

GSR1317S: CMOS SOI SP3T Switch

0.02 – 7.2 GHz

Applications

- WLAN 802.11a/b/g/n/ac/ax networks
- ISM band radios
- Low power T/R systems
- Low insertion loss (0.38dB @ 2.5GHz, 0.55dB @ 5.8GHz)
- High isolation (32dB @ 2.5GHz)
- Low delay, switch time: 75~150nS
- 1.5×1.5×0.45mm QFN Package (MSL3, 260°C per JEDEC-J-STD-020)

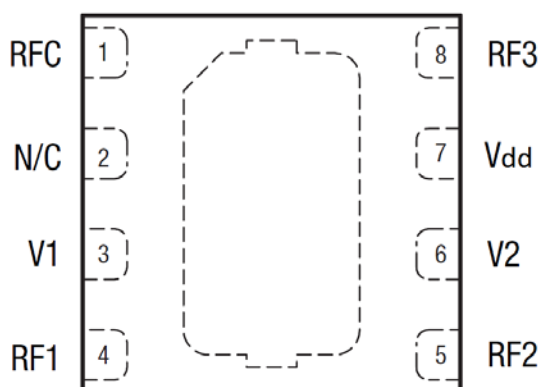
Features

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

Description

The GSR1317S is a CMOS SOI single pole triple throw (SP3T) high power switch in a low cost miniature 1.5×1.5×0.45mm package. The GSR1317S 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 requiring 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. GSR1317S Pin-Def.
(Top View)

Table 1. GSR1317S Pin Definition

Pin #	Name	Description	Pin #	Name	Description
1	RFC	Common Port	5	RF2	RF port 2
2	N/C	No connect	6	V2	Logic control 2
3	V1	Logic control 1	7	Vdd	DC power
4	RF1	RF port 1	8	RF3	RF port 3

Table 2. GSR1317S Absolute Maximum Ratings

Parameter	Absolute Maximum
Max Input Power (0.02 – 7.2 GHz, 3.3 V control)	+33 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. GSR1317S Recommended Operating Conditions

Parameter	Symbol	Minimum	Typical	Maximum	Units
Operating frequency	f_0	0.02		7.2	GHz
Supply Voltage	Vdd	1.2	3.3	3.6	V
Control voltage:					
Low	Vc_L	0	0	0.4	V
High	Vc_H	1.2	3.3	Vdd	V
Operating temperature	T _{oper.}		25		°C

Truth Table and Pin Out

Table 4. GSR1317S Truth Table

Mode	Insertion Loss Path	V1(pin3)	V2(pin6)
1	RFC—RF1	1	0
2	RFC—RF2	0	1
3	RFC—RF3	0	0

Note: “1” = +1.2V to 3.6V. “0” = 0V to +0.4V.

Application Circuit

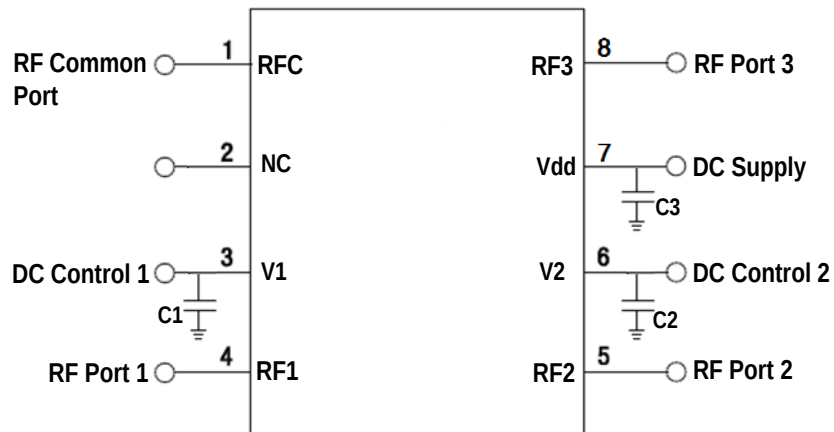


Figure 2. GSR1317S Evaluation Board Schematic

C1, C2 and C3 are optional bypass capacitors. The RF path should use DC block capacitor if it's with any dc voltage.

Electrical Specification

Table 5. GSR1317S electrical specifications at 25 °C (0 , +3.3 V)

Parameter	Test Condition	Min.	Typ.	Max.	Units
Insertion Loss	0.02GHz — 3.0GHz		0.38	0.55	dB
	3.0GHz — 6.0GHz		0.55	0.75	dB
	6.0GHz — 7.2GHz		0.75	1.00	dB
Isolation	0.02GHz — 3.0GHz		-32	-29	dB
	3.0GHz — 6.0GHz		-24	-20	dB
	6.0GHz — 7.2GHz		-22	-20	dB
Return Loss	0.02GHz — 3.0GHz		-24	-18	dB
	3.0GHz — 6.0GHz		-16	-13	dB
	6.0GHz — 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}	0.02 – 7.2GHz, Vc = 0V/3.3 V		32		dBm
IP _{1dB}	0.02 – 7.2GHz, Vc = 0V/3.3 V		32.5		dBm
Control Current	Vlow=0V to 0.4V Vhigh=1.2V to 3.6V		1	5	uA
I _{dd}	Pin7 Supply Current		13	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		125		ns

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

2: Board loss de-embedded.

