HX12-6-LGA 0.617GHz -7.125GHz SP2T Switch

Description

The HX12-6-LGA is a single-pole double-throw (SP2T) switch specifically designed to operate within a frequency range of 0.617 GHz to 7.125 GHz. It is manufactured utilizing advanced CMOS SOI technology, which ensures low insertion loss, high isolation, and exceptional linearity at low supply voltages.

No external DC blocking capacitors are required as long as no DC voltage is applied to any RF path. The outstanding performance characteristics of the HX12-6-LGA make it particularly well-suited for wireless applications such as WiFi/BT transmission and reception, cellular reception, diversity reception, FBRX functions, and cellular pre-PA transmission.

Additionally, the internal decoder enables convenient GPIO connections and supports digital control signals.

The HX12-6-LGA is housed in a compact QFN package measuring 1.1 mm x 0.7 mm with a low profile of just 0.55 mm. This product complies with RoHS standards and is halogen-free.

Furthermore, the HX12-6-LGA has been rated at Moisture Sensitivity Level 1 (MSL1) at temperatures up to 260°C in accordance with JEDEC JSTD-020 standards.

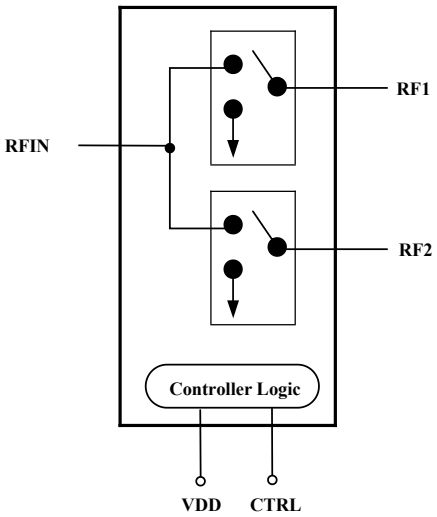
Features

- Broadband support 0.617-7.125GHz
- Advanced SOI process
- Low insertion loss
- Excellent linearity
- GPIO control interface
- QFN, 1.1mm x 0.7mm x 0.55mm, 6-pin
- Green product

Application

- WiFi /BT TX/RX
- Cellular RX
- Diversity RX
- FBRX
- Cellular Pre-PA TX

Block Diagram



Absolute Maximum Ratings

Parameter	Rating	Unit
Supply Voltage (VDD)	3.8	V
Control Voltage (VCTRL)	3	V
RF Input Power	28	dBm
Operating Temperature	-20 to 85	°C
Storage Temperature	-40 to 125	°C
ESD-Human Body Mode (HBM)	-1 to 1	kV
ESD-Charged Device Mode (CDM)	-0.5 to 0.5	kV

ESD Caution
Appropriate precautions in handling, packaging and testing devices must be observed.

Recommended Operating Conditions

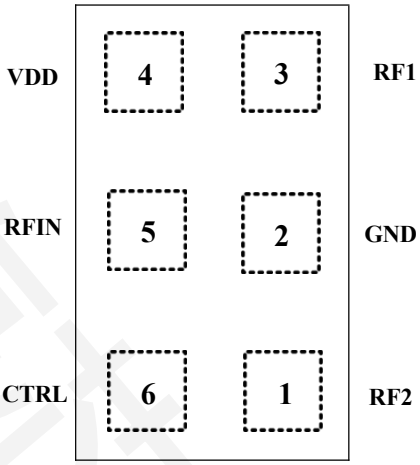
Parameter	Symbol	Condition	Minimum	Typical	Maximum	Unit
Supply Voltage	VDD		1.65	1.8	3.6	V
Supply Current	IDD			20	80	μA
Control Voltage	VCTRL	High Low	1.02 0	1.8 0	2.7 0.3	V
Control Current	ICTRL			5	10	μA

Logic Truth Table for Operation Modes

MODE	CTRL
RFIN to RF1	0
RFIN to RF2	1

NOTE: Any operating mode other than described in this Table is not supported.

Pin-Out



Pin Definitions

Pin	Name	Description
1	RF2	RF Port 2
2	GND	Ground
3	RF1	RF Port 1
4	VDD	Supply voltage
5	RFIN	RF port In
6	CTRL	Control Pin

TRX Electrical Specifications

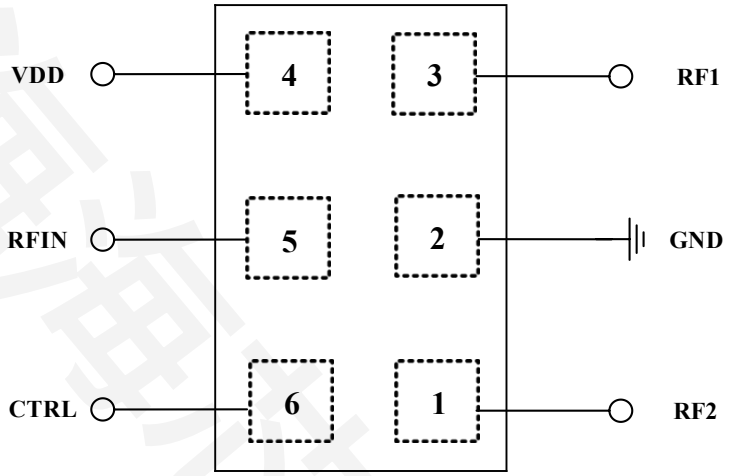
(Test Condition V_{DD} = 1.8V, V_{CTRL}= 1.8V/oV, P_{IN} = odBm, 50Ω, unless otherwise specified)

