Product Specification

RS1125 High Power SPDT

General Description

The RS1125 is a SPDT high power RF switch supporting wireless applications up to 3 GHz. It offers maximum power handling of 43 dBm continuous wave (CW). It delivers high linearity and excellent harmonics performance. No blocking capacitors are required if DC voltage is not present on the RF ports.

Applications

- Wireless infrastructure
- Military and high reliability applications
- Test equipment
- Pin diode replacement
- Land Mobile Radio

Features

- Low insertion loss: 0.4 dB typical to 2 GHz
- High power handling at T_{CASE} = 85°C,VDD=5V
  - CW power: 43 dBm
  - Peak power: 47 dBm
- High ESD
  - 2kV HBM on all pins
- Single positive supply: 5 V
- Positive control, CMOS/TTL compatible
- 32-leads, 5 mm × 5 mm QFN package

Functional Block Diagram

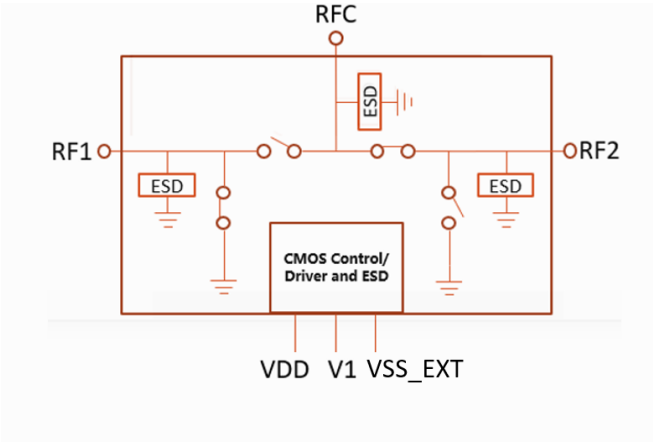


Figure 1

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Absolute Maximum Ratings

Table 1

Parameter	Min	Max	Units
VDD to GND	-0.3	5.5	V
VCTRL to GND	-0.3	5.5	V
VSS_EXT	-3.6	0	V
Maximum Junction Temperature		120	°C
Storage Temperature Range	-65	150	°C
Lead Temperature (soldering, 10s)		260	°C
ESD Voltage– HBM (Per JESD22-A114)		Class 2 (2000V)	
ESD Voltage – CDM (Per JESD22-C101)		Class IV (500V)	

Stresses above those listed above may cause permanent damage to the device. Functional operation of the device at these or any other conditions above those indicated in the operational section of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

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Recommended Operating Conditions

Table 2

Parameter	Conditions	Min	Typ	Max	Units
Supply Voltage		3		5.25	V
VSS_EXT***		-3.6		-3.2***	V
Operating Temp Range	Case Temperature	-40		85	°C
RF Frequency Range		30		3000	MHz
Input CW Power, TX mode	800MHz, VDD=5V			43	dBm
Input pulse Power, TX mode	800MHz, 10%Pulse Signal(500us-50us),VDD=5V			46	dBm

Note:***If better spur performance is required, an external negative voltage is recommended to be applied on VSS_EXT pin. Otherwise, VSS_EXT should be connected to ground

Operation should be restricted to the limits in the Recommended Operating Conditions table. Operation between operating range maximum and absolute maximum for extended periods may reduce reliability.

Specification

Typical Application Circuit, Normal mode (VDD=5V), T_C = +25°C, F_{RF} = 1000MHz, Input power = 0dBm per tone unless otherwise stated. PCB board trace and connector losses are de-embedded unless otherwise noted.

