

HX13526-485-Q 0.1-3.0GHz SP6T Switch with MIPI RFFE Interface for Diversity Applications

Description

The HX13526-485-Q is a SP6T (single-pole six-throw) switch specifically designed for diversity applications operating within the frequency range of 100 MHz to 3.0 GHz. Its RF performance has been optimized to ensure low insertion loss, thereby meeting the stringent requirements set forth by all 3G/LTE standards.

No external DC blocking capacitors are necessary as long as no DC voltage is applied to any RF path. The HX13526-485-Q is compatible with RFFE serial control and demonstrates low insertion loss across every path, from the antenna port to any Rx port, while maintaining high isolation between both opposite and adjacent paths. Furthermore, the HX13526-485-Q achieves excellent linearity performance, making it suitable for both 3G and LTE applications.

Encapsulated in a compact 2mm x 2mm, 14-pin LGA package with a low profile of just 0.55 mm, this product complies with RoHS regulations and is halogen-free.

The HX13526-485-Q is rated at Moisture Sensitivity Level 3 (MSL3) at temperatures up to 260°C according to JEDEC J-STD-020 standards.

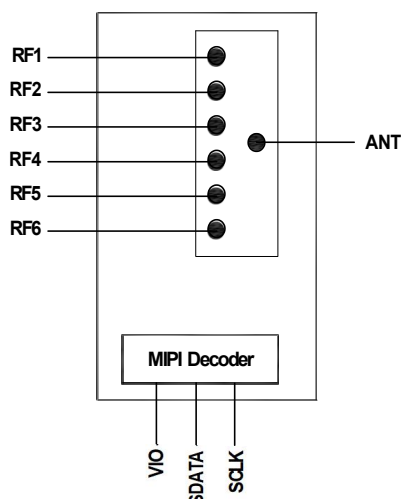
Features

- ★ Broadband support 0.1-3.0GHz
- ★ Compatible with UMTS, TD-SCDMA, and LTE
- ★ Advanced SOI process
- ★ Low insertion loss
- ★ Excellent linearity
- ★ 6 symmetrical RF ports
- ★ MIPI RFFE interface
- ★ Ultra small LGA footprint, 2mm x 2mm x 0.55mm, 14-pin
- ★ ESD Class 1C
- ★ Green product

Application

- ★ Diversity for UMTS/LTE

Block Diagram



Absolute Maximum Ratings

Parameter	Rating	Unit
MIPI Supply Voltage (V _{IO})	2	V
RF Input Power	32	dBm
Operating Temperature	-40 to 90	°C
Storage Temperature	-55 to 150	°C
ESD-Human Body Mode (HBM)	-1 to 1	kV



ESD Caution

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

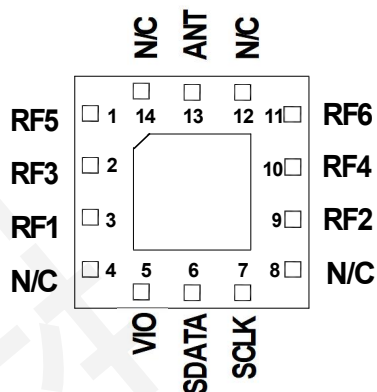
Recommended Operating Conditions

Parameter	Symbol	Condition	Minimum	Typical	Maximum	Unit
MIPI Supply Voltage	V _{IO}		1.65	1.8	2	V
Supply Current	I _{DD}			110	150	μA
Control Current	I _{CTRL}			2	5	μA
Operating Temperature	Temp		-40	25	90	°C

Logic Truth Table for Operation Modes

Register 0									
MODE	D7	D6	D5	D4	D3	D2	D1	D0	
All Isolation		0	0	0	0	0	0	0	0x00
RF1		0	0	0	0	1	1	1	0x07
RF2		0	0	0	0	1	0	0	0x04
RF3		0	0	0	1	0	1	1	0x0B
RF4		0	0	0	0	0	1	0	0x02
RF5		0	0	0	1	0	1	0	0x0A
RF6		0	0	0	1	1	0	0	0x0C

