

Preliminary Data Sheet PD-20809 09/04

International
IOR Rectifier

83CNQ...GA
83CNQ...GASM
83CNQ...GASL

SCHOTTKY RECTIFIER
New GenIII D-61 Package

80 Amp

$I_{F(AV)} = 80\text{Amp}$
 $V_R = 80\text{-}100\text{V}$

Major Ratings and Characteristics

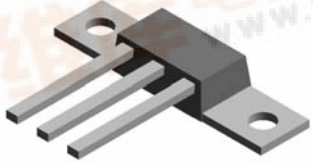
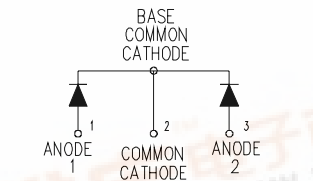
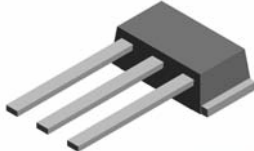
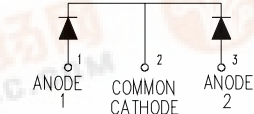
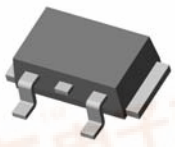
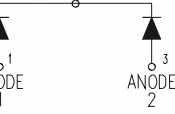
Characteristics	Values	Units
$I_{F(AV)}$ Rectangular waveform	80	A
V_{RRM} range	80 - 100	V
I_{FSM} @tp = 5 μ s sine	5800	A
V_F @40 Apk, $T_J = 125^\circ\text{C}$ (per leg)	0.67	V
T_J range	-55 to 175	$^\circ\text{C}$

Description/ Features

The 83CNQ...AG 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 $^\circ\text{C}$ junction temperature. Typical applications are in switching power supplies, converters, free-wheeling diodes, and reverse battery protection.

- 175 $^\circ\text{C}$ 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

Case Styles

83CNQ...GA	83CNQ...GASM	83CNQ...GASL
  D61-8	  D61-8-SM	  D61-8-SL



Voltage Ratings

Part number	83CNQ080GA	83CNQ100GA
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 @ $T_C = 132^\circ\text{C}$, rectangular wave form		
I_{FSM}	Max. Peak One Cycle Non-Repetitive Surge Current (Per Leg) * See Fig. 7	5800	A	5 μs Sine or 3 μs Rect. pulse	Following any rated load condition and with rated V_{RRM} applied	
		600		10ms Sine or 6ms Rect. pulse		
E_{AS}	Non-Repetitive Avalanche Energy (Per Leg)	15	mJ	$T_J = 25^\circ\text{C}$, $I_{AS} = 1$ 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. $V_A = 1.5 \times V_R$ 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)	0.4	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	10000	V/ μs	(Rated V _R)	

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

Thermal-Mechanical Specifications

Parameters		83CNQ	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 * See Fig. 4
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. 12 (10)	Kg-cm (lbf-in)	Recommended hardware 3M stainless screw
	(D61-8 Only)	Max. 24 (20)		
Device Marking		83CNQ...GA	Case style D61-8	
		83CNQ...GASM	Case style D61-8-SM	
		83CNQ...GASL	Case style D61-8-SL	

