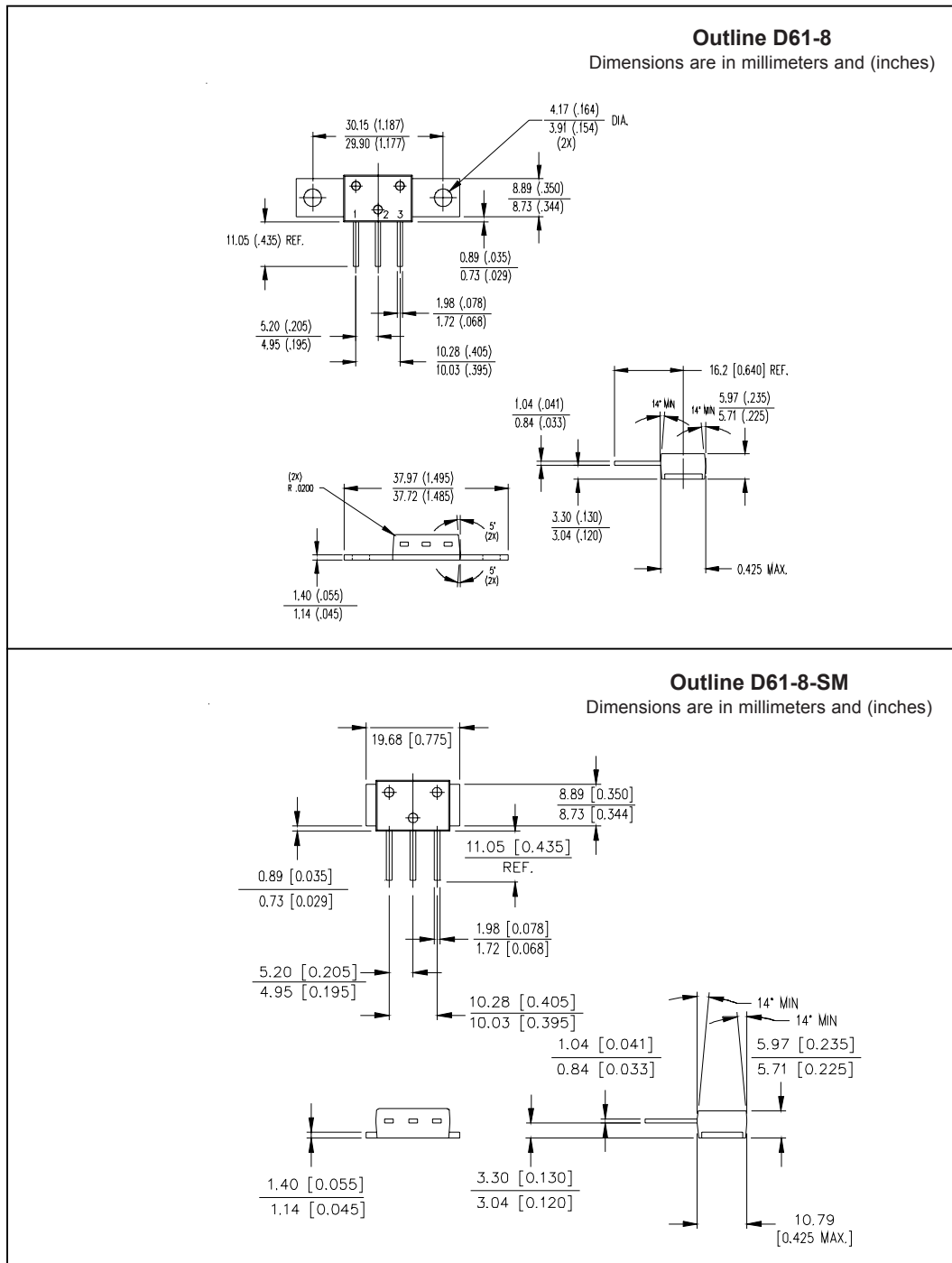


Fig. 8 - Unclamped Inductive Test Circuit

Outline Table

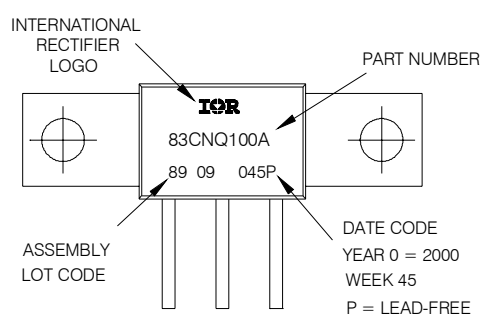


Marking Information

Outline D61-8

EXAMPLE: THIS IS A 83CNQ100 WITH
LOT CODE 89 09
ASSEMBLED ON WW 45, 2000

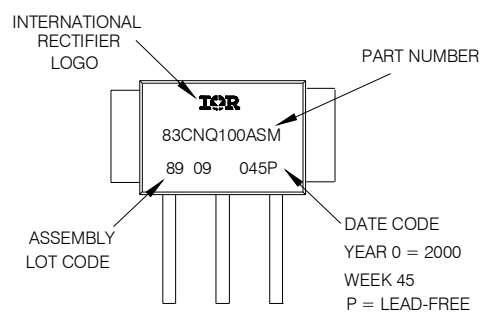
Note: "P" in assembly line
position indicates "Lead-Free"



Outline D61-8-SM

EXAMPLE: THIS IS A 83CNQ100ASM WITH
LOT CODE 89 09
ASSEMBLED ON WW 45, 2000

Note: "P" in assembly line
position indicates "Lead-Free"



83CNQ100A

* This model has been developed by *
 * Wizard SPICE MODEL GENERATOR (1999) *
 * (International Rectifier Corporation) *
 * contains Proprietary Information *

* SPICE Model Diode is composed by a *
 * simple diode plus paralalled VCG2T *

.SUBCKT 83CNQ100A ANO CAT

D1 ANO 1 DMOD (0.20831)

*Define diode model

.MODEL DMOD D(IS=3.91765102575707E-04A,N=1.6412007115037,BV=110V,
 + IBV=1.66611874283115A,RS= 0.001083212,CJO=1.31909764291715E-08,
 + VJ=1.04145964983498,XTI=2, EG=0.757359996913038)

*Implementation of VCG2T

VX 1 2 DC 0V

R1 2 CAT TRES 1E-6

