Bulletin PD-20046 rev. C 07/02

International
IOR Rectifier

89CNQ...A Series

SCHOTTKY RECTIFIER

New GenIII D-61 Package

80 Amp

Major Ratings and Characteristics

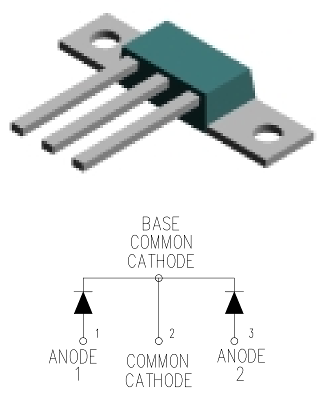
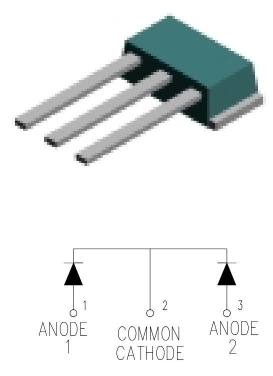
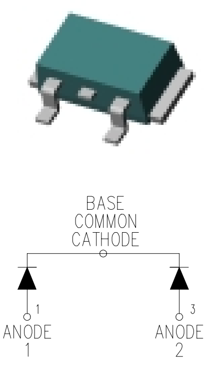
Characteristics	89CNQ...A	Units
$I_{F(AV)}$ Rectangular waveform	80	A
V_{RRM}	135 to 150	V
I_{FSM} @ tp = 5 μs sine	4300	A
V_F @ 40 Apk, T_J = 125 °C (per leg)	0.69	V
T_J range	- 55 to 175	°C

Description/Features

The 89CNQ...A 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 175°C junction temperature. Typical applications are in switching power supplies, converters, free wheeling diodes, and reverse battery protection.

- 175 °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*

Case Styles

89CNQ...A	89CNQ...ASM	89CNQ...ASL
		
D61-8	**D61-8-SM**	**D61-8-SL**

Voltage Ratings

	Part number	89CNQ135A	89CNQ150A
V_R	Max. DC Reverse Voltage (V)	135	150
V_{RWM}	Max. Working Peak Reverse Voltage (V)		

Absolute Maximum Ratings

	Parameters		89CNQ	Units	Conditions	
$I_{F(AV)}$	Max. Av. Forward Current (Per Leg)		40	A	50% duty cycle @ T_C = 130°C, rectangular wave form	
	See Fig. 5	(Per Device)	80		(Rated V_R)	
I_{FSM}	Max. Peak One Cycle Non-Repetitive		4300	A	5µs Sine or 3µs Rect. pulse	Following any rated load condition and with rated Vr applied
	Surge Current (Per Leg)	See Fig. 7	500		10ms Sine or 6ms Rect. pulse	
E_{AS}	Non-Repetitive Avalanche Energy (Per Leg)		9	mJ	T_J = 25 °C, I_{AS} = 1 Amps, L = 18 mH	
I_{AR}	Repetitive Avalanche Current (Per Leg)		1.0	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	89CNQ	Units	Conditions	
V_{FM}	Max. Forward Voltage Drop	0.99	V	@ 40A	T_J = 25 °C
	(Per Leg) See Fig. 1 (1)	1.14	V	@ 80A	
		0.69	V	@ 40A	T_J = 125 °C
		0.78	V	@ 80A	
I_{RM}	Typical Reverse Leakage Current	1.5	mA	T_J = 25 °C	V_R = rated V_R
	(Per Leg) See Fig. 2 (1)	21	mA	T_J = 125 °C	
C_T	Max. Junction Capacitance (Per Leg)	980	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_R)	10000	V/ µs		

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

Thermal-Mechanical Specifications

	Parameters		89CNQ	Units	Conditions
T_J	Max. Junction Temperature Range		-55 to 175	°C	
T_{stg}	Max. Storage Temperature Range		-55 to 175	°C	
R_{thJC}	Max. Thermal Resistance Junction to Case (Per Leg)		0.85	°C/W	DC operation
R_{thJC}	Max. Thermal Resistance Junction to Case (Per Package)		0.42	°C/W	DC operation
R_{thCS}	Typical Thermal Resistance, Case to Heatsink **(D61-8 Only)**		0.30	°C/W	Mounting surface , smooth and greased Device flatness < 5 mils
wt	Approximate Weight		7.8 (0.28)	g (oz.)	
T	Mounting Torque	Min.	40 (35)	Kg-cm (lbf-in)	
	(D61-8 Only)	Max.	58 (50)		

