Product Specification

RS1121A High Power SPDT

General Description

The RS1121A is a silicon-based, high power, 5 MHz to 6.0 GHz, single-pole, double-throw (SPDT) reflective switch in a leadless, surface-mount package. The switch is ideal for high power and cellular infrastructure applications, such as long-term evolution (LTE) base stations.

The RS1121A has a low insertion loss of 0.8 dB typical to 5.0 GHz, and a 0.1 dB compression point (P0.1dB) of 39 dBm.

On-chip circuitry operates at double-pin-control of 5 V at a typical supply current of 60 uA, making the RS1121A an ideal alternative to pin diode-based switches. The RS1121A comes in an RoHS compliant, compact, 8-lead,2 mm × 2 mm DFN Competitive Advantage.

Applications

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

Features

- Reflective, 50 Ω design
- Low insertion loss: 0.8 dB typical to 5.0 GHz
- High linearity
  - P0.1dB: 39.0 dBm typical
- Complementary -pin Control: 5 V/0V
- H8-lead, 2 mm × 2 mm DFN package

Functional Block Diagram

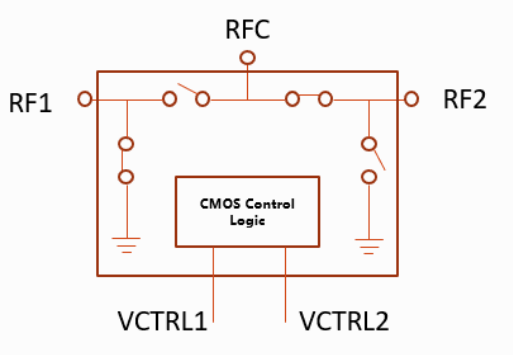


Figure 1

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Absolute Maximum Ratings

Table 1

Parameter	Min	Max	Units
VCTRL to GND	-0.3	5.5	V
Storage Temperature Range	-65	150	°C
Lead Temperature (soldering, 10s)		260	°C

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.

Recommended Operating Conditions

Table 2

Parameter	Conditions	Min	Typ	Max	Units
VCTRL1 / VCTRL2		3	5.0	5.5	V
Operating Temp Range	Case Temperature	-40	25	105	°C
RF Frequency Range		5		6000	MHz

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 (VCTRL=5.0V/0V), T_C = +25°C, PCB board trace and connector losses are de-embedded unless otherwise noted.

Table 3

Parameter	Conditions	Min	Typ	Max	Units
Insertion Loss	5MHz – 2000MHz		0.4		dB
	2000MHz – 4000MHz		0.54		
	4000MHz – 6000MHz		0.8		
RFC - RFX Isolation	5MHz – 2000MHz		40		dB
	2000MHz – 4000MHz		28		
	4000MHz – 6000MHz		23		
RFX - RFX Isolation	5MHz – 2000MHz		40		dB
	2000MHz – 4000MHz		30		
	4000MHz – 6000MHz		24		
Return Loss (RFC)	5MHz – 2000MHz		27		dB
	2000MHz – 4000MHz		19		
	4000MHz – 6000MHz		16		
Return Loss (RFX)	5MHz – 2000MHz		26		dB
	2000MHz – 4000MHz		18		
	4000MHz – 6000MHz		17		
Input 0.1dB Compression	VCTRL=3.3V, 2500MHz		35.6		dBm
	VCTRL=5.0V, 2500MHz		38.8		dBm
IP2	F1=2200MHz,F2=2300MHz@33dBm		121		dBm
IP3	F1=1880MHz,F2=2000MHz@33dBm		74.8		dBm
Switching Time	50% CTRL to 90% RF		230		ns
	50% CTRL to 10% RF		230		
Logic Input High Threshold		3.0	5.0	5.5	V
Logic Input Low Threshold		0		0.3	V
Logic Current	For each control pin		60	150	μA

