

N-CHANNEL ENHANCEMENT MODE FIELD MOSFET
Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$	Package	I_D $T_A = +25^\circ\text{C}$
600V	160Ω @ $V_{GS} = 10\text{V}$	SC59 SOT23	70mA

Features

- Low Input Capacitance
- High BVD_{SS} rating for power application
- Low Input/Output Leakage
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

Description

This new generation uses advanced planar technology MOSFET, provide excellent high Voltage and fast switching, making it ideal for small-Signal and level shift applications.

Applications

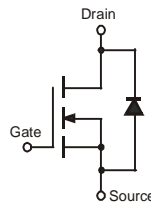
- Motor Control
- Backlighting
- DC-DC Converters
- Power Management Functions

Mechanical Data

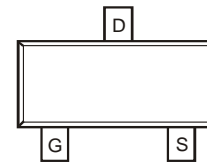
- Case: SC59 / SOT23
- Case Material: Molded Plastic "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin annealed over Copper leadframe Solderable per MIL-STD-202, Method 208 **Ⓔ3**
- Terminal Connections: See Diagram
- Weight: 0.008 grams (approximate)



Top View



Equivalent Circuit

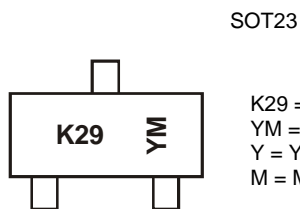


Top View

Ordering Information (Note 4)

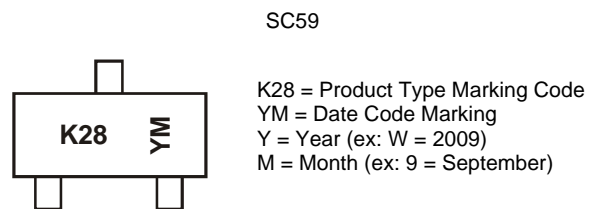
Part Number	Case	Packaging
BSS127SSN-7	SC59	3000/Tape & Reel
BSS127S-7	SOT23	3000/Tape & Reel

- Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
 2. See <http://www.diodes.com> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 4. For packaging details, go to our website at <http://www.diodes.com>.

Marking Information


SOT23

K29 = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: W = 2009)
 M = Month (ex: 9 = September)



SC59

K28 = Product Type Marking Code
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Date Code Key

Year	2009	2010	2011	2012	2013	2014	2015
Code	W	X	Y	Z	A	B	C

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V _{DSS}	600	V
Gate-Source Voltage			V _{GSS}	±20	V
Continuous Drain Current (Note 5) V _{GS} = 10V	Steady State	T _A = +25°C	I _D	50	mA
		T _A = +70°C		40	
Continuous Drain Current (Note 6) V _{GS} = 10V	Steady State	T _A = +25°C	I _D	70	mA
		T _A = +70°C		55	
Continuous Drain Current (Note 5) V _{GS} = 4.5V	Steady State	T _A = +25°C	I _D	45	mA
		T _A = +70°C		35	
Continuous Drain Current (Note 6) V _{GS} = 4.5V	Steady State	T _A = +25°C	I _D	65	mA
		T _A = +70°C		50	
Pulsed Drain Current @ T _{SP} = +25°C (Notes 7)			I _{DM}	0.16	A

Thermal Characteristics

Characteristic	Symbol	Value	Units
Power Dissipation, @T _A = 25°C (Note 5)	P _D	0.61	W
Thermal Resistance, Junction to Ambient @T _A = +25°C (Note 5)	R _{θJA}	204	°C/W
Power Dissipation, @T _{SP} = 25°C (Note 6)	P _D	1.25	W
Thermal Resistance, Junction to Ambient @T _{SP} = +25°C (Note 6)	R _{θJSA}	100	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV _{DSS}	600	—	—	V	V _{GS} = 0V, I _D = 250μA
Zero Gate Voltage Drain Current T _J = +25°C	I _{DSS}	—	—	0.1	μA	V _{DS} = 600V, V _{GS} = 0V
Gate-Body Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	V _{GS(th)}	3	—	4.5	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(on)}	—	80	160	Ω	V _{GS} = 10V, I _D = 16mA
		—	95	190		V _{GS} = 5.0V, I _D = 16mA
Forward Transfer Admittance	Y _{fs}	—	76	—	mS	V _{DS} = 10V, I _D = 16mA
Diode Forward Voltage	V _{SD}	—	—	1.5	V	V _{GS} = 0V, I _S = 16mA
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iss}	—	21.8	—	pF	V _{DS} = 25V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	—	2.2	—		
Reverse Transfer Capacitance	C _{rss}	—	0.3	—		
Total Gate Charge	Q _g	—	1.08	—	nC	V _{GS} = 10V, V _{DD} = 300V, I _D = 0.01A
Gate-Source Charge	Q _{gs}	—	0.08	—		
Gate-Drain Charge	Q _{gd}	—	0.50	—		
Turn-On Delay Time	t _{D(on)}	—	5.0	—	ns	V _{DD} = 300V, V _{GS} = 10V, R _{GEN} = 6Ω, I _D = 10mA
Turn-On Rise Time	t _r	—	7.2	—		
Turn-Off Delay Time	t _{D(off)}	—	28.7	—		
Turn-Off Fall Time	t _f	—	168	—		
Reverse Recovery Time	T _{rr}	—	131	—	ns	V _R = 300V, I _F = 0.016A, di/dt = 100A/μs
Reverse Recovery Charge	Q _{rr}	—	32	—		