Table 3

Parameter	Conditions	Min	Typ	Max	Units
Insertion Loss	100kHz - 30MHz		0.14		dB
	30MHz - 1000MHz		0.26		
	1000MHz - 2000MHz		0.42		
	2000MHz - 3000MHz***		0.49***		
RFC-RFX Isolation	100kHz - 30MHz		60		dB
	30MHz - 1000MHz		45.6		
	1000MHz - 2000MHz		36.6		
	2000MHz - 3000MHz		30		
RFX-RFX Isolation	100kHz - 30MHz		65		dB
	30MHz - 1000MHz		50		
	1000MHz - 2000MHz		39.5		
	2000MHz - 3000MHz		31		
Return Loss	100kHz - 30MHz		43		dB
	30MHz - 1000MHz		26		
	1000MHz - 2000MHz		21		
	2000MHz - 3000MHz***		17		
Input 0.1dB Compression	700MHz		47.5		dBm
Input IP2	F1=2300MHz,F2=2400MHz@33dBm		126		dBm
Input IP3	F1=1870MHz,F2=1990MHz@33dBm		80		dBm
2nd and 3rd Harmonic (< 1.15:1 VSWR)	TX port, 40dBm Input Signal@700MHz		-80		dBc
Switching Time	50% CTRL to 90% RF		4		us
	50% CTRL to 10% RF		4		
Logic Input High Threshold		1.4		5	V
Logic Input Low Threshold		-0.3		0.6	V
Logic Current	For each control pin		7		µA
DC Current (VDD)	3.3V Logic		80		µA

Note: ***Insertion loss at 3GHz could be optimized with external matching

Pin Diagram

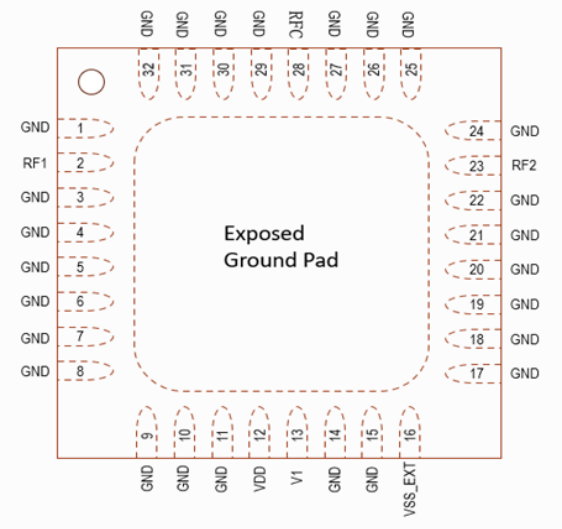


Figure 2

Pin Description

Table 4

Pin No.	Label	Description
1,3-11,14,15,17-22,24-27,29-32	GND	Ground.
2	RF1	RF port 1
23	RF2	RF port 2
28	RFC	RF common port(ANT)
12	VDD	Positive power supply voltage.
13	V1	Digital control logic input
16****	VSS_EXT****	External VSS negative voltage

Note:****If better spur performance is required, an external negative voltage is recommended to be applied on VSS_EXT pin. Otherwise, VSS_EXT should be connected to ground