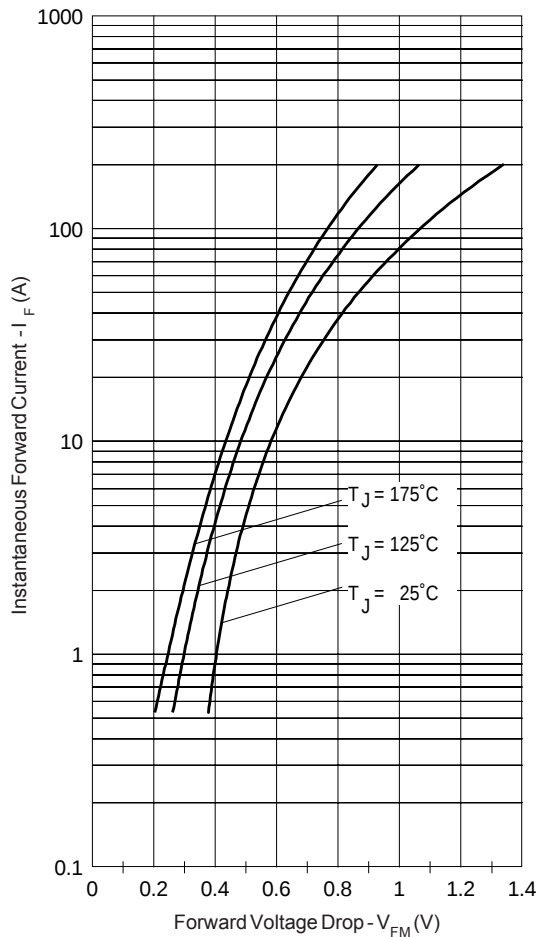


Fig. 1 - Max. Forward Voltage Drop Characteristics (Per Leg)

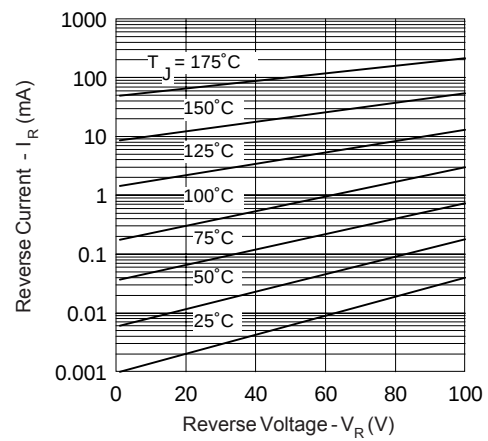


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (Per Leg)

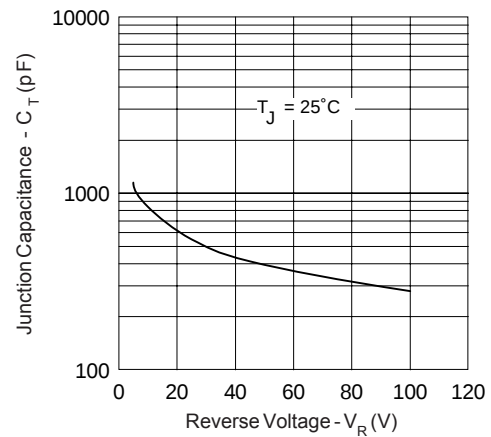


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

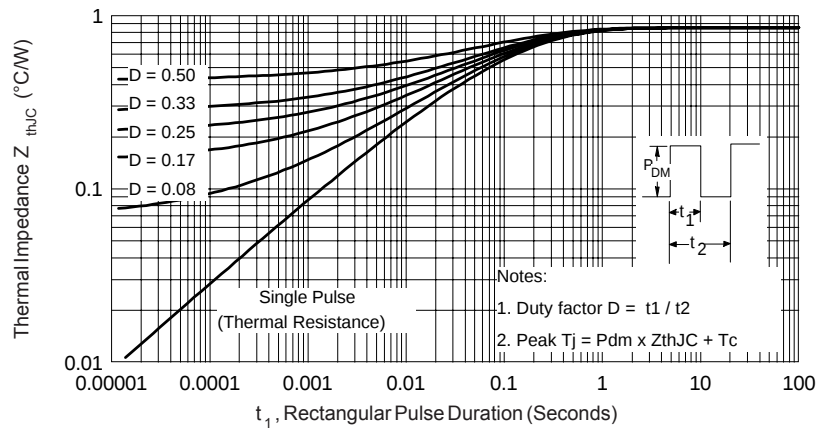


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics (Per Leg)