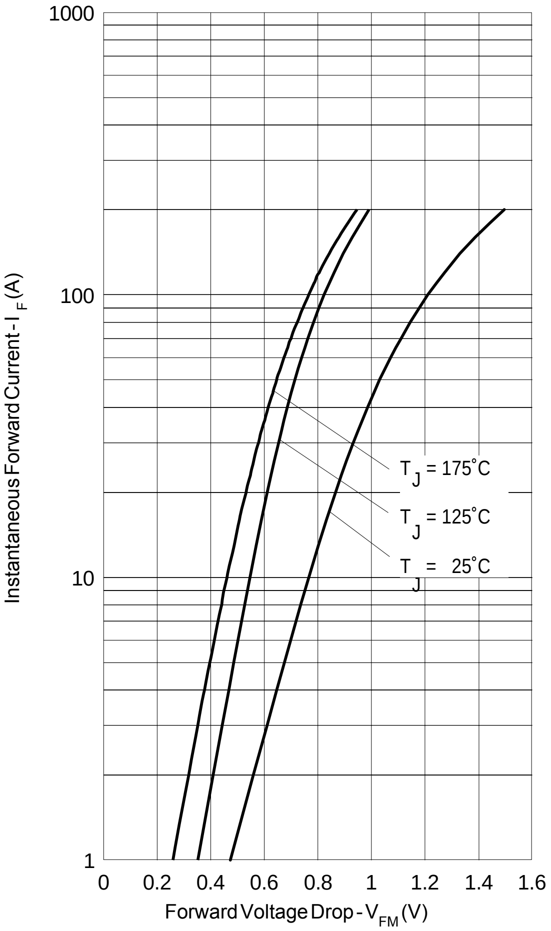


Fig. 1 - Max. Forward Voltage Drop Characteristics (Per Leg)

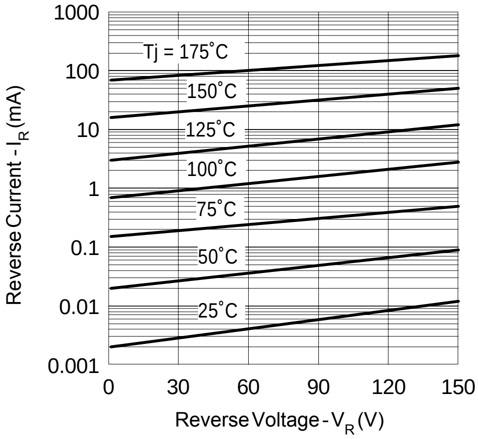


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (Per Leg)

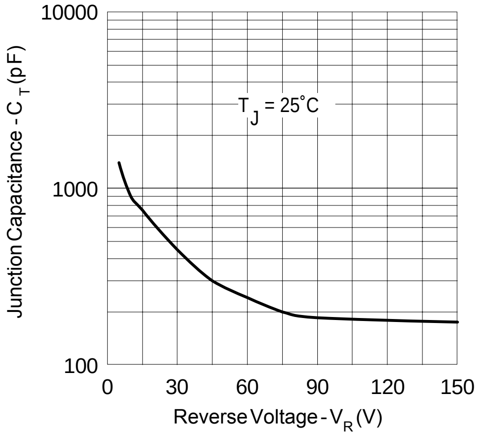


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

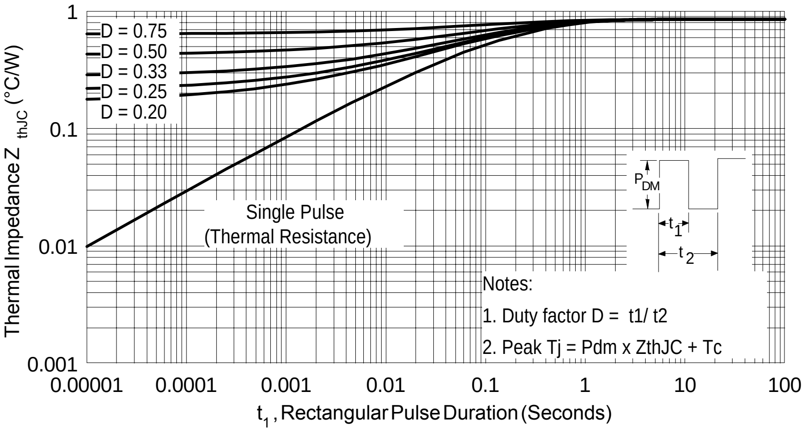


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics (Per Leg)

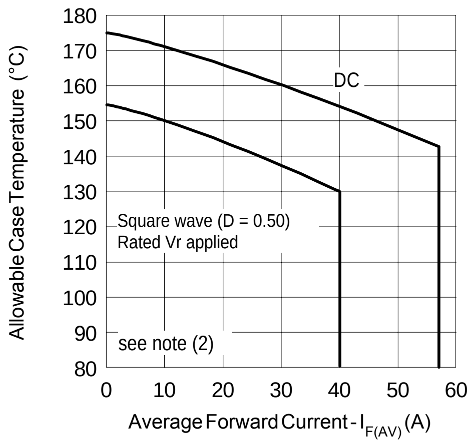


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current (Per Leg)