Parameter	Condition	Minimum	Typical	Maximum	Unit
Frequency		617		7125	MHz
Insertion Loss (@25°C)	617MHz to 960MHz 1710MHz to 2170MHz 2300MHz to 2690MHz 3300MHz to 3800MHz 3800MHz to 4200MHz 4400MHz to 5000MHz 5150MHz to 5925MHz 5925MHz to 7125MHz		0.3 0.4 0.4 0.45 0.45 0.5 0.55 0.6	0.4 0.5 0.5 0.7 0.7 0.8 0.9 1.0	dB
Insertion Loss (@ -20°C~85°C)	617MHz to 960MHz 1710MHz to 2170MHz 2300MHz to 2690MHz 3300MHz to 3800MHz 3800MHz to 4200MHz 4400MHz to 5000MHz 5150MHz to 5925MHz 5925MHz to 7125MHz			0.5 0.6 0.65 0.75 0.8 0.9 1.0 1.1	dB
Isolation RFC to RF1/RF2 (@25°C)	617MHz to 960MHz 1710MHz to 2170MHz 2300MHz to 2690MHz 3300MHz to 3800MHz 3800MHz to 4200MHz 4400MHz to 5000MHz 5150MHz to 5925MHz 5925MHz to 7125MHz	34 26 25 25 24 23 18 16	40 32 30 29 28 26 22 20		dB
Isolation RF1 to RF2/ RF2 to RF1 (@25°C)	617MHz to 960MHz 1710MHz to 2170MHz 2300MHz to 2690MHz 3300MHz to 3800MHz 3800MHz to 4200MHz 4400MHz to 5000MHz 5150MHz to 5925MHz 5925MHz to 7125MHz	38 30 28 25 24 23 18 16	44 35 32 28 27 26 22 19		dB
Voltage Standing Wave Ratio (@25°C)	617MHz to 960MHz 1710MHz to 2170MHz 2300MHz to 2690MHz 3300MHz to 3800MHz 3800MHz to 4200MHz 4400MHz to 5000MHz 5150MHz to 5925MHz 5925MHz to 7125MHz		1.09 1.11 1.16 1.2 1.24 1.33 1.41 1.42	1.4 1.45 1.5 1.6 1.75 1.85 1.9 2.0	

Harmonics (2f0/3f0/4f0.../nf0 up to 26.5GHz) @VSWR=1:1,CW,15~85℃	617MHz to 960MHz (Pin=26dBm) 1710MHz to 2170MHz (Pin=26dBm) 2300MHz to 2490MHz (Pin=26dBm) 2490MHz to 2690MHz (Pin=26dBm) 3300MHz to 3800MHz (Pin=26dBm) 3800MHz to 4200MHz (Pin=26dBm) 4400MHz to 5000MHz (Pin=26dBm) 5150MHz to 5925MHz (Pin=26dBm) 5925MHz to 7125MHz (Pin=26dBm)		-46 -45 -46 -46 -43 -43 -49 -48 -44	-40 -40 -40 -40 -40 -40 -40 -40 -40	dBm
Harmonics (2f0/3f0/4f0.../nf0 up to 26.5GHz) @VSWR≤5:1, CW,15~85℃	617MHz to 960MHz (Pin=23dBm) 1710MHz to 2170MHz (Pin=20dBm) 2300MHz to 2490MHz (Pin=20dBm) 2490MHz to 2690MHz (Pin=20dBm) 3300MHz to 3800MHz (Pin=20dBm) 3800MHz to 4200MHz (Pin=20dBm) 4400MHz to 5000MHz (Pin=20dBm) 5150MHz to 5925MHz (Pin=20dBm) 5925MHz to 7125MHz (Pin=20dBm)		-45 -51 -53 -53 -49 -49 -53 -56 -53	-40 -40 -40 -40 -40 -40 -40 -40 -40	dBm
IMD2(@25°C)	f1=24dBm,f2=-15dBm f1=2462MHz,f2=887MHz		-101	-92	dBm
IMD3(@25°C)	f1=24dBm,f2=-15dBm f1=2452MHz,f2=2600MHz		-99.8	-88	dBm
Maximum Power (Pmax) (CW, output port VSWR 1:1, +85°C)	617MHz to 7125MHz	28			dBm
Switching Time(Tup+TSTON)	Reference to page 4 for NOTE.			0.5	μs

