

GSR1370S: CMOS SOI SPDT Switch

0.01 – 7.2 GHz

Applications

- WLAN 802.11a/b/g/n/ac/ax/be networks
- ISM band radios
- Low power T/R systems

Features

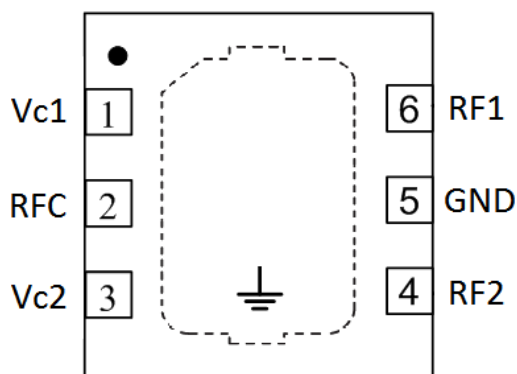
- $P_{0.1dB}$ +32dBm typical @ +3.3V

- Low insertion loss (0.50dB @ 2.5GHz, 0.58dB @ 5.8GHz)
- High isolation (25dB @ 2.5GHz)
- Low delay, switch time: 75~125nS
- 1.5mm × 1.5mm QFN Package (MSL3, 260°C per JEDEC-J-STD-020)

Description

Using advanced switching technologies, the GSR1370S is a single pole dual throw (SPDT) high power switch in a low cost miniature 1.5 mm × 1.5 mm package. The GSR1370S is ideally suited for applications where high power, low insertion loss and small size are required. Typical applications are for handset systems that connect separate transmit and receive functions to a common antenna, as well as other related handset and general purpose applications. This part can be used in all systems operating up to 7.2 GHz required high power at low control voltage.

Function and Pin Definition



GSR products are compliant with all applicable legislation and are halogen-free. For additional information, refer to GSR Microelectronics RoHS Compliance Declaration.

Figure 1. GSR1370S Pin-Def.
(Top View)

Table 1. GSR1370S Pin Definition

Pin #	Name	Description	Pin #	Name	Description
1	Vc1	Logic control	4	RF2	RF port 2
2	RFC	Common Port	5	GND	Ground
3	Vc2	Logic control	6	RF1	RF port 1

Table 2. GSR1370S Absolute Maximum Ratings

Parameter	Absolute Maximum
Max Input Power (0.01 – 7.2 GHz, 3.3 V control)	+32.5 dBm
Operating Voltage	+4.2 V
Thermal resistance (Θ_{JC})	25 °C/W
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +150°C

Table 3. GSR1370S Recommended Operating Conditions

Parameter	Symbol	Minimum	Typical	Maximum	Units
Operating frequency	f_0	0.01		7.2	GHz
Control voltage:					
Low	Vc_L	0	0	0.4	V
High	Vc_H	1.6	3.3	3.6	V
Operating temperature	T _{oper.}		25		°C

Truth Table and Pin Out

Table 4. GSR1370S Truth Table

Mode	Vc1	Vc2	RFC—RF1	RFC—RF2
1	1	0	Insertion loss	Isolation
2	0	1	Isolation	Insertion loss

Note: "1" indicates 1.6 to 3.6 V, "0" indicates 0 to 0.4 V.