Average Power Loss (Watts)

Average Forward Current - $I_{F(AV)}$ (A)

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

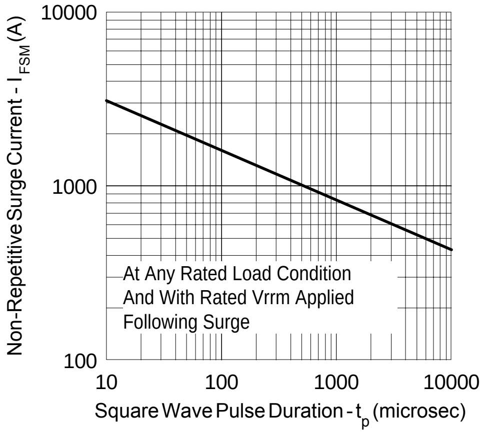


Fig. 7 - Max. Non-Repetitive Surge Current (Per Leg)

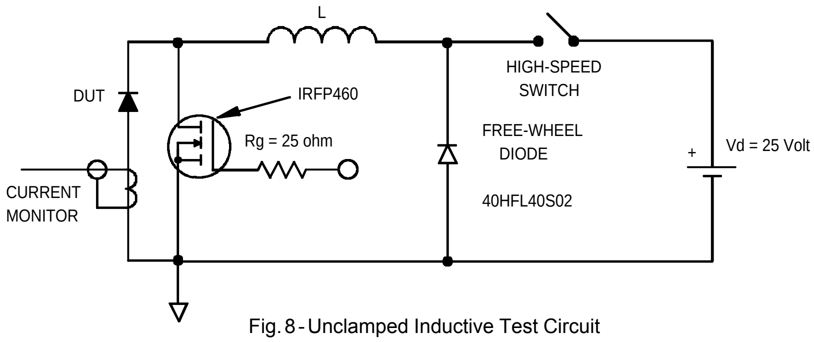


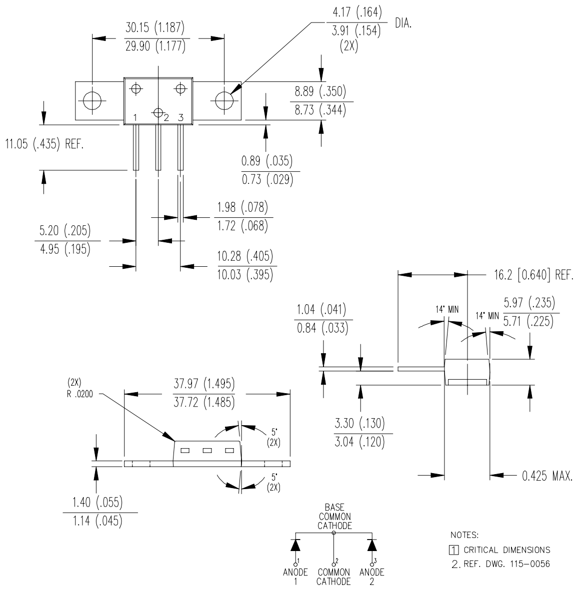
Fig. 8 - Unclamped Inductive Test Circuit

(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 = $V_{R1} \times I_R (1 - D)$; I_R @ V_{R1} = Rated V_R

Outline Table

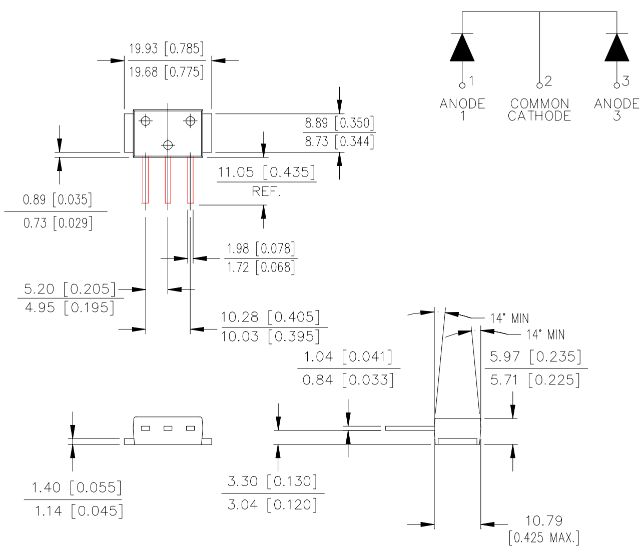
Outline D61-8

Dimensions are in millimeters and (inches)