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Pin Diagram

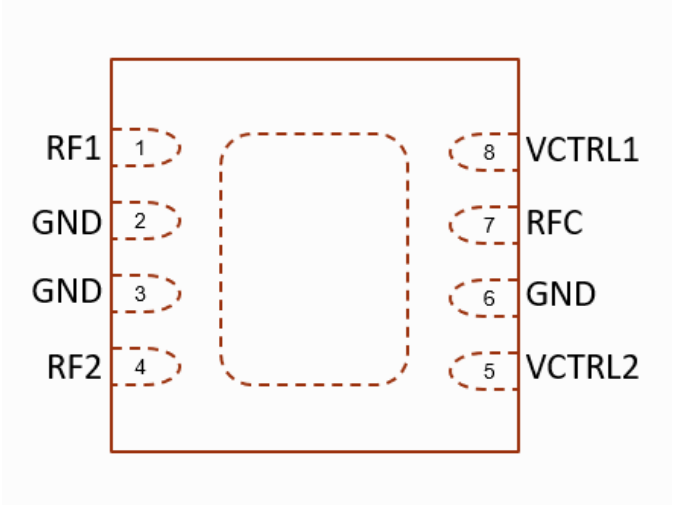


Figure 2

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Pin Description

Table 4

Pin No.	Label	Description
2,3,6	GND	Ground.
1	RF1	RF port 1. The RF pin requires a DC blocking capacitor for proper operation.
4	RF2	RF port 2. The RF pin requires a DC blocking capacitor for proper operation.
7	RFC	RF common port. The RF pin requires a DC blocking capacitor for proper operation.
5,8	VCTRL1/ VCTRL2	Digital control logic input.

Control Logic

Table 5

States	Control Logic		RF Channels	
	VCTRL1	VCTRL2	RFC-RF1	RFC-RF2
1	High	Low	ON	OFF
2	Low	High	OFF	ON

Applications Information

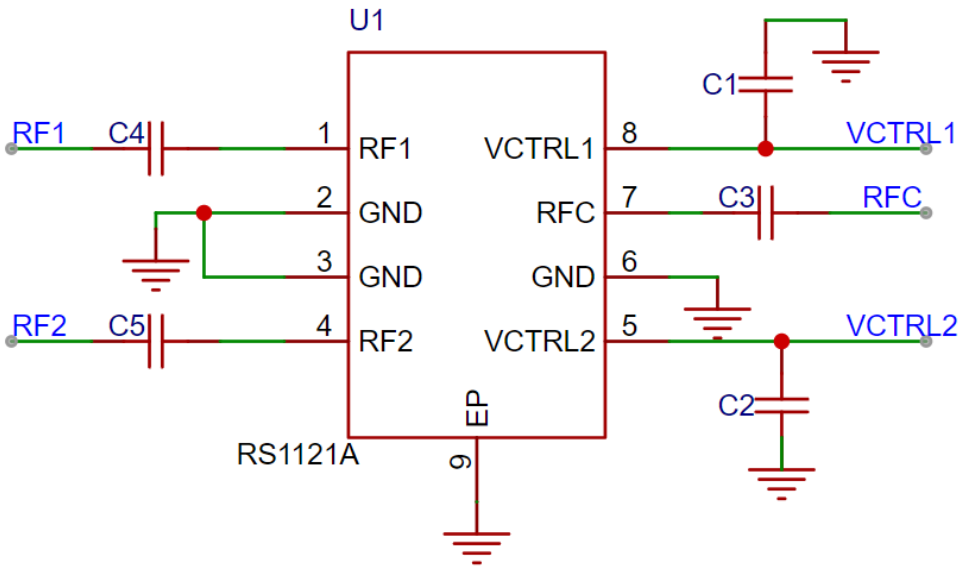


Figure 3

BOM LIST

Table 6

No.	Quantity	Part Lable	Value(<500MHz)	Value(>500MHz)	Footprint
1	2	C1,C2	100pF	100pF	C0402
2	3	C3,C4,C5	10nF	43pF	C0402
3	1	U1	RS1121A	RS1121A	

Typical Performance Characteristics (Typical RF C=10nF)