.MODEL TRES RES(R=1,TC1=-5.06642501757023)

GP1 ANO CAT VALUE={-ABS(I(VX))*(EXP((((2.558893E-02/-5.066425)*(V(2,CAT)*1E6)/(I(VX)+1E-6)-
 1)))+1)*3.120336E-03*ABS(V(ANO,CAT)))-1}}

.ENDS 83CNQ100A

Thermal Model Subcircuit

.SUBCKT 83CNQ100A 5 1

CTHERM1	5	4	8.75E-04
CTHERM2	4	3	1.99E+00
CTHERM3	3	2	2.04E+01
CTHERM4	2	1	2.41E+02

RTHERM1	5	4	1.00E-07
RTHERM2	4	3	4.51E-01
RTHERM1	3	2	3.08E-01
RTHERM1	2	1	7.27E-02

.ENDS 83CNQ100A

Ordering Information Table

Device Code

83	C	N	Q	100	A	PbF
1	2	3	4	5	6	7

- 1** - Current Rating (80A)
- 2** - Circuit Configuration
C = Common Cathode
- 3** - Package
N = D-61
- 4** - Schottky "Q" Series
- 5** - Voltage Ratings
- 6** -
 - A = D-61-8 package style
 - ASM = D-61-8-SM package style
- 7** -
 - none = Standard Production
 - PbF = Lead-Free

080 = 80V

100 = 100V

Standard pack quantity: A = 10 pieces

ASM = 20 pieces

080 = 80V
100 = 100V

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

IR WORLD HEADQUARTERS: 233 Kansas St., El Segundo, California 90245, USA Tel: (310) 252-7105
 TAC Fax: (310) 252-7309
 Visit us at www.irf.com for sales contact information. 01/05