Pin-Out



Pin Definitions

Pin	Name	Description
1	RF5	RF path 5
2	RF3	RF path 3
3	RF1	RF path 1
4	N/C	Not Connected
5	VIO	MIPI decoder interface voltage
6	SDATA	Data input/output
7	SCLK	Clock signal
8	N/C	Not Connected
9	RF2	RF path 2
10	RF4	RF path 4
11	RF6	RF path 6
12	N/C	Not Connected
13	ANT	Antenna port
14	N/C	Not Connected

MIPI RFFE Register Map

Register 0	Description	Default	Notes
[7:0]	Mode Control	0x00	see Logic Truth Table for Operational Modes.
Register 26	Description	Default	Notes
[7]	Software Reset	0	0:Normal Operation 1:Software Reset
[6]	Command_Frame_Parity_Error	0	Command Sequence received with parity error – discard command. The RFFE_STATUS register shall reset after it is read.
[5]	Command_Length_Error	0	Command length error. The RFFE_STATUS register shall reset after it is read.
[4]	Address_Frame_Parity_Error	0	Address frame with parity error. The RFFE_STATUS register shall reset after it is read.
[3]	Data_Frame_Parity_Error	0	Data frame with parity error. The RFFE_STATUS register shall reset after it is read.
[2]	Read_Unused_Reg	0	Read command to an invalid address. The RFFE_STATUS register shall reset after it is read.
[1]	Write_Unused_Reg	0	Write command to an invalid address. The RFFE_STATUS register shall reset after it is read.
[0]	Bid_Gid_Error	0	Read command with a BROADCAST_ID or GROUP_ID. The RFFE_STATUS register shall reset after it is read.
Register 27	Description	Default	Notes
[7:4]	reserved	0000	Reserved
[3:0]	Group SID	0000	Group Slave ID
Register 28	Description	Default	Notes
[7:6]	PWR_MODE	00	00:Normal Operation (ACTIVE) 01:Default Settings (STARTUP) 10:Low Power (LOW POWER) 11:Reserved
[5]	Trigger Mask 2	0	0:Trigger Enable 1:Trigger Disable
[4]	Trigger Mask 1	0	0:Trigger Enable 1:Trigger Disable
[3]	Trigger Mask 0	0	0:Trigger Enable 1:Trigger Disable
[2]	Trigger Register 2	0	Not Supported
[1]	Trigger Register 1	0	Reserved
[0]	Trigger Register 0	0	1=Latch Register 0,1 contents
Register 29	Description	Default	Notes
[7:0]	Product ID	0xA4	Product ID[7:0] = 0xA4
Register 30	Description	Default	Notes
[7:0]	Manufacturer ID	0x4E	Manufacturer ID[7:0] = 0x4E
Register 31	Description	Default	Notes

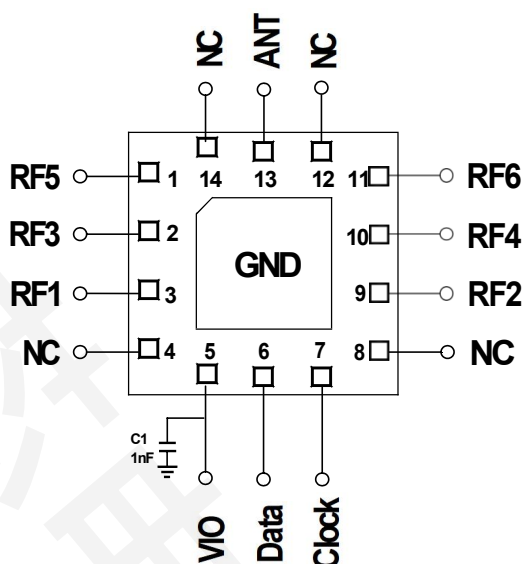
[7:6]	Reserved	00	
[5:4]	Manufacturer ID	0x3	Manufacturer ID[9:8] = 11
[3:0]	USID	1010	USID = 1010

UMTS/TD-SCDMA/LTE RF Electrical Specifications

(Test Condition $P_{IN} = 0\text{dBm}$, $T_c = 25^\circ\text{C}$, 50Ω , unless otherwise specified)

