

International
IR Rectifier

PD-2.495 rev. A 09/99

89CNQ.. Series

SCHOTTKY RECTIFIER

80 Amp

Major Ratings and Characteristics

Characteristics	89CNQ...	Units
$I_{F(AV)}$ Rectangular waveform	80	A
V_{RRM}	135 to 150	V
I_{FSM} @ $t_p=5\mu s$ sine	5000	A
V_F @ 40 Apk, $T_J=125^\circ C$ (per leg)	0.69	V
T_J range	-55 to 175	$^\circ C$

Description/Features

The 89CNQ 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 $^\circ C$ 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
- Low profile, small footprint, high current package

Case Styles

89CNQ...	89CNQ...SM	89CNQ...SL
		
D61-8	D61-8-SM	D61-8-SL



Voltage Ratings

Part number	89CNQ135	89CNQ150
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) See Fig. 5 (Per Device)	40 80	A	50% duty cycle @ $T_C = 130^\circ\text{C}$, rectangular waveform (Rated V_R)
I_{FSM} Max. Peak One Cycle Non-Repetitive Surge Current (Per Leg) See Fig. 7	5000 590	A	5 μs Sine or 3 μs Rect. pulse 10ms Sine or 6ms Rect. pulse
E_{AS} Non-Repetitive Avalanche Energy (Per Leg)	290	mJ	$T_J = 25^\circ\text{C}$, $I_{AS} = 1$ 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. $V_A = 1.5 \times V_R$ typical

Electrical Specifications

Parameters	89CNQ	Units	Conditions
V_{FM} Max. Forward Voltage Drop (Per Leg) See Fig. 1 (1)	0.99	V	@ 40A $T_J = 25^\circ\text{C}$
	1.14	V	@ 80A
	0.69	V	@ 40A $T_J = 125^\circ\text{C}$
	0.78	V	@ 80A
I_{RM} Typical Reverse Leakage Current (Per Leg) See Fig. 2 (1)	1.5	mA	$T_J = 25^\circ\text{C}$ $V_R = \text{rated } V_R$
	21	mA	$T_J = 125^\circ\text{C}$
C_T Max. Junction Capacitance (Per Leg)	866	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)	10,000	V/ μs	

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

Thermal-Mechanical Specifications

Parameters	89CNQ	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
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
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)		

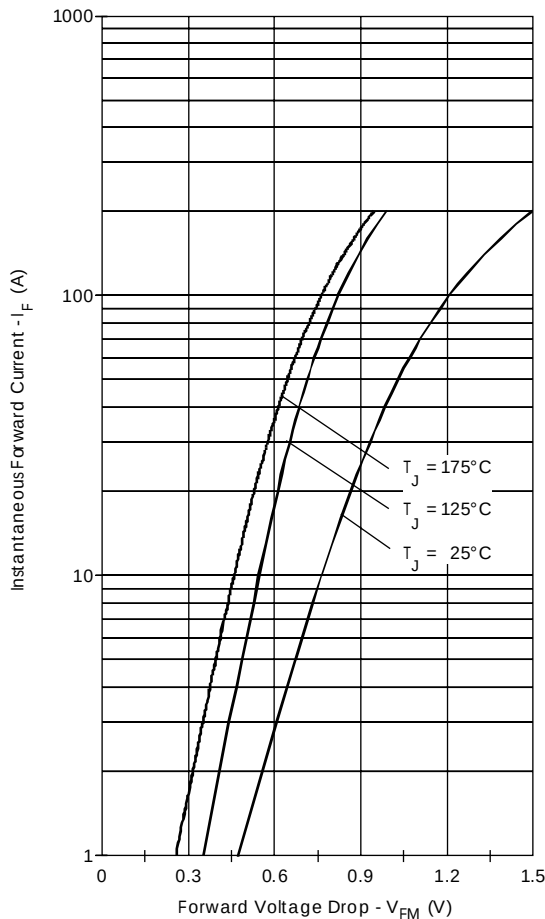


Fig. 1 - Max. Forward Voltage Drop Characteristics (PerLeg)

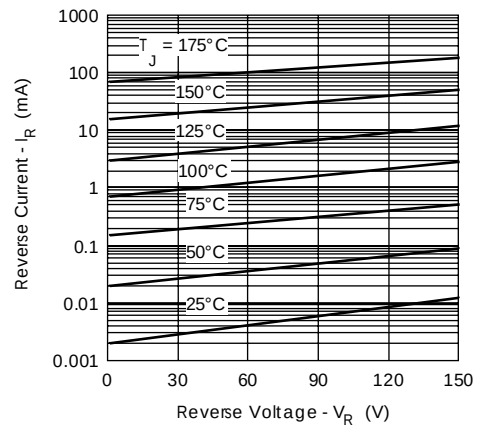


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (PerLeg)

