GSR1322S: High Isolation SPDT Switch 0.1 – 7.2 GHz

Applications

- Dual-band wireless (802.11a/b/g/n/ac/ax)
- Diversity antenna switching
- Low power T/R systems

Features

- $P_{0.1dB}$ +31.5dBm typical @ +3.3V
- Low insertion loss (0.5dB @ 2.5GHz)
- High isolation (45dB @ 2.5GHz)
- Low DC current: < 20uA
- Low delay, switch time: 100~200nS
- 1.1mm × 1.1mm QFN Package (MSL3, 260°C per JEDEC-J-STD-020)

Description

The GSR1322S is a CMOS SOI single pole dual throw (SPDT) with high power and high isolation switch in a low cost miniature 1.1 mm × 1.1 mm package. The GSR1322S is ideally suited for applications where high power, low insertion loss, and small size are required. Typical applications are for dual-band wireless 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 requiring high power at low control voltage.

Function and Pin Definition

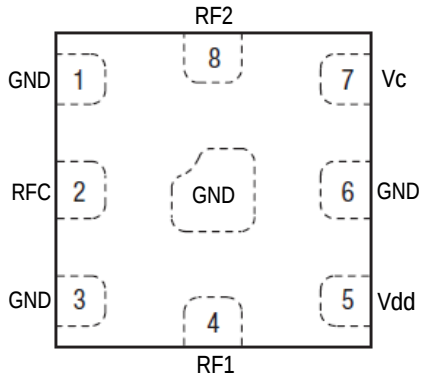


Figure 1. GSR1322S Pin-Def.

(Top View)

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

Table 1. GSR1322S Pin Definition

Pin #	Name	Description	Pin #	Name	Description
1, 3, 6	GND	Ground	5	Vdd	DC supply
2	RFC	Common port	7	Vc	Logic control
4	RF1	RF port 1	8	RF2	RF port 2

Table 2. GSR1322S Absolute Maximum Ratings

Parameter	Absolute Maximum
Max Input Power (0.1 – 7.2 GHz, 3.3 V control)	+32.5 dBm
Operating Voltage	+4.2 V
Thermal resistance (Θ_{JC})	25 ℃/W
Operating Temperature	-40℃ to +85℃
Storage Temperature	-65℃ to +150℃

Table 3. GSR1322S Recommended Operating Conditions

Parameter	Symbol	Minimum	Typical	Maximum	Units
Operating frequency	f_0	0.1		7.2	GHz
Supply voltage	Vdd	1.8	3.3	3.6	V
Control voltage: Low High	 Vc_L Vc_H	 0 1.8	 0 3.3	 0.2 3.6	 V V
Operating temperature	$T_{oper.}$		25		℃

Truth Table and Pin Out

Table 4. GSR1322S Truth Table 1

Vdd	Vc	RFC—RF1	RFC—RF2
Vdd	0	off	on
Vdd	1	on	off

Note: “1” = 1.8V to Vdd, Vdd = 1.8V to 3.6V, “0” = 0V to 0.2V.

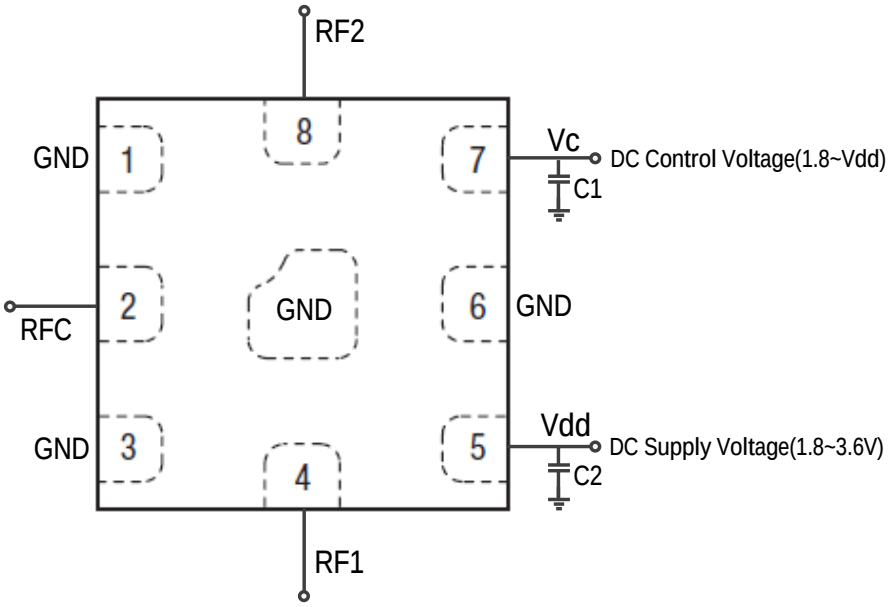


Figure 2. GSR1322S Pin Out

C1 and C2 are optional bypass capacitors (0.1pF or 0.2pF). The RF path should use DC block capacitor if it’s with any dc voltage.

