

International  
**IR** Rectifier

88CNQ060APbF  
 88CNQ060ASMPbF

SCHOTTKY RECTIFIER  
*New GenIII D-61 Package*

80 Amp

#### Major Ratings and Characteristics

Characteristics	Values	Units
$I_{F(AV)}$ Rectangular waveform	80	A
$V_{RRM}$	60	V
$I_{FSM}$ @tp = 5 $\mu$ s sine	5000	A
$V_F$ @40 Apk, $T_J = 125^\circ\text{C}$ (per leg)	0.56	V
$T_J$ range	-55 to 150	$^\circ\text{C}$

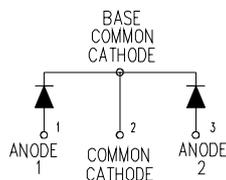
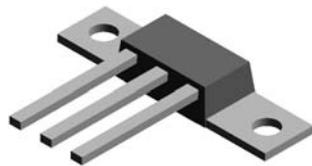
#### Description/ Features

The center tap Schottky rectifier module has been optimized for very low forward voltage drop, with moderate leakage. The proprietary barrier technology allows for reliable operation up to 150°C junction temperature. Typical applications are in switching power supplies, converters, free wheeling diodes, and reverse battery protection.

- 150  $^\circ\text{C}$   $T_J$  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)

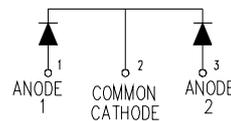
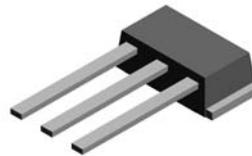
#### Case Styles

88CNQ060APbF



**D61-8**

88CNQ060ASMPbF



**D61-8-SM**

## Voltage Ratings

Part number	88CNQ060A..
$V_R$ Max. DC Reverse Voltage (V)	60
$V_{RWM}$ Max. Working Peak Reverse Voltage (V)	

## Absolute Maximum Ratings

Parameters	88CNQ	Units	Conditions
$I_{F(AV)}$ Max. Av. Forward Current (Per Leg) See Fig. 5 (Per Device)	40 80	A	50% duty cycle @ $T_C = 120^\circ\text{C}$ , rectangular wave form (Rated $V_R$ )
$I_{FSM}$ Max. Peak One Cycle Non-Repetitive Surge Current (Per Leg) See Fig. 7	5000 600	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 $V_r$ applied
$E_{AS}$ Non-Repetitive Avalanche Energy (Per Leg)	75	mJ	$T_J = 25^\circ\text{C}$ , $I_{AS} = 1$ Amps, $L = 0.57$ mH
$I_{AR}$ Repetitive Avalanche Current (Per Leg)	1.0	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	88CNQ	Units	Conditions
$V_{FM}$ Max. Forward Voltage Drop (Per Leg) (1)	0.58	V	@ 40A $T_J = 25^\circ\text{C}$
	0.77	V	@ 80A
	0.56	V	@ 40A $T_J = 125^\circ\text{C}$
	0.67	V	@ 80A
$I_{RM}$ Typical Reverse Leakage Current (Per Leg) See Fig. 2 (1)	0.64	mA	$T_J = 25^\circ\text{C}$ $V_R = \text{rated } V_R$
	240	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)	5.5	nH	Measured lead to lead 5mm from package body
$dv/dt$ Max. Voltage Rate of Change (Rated $V_R$ )	10000	V/ $\mu\text{s}$	

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

## Thermal-Mechanical Specifications

Parameters	88CNQ	Units	Conditions
$T_J$ Max. Junction Temperature Range	-55 to 150	$^\circ\text{C}$	
$T_{stg}$ Max. Storage Temperature Range	-55 to 150	$^\circ\text{C}$	
$R_{thJC}$ Max. Thermal Resistance Junction to Case (Per Leg)	0.85	$^\circ\text{C}/\text{W}$	DC operation
$R_{thJC}$ Max. Thermal Resistance Junction to Case (Per Package)	0.42	$^\circ\text{C}/\text{W}$	DC operation
$R_{thCS}$ Typical Thermal Resistance, Case to Heatsink (D61-8 Only)	0.30	$^\circ\text{C}/\text{W}$	Mounting surface, smooth and greased Device flatness < 5 mils
wt Approximate Weight	7.8(0.28)	g(oz.)	
T Mounting Torque (D61-8 Only)	Min.	40(35)	Kg-cm (lbf-in)
	Max.	58(50)	