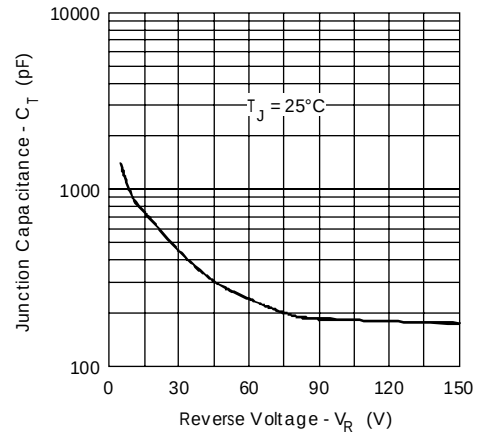


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (PerLeg)

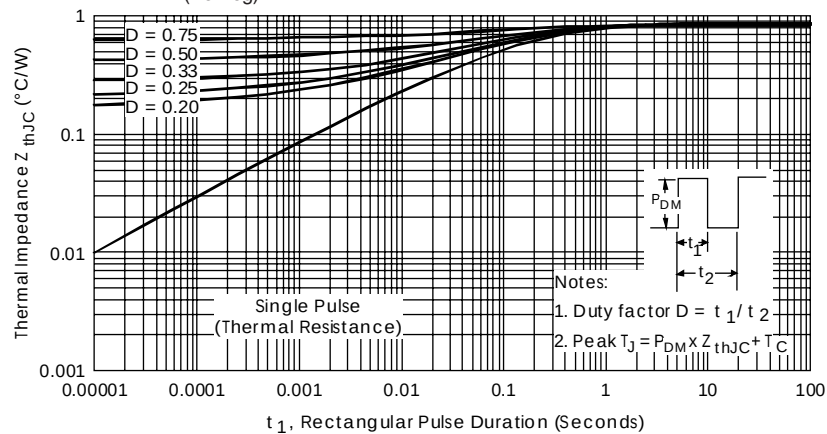


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics (PerLeg)

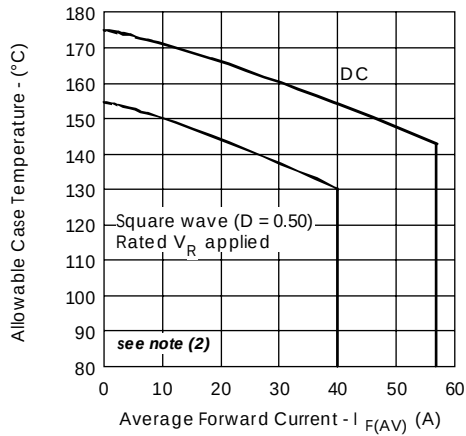


Fig. 5- Max. Allowable Case Temperature Vs. Average Forward Current (PerLeg)

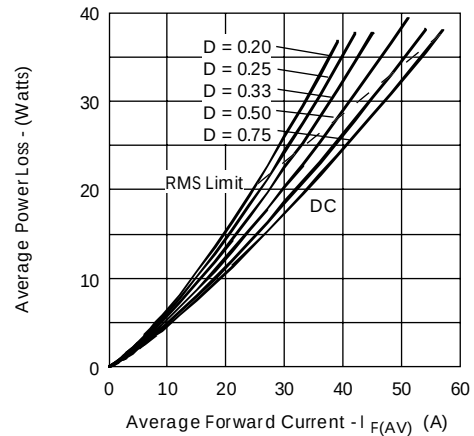


Fig. 6- Forward Power Loss Characteristics (PerLeg)

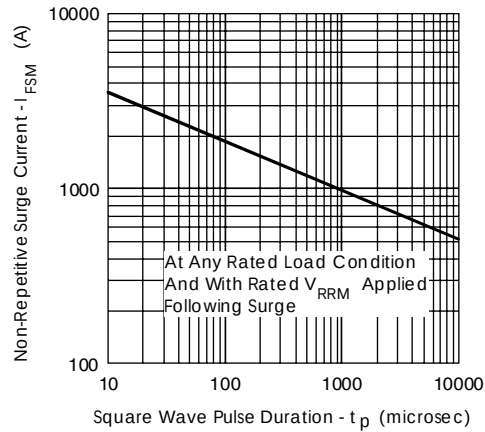


Fig. 7- Max. Non-Repetitive Surge Current (PerLeg)

