Product Specification

RS1924 Wideband DPDT

General Description

The RS1924 is a silicon-based, high power, 40 MHz to 6.0 GHz, double-pole, double-throw (DPDT) 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 RS1924 has a low insertion loss of 0.5 dB typical to 3.0 GHz, an input third-order intercept (IP3) of 64 dBm (typical), and a 0.1 dB compression point (P0.1dB) of 43 dBm.

On-chip circuitry operates at a single positive supply voltage of 3 V at a typical supply current of 50 uA, making the RS1924 an ideal alternative to pin diode-based switches. The RS1924 comes in an RoHS compliant, compact, 10-lead,1.1 mm × 1.5 mm LGA Competitive Advantage.

Applications

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

Features

- Reflective, 50 Ω design
- Low insertion loss: 0.5 dB typical to 3.0 GHz
- High linearity
  - P0.1dB: 43 dBm typical
  - IP3: 64 dBm typical
- Single positive supply: 3V
- Positive control, CMOS/TTL compatible
- 10-lead, 1.1 mm × 1.5 mm LGA package

Functional Block Diagram

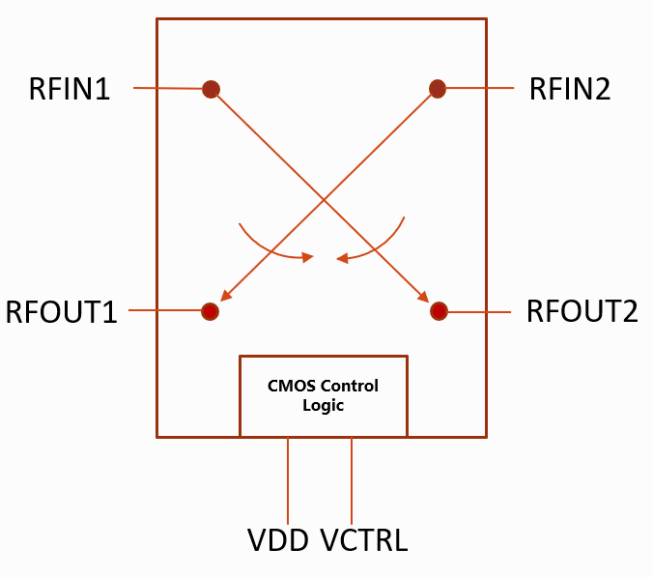


Figure 1

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Absolute Maximum Ratings

Table 1

Parameter	Min	Max	Units
VDD to GND	-0.3	3.6	V
VCTRL to GND	-0.3	3.6	V
Maximum Junction Temperature		140	°C
Storage Temperature Range	-65	150	°C
Lead Temperature (soldering, 10s)		260	°C
ESD Voltage– HBM (Per JESD22-A114)		1000	V
ESD Voltage – CDM (Per JESD22-C101)		500	V

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
Supply Voltage		1.5		3.3	V
Operating Temp Range	Case Temperature	-40		85	℃
RF Frequency Range		40		6000	MHz
Input Power	2.5GHz			40	dBm

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=3V), T_C = +25°C, F_{RF} = 3500MHz, PCB board trace and connector losses are de-embedded unless otherwise noted.

Table 3

Parameter	Conditions	Min	Typ	Max	Units
Insertion Loss	40MHz – 1000MHz		0.32		dB
	1000MHz - 2000MHz		0.38		
	2000MHz - 3000MHz		0.5		
	3000MHz – 6000MHz		0.78		
Isolation	40MHz – 1000MHz		55		dB
	1000MHz - 2000MHz		46		
	2000MHz - 3000MHz		43		
	3000MHz – 6000MHz		40		
Return Loss (RFC)	40MHz – 6000MHz		-18		dB
Return Loss (RFX)	40MHz – 6000MHz		-18		dB
Input 0.1dB Compression	2.5GHz		43		dBm
Input IP2	Input power = 18dBm,F1@700MHz ,F2@710MHz		118		dBm
Input IP3	Input power = 18dBm,F1@1880MHz ,F2@2000MHz		64		dBm
Switching Time	50% CTRL to 90% RF		2		us
	50% CTRL to 10% RF		2		
Logic Input High Threshold		1.4	3	3.3	V
Logic Input Low Threshold		-0.3		0.6	V
Logic Current	For each control pin		1		μA
DC Current (VDD)			50		μA