Control Logic

Table 5

Path	V1
RFC-RF1	L
RFC-RF2	H

Application Information

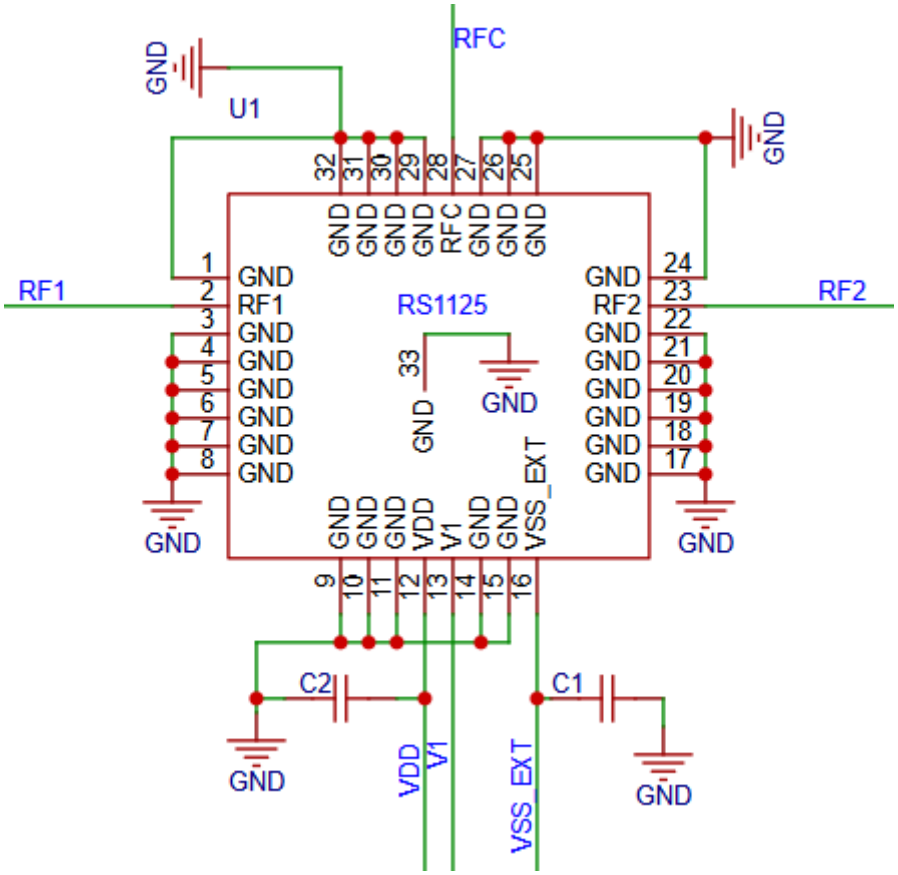


Figure 3

BOM LIST

Table 6

No.	Quantity	Part Lable	Value(No Match)	Value(Match to 3GHz)	Footprint
1	2	C1,C2	100nF	100nF	C0402
2	1	U1	RS1125		