- Notes:
5. Device mounted on FR-4 PCB with minimum recommended pad layout, single sided.
 6. Device mounted on 1" x 1" FR-4 PCB with high coverage 2 oz. Copper, single sided.
 7. Repetitive rating, pulse width limited by junction temperature, 10μs pulse, duty cycle = 1%.
 8. Short duration pulse test used to minimize self-heating effect.
 9. Guaranteed by design. Not subject to production testing.

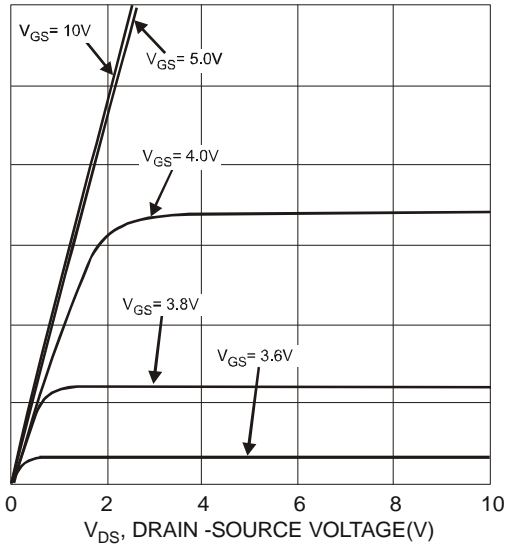


Figure 1 Typical Output Characteristics

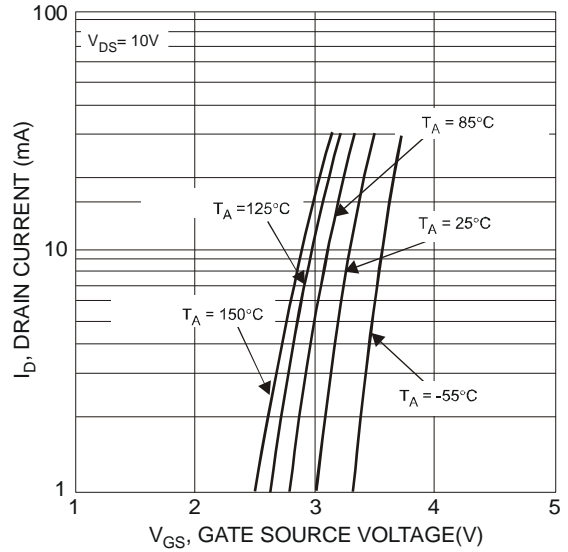


Figure 2 Typical Transfer Characteristics

