

30MHz to 7.125GHz SP3T Switch

1. Description

The SR1317D4RL is a CMOS silicon-on-insulation (SOI) SP3T switch IC with low insertion loss and high isolation over wide frequency range from 30MHz to 7.125 GHz.

The SR1317D4RL is packaged in a miniaturized 1.5mm×1.5mm×0.45mm, 8-lead DFN with exposed ground pad.

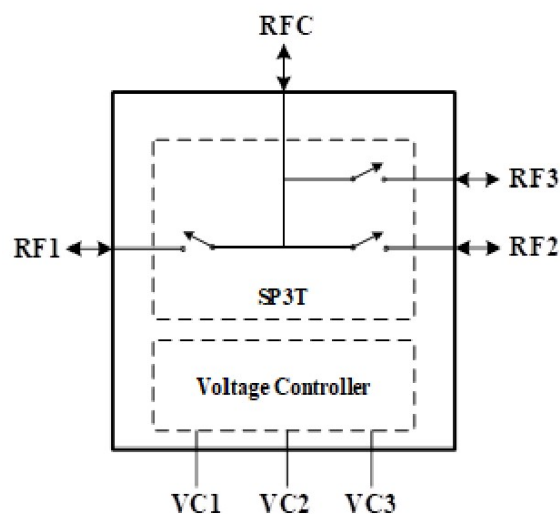
2. Features

- ❑ Wide control voltage range: 1.6V to 3.5V.
- ❑ Broad frequency range: 30MHz to 7.125 GHz
- ❑ Low insertion loss: 0.5 dB typical @2.45GHz, 1.1 dB typical @7.125 GHz
- ❑ High isolation
- ❑ High P1dB: +32dBm at 3V
- ❑ Miniaturized package: DFN-8L, 1.5mm×1.5mm×0.45mm.
- ❑ RoHS compliant, Pb-free, Halogen-free

3. Applications

- ❑ IEEE802.11a/b/g/n/ac/ax/be (Wi-Fi 5, Wi-Fi 6, Wi-Fi 6e, Wi-Fi 7)
- ❑ ISM band radios

4. Functional Block Diagram



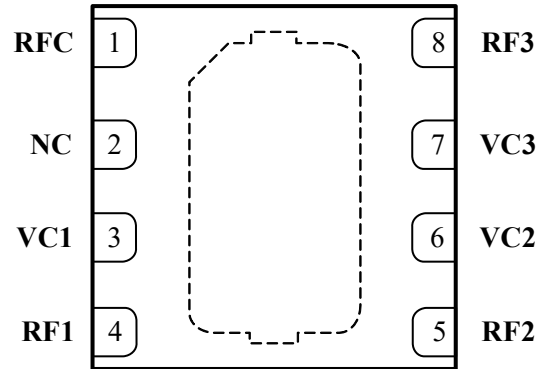


Figure 1: SR1317D4RL Pinout
(Top View)

Table 1. Pin Descriptions

Pin	Name	Description
1	RFC	RF antenna port, must be DC blocked.
2	NC	Not connected
3	VC1	DC control voltage 2
4	RF1	RF port 1, must be DC blocked.
5	RF2	RF port 2, must be DC blocked.
6	VC2	DC control voltage 1
7	VC3	DC control voltage 3
8	RF3	RF port 3, must be DC blocked.

Table 2. Truth Table (High: 1.6V ~ 3.5V, Low: -0.2V ~ 0.2V)

VC1 (Pin 3)	VC2 (Pin 6)	VC3 (Pin 7)	RFC-RF1	RFC-RF2	RFC-RF3
High	Low	Low	Insertion loss	Isolation	Isolation
Low	High	Low	Isolation	Insertion loss	Isolation
Low	Low	High	Isolation	Isolation	Insertion loss

5. Absolute Maximum Ratings

Parameters	Symbol	Absolute Maximum	Unit
Control Voltage	VC1, VC2, VC3	3.6V	V
RF Input Power	P _{IN}	32	dBm
Operating Temperature	T _A	-40 to +85	°C
Storage Temperature	T _{STG}	-40 to +125	°C

6. Recommended Operating Condition

Parameters	Symbol	Min.	Typ.	Max.	Unit
Operating Frequency	f	0.03		7.125	GHz
Control Voltage High	V _{CTL_H}	1.6	3.0	3.5	V
Control Voltage Low	V _{CTL_L}	0		0.4	V
Operating Temperature	T _{OP}	-40	+25	+85	°C

7. Electrical Characteristics

T_a = 25 °C; V_{CTL_H}=3.0V unless otherwise specified.

