Product Specification

RS1422 Low Power Consumption SPDT

General Description

The RS1422 is a silicon-based, high power, low insertion loss, 10 MHz to 3.0 GHz, single-pole, double-throw (SPDT) reflective switch in a 6 leads SC-70 package. This reflective switch integrates on-board CMOS control logic with a low voltage CMOS-compatible control interface, and can be controlled using either single-pin or complementary control inputs. Using a nominal +3-volt power supply voltage, a typical input 0.1dB compression point of +36 dBm can be achieved.

Features

- Reflective, 50 Ω design
- High input 0.1 dB compression point of 36dBm
- Low insertion loss:
  - 0.3dB typical to 1.0 GHz
  - 0.6dB typical to 3.0 GHz
- Isolation of 35dB at 1.0GHz
- High ESD tolerance of 2000V HBM
- Single positive supply: 1.8 – 3.3 V
- Ultra-small SC-70 package

Applications

- IoT
- WiFi
- General application

Functional Block Diagram

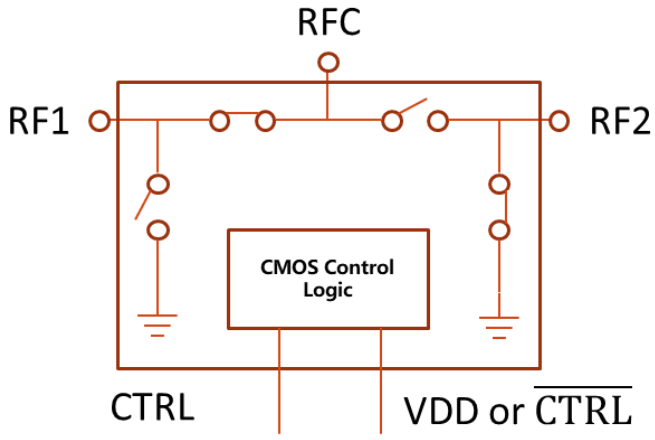


Figure 1

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Absolute Maximum Ratings

Table 1

Parameter	Min	Max	Units
VDD to GND	-0.3	4.0	V
VCTRL to GND	-0.3	4.0	V
Input Power (50ohm)		36	dBm
Storage Temperature Range	-65	150	°C
ESD Voltage– HBM (Per JESD22-A114)		2000	V
ESD Voltage – MM (Per JESD22-C114-B)		100	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.

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Recommended Operating Conditions

Table 2

Parameter	Min	Typical	Max	Unit
Supply Voltage (VDD)	1.8	3	3.3	V
IDD Power Supply Current		10.0		uA
Operating Temp Range	-40	25	85	°C
Control Logic High Voltage	0.7xVDD			V
Control Logic Low Voltage			0.3xVDD	V

Specification

Typical Application Circuit, Normal mode (VDD=3.3V), T_C = +25°C, F_{RF} = 2000MHz, 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	10MHz-1000MHz		0.3		dB
	1000MHz-2000MHz		0.35		
	2000MHz-3000MHz		0.6		
Isolation RFC to RFX	10MHz-1000MHz		35		dB
	1000MHz-2000MHz		25		
	2000MHz-3000MHz		16		
Isolation RFX to RFX	10MHz-1000MHz		35		dB
	1000MHz-2000MHz		25		
	2000MHz-3000MHz		16		
Return Loss (RFC)	10MHz-1000MHz		-28		dB
	1000MHz-2000MHz		-28		
	2000MHz-3000MHz		-20		
Return Loss (RFX)	10MHz-1000MHz		-28		dB
	1000MHz-2000MHz		-28		
	2000MHz-3000MHz		-20		
Input 0.1dB Compression	700MHz		36		dBm
Input IP3	1000MHz, 20dBm input power		55		dBm
Switching Time	50% CTRL to 90% RF		450		ns
	50% CTRL to 10% RF		450		