Typical Performance Characteristics

Figure 4. RF1 Insertion Loss

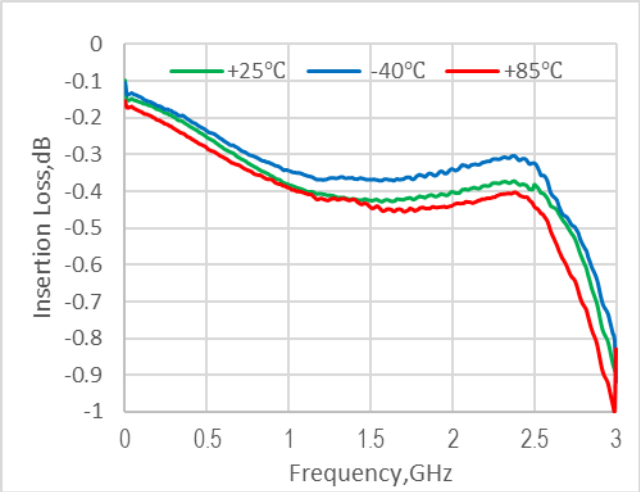


Figure 5. RF2 Insertion Loss

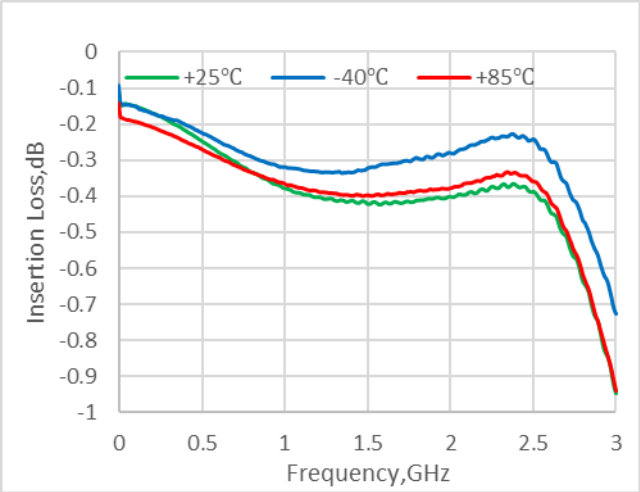


Figure 6. RFC Return Loss

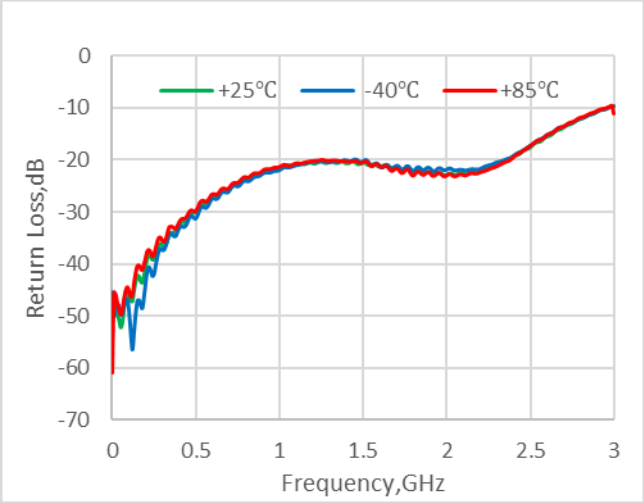


Figure 7. RFX Return Loss

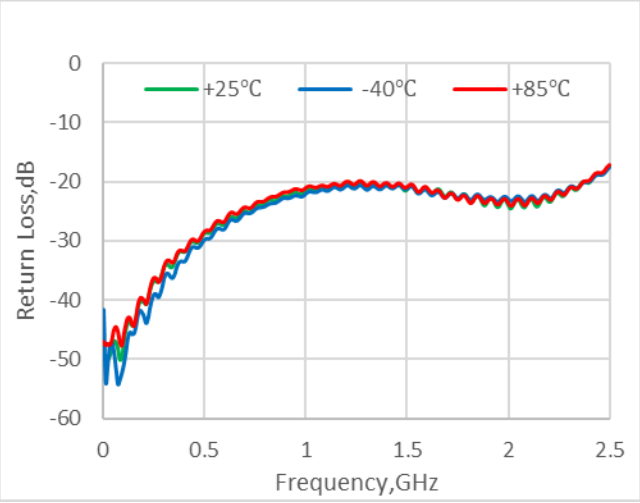


Figure 8. RFX-RFX Isolation

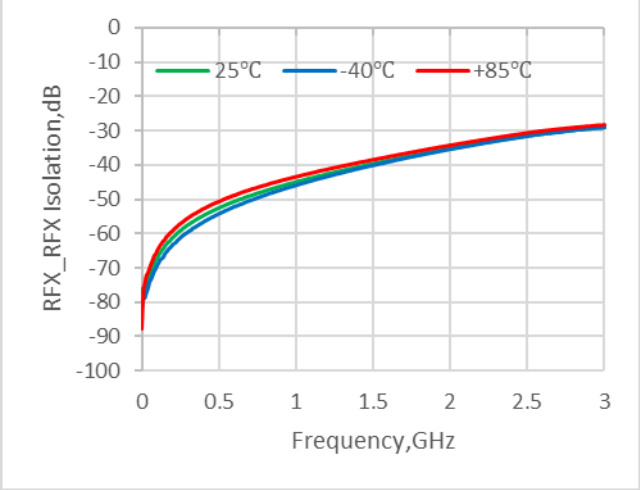
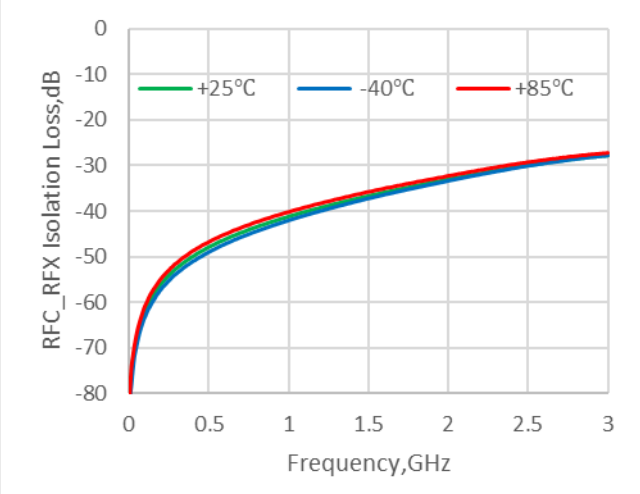