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Pin Diagram

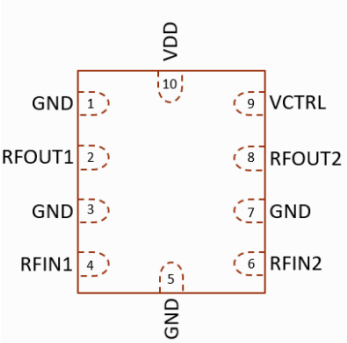


Figure 2

Pin Description

Table 4

Pin No.	Label	Description
1,3,5,7	GND	Ground.
2	RFOUT1	RFOUT Port1
4	RFIN1	RFIN Port1
6	RFIN2	RFIN Port2
8	RFOUT2	RFOUT Port2
9	VCTRL	Control voltage pin
10	VDD	Power Supply

Control Logic

Table 5

Digital Control Input (VCTRL)	Path
Low	RFIN1 to RFOUT1 on, RFIN2 to RFOUT2 on
High	RFIN1 to RFOUT2 on, RFIN2 to RFOUT1 on

Application Circuit

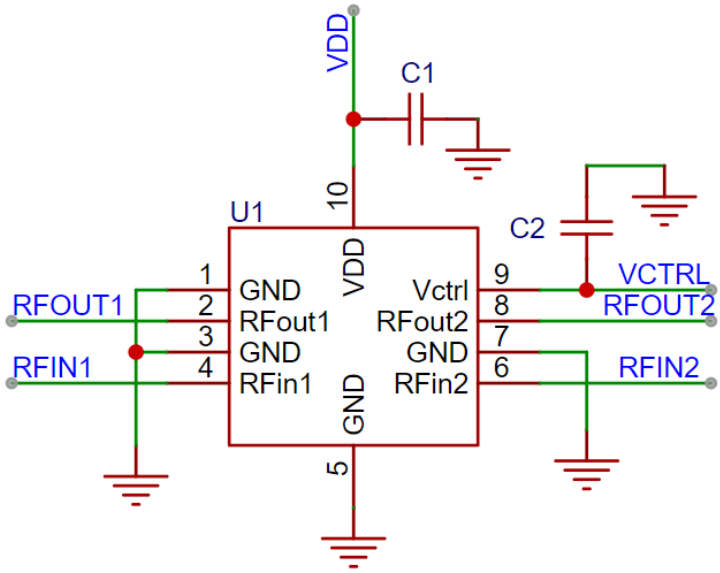