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Pin Diagram

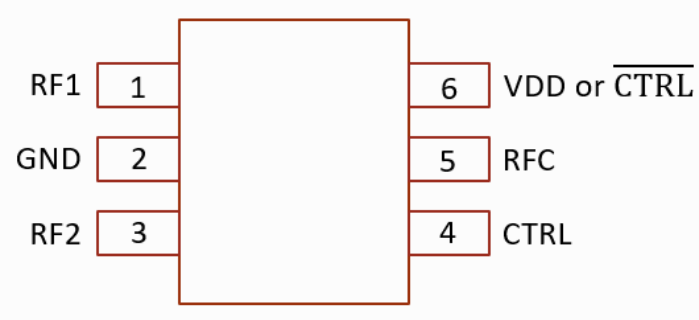


Figure 2

Pin Description

Table 4

Pin No.	Pin Name	Description
1	RF1	RF port 1.
2	GND	Ground connection. Traces should be physically short and connected to ground plane for best performance.
3	RF2	RF port 2.
4	CTRL	Switch control input, CMOS logic level.
5	RFC	RF common.
6	VDD or $\overline{CTRL}$	This pin supports two interface options: Single-pin control mode. A nominal 3-volt supply connection is required. Complementary-pin control mode. A complementary CMOS control signal to CTRL is supplied to this pin. Bypassing on this pin is not required in this mode.

Control Logic

Table 5

Control Voltages	Signal Path	Mode
Pin 6 (VDD) = VDD Pin 4 (CTRL) = High	RFC to RF1	Single Pin Control
Pin 6 (VDD) = VDD Pin 4 (CTRL) = Low	RFC to RF2	
Pin 6 (VDD or $\overline{CTRL}$) = Low Pin 4 (CTRL) = High	RFC to RF1	Complementary-Two Pin Control
Pin 6 (VDD or $\overline{CTRL}$) = High Pin 4 (CTRL) = Low	RFC to RF2	

Applications Information

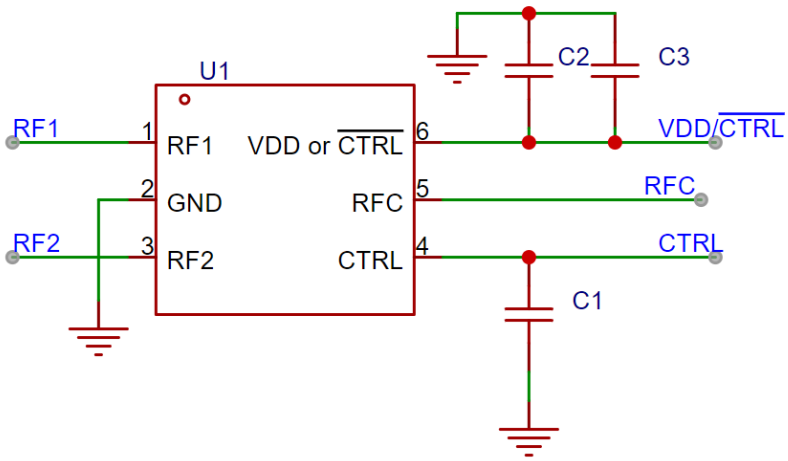


Figure 3

Table 6

No.	Designator	Comment	Footprint
1	C1,C2	100pF	C0402
2	C3	100nF	C0402
3	U1	RS1422	

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Typical Performance Characteristics