Parameters	Symbol	Conditions	Min.	Typ.	Max.	Unit
Insertion Loss	IL	2.5 GHz,		0.5		dB
		6 GHz,		0.8		
		7.125 GHz		1.1		
Isolation	ISOL	2.5 GHz		27		dB
		6 GHz		25		
		7.125 GHz		24		
Return Loss	RL			15		dB

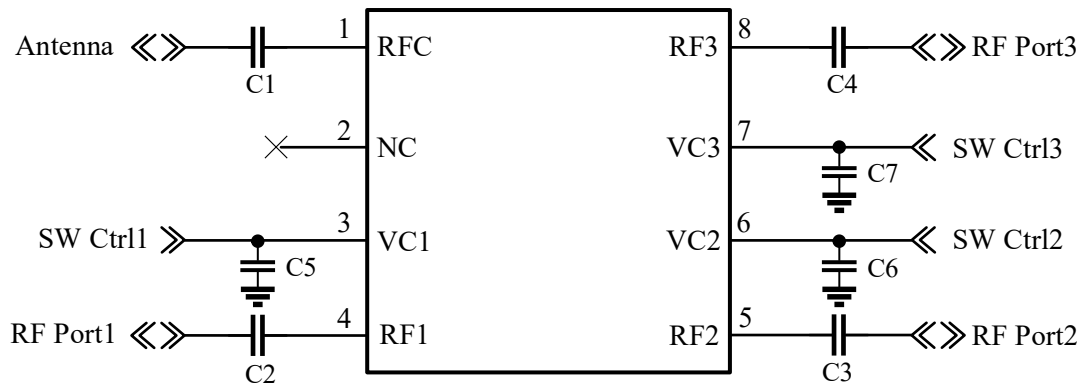
1dB Input Compression	IP _{1dB}	2.4 GHz, V _{CTL_H} =3.0V/ V _{CTL_L} =0V		32		dBm
		2.4 GHz, V _{CTL_H} =1.8V/ V _{CTL_L} =0V		27		dBm
Switching rise time	tr	10% to 90% RF		80		ns
Switching rise time	tf	90% to 10% RF		80		ns
Switching on time	ton	50% of V _{CTL} to 90% RF		120		ns
Switching off time	toff	50% of V _{CTL} to 10% RF		120		ns
Control Current		V _{CTL_H} =3.0V, V _{CTL_L} =0V		10		uA



Caution: ESD sensitive.

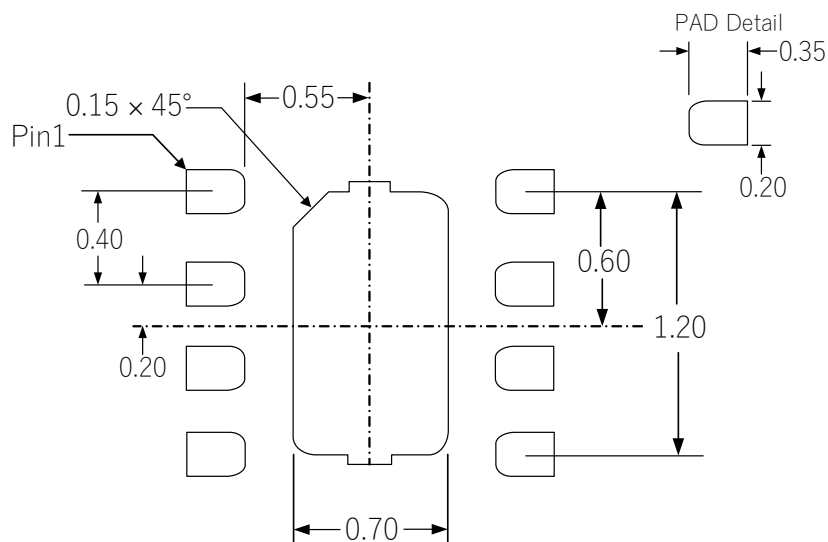
8. Application Circuit and PCB Layout

Application circuit:



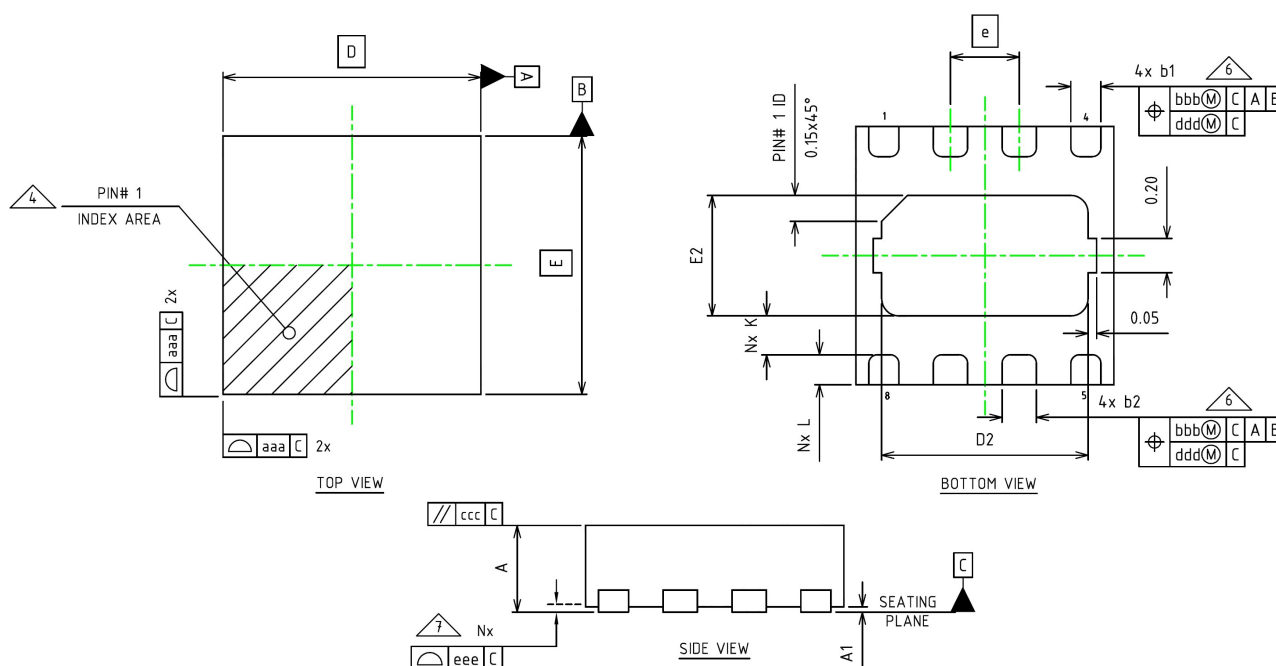
1. C1, C2, C3 and C4 are DC blocking capacitors (33pF)
2. Use 3.3nF of DC blocking capacitors (C1, C2, C3 and C4) for <100MHz operation.
3. C5, C6 and C7 are bypass capacitor (100pF).

PCB Layout Footprint:



Exposed Solder Area and Land Pattern
Top View(mm)

9. Package Drawing



Symbol	Dimension in Millimeters			Dimension in Inch		
	Min.	Norm.	Max.	Min.	Norm.	Max.
A	0.41	0.45	0.50	0.016	0.018	0.020
A1	0.00	0.02	0.05	0.000	0.001	0.002

A3	---	0.127 Ref	---	---	0.005 Ref	---
b1	0.125	0.175	0.225	0.005	0.007	0.009
b2	0.15	0.20	0.25	0.006	0.008	0.010
D	1.50 BSC			0.059 BSC		
E	1.50 BSC			0.059 BSC		
e	0.40 BSC			0.016 BSC		
D2	1.05	1.20	1.30	0.041	0.047	0.051
E2	0.55	0.70	0.80	0.022	0.028	0.031
K	0.15	---	---	0.006	---	---
L	0.125	0.175	0.225	0.005	0.007	0.009
aaa	0.05			0.002		
bbb	0.07			0.003		
ccc	0.10			0.004		
ddd	0.05			0.002		
eee	0.08			0.003		
N	8			0.315		
ND	4			0.157		

10. SMT Reflow