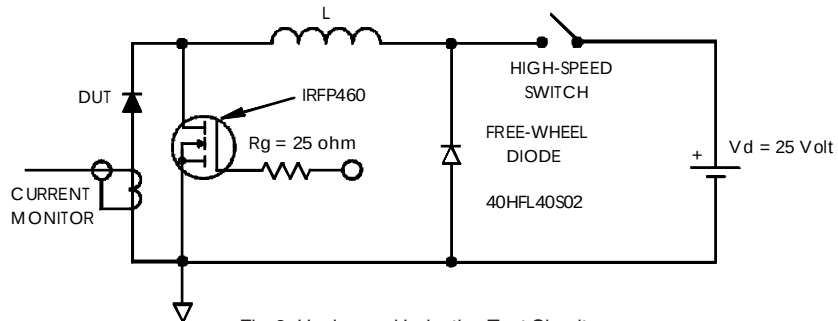


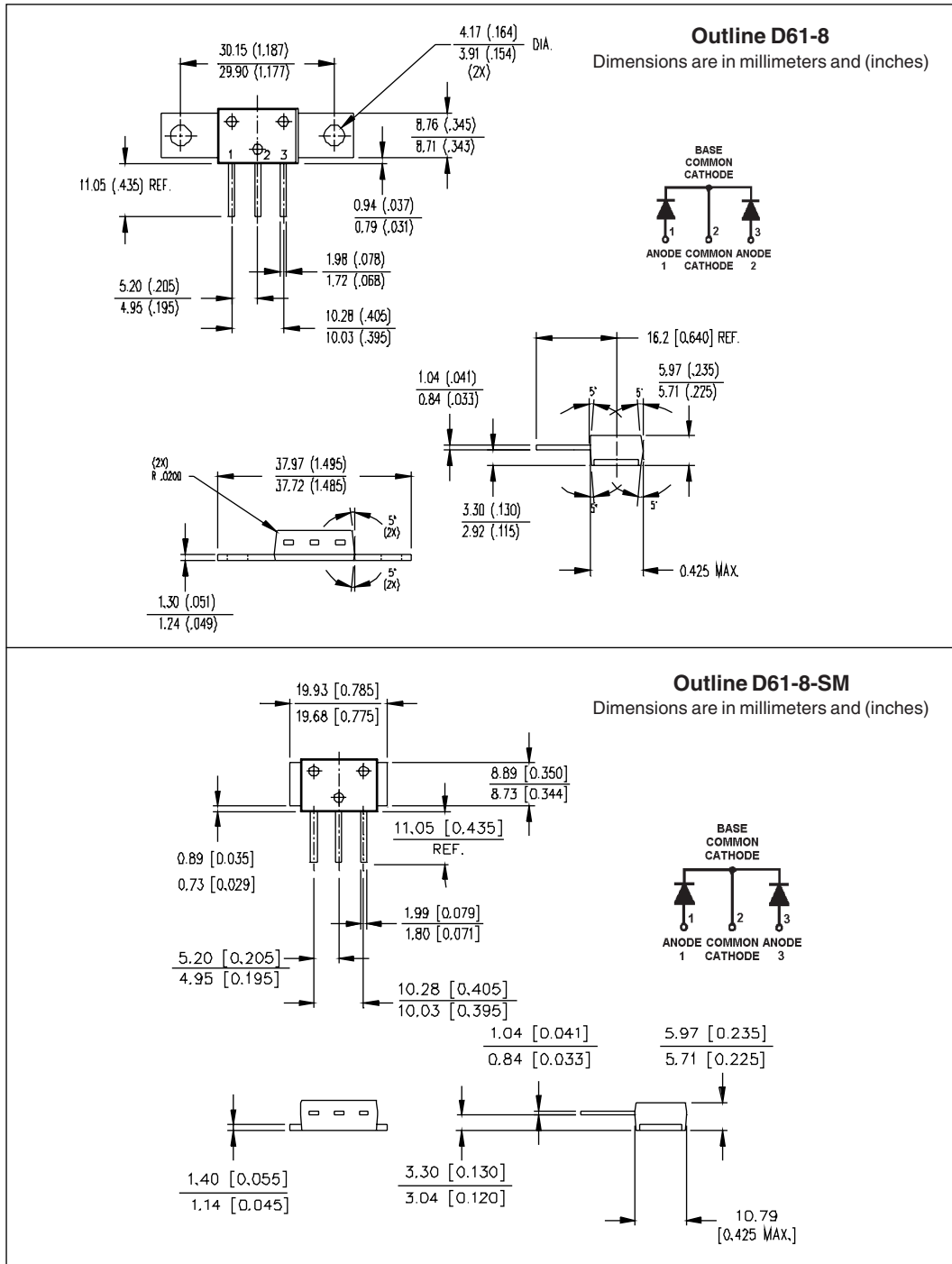
Fig. 8- Unclamped Inductive Test Circuit