Outline D61-8-SM

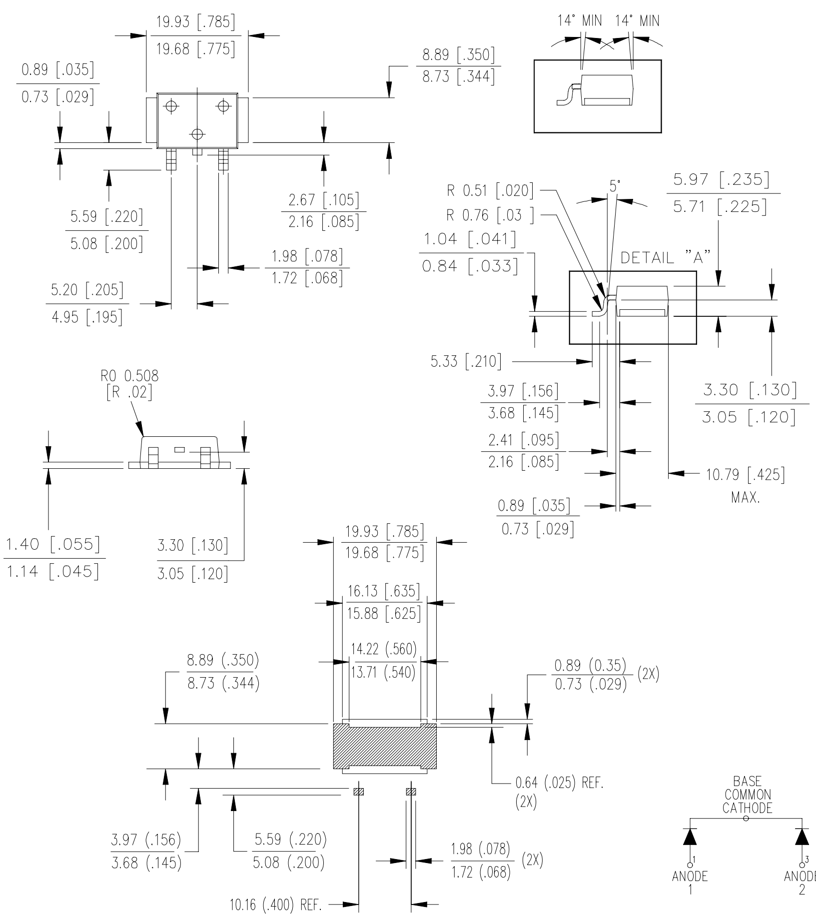
Dimensions are in millimeters and (inches)



Outline Table

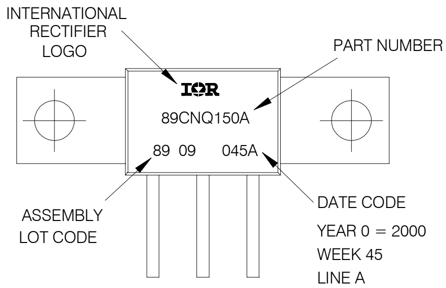
Outline D61-8-SL

Dimensions are in millimeters and (inches)



Part Marking Information

EXAMPLE: THIS IS A 89CNQ150A WITH
LOT CODE 89 09
ASSEMBLED ON WW 45, 2000
IN THE ASSEMBLY LINE "A"



D61-8

EXAMPLE: THIS IS A 89CNQ150ASM WITH
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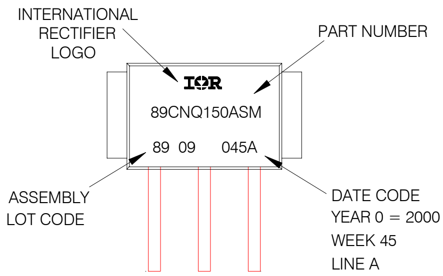
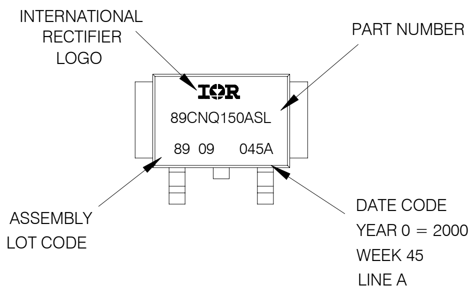


D61-8-SM

EXAMPLE: THIS IS A 89CNQ150ASL WITH
LOT CODE 89 09
ASSEMBLED ON WW 45, 2000
IN THE ASSEMBLY LINE "A"



D61-8-SL

Data and specifications subject to change without notice.
This product has been designed and qualified for Industrial Level.
Qualification Standards can be found on IR's Web site.

International IOR Rectifier

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