Figure 3

Table 6

Reference Designator	Value	Description
C1	100nF	C0402
C2	100pF	C0402
U1	\	RS1924

Typical Performance Characteristics

Figure 4. Insertion Loss

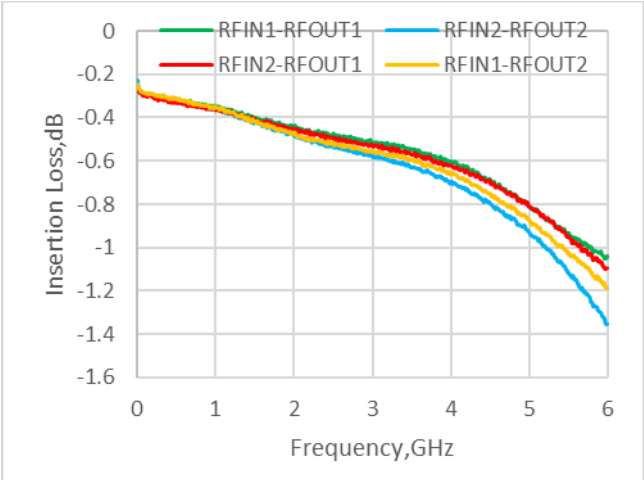


Figure 5. Input Return Loss

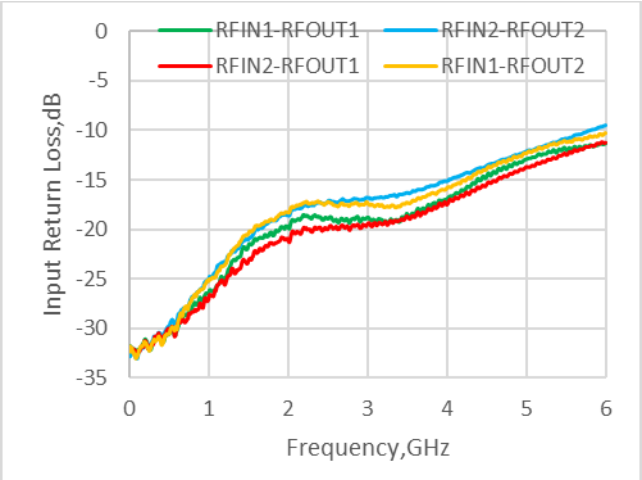


Figure 6. Output Return Loss

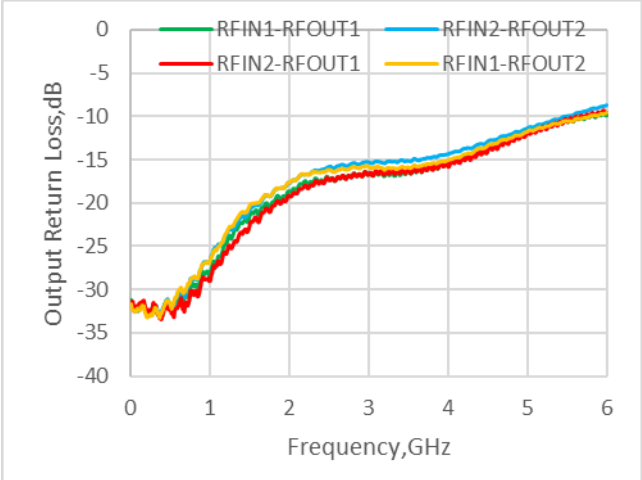


Figure 7. Isolation

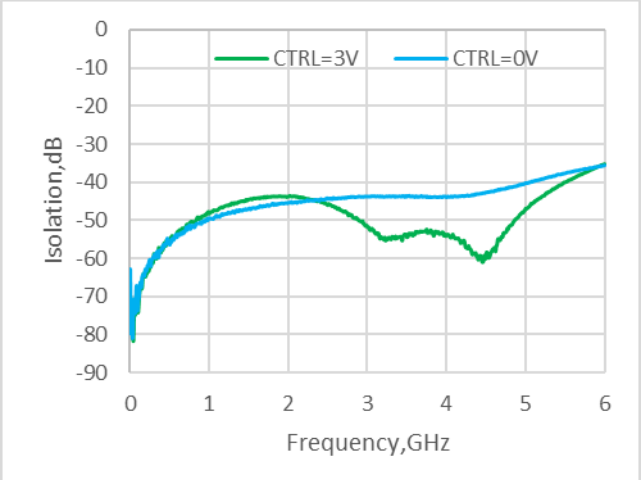


Figure 8. Insertion Loss

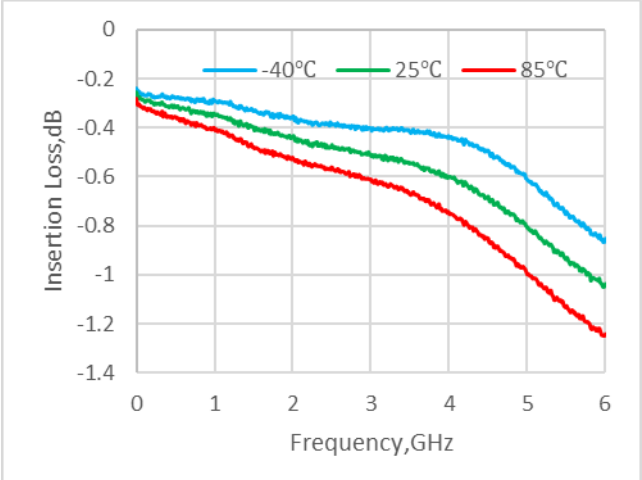
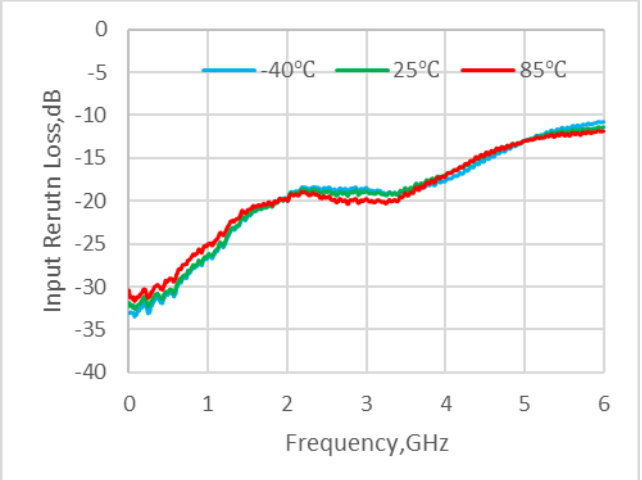