(2) Formula used: $T_C = T_J - (P_d + P_{d_{REV}}) \times R_{thJC}$;

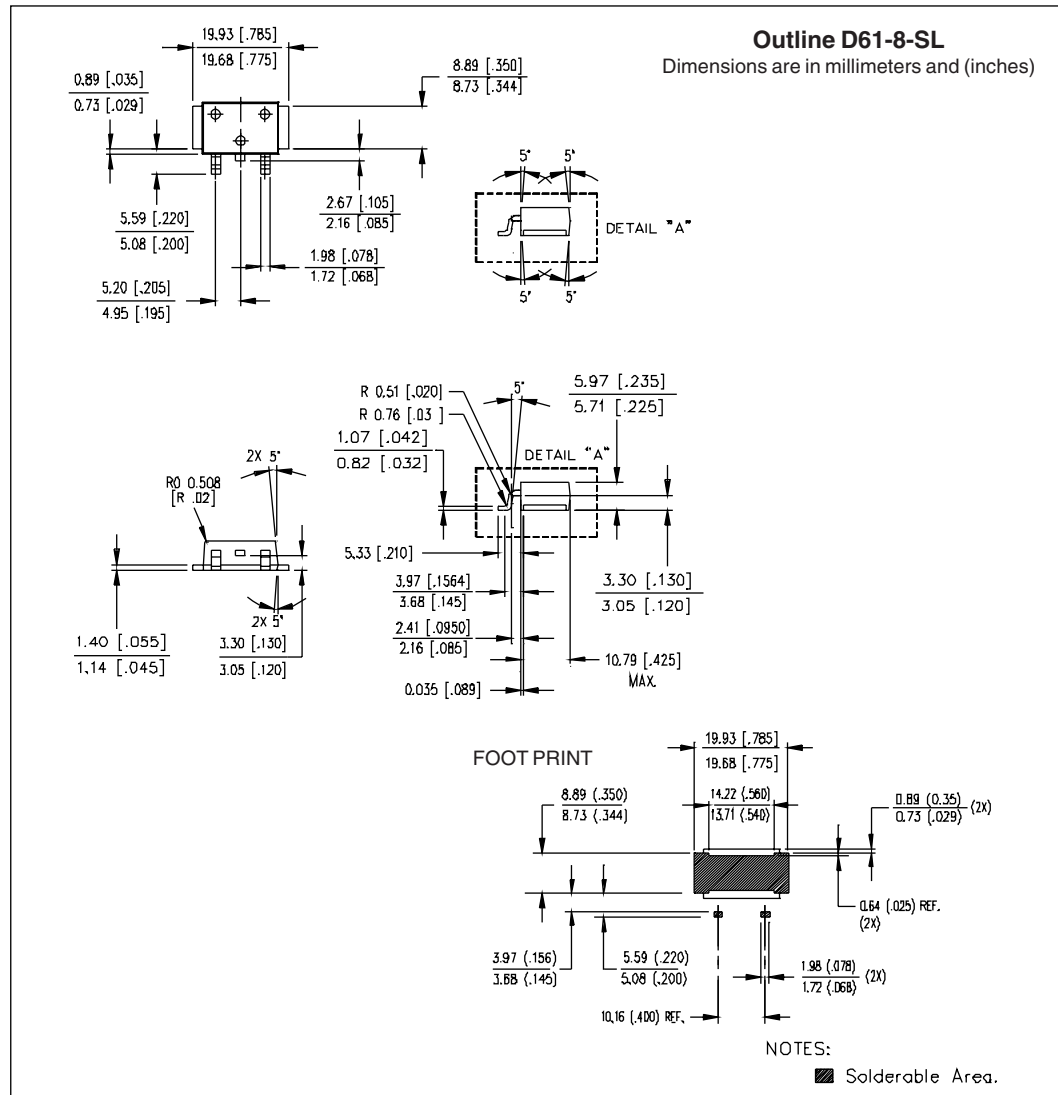
P_d = Forward Power Loss = $I_{F(AV)} \times V_{FM} @ (I_{F(AV)} / D)$ (see Fig. 6);

$P_{d_{REV}}$ = Inverse Power Loss = $V_{R1} \times I_{R1} (1 - D)$; $I_{R1} @ V_{R1}$ = Rated V_R

Outline Table



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