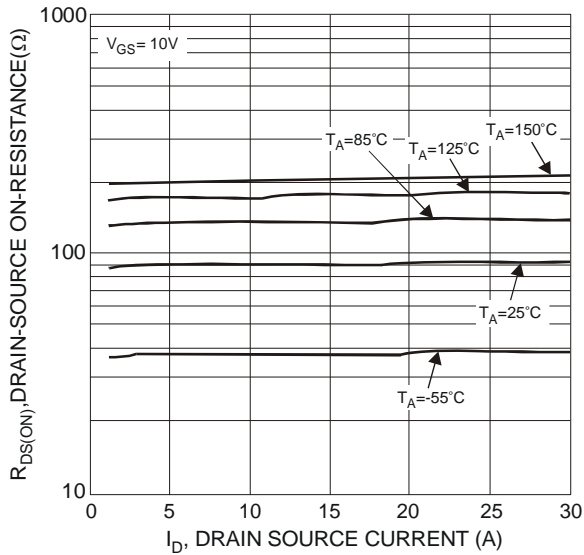


Figure 3 Typical On-Resistance vs. Drain Current and Temperature

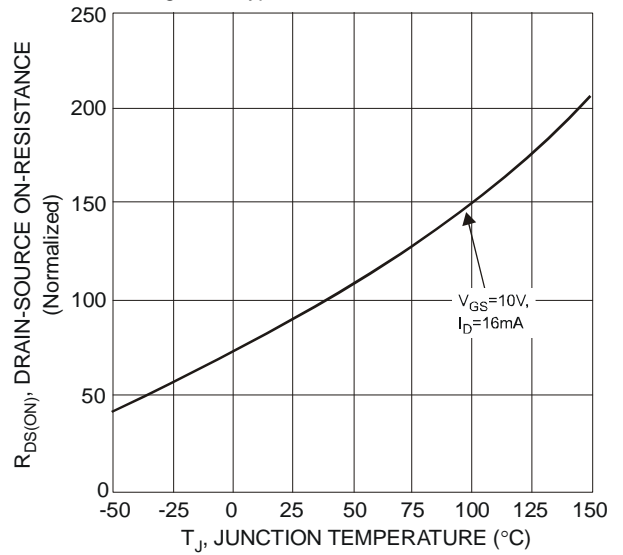


Figure 4 On-Resistance Variation with Temperature

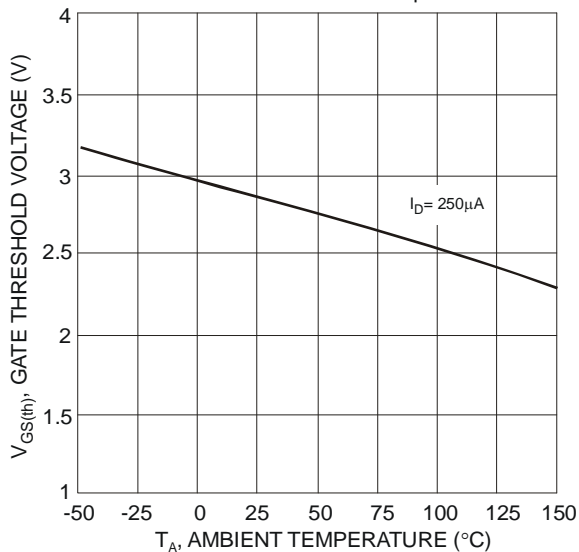


Figure 5 Gate Threshold Variation vs. Ambient Temperature

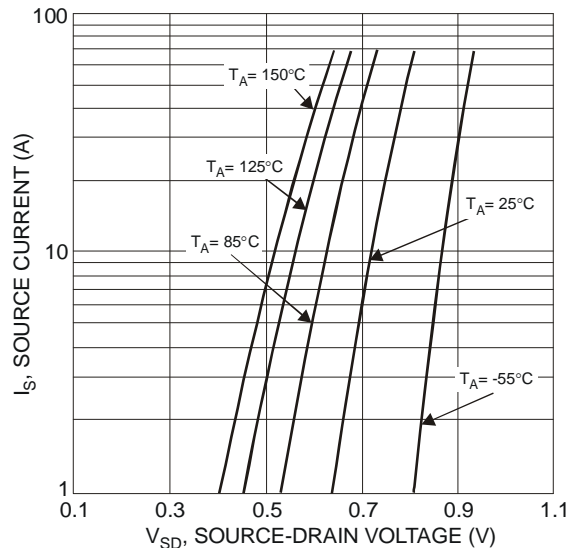


Figure 6 Diode Forward Voltage vs. Current

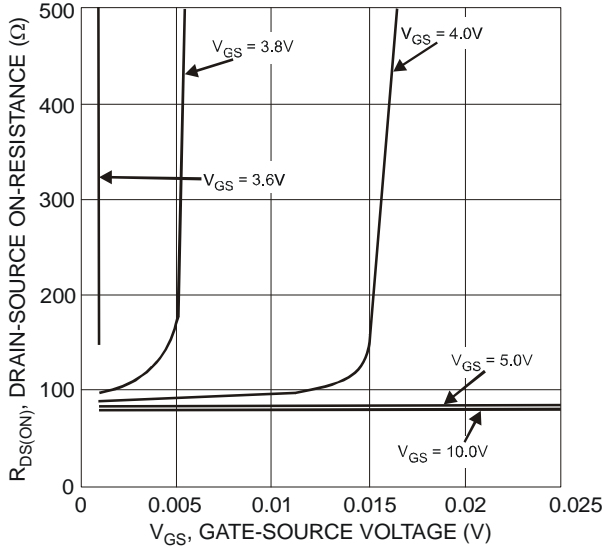


Figure 7 Typical On-Resistance vs. Drain Current and Gate Voltage

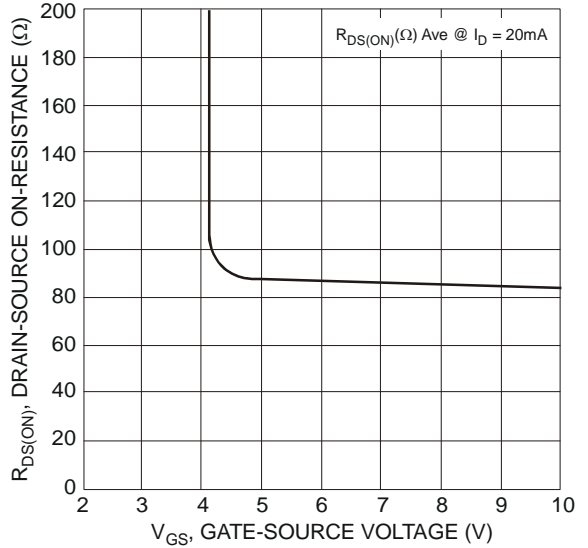


Figure 8 Typical Transfer Characteristic