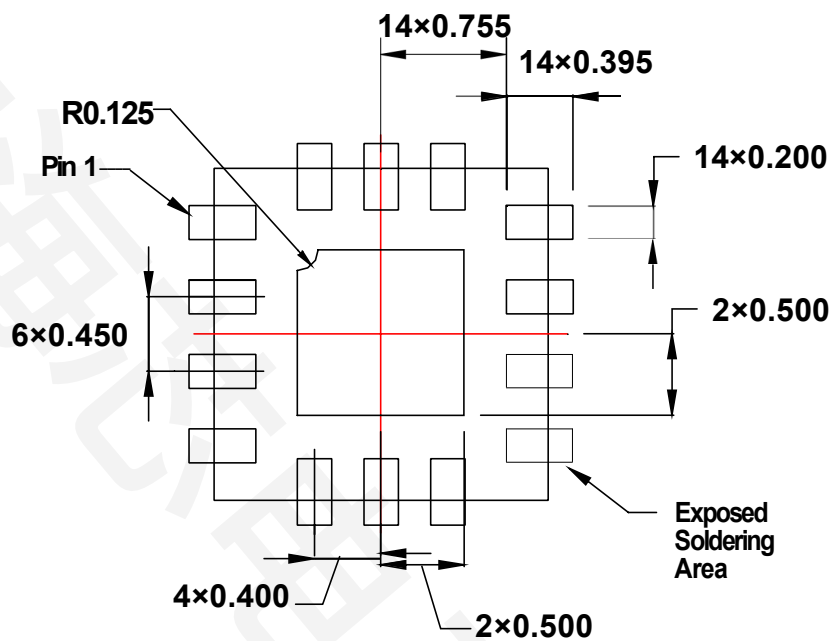
Parameter	Condition	Minimum	Typical	Maximum	Unit
Frequency	UMTS/LTE Band 5/8/12/13/14/17/20 UMTS/TD-SCDMA/LTE Band 1/2/3/4/34/39 LTE Band 7/38/40/41	698 1710 2300		960 2170 2690	MHz
Insertion Loss	698MHz to 960MHz 1710MHz to 2170MHz 2300MHz to 2690MHz		0.31 0.41 0.49	0.5 0.65 0.75	dB
Adjacent Port Isolation	698MHz to 960MHz 1710MHz to 1980MHz 2300MHz to 2690MHz	28 23 21	34 28 25		dB
Non-Adjacent Port Isolation	698MHz to 960MHz 1710MHz to 1980MHz 2300MHz to 2690MHz	33 26 23	37 30 27		dB
IMD2	Receive Freq: 881.5MHz Tone1: 836.5MHz at 20dBm Tone2: 45MHz at -15 dBm Tone2: 1718MHz at -15 dBm		-95.3 -104.8		dBm
	Receive Freq: 1960MHz Tone1: 1880MHz at 20dBm Tone2: 80MHz at -15 dBm Tone2: 3840MHz at -15 dBm		-105.5 -110.3		dBm
	Receive Freq: 2140MHz Tone1: 1950MHz at 20dBm Tone2: 190MHz at -15 dBm Tone2: 4090MHz at -15 dBm		-99.3 -108.7		dBm
IMD3	Receive Freq: 881.5MHz Tone1: 836.5MHz at 20dBm Tone2: 791.5MHz at -15 dBm Tone2: 2554.5MHz at -15 dBm		-105.6 -111.6		dBm
	Receive Freq: 1960MHz Tone1: 1880MHz at 20dBm Tone2: 1800MHz at -15 dBm Tone2: 5720MHz at -15 dBm		-105.3 -108.6		dBm
	Receive Freq: 2140MHz Tone1: 1950MHz at 20dBm Tone2: 1760MHz at -15 dBm Tone2: 6040MHz at -15 dBm		-103.3 -111.5		dBm
Switching Time	10% to 90% RF		0.36		μs