Package Dimensions

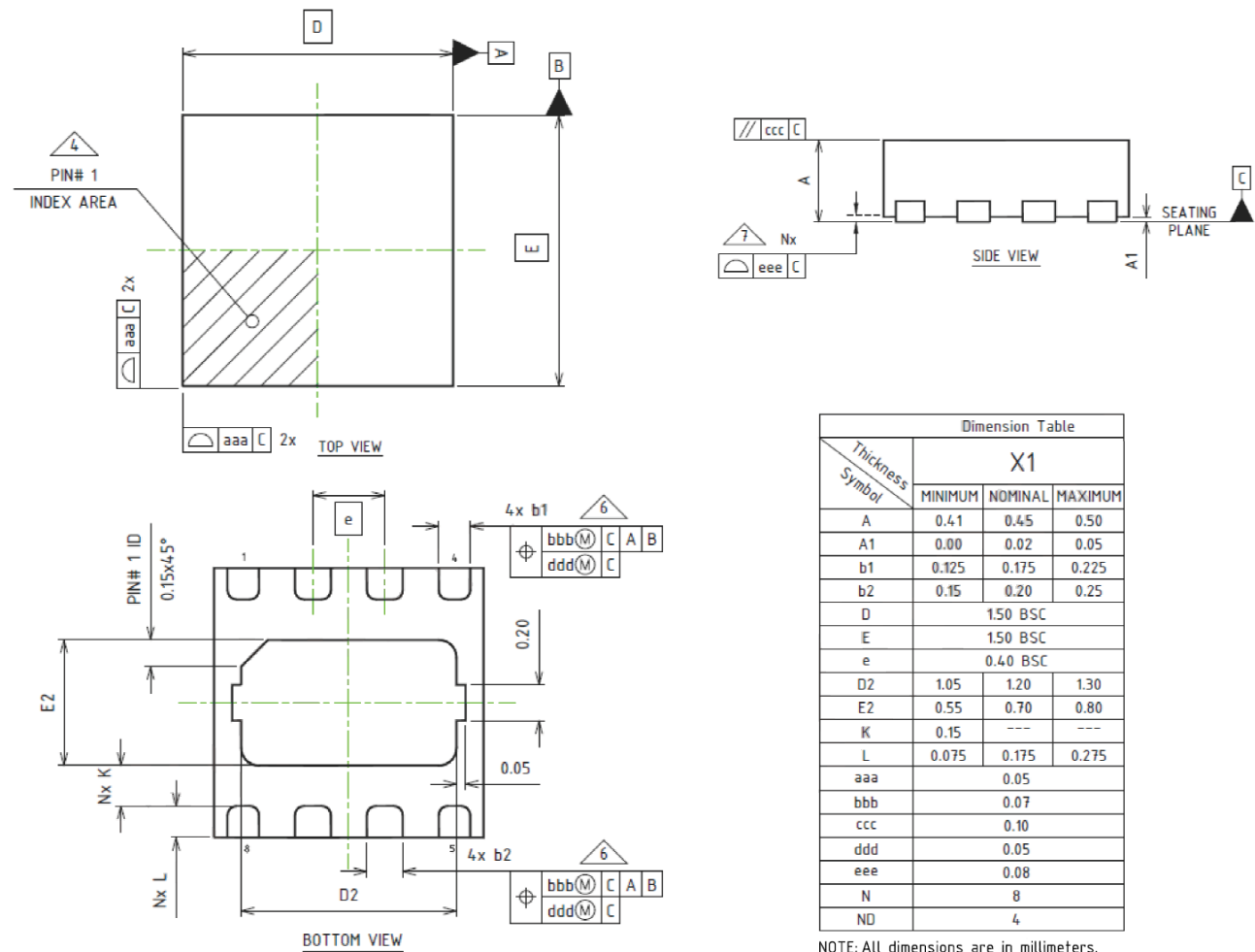


Figure 3. GSR1317S Package Dimensions

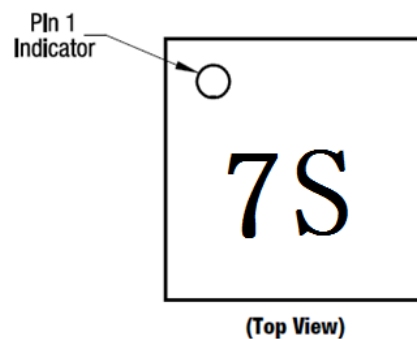


Figure 4. Typical Case Markings

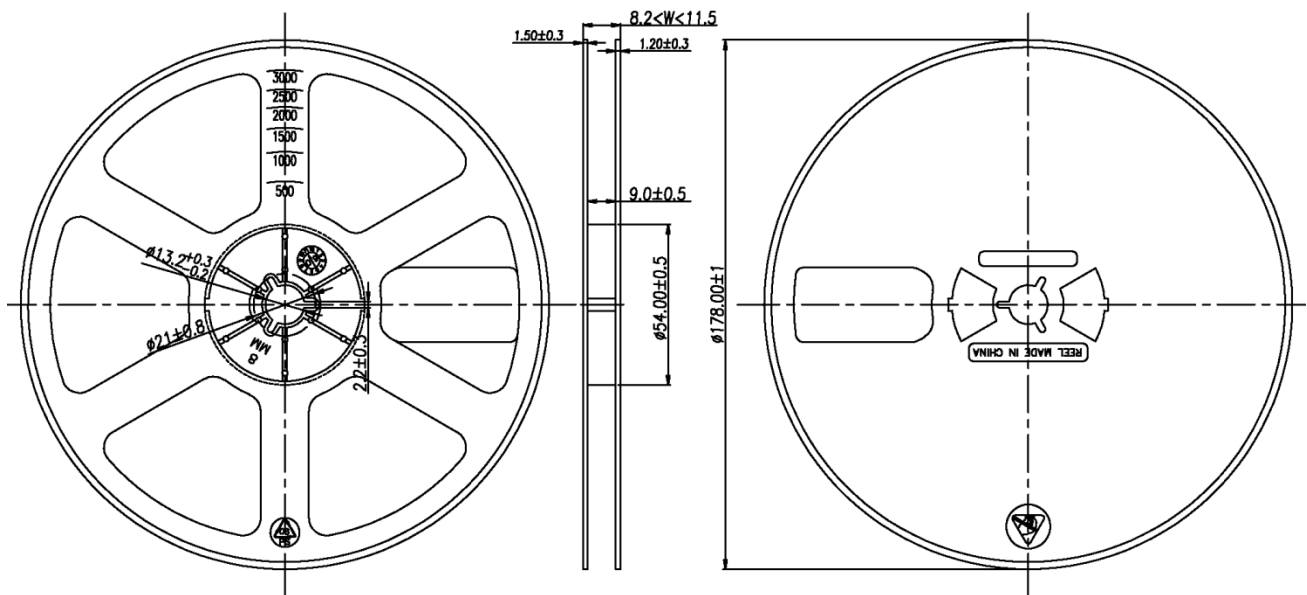
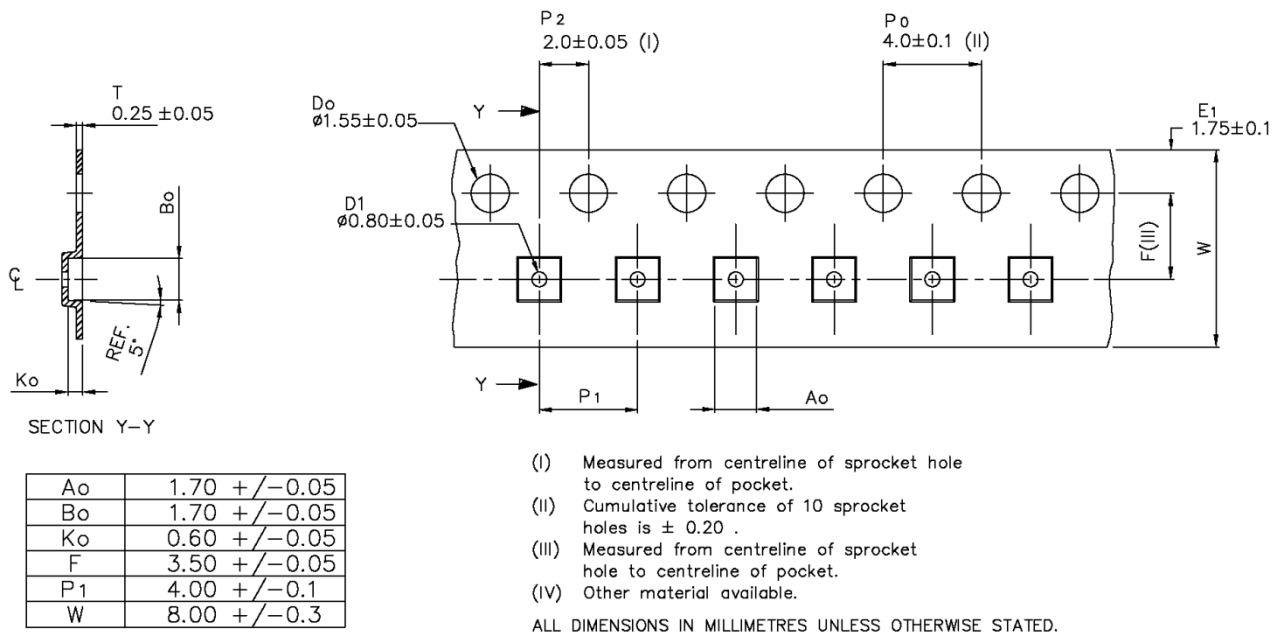


Figure 5. GSR1317S Tape and Reel Dimensions

ESD Precautions

The GSR1317S 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	1500 V

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	Jun. 8, 2022	Initial Release
1.1	Feb. 10, 2023	Modify Electrical Specifications
1.2	Apr. 25, 2023	Modify Electrical Specifications
1.3	Jun. 7, 2023	Add Tape and Reel Dimensions