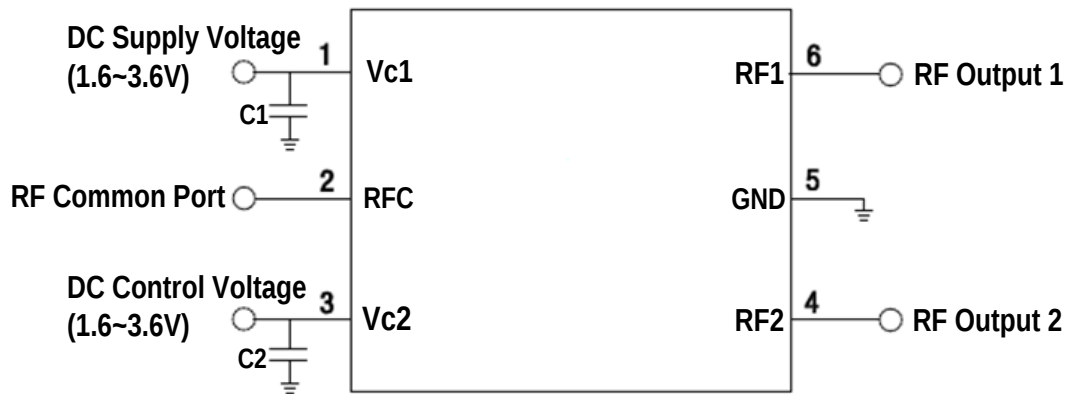


Figure 2. GSR1370S Pin Out

C1 and C2 are optional bypass capacitors (100pF). The RF path should use DC block capacitor if it's with any dc voltage.

Electrical Specification

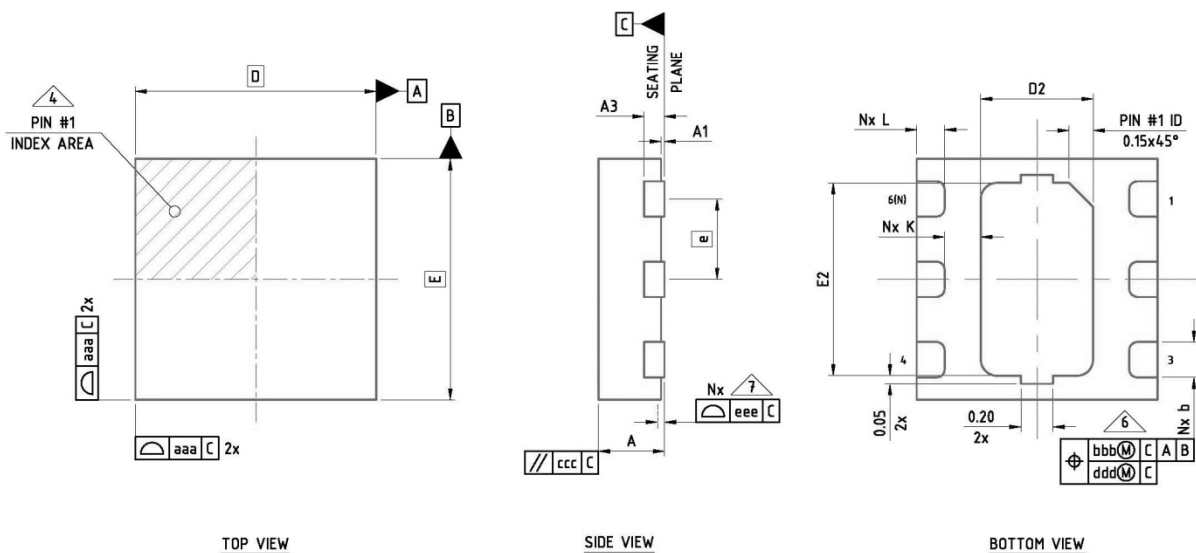
Table 5. GSR1370S electrical specifications at 25 °C (0 , +3.3 V)

Parameter	Test Condition	Min.	Typ.	Max.	Units
Insertion Loss	0.01GHz — 2.0GHz		0.38	0.55	dB
	2.0GHz — 2.5GHz		0.50	0.75	dB
	4.8GHz — 6.0GHz		0.58	0.78	dB
	6.0GHz — 7.2GHz		0.75	1.00	dB
Isolation (RFC to RF1/RF2)	0.01GHz — 2.0GHz		-32	-29	dB
	2.0GHz — 2.5GHz		-25	-22	dB
	4.8GHz — 6.0GHz		-24	-20	dB
	6.0GHz — 7.2GHz		-22	-20	dB
Isolation (RF1 to RF2)	0.01GHz — 2.0GHz		-34	-30	dB
	2.0GHz — 2.5GHz		-27	-24	dB
	4.8GHz — 6.0GHz		-25	-22	dB
	6.0GHz — 7.2GHz		-24	-22	dB
Return Loss (S11)	0.01GHz — 2.0GHz		-24	-18	dB
	2.0GHz — 2.5GHz		-16	-13	dB
	4.8GHz — 7.2GHz		-17	-14	dB
2 nd Hamonic	2.4GHz, Pin=+24dBm. Vc = 0V/3.3V		-55		dBm
3 rd Hamonic	2.4GHz, Pin=+24dBm. Vc = 0V/3.3V		-53		dBm
IP _{0.1dB}	2.0 – 7.2 GHz, Vc = 0V/3.3V	30	32		dBm
IP _{1dB}	2.0 – 7.2 GHz, Vc = 0V/3.3V	30.5	32.5		dBm
Vc1,Vc2	Control voltage	1.6	3.3	3.6	V
I _{vc}	Vc1=3.3V, Vc2=0V, Vc1 pin current		15	20	uA
	Vc1=0V, Vc2=3.3V, Vc2 pin current		15	20	uA
Trise, Tfall	10% to 90% RF, 90% to 10% RF		35		ns
Ton, Toff	50% control to 90% RF, and 50% control to 10% RF (Switching Time)		125		ns