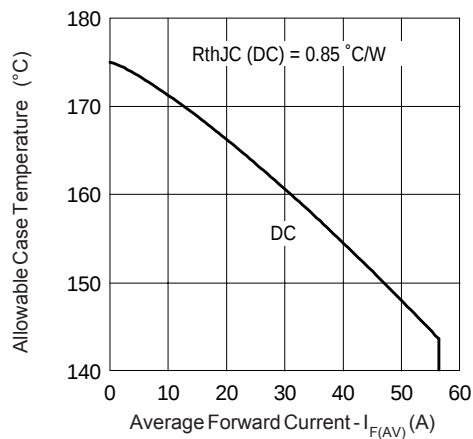


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current (Per Leg)

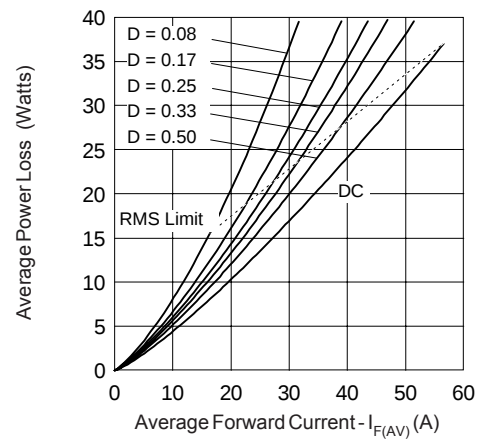


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

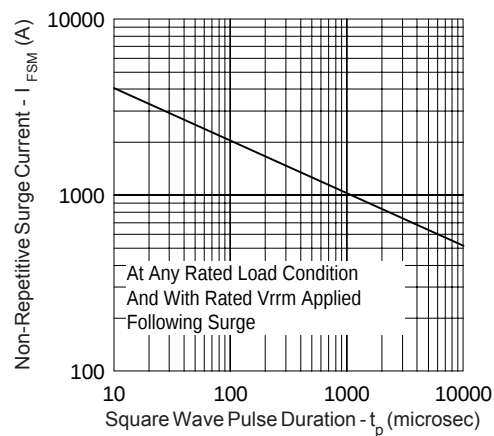


Fig. 7 - Max. Non-Repetitive Surge Current (Per Leg)