Figure 4. Insertion Loss

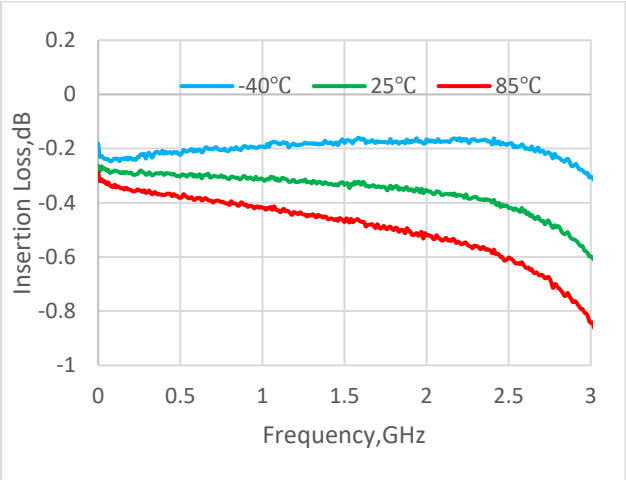


Figure 5. RFC Return Loss

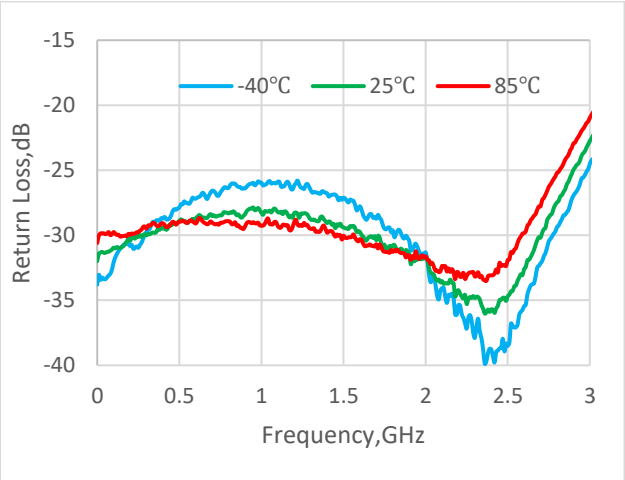


Figure 6. RFX Return Loss

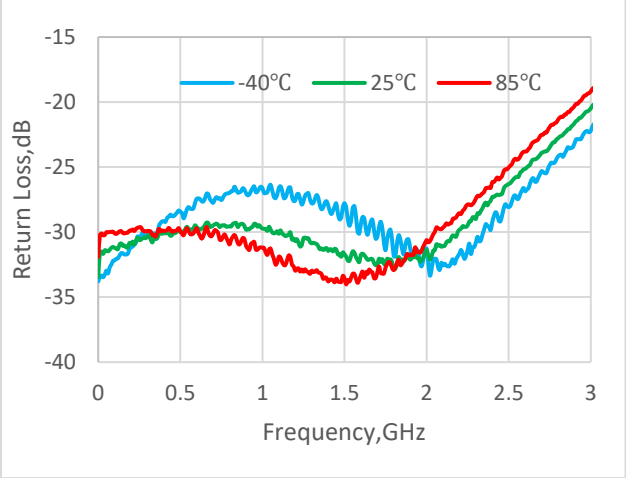