Figure 9. RFC-RFX Isolation



Typical Performance Characteristics

Figure 10. Noise Figure

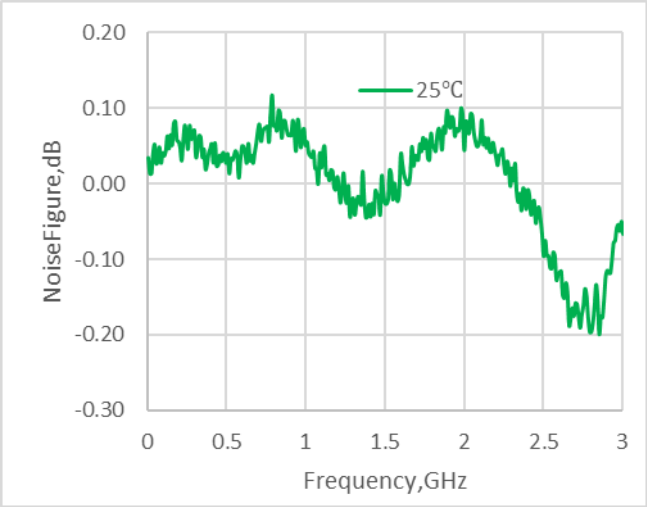


Figure 11. Spur_0.1GHz*

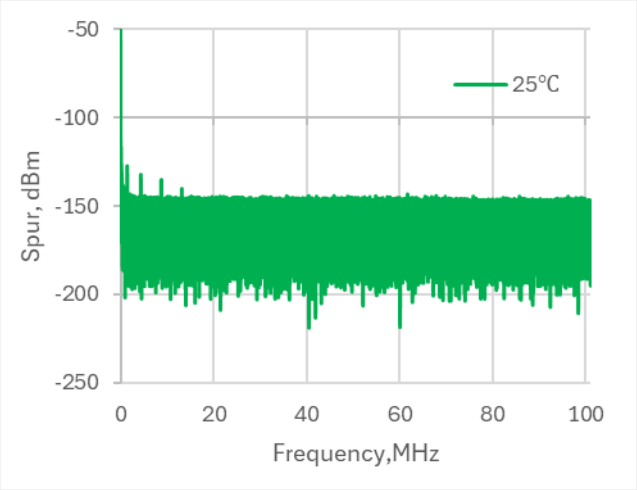
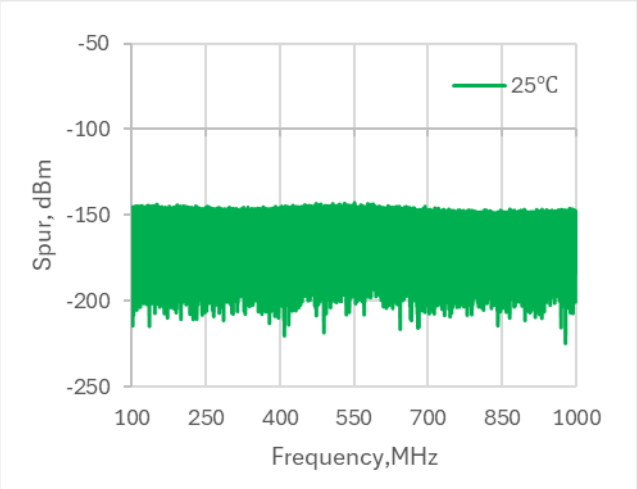
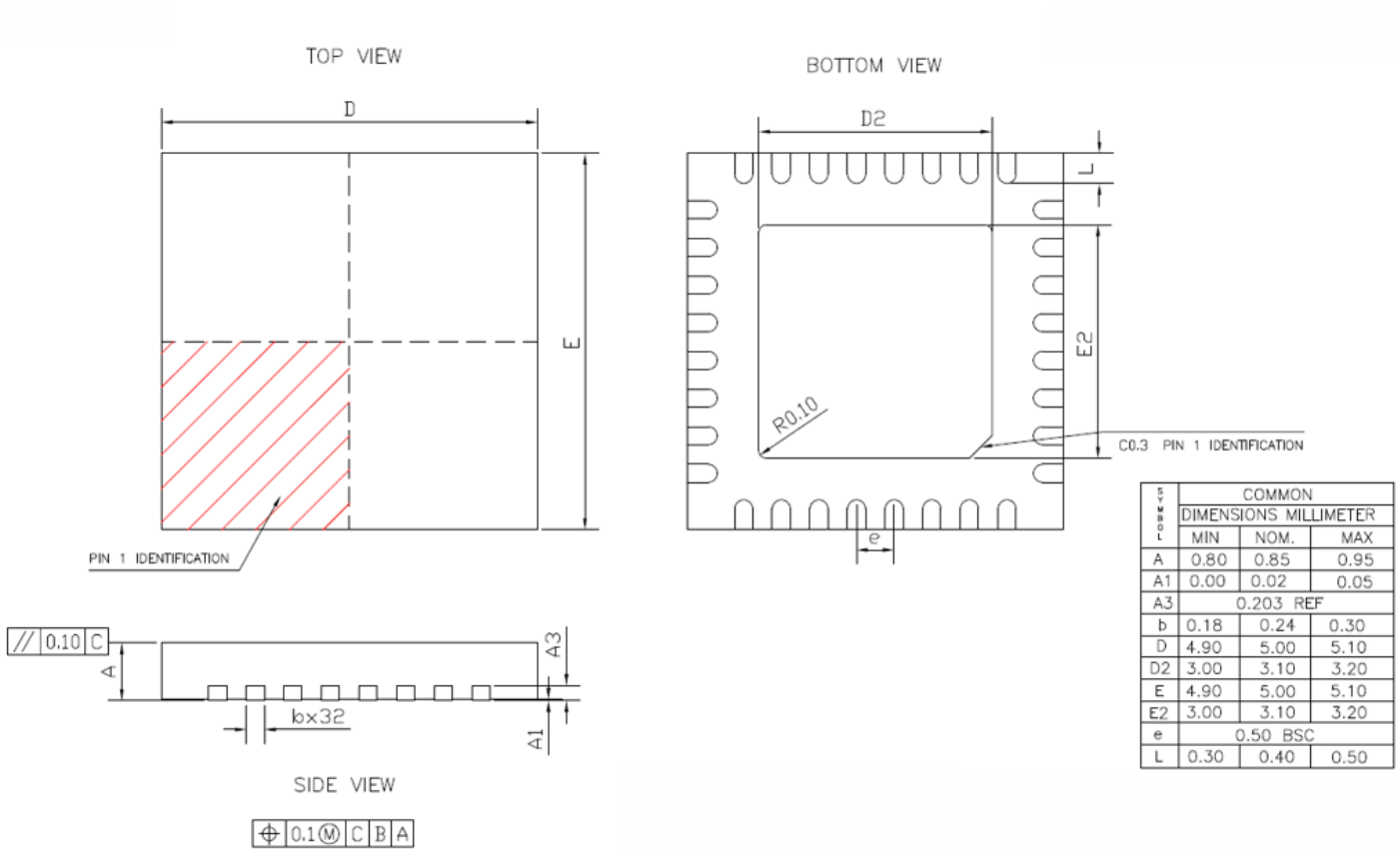