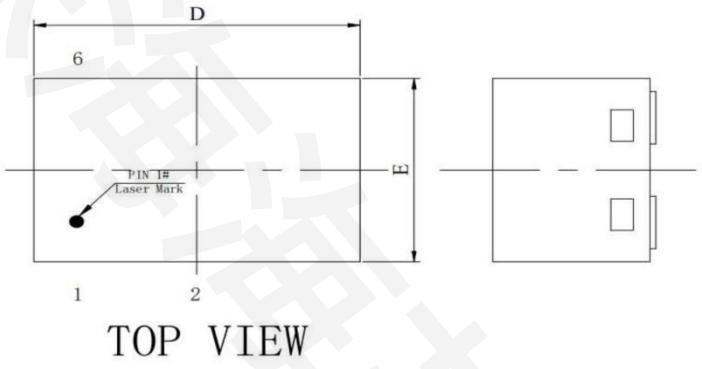
NOTE:
1. TSTON is the time it takes for the detected RF output to raise from 10% to 90% of the final value, when the switch is changed from “off” to “on” state.
2. Tup is the period from end ofGPIO command to the time allow RF signal input.

Application Schematic

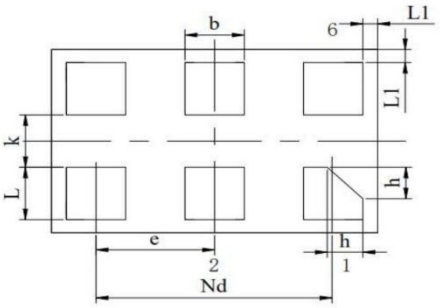


1. RF input and output are 50-Ohm microstrip.
2. Decoupling capacitors may be added for VDD & CTRL according to different applications.

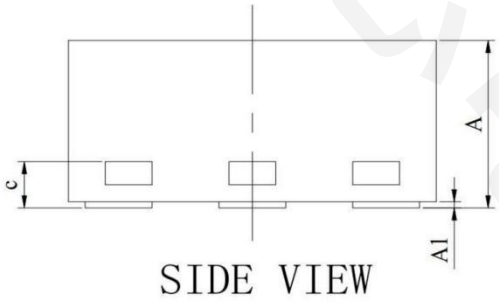
Package Dimensions



TOP VIEW



BOTTOM VIEW

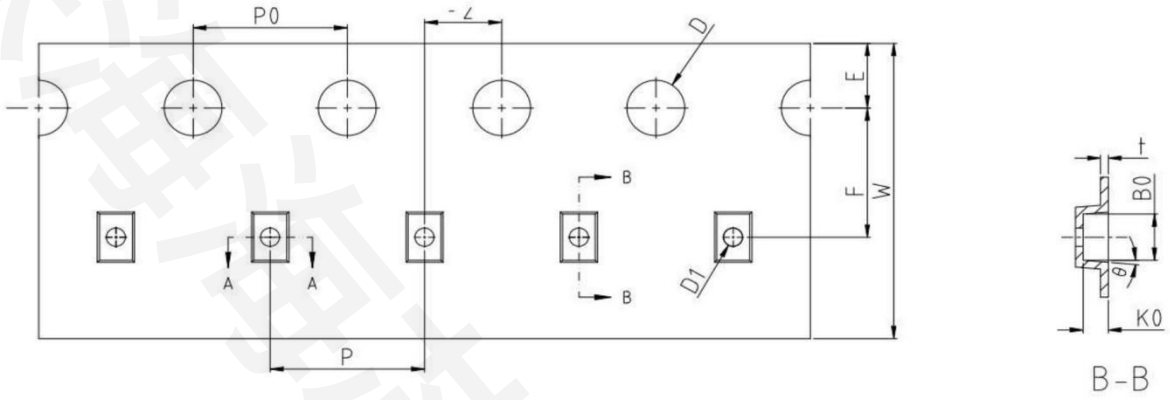


SIDE VIEW

SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.50	0.55	0.60
A1	0	0.02	0.05
b	0.15	0.20	0.25
c	0.152REF		
D	1.05	1.10	1.15
e	0.40BSC		
Nd	0.80BSC		
E	0.65	0.70	0.75
L	0.15	0.20	0.25
L1	0	0.05	0.10
h	0.12REF		
K	0.20REF		

NOTE:
1. All dimensions are measured in millimeters.
2. Drawing is not to scale.

Packaging Information



E	1.75±0.10
F	3.50±0.05
P2	2.00±0.05
D	1.55±0.05
D1	0.40±0.05
P0	4.00±0.10
10P0	40.0±0.20

W	$8.00^{+0.30}_{-0.10}$
P	4.00±0.10
A0	0.85±0.05
B0	1.25±0.05
K0	0.65±0.03
t	0.20±0.02
θ	3° TYP

NOTE:
1. All dimensions are measured in millimeters.
2. Drawing is not to scale.

Package Type	Unit Size	Max Reel Diameter	Type Width	Pocket Pitch	Reel Capacity
Tape and Reel	1.1mm x 0.7mm x 0.55mm	7”	8mm	4mm	5000

Order Information

ORDER NUMBER	TEMPERATURE	PACKAGE DESCRIPTION	TYPE
HX12-6-LGA	-40°C ~ 125°C	6-Pin, 1.1mm x 0.7mm x 0.55mm QFN Module Halogen Free	Tape & Reel, 5000 pcs per Reel