Figure 7. RFC–RFX Isolation

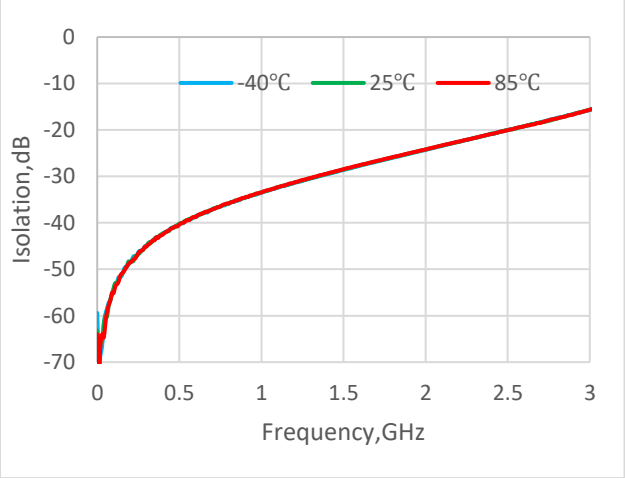


Figure 8. RFX–RFX Isolation

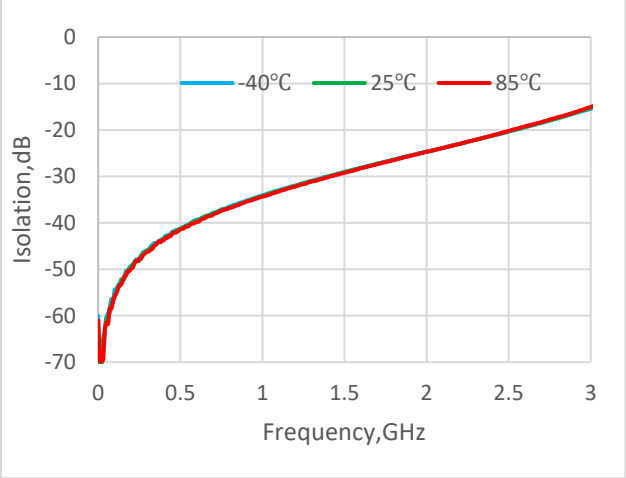
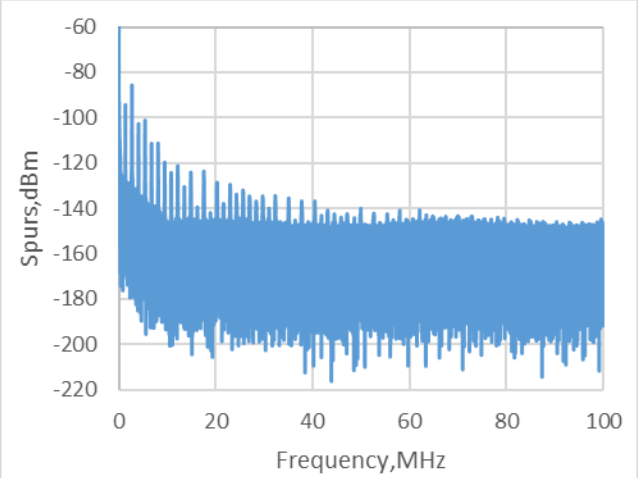
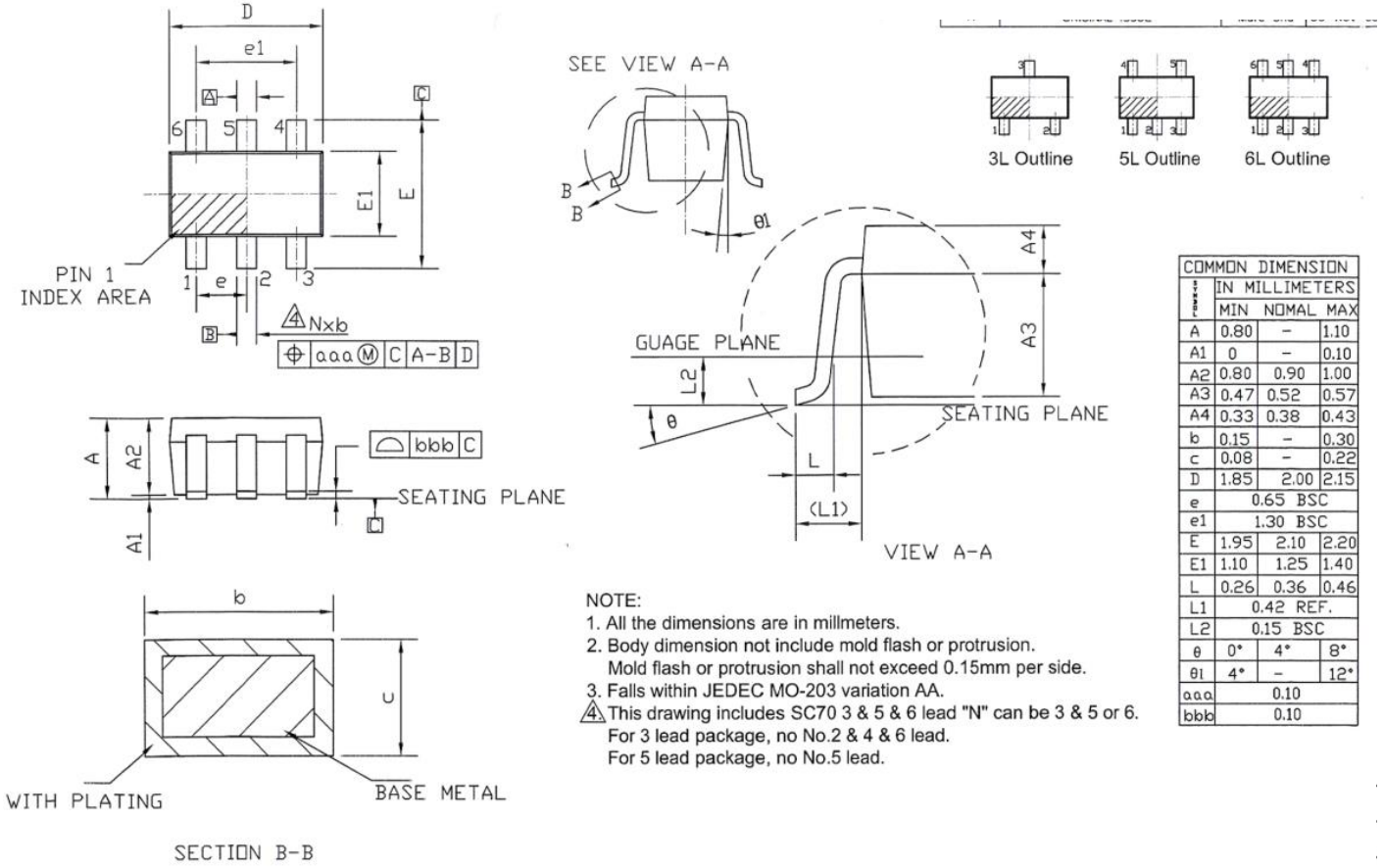