Figure 4. RFX Insertion Loss

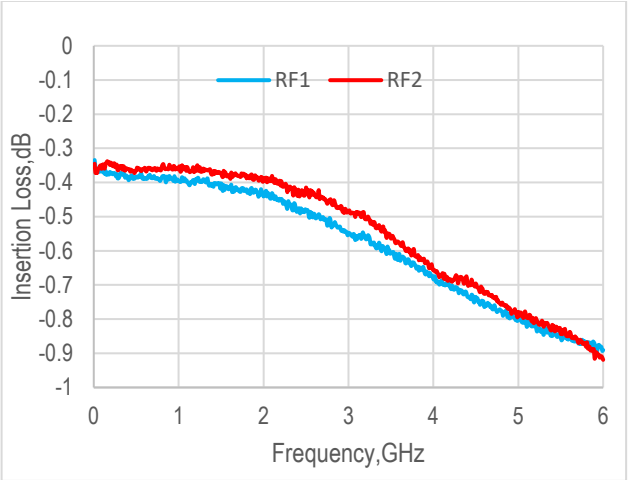


Figure 5. RF2 Insertion Loss

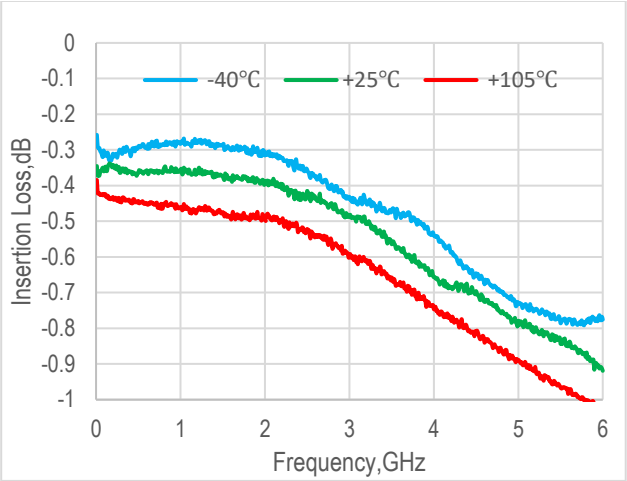


Figure 6. RF1 Return Loss

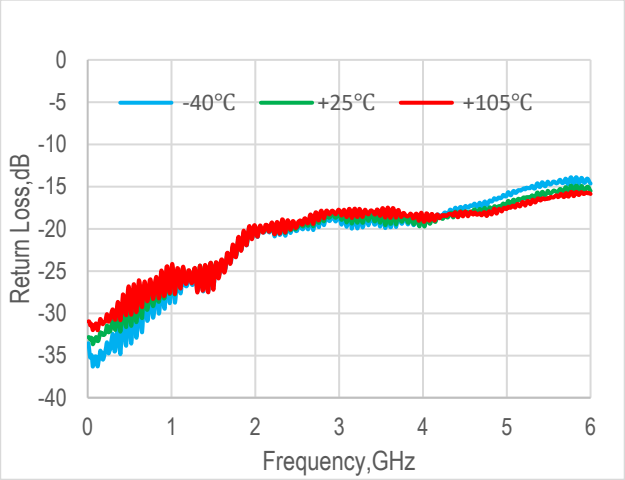