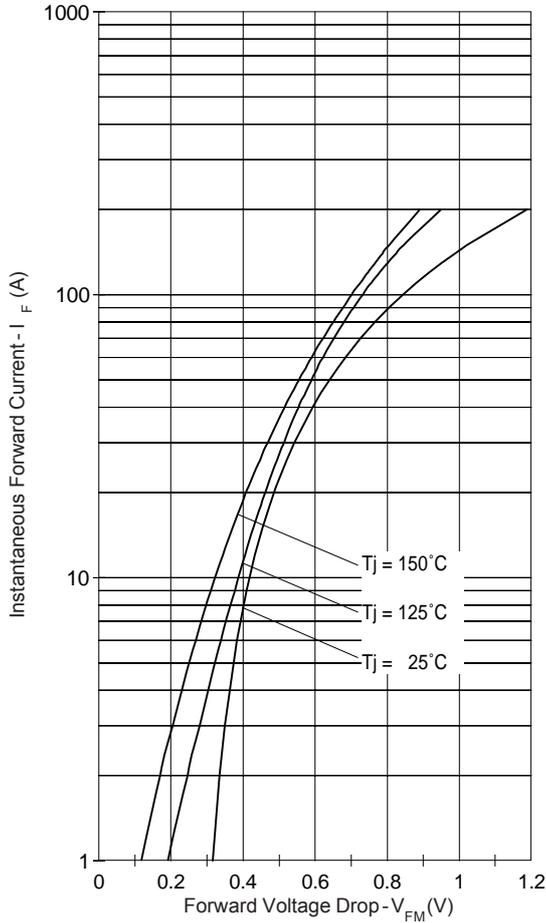


Fig. 1 - Max. Forward Voltage Drop Characteristics (Per Leg)

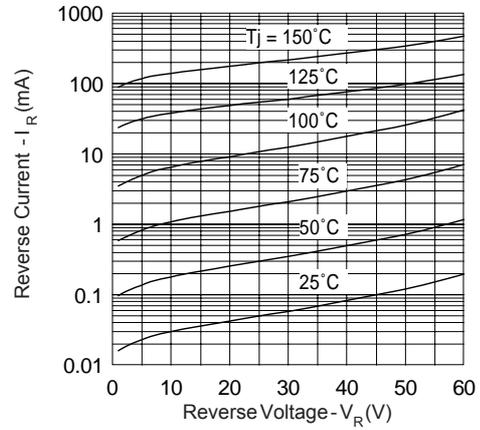


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (Per Leg)