Electrical Specification

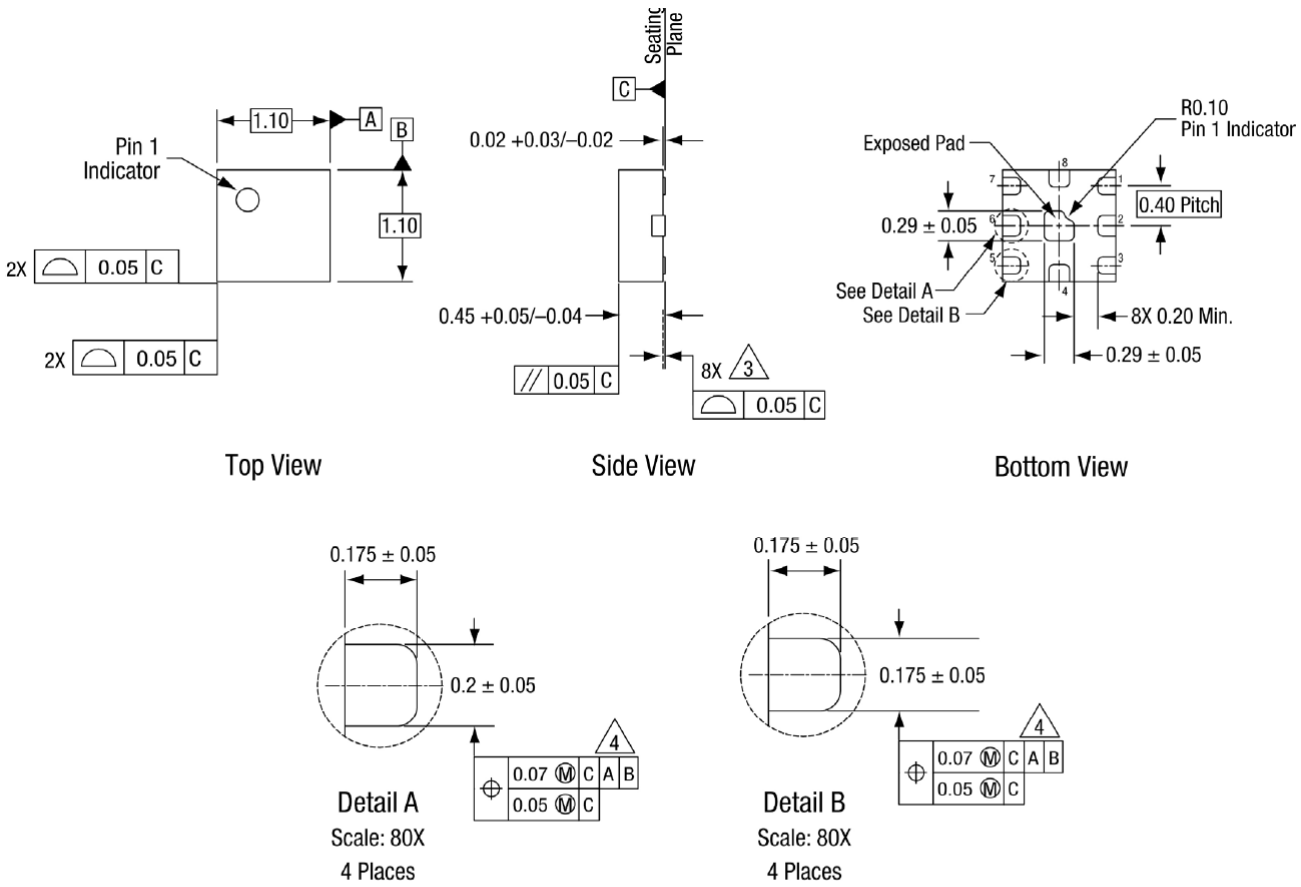
Table 5. GSR1322S electrical specifications at 25 ℃ (0 , +3.3 V)