Figure 9. Input Return Loss



Typical Performance Characteristics

Figure 10. Output Return Loss

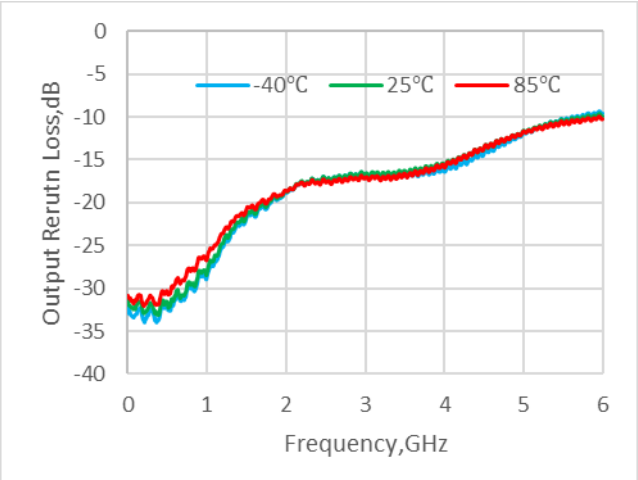


Figure 11. Isolation

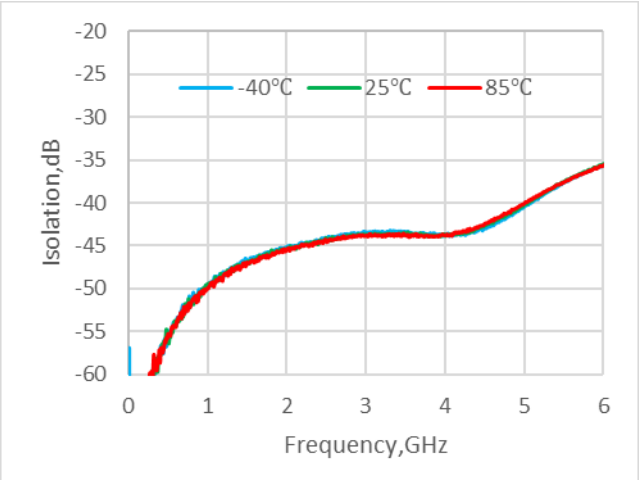


Figure 12. Noise Figure

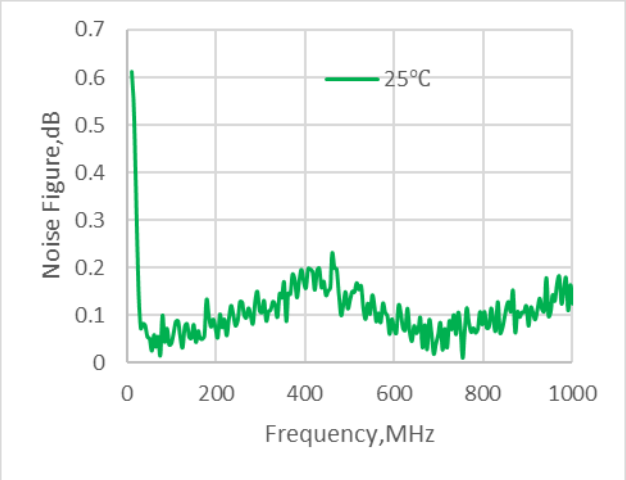


Figure 13. Spur(0~30M) *

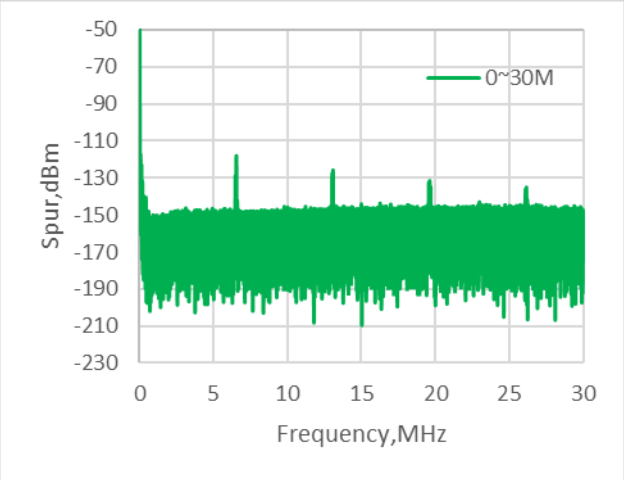


Figure 14. Spur(30~100M) *

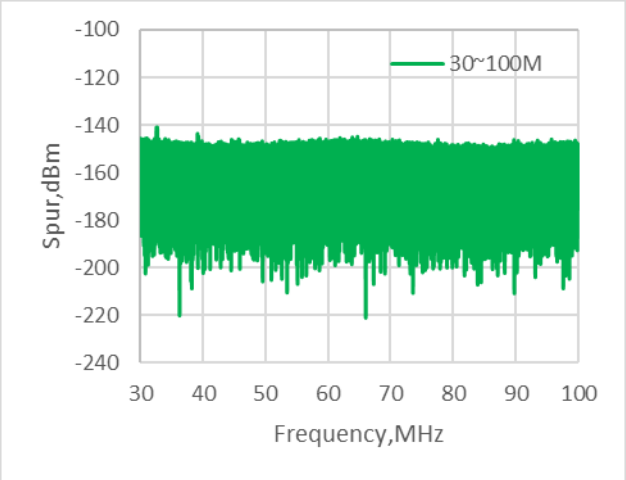
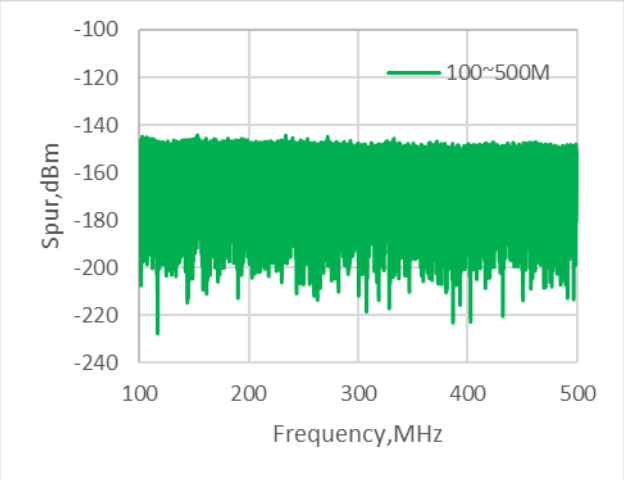


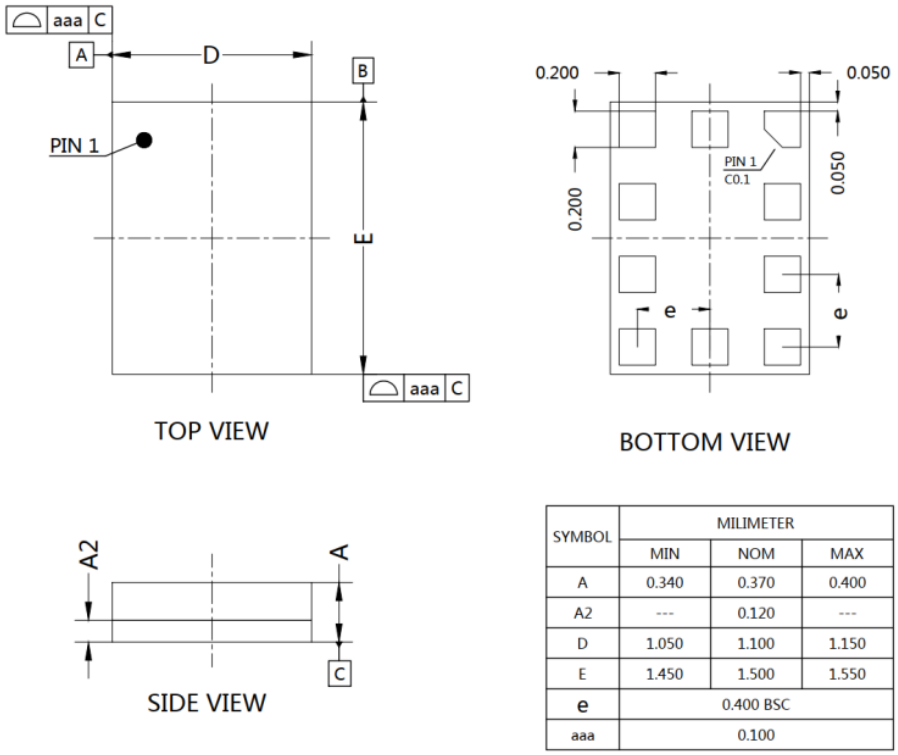
Figure 15. Spur(100~500M) *



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

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Package Drawing



SYMBOL	MILIMETER		
	MIN	NOM	MAX
A	0.340	0.370	0.400
A2	---	0.120	---
D	1.050	1.100	1.150
E	1.450	1.500	1.550
e	0.400 BSC		
aaa	0.100		

Figure 16

Revision History

Table 7

Revision Number	Revision Date	Description	Modifications
0	2020/11/7	Draft	—
0.1	2020/12/8	Initial release	
0.2	2021/1/7	Preliminary	Modify the format
0.3	2021/2/26	Preliminary	Add applications information
0.4	2021/5/20	Preliminary	
0.5	2021/9/22	Release	Modify the control logic
0.6	2025/08/25	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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