Note 1: Performance is guaranteed only under the conditions listed in this Table.

2: Board loss de-embedded.

Package Dimensions



Dimension Table				
Thickness Symbol	X1			NOTE
	MINIMUM	NOMINAL	MAXIMUM	
A	0.41	0.45	0.50	
A1	0.00	0.02	0.05	
A3	---	0.127 Ref	---	
b	0.17	0.22	0.27	6
D		1.50 BSC		
E		1.50 BSC		
e		0.50 BSC		
D2	0.55	0.70	0.80	
E2	1.05	1.20	1.30	
K	0.15	---	---	
L	0.125	0.175	0.225	
aaa		0.05		
bbb		0.10		
ccc		0.10		
ddd		0.05		
eee		0.08		
N		6		3
NE		3		5
NOTES		1, 2		

NOTE:

1. Dimensioning and tolerancing conform to ASME Y14.5-2009.
2. All dimensions are in millimeters.
3. N is the total number of terminals.
4. The location of the marked terminal #1 identifier is within the hatched area.
5. NE refers to the maximum number of terminals on E side.
6. Dimension b applies to the metalized terminal. If the terminal has a radius on the end of it, dimension b should not be measured in that radius area.
7. Coplanarity applies to the terminals and all other bottom surface metalization.

Figure 3. GSR1370S Package Dimensions

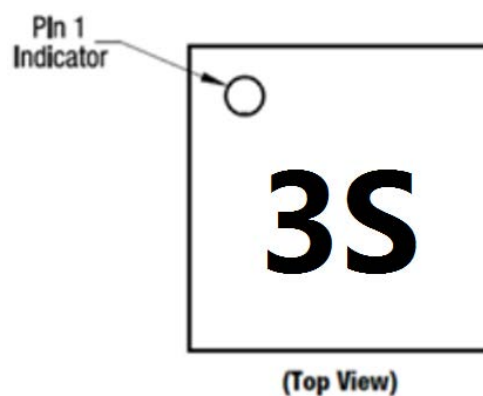


Figure 4. Typical Case Markings

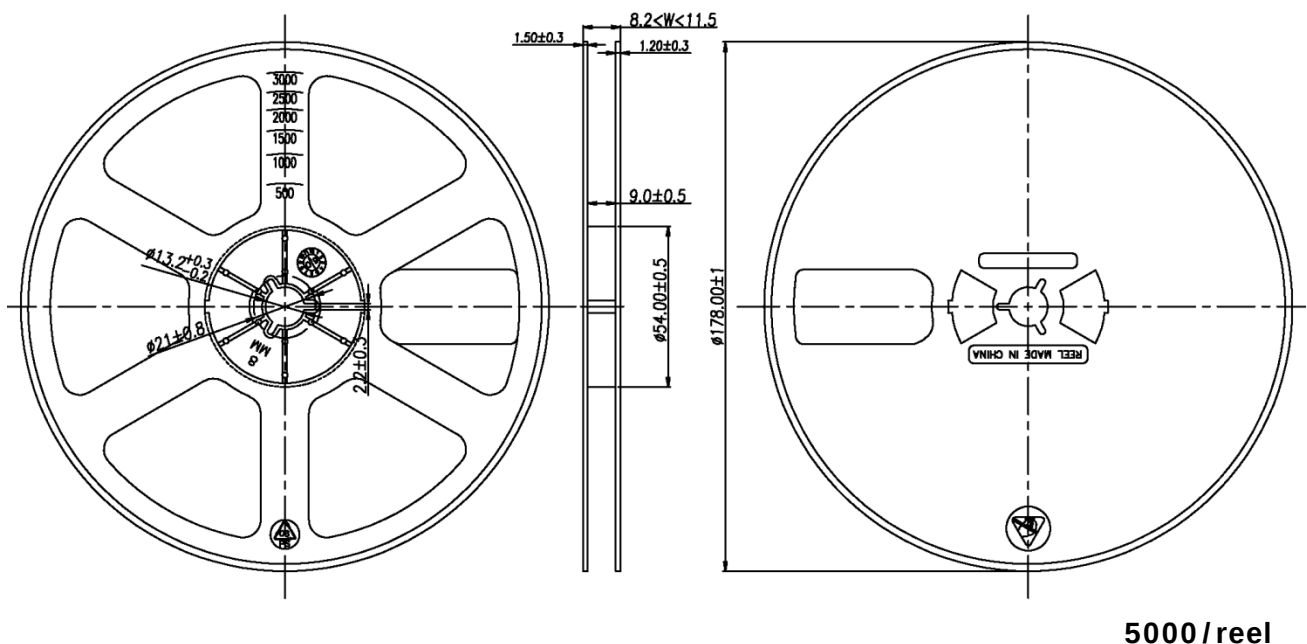
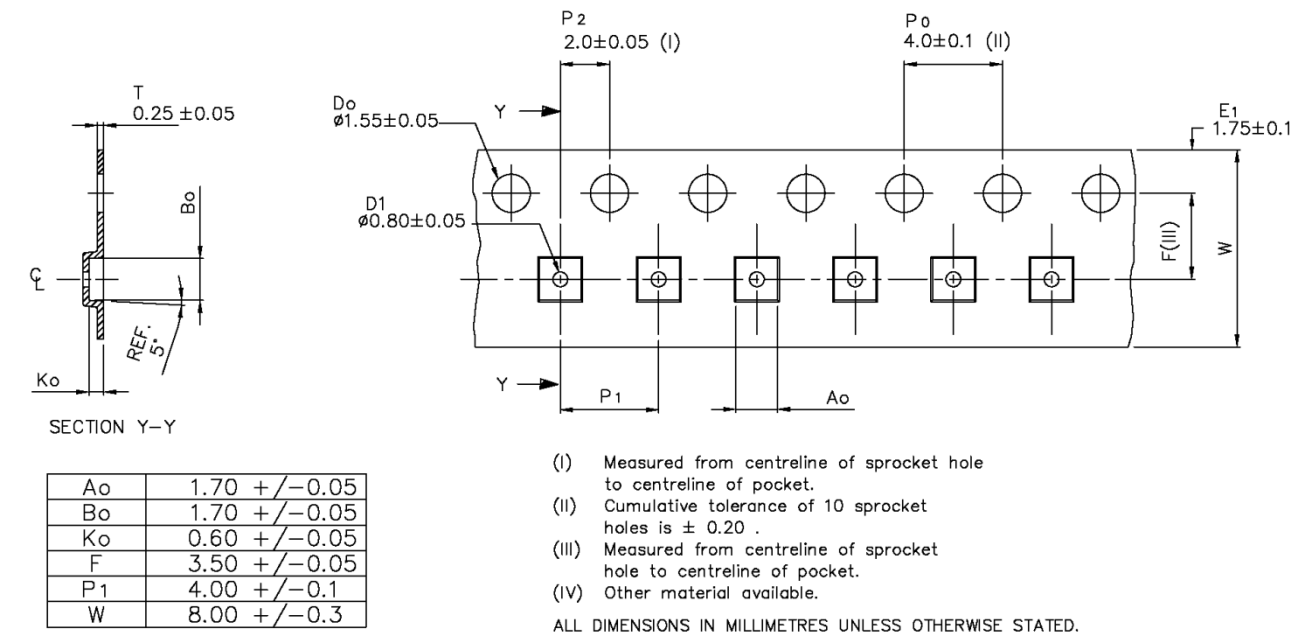
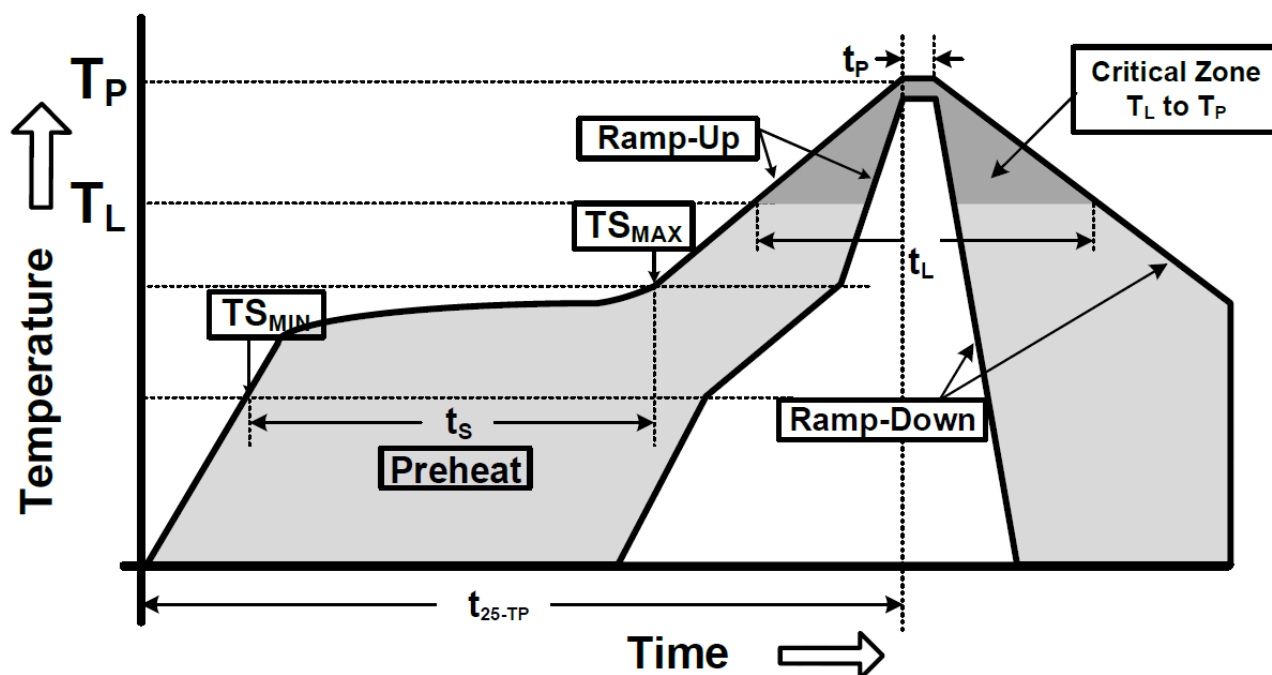