Parameter	Test Condition	Min.	Typ.	Max.	Units
Insertion Loss	0.1GHz — 2.0GHz		0.45	0.65	dB
	2.4GHz — 2.5GHz		0.5	0.75	dB
	4.9GHz — 6.0GHz		0.8	1.1	dB
	6.0GHz — 7.2GHz		1.0	1.3	dB
Isolation (RFC to RF1,RF2)	0.1GHz — 2.0GHz	45	48		dB
	2.4GHz — 2.5GHz	42	45		dB
	4.9GHz — 6.0GHz	39	41		dB
	6.0GHz — 7.2GHz	32	34		dB
Isolation (RF1 to RF2)	0.1GHz — 2.0GHz	45	48		dB
	2.4GHz — 2.5GHz	41	44		dB
	4.9GHz — 6.0GHz	42	45		dB
	6.0GHz — 7.2GHz	35	40		dB
Return Loss	0.1GHz — 2.0GHz	20	30		dB
	2.4GHz — 2.5GHz	20	25		dB
	4.9GHz — 6.0GHz	16	20		dB
	6.0GHz — 7.2GHz	15	18		dB
2^{nd} Harmonic	2.4GHz, Pin=+24dBm. Vc = 0V/3.3V	-48	-55		dBm
3^{rd} Harmonic	2.4GHz, Pin=+24dBm. Vc = 0V/3.3V	-50	-57		dBm
$IP_{0.1dB}$	0.1-7.2GHz, Vc = 0V/3.3 V		31.5		dBm
IP_{1dB}	0.1-7.2GHz, Vc = 0V/3.3 V		32		dBm
Trise, Tfall	10% to 90% RF, 90% to 10% RF		50		ns
Ton, Toff	50% control to 90% RF, and 50% control to 10% RF		150	300	ns
Supply Current	Vdd = 1.8 to 3.6 V		13	20	uA
Control Current	Vc =3.3 V		2	5	uA

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

2: Board loss de-embedded.

Package Dimensions



Notes:

1. *All measurements are in millimeters.*
2. *Dimensions and tolerances according to ASME Y14.5M-1994.*
3. *Coplanarity applies to the terminals and all other bottom surface metallization.*
4. *Dimension applies to metallized terminal. If the terminal has a radius on its end, the dimension should not be measured in that radius area.*

Figure 3. GSR1322S Package Dimensions

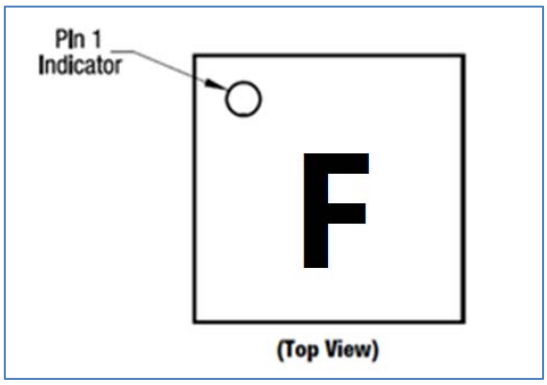
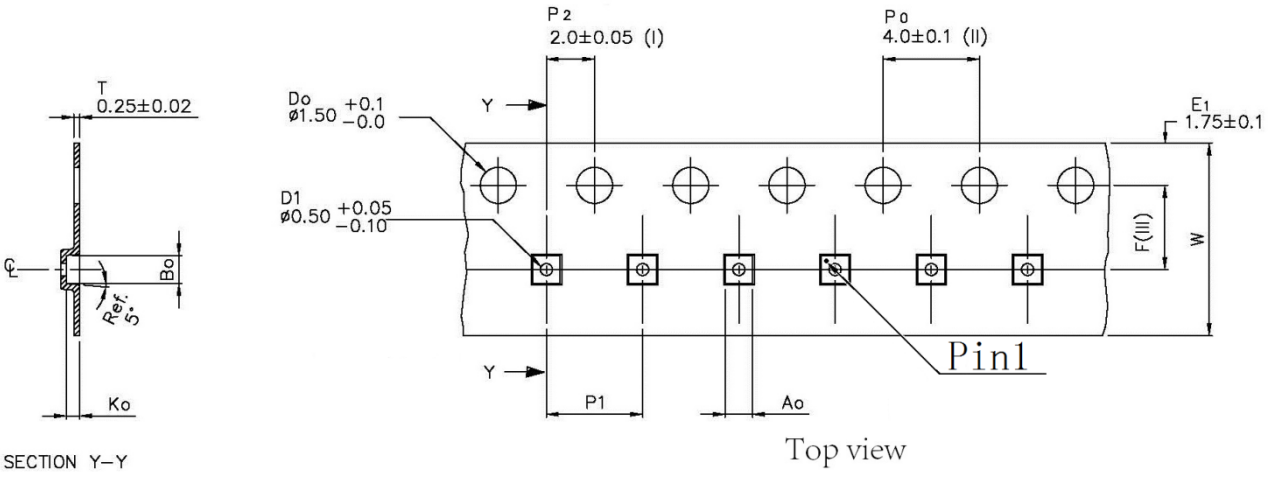