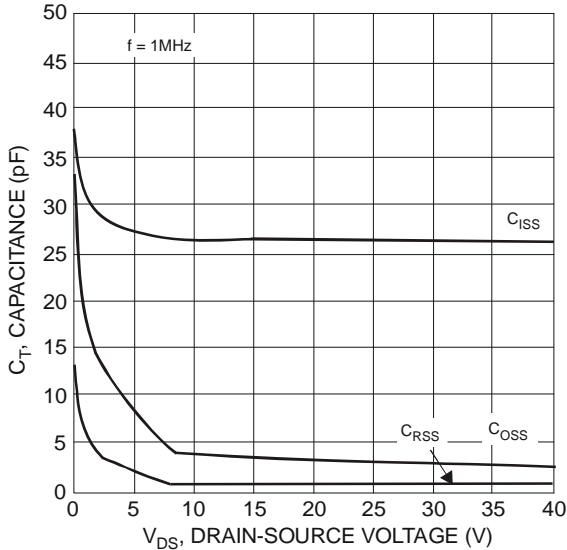


Figure 9 Typical Junction Capacitance

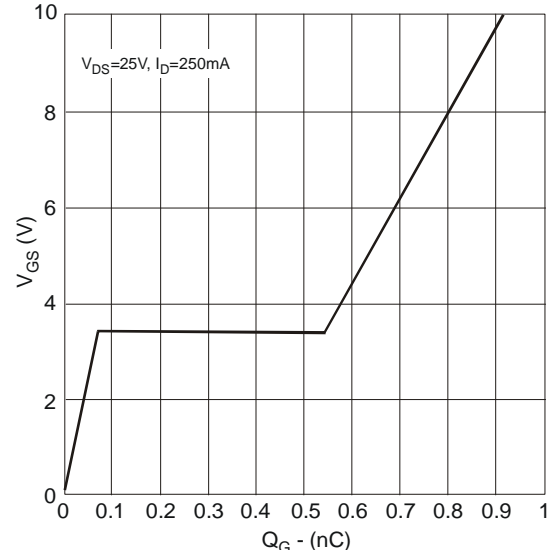


Figure 10 Gate Charge Characteristics

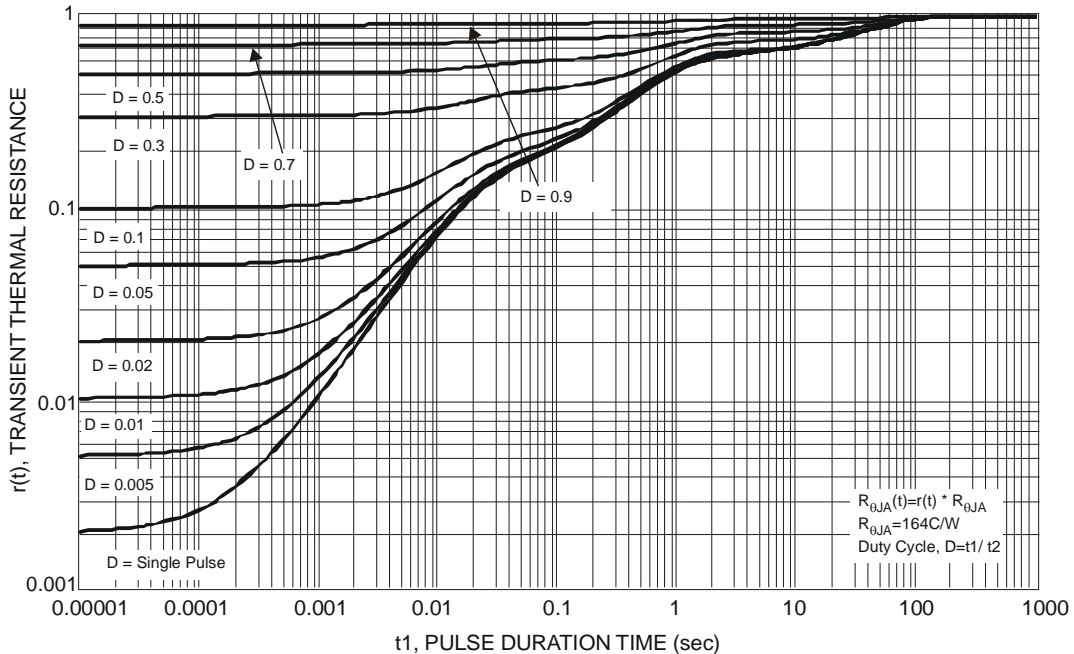
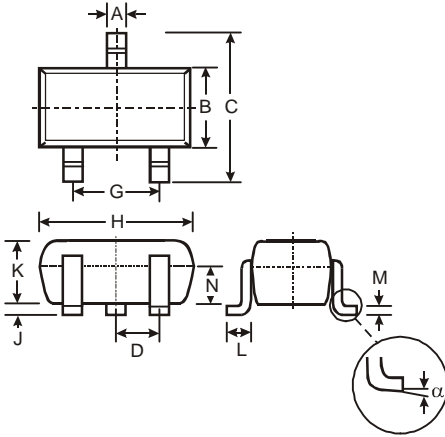


Figure 11 Transient Thermal Resistance

Package Outline Dimensions

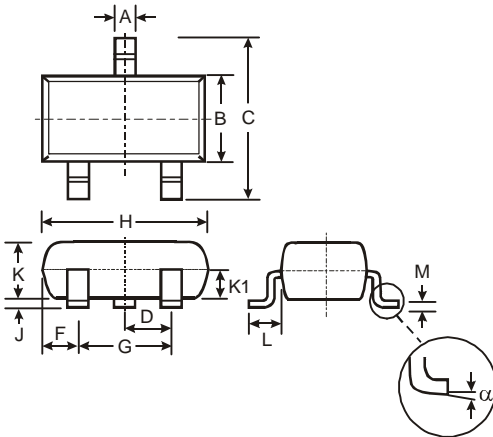
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.

SC59



SC59			
Dim	Min	Max	Typ
A	0.35	0.50	0.38
B	1.50	1.70	1.60
C	2.70	3.00	2.80
D	-	-	0.95
G	-	-	1.90
H	2.90	3.10	3.00
J	0.013	0.10	0.05
K	1.00	1.30	1.10
L	0.35	0.55	0.40