Figure 12. Spur_0.1-1GHz*



*Note:*** spur's test condition in noise floor:RBW=VBW=100Hz*

Package Drawing



SYMBOL	COMMON DIMENSIONS MILLIMETER		
	MIN	NOM.	MAX
A	0.80	0.85	0.95
A1	0.00	0.02	0.05
A3		0.203 REF	
b	0.18	0.24	0.30
D	4.90	5.00	5.10
D2	3.00	3.10	3.20
E	4.90	5.00	5.10
E2	3.00	3.10	3.20
e		0.50 BSC	
L	0.30	0.40	0.50

Figure 12

Ordering Information

Table 7

Order Code	Part Marking	Package	Shipping Method
RS1125-250	1125	QFN5X5_32PIN	250 units
RS1125-3000	1125	QFN5X5_32PIN	3000 units

Revision History

Table 8

Revision Number	Revision Date	Description	Modifications
0	2023/1/6	Draft	—
0.1	2023/3/22	Initial release	
0.2	2023/4/20	Preliminary specification	
0.3	2023/6/5	Preliminary specification	
1.0	2024/3/20	Release	
1.1	2024/11/29	Update	Modify Package Drawing
1.2	2025/05/16	Update	

Document Categories

Advance Information

The product is in a formative or design stage. The datasheet contains design target specifications for product development. Specifications and features may change in any manner without notice.

Preliminary Specification

The datasheet contains preliminary data. Additional data may be added at a later date. RFone Technology reserves the right to change specifications at any time without notice in order to supply the best possible product.

Product Specification

The datasheet contains final data. In the event RFone Technology decides to change the specifications, RFone Technology will notify customers of the intended changes by issuing a CNF (Customer Notification Form).

Sales Contact

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