Figure 6. RF2 Return Loss

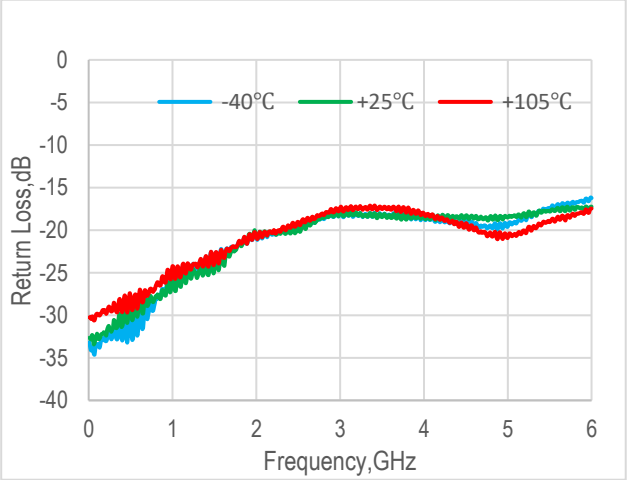


Figure 8. RFC Return Loss

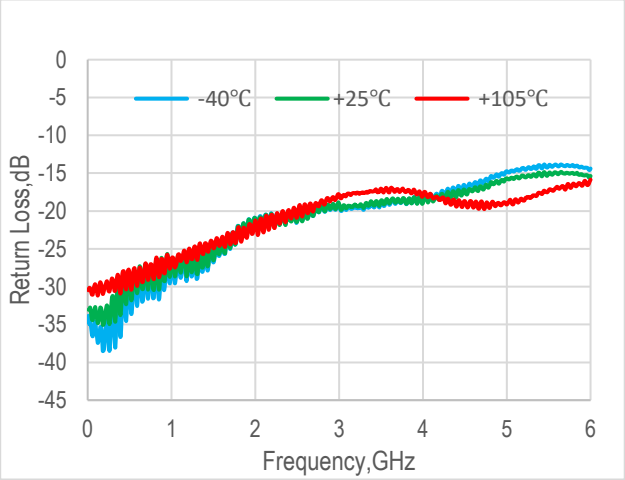
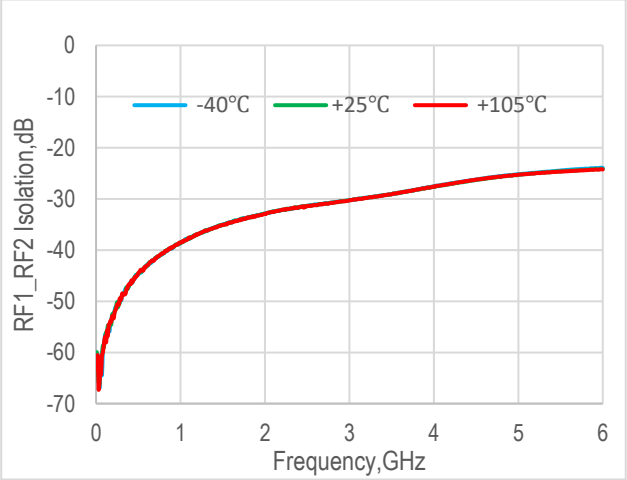