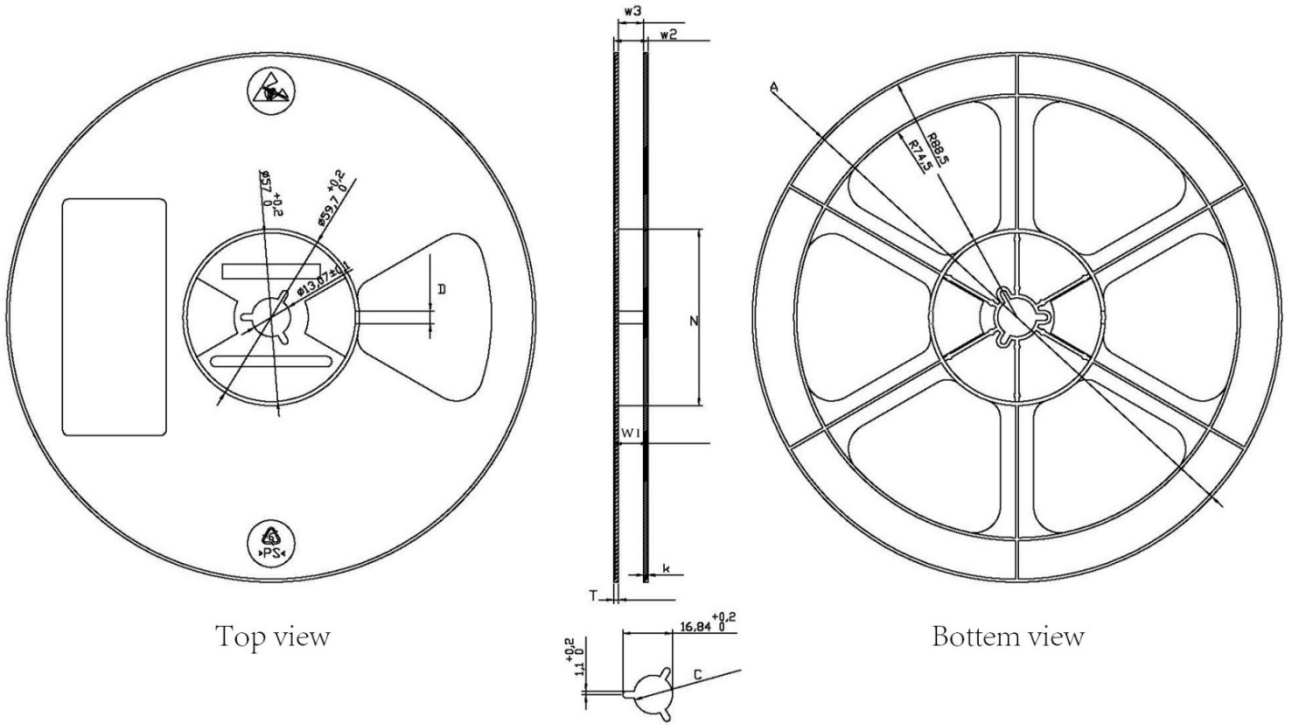
Figure 4. Typical Case Markings



Ao	1.14 +/−0.05
Bo	1.17 +/−0.05
Ko	0.56 +/−0.05
F	3.50 +/−0.05
P1	4.00 +/−0.10
W	8.00 +0.3/−0.1

(I) Measured from centreline of sprocket hole to centreline of pocket.
(II) Cumulative tolerance of 10 sprocket holes is ± 0.20 .
(III) Measured from centreline of sprocket hole to centreline of pocket.
(IV) Other material available.

ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED.



TYPE	A	N	C	D	w1	w2	w3	T	k
8MM	+2 ø180−2	+1 ø60−1	+0,2 ø13,1−0,2	4,2±0,5	+1 8,4−0	+1 11,6−1	+1 8,75−1	1,5±0,15	+0.1 1,25−0.05
12MM	+2 ø180−2	+1 ø60−1	+0,2 ø13,1−0,2	4,2±0,5	+1 12,5−0	+1 15,7−1	+1 12,7−1	1,5±0,15	1,2±0,1

5000/reel

Figure 5. GSR1322S Tape and Reel Dimensions

ESD Precautions

The GSR1322S is a static-sensitive electronic device. Do not operate or store near strong electrostatic fields. ESD protection circuitry is contended in this device, but special handling precautions are required.

Electrostatic discharge	Symbol	Typ.
Human Body Model (HBM), Class-1C	ESD	1500 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	Aug. 16, 2024	Initial Release