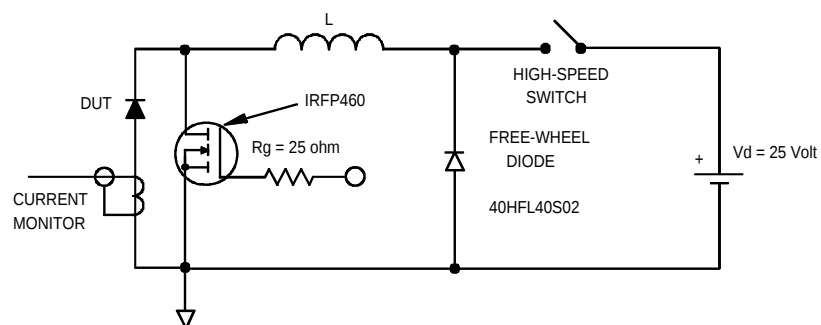
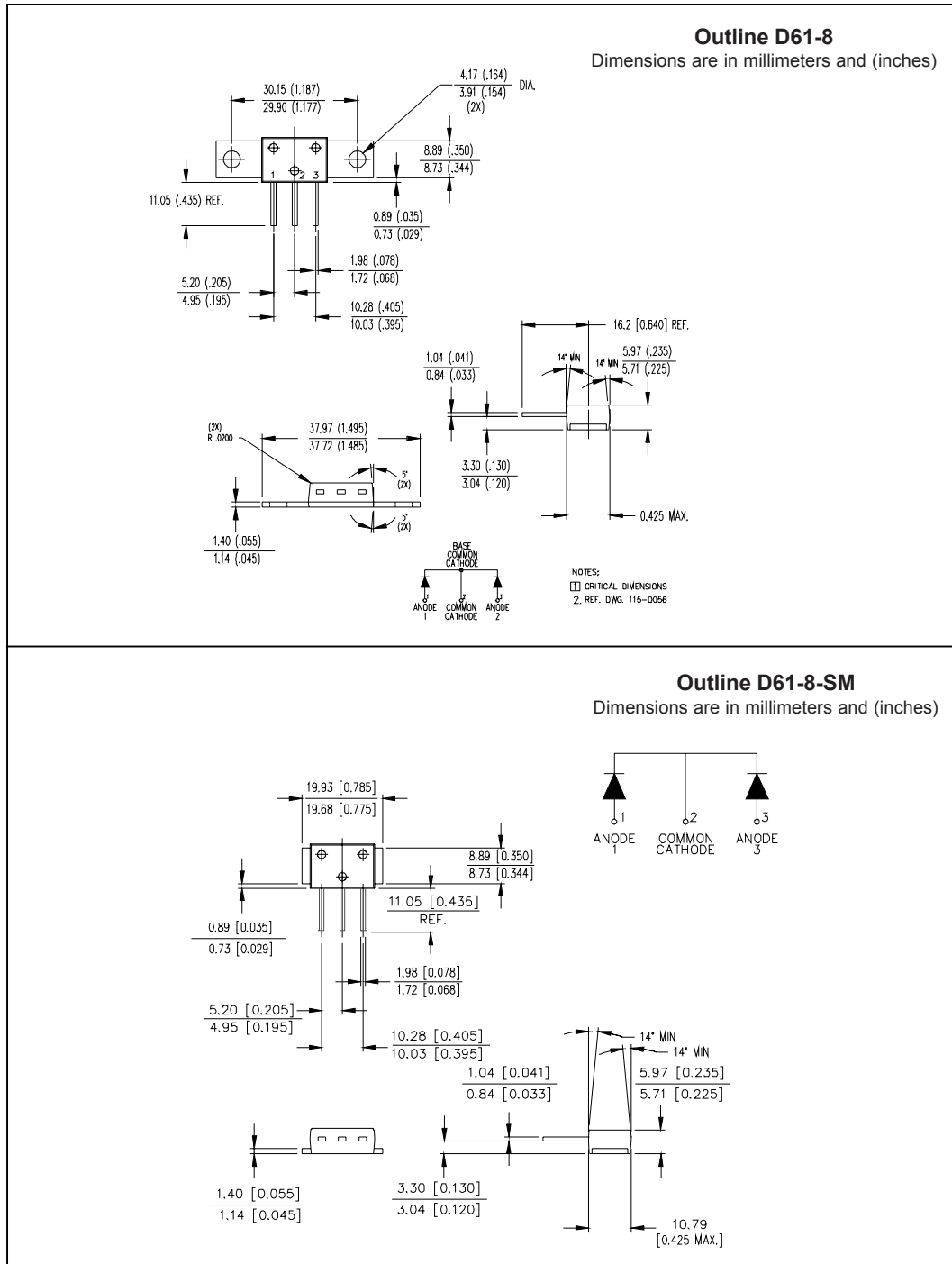


Fig. 8 - Unclamped Inductive Test Circuit

Outline Table



Outline D61-8-SL

Dimensions are in millimeters and (inches)

The drawing includes the following views and dimensions:

- Top View:** Shows overall dimensions including 19.93 [.785], 19.68 [.775], 8.89 [.350], 8.73 [.344], 0.89 [.035], 0.73 [.029], 5.59 [.220], 5.08 [.200], 2.67 [.105], 2.16 [.085], 1.98 [.078], 1.72 [.068], 5.20 [.205], 4.95 [.195], 1.40 [.055], 1.14 [.045], 3.30 [.130], 3.05 [.120], 16.13 [.635], 15.88 [.625], 14.22 [.560], 13.71 [.540], 8.89 [.350], 8.73 [.344], 0.89 [.035], 0.73 [.029], 0.64 [.025] REF. (2X), 1.98 [.078], 1.72 [.068] (2X), 10.16 [.400] REF., 3.97 [.156], 3.68 [.145], 5.59 [.220], 5.08 [.200].
- Side View:** Shows dimensions including 14" MIN, 14" MIN, 5.97 [.235], 5.71 [.225], 1.04 [.041], 0.84 [.033], 5.33 [.210], 3.97 [.156], 3.68 [.145], 2.41 [.095], 2.16 [.085], 10.79 [.425] MAX., 0.89 [.035], 0.73 [.029].
- Detail "A":** Shows a close-up of the corner with dimensions R 0.51 [.020], R 0.76 [.03], 5°, 0.84 [.033], 5.33 [.210], 3.97 [.156], 3.68 [.145], 2.41 [.095], 2.16 [.085], 10.79 [.425] MAX., 0.89 [.035], 0.73 [.029].
- Bottom View:** Shows dimensions including 19.93 [.785], 19.68 [.775], 16.13 [.635], 15.88 [.625], 14.22 [.560], 13.71 [.540], 8.89 [.350], 8.73 [.344], 0.89 [.035], 0.73 [.029], 0.64 [.025] REF. (2X), 1.98 [.078], 1.72 [.068] (2X), 10.16 [.400] REF., 3.97 [.156], 3.68 [.145], 5.59 [.220], 5.08 [.200].