M	0.10	0.20	0.15
N	0.70	0.80	0.75
α	0°	8°	-
All Dimensions in mm			

SOT23

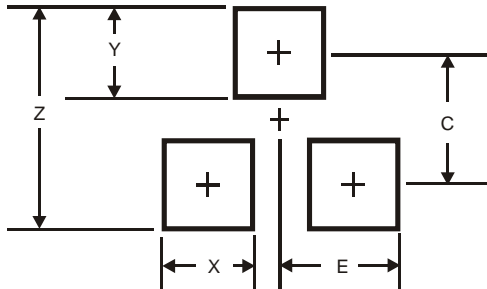


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.903	1.10	1.00
K1	-	-	0.400
L	0.45	0.61	0.55
M	0.085	0.18	0.11
α	0°	8°	-
All Dimensions in mm			

Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.

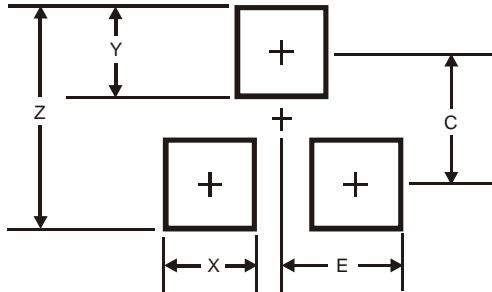
SC59



Dimensions	Value (in mm)
Z	3.4
X	0.8
Y	1.0
C	2.4
E	1.35

Suggested Pad Layout (cont.)

SOT23



Dimensions	Value (in mm)
Z	2.9
X	0.8
Y	0.9
C	2.0
E	1.35

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