Figure 9. RF1-RF2 Isolation



Typical Performance Characteristics

Figure 10. RFX-RFX Isolation

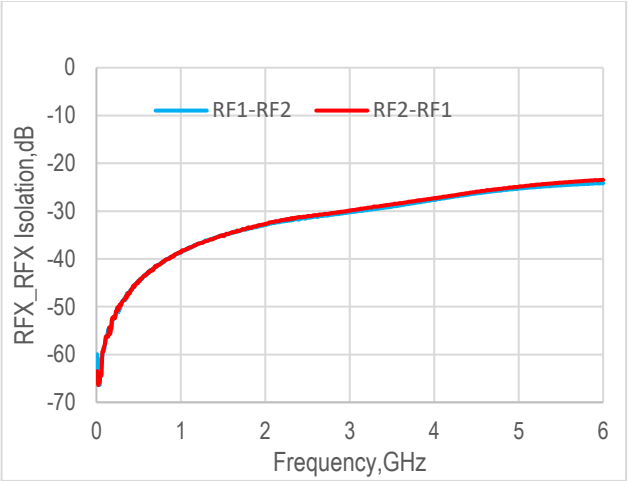


Figure 10. RFC-RFX Isolation

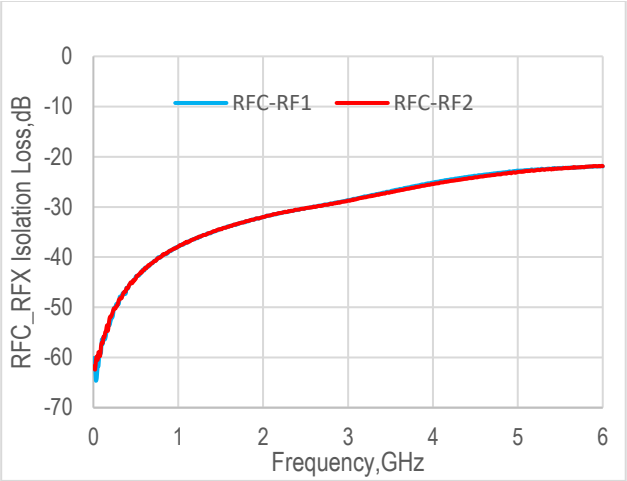


Figure 12. NoiseFigure

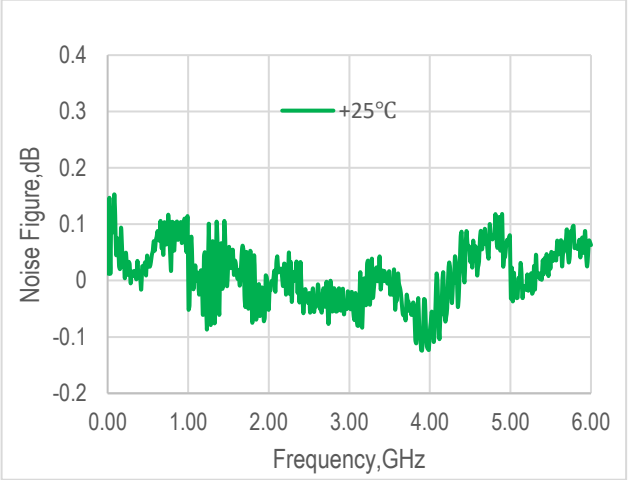


Figure 13. Spur_0.1GHz***

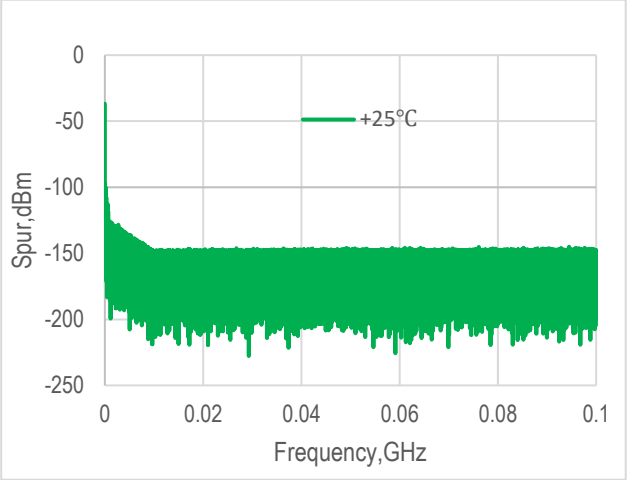


Figure 14. Spur_0.1-0.5GHz***

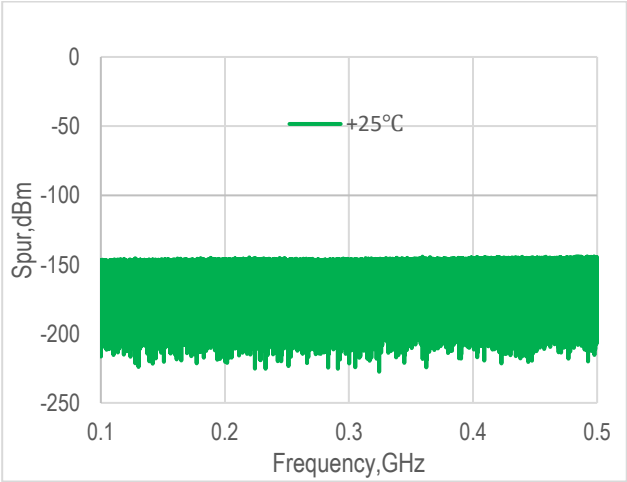
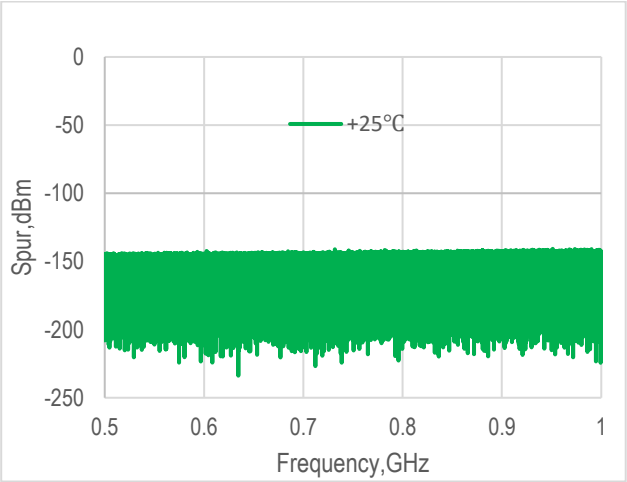
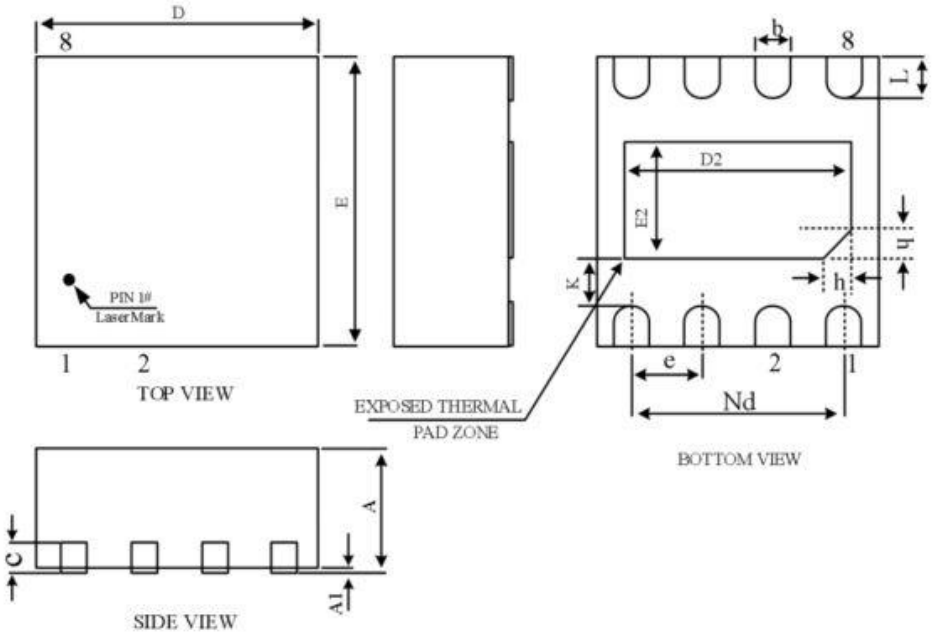


Figure 15. Spur_0.5-1GHz***



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

Package Drawing



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.80	0.85	0.90
A1	0.00	0.02	0.05
b	0.20	0.25	0.30
c		0.203REF	
D	1.95	2.00	2.05
D2	1.55	1.60	1.65
Nd		1.50BSC	
e		0.50BSC	
E	1.95	2.00	2.05
E2	0.75	0.80	0.85
L	0.25	0.30	0.35
K	0.25	0.30	0.35
h		0.20REF	

Figure 16

Ordering Information

Table 6

Order Code	Part Marking	Package	Shipping Method
RS1121A	1121	DFN2X2_8PIN	5000 units

Revision History

Table 7

Revision Number	Revision Date	Description	Modifications
0	2022/1/7	Draft	—
0.1	2022/3/8	Initial release	
0.2	2022/10/15	Preliminary	Modify the format
1.0	2023/3/15	Product Specification	
1.1	2023/6/19	Update	Modify P-0.1@3.3V
1.2	2025/06	Update	Modify All

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

For additional information, contact Sales at sales@rfonetech.com.

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