Figure 5. GSR1370S Tape and Reel Dimensions

Reflow Chart



Reflow Profile	Parameter
Preheat Temperature (TS_{MIN} to TS_{MAX})	150°C to 200°C
Preheat Time (t_s)	60 to 180 Seconds
Ramp-Up Rate (TS_{MAX} to T_P)	3°C/s MAX
Time Above T_L 217°C (t_L)	60 to 150 Seconds
Peak Temperature (T_P)	260°C
Time within 5°C of Peak Temperature (t_P)	20 to 40 Seconds
Ramp-Down Rate (TS_{MAX} to T_P)	6°C/s MAX
Time for 25°C to Peak Temperature (t_{25-TP})	8 Minutes MAX

ESD Precautions

The GSR1370S is a static-sensitive electronic device. Do not operate or store near strong electrostatic fields. ESD protection circuitry is contained in this device, but special handling precautions are required.

Electrostatic discharge	Symbol	Typ.
Human Body Model (HBM), Class-1C	ESD	1800 V
Charged Device Model (CDM), Class_C3	CDM	2000V

RoHS Compliant

The product does not contain lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE), and are therefore considered RoHS compliant.

Revision History

Rev.	Date	Description
1.0	May. 28, 2024	Initial Release
1.1	Dec. 16, 2024	Add Parameter Description
1.2	Mar. 4, 2025	Add Parameter Description