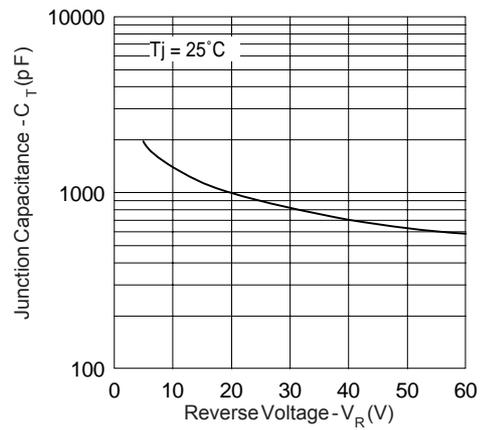


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

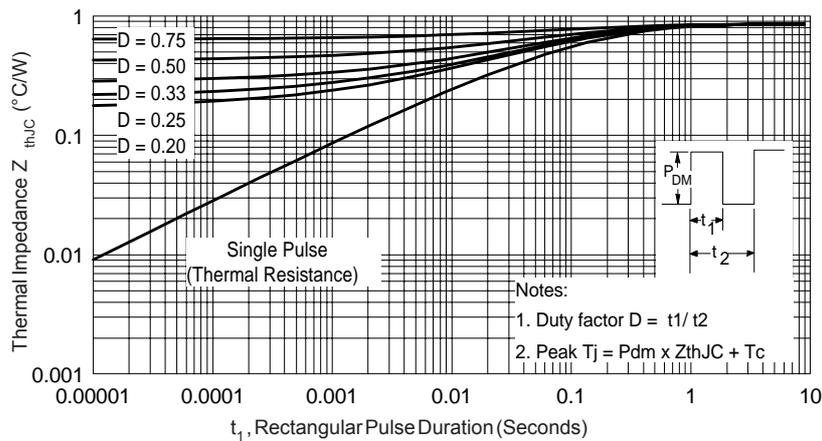


Fig. 4 - Max. Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

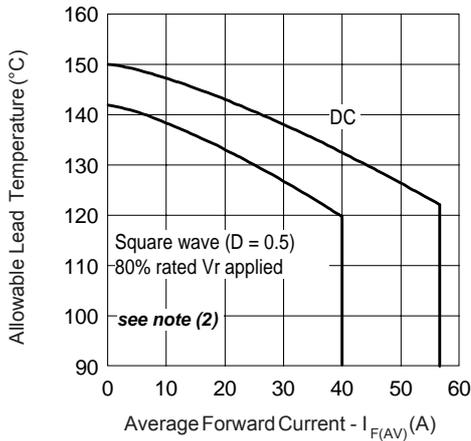


Fig. 5 - Maximum Average Forward Current Vs. Allowable Lead Temperature

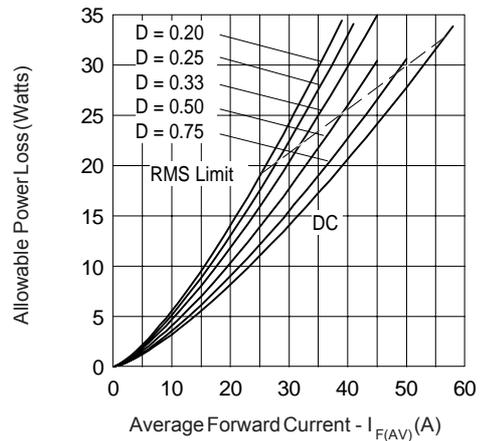


Fig. 6 - Maximum Average Forward Dissipation Vs. Average Forward Current

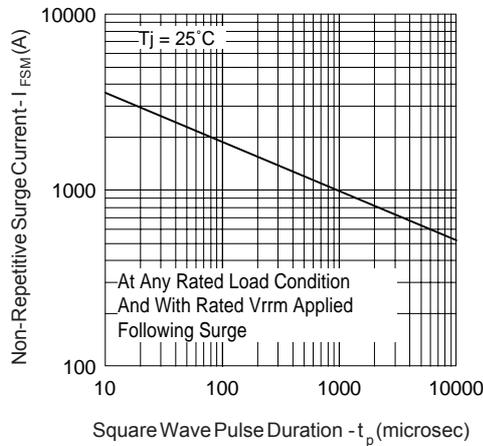
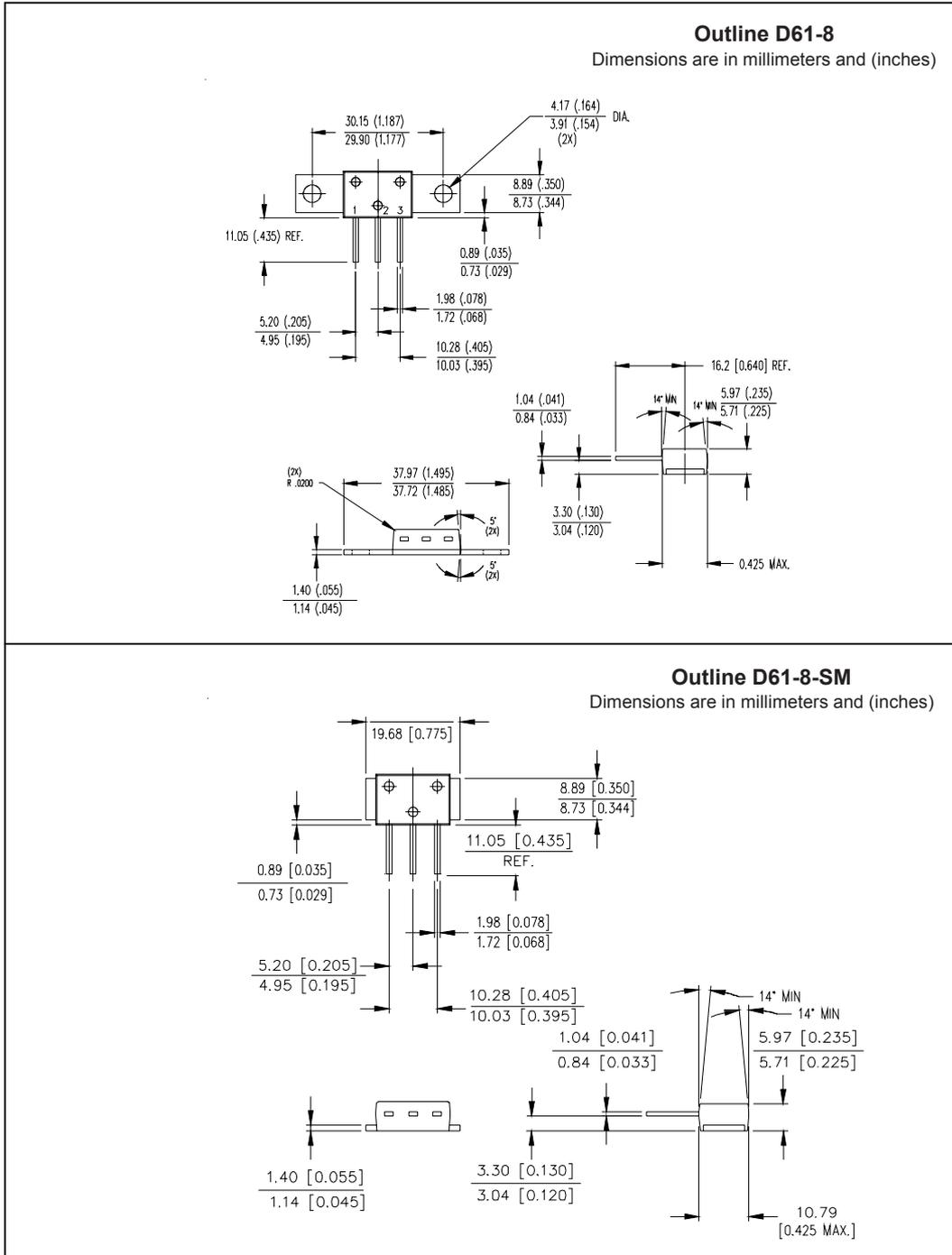


Fig. 7 - Maximum Peak Surge Forward Current Vs. Pulse Duration

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

Outline Table



**Outline D61-8-SM**  
 Dimensions are in millimeters and (inches)

Part Marking Information

**D61-8**

EXAMPLE: THIS IS A 88CNQ060A WITH  
LOT CODE 89 09  
ASSEMBLED ON WW 45, 2000

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

INTERNATIONAL RECTIFIER LOGO

PART NUMBER

88CNQ060A

89 09 045P