Figure 9. Spur@RBW=100Hz



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Package Drawing

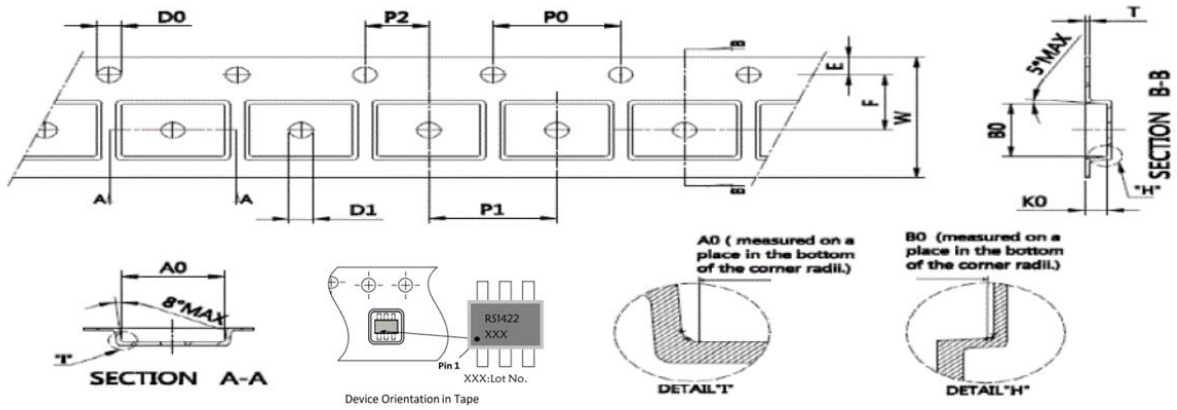


NOTE:
1. All the dimensions are in millmeters.
2. Body dimension not include mold flash or protrusion.
   Mold flash or protrusion shall not exceed 0.15mm per side.
3. Falls within JEDEC MO-203 variation AA.
4. This drawing includes SC70 3 & 5 & 6 lead "N" can be 3 & 5 or 6.
   For 3 lead package, no No.2 & 4 & 6 lead.
   For 5 lead package, no No.5 lead.

COMMON DIMENSION			
SYMBOL	IN MILLIMETERS		
	MIN	NOMAL	MAX
A	0.80	–	1.10
A1	0	–	0.10
A2	0.80	0.90	1.00
A3	0.47	0.52	0.57
A4	0.33	0.38	0.43
b	0.15	–	0.30
c	0.08	–	0.22
D	1.85	2.00	2.15
e	0.65 BSC		
e1	1.30 BSC		
E	1.95	2.10	2.20
E1	1.10	1.25	1.40
L	0.26	0.36	0.46
L1	0.42 REF.		
L2	0.15 BSC		
θ	0°	4°	8°
θ1	4°	–	12°
aaa	0.10		
bbb	0.10		

Figure 10

Tape & Reel Specifications



Symbol	A0	B0	K0	P0	P1	P2	T
Spec	2.35±0.10	2.40±0.10	1.22±0.10	4.00±0.10	4.00±0.10	2.00±0.05	0.25±0.02
Symbol	E	F	D0	D1	W	10P0	
Spec	1.75±0.10	3.50±0.05	$1.50^{+0.10}_{+0}$	$1.00^{+0.25}_{0}$	$8.00^{+0.30}_{-0.10}$	40.00±0.20	

Figure 11

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Revision History

Table 7

Revision Number	Revision Date	Description	Modifications
0.0	2020/11/12	Draft	—
0.1	2020/12/10	Initial release	
0.2	2021/6/28	Update	
0.3	2021/9/27	Update	Specification & application information
1.0	2021/10/22	Released	Add Tape & Reel information Add Ordering Information
1.1	2022/3/22	Released	
1.2	2022/9/15	Released	Modify Ordering Information
1.3	2022/12/13	Released	Modify Switching time
1.4	2023/9/13	Released	Update package figure
1.5	2025/7/15	Released	Update all temperature figure

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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