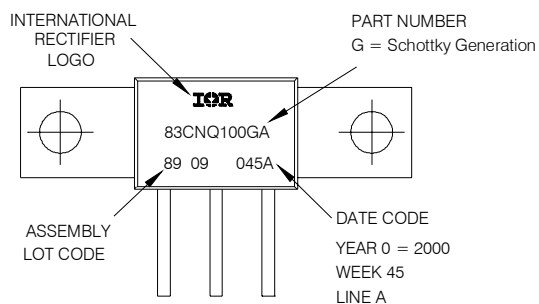
BASE COMMON CATHODE

ANODE 1

ANODE 2

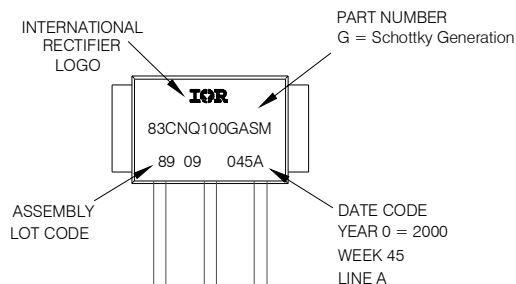
Part Marking Information

EXAMPLE: THIS IS A 83CNQ100GA WITH
LOT CODE 89 09
ASSEMBLED ON WW 45, 2000
IN THE ASSEMBLY LINE "A"



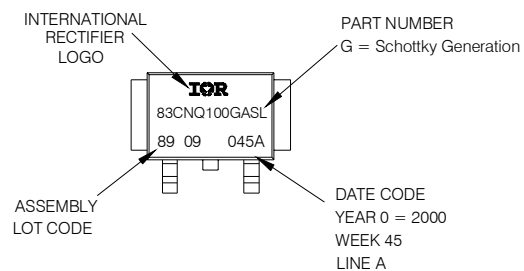
D61-8

EXAMPLE: THIS IS A 83CNQ100GASM WITH
LOT CODE 89 09
ASSEMBLED ON WW 45, 2000
IN THE ASSEMBLY LINE "A"



D61-8-SM

EXAMPLE: THIS IS A 83CNQ100GASL WITH
LOT CODE 89 09
ASSEMBLED ON WW 45, 2000
IN THE ASSEMBLY LINE "A"



D61-8-SL

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)

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

.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

R THERM1 5 4 1.00E-07

R THERM2 4 3 4.51E-01

R THERM1 3 2 3.08E-01

R THERM1 2 1 7.27E-02

.ENDS 83CNQ100A

Ordering Information Table

Device Code							
83	C	N	Q	100	G	A	-
1	2	3	4	5	6	7	8
1	-	Current Rating (80A)					
2	-	C = Common Cathode					
3	-	N = Module (Not Isolated)					
4	-	Q = Schottky Q Series					
5	-	Voltage Ratings					
6	-	G = Schottky Generation					
7	-	- A = D-61-8 (10 pieces) - ASL = D61-8-SL (20 pieces) - ASM = D61-8-SM (20 pieces)					
8	-	- none = Standard Production - PbF = Lead-Free					

080 = 80V
100 = 100V

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
IR Rectifier

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