ASSEMBLY LOT CODE

DATE CODE  
YEAR 0 = 2000  
WEEK 45  
P = LEAD-FREE

**D61-8-SM**

EXAMPLE: THIS IS A 88CNQ060ASM WITH  
LOT CODE 89 09  
ASSEMBLED ON WW 45, 2000

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

INTERNATIONAL RECTIFIER LOGO

PART NUMBER

88CNQ060ASM

89 09 045P

ASSEMBLY LOT CODE

DATE CODE  
YEAR 0 = 2000  
WEEK 45  
P = LEAD-FREE

Ordering Information Table

Device Code	
88	C
N	Q
060	A
PbF	
①	②
③	④
⑤	⑥
⑦	
<b>1</b>	- Current Rating (80A)
<b>2</b>	- Circuit Configuration C = Common Cathode
<b>3</b>	- Package N = D-61
<b>4</b>	- Schottky "Q" Series
<b>5</b>	- Voltage Rating (060 = 60V)
<b>6</b>	- <ul style="list-style-type: none"> <li>• A = D-61-8 package style</li> <li>• ASM = D-61-8-SM package style</li> </ul>
<b>7</b>	- <ul style="list-style-type: none"> <li>• none = Standard Production</li> <li>• PbF = Lead-Free</li> </ul>
Standard pack quantity: A = 10 pieces ASM = 20 pieces	

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.