Application Schematic



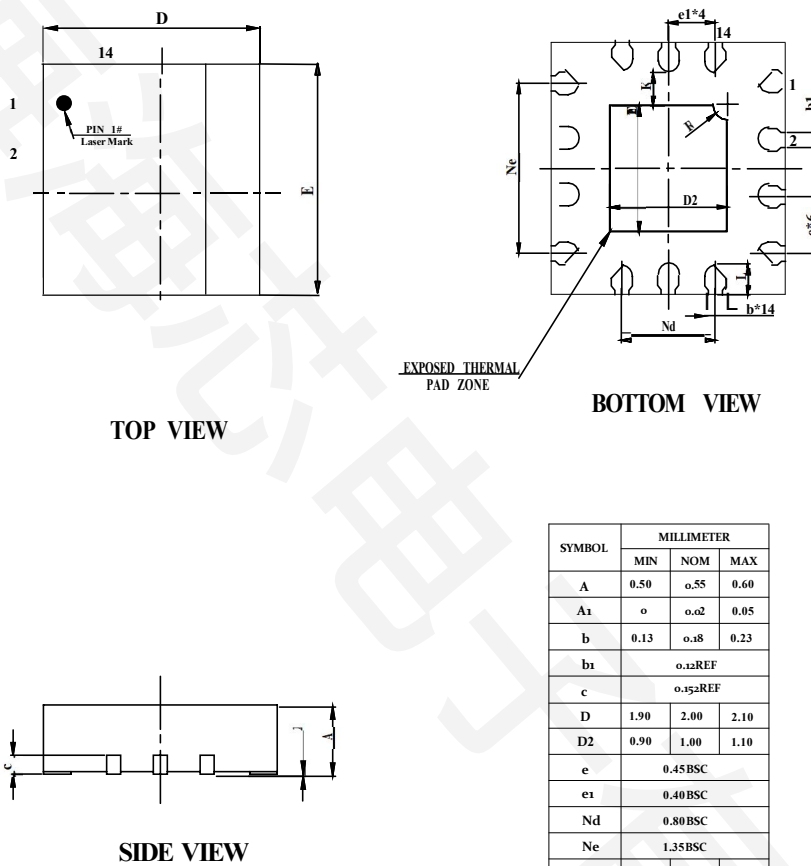
1. RF input and output are 50-Ohm microstrip.
2. The values for capacitors and inductors could be changed according to different applications.

PCB Layout Footprint



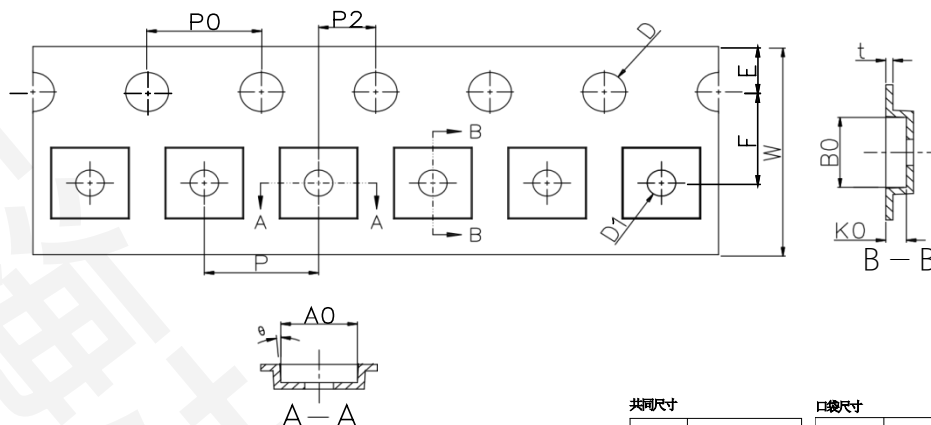
PCB Metal Top View

Package Dimensions



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.50	0.55	0.60
A1	0	0.02	0.05
b	0.13	0.18	0.23
b1	0.12REF		
c	0.152REF		
D	1.90	2.00	2.10
D2	0.90	1.00	1.10
e	0.45BSC		
e1	0.40BSC		
Nd	0.80BSC		
Ne	1.35BSC		
E	1.90	2.00	2.10
E2	0.90	1.00	1.10
L	0.185	0.235	0.285
R	0.075	0.125	0.175
K	0.26SREF		

Packaging Information



共同尺寸

外观	尺寸 (MM)
E	1.75±0.10
F	3.50±0.05
P2	2.00±0.05
D	1.55±0.05
D1	1.00MIN
P0	4.00±0.10
10P0	40.0±0.20

口模尺寸

外观	尺寸(MMM)
W	8.00+0.30 -0.10
P	4.00±0.10
A0	2.25±0.10
B0	2.25±0.10
K0	0.75±0.08
t	0.25±0.05

Package Type	Unit Size	Max Reel Diameter	Type Width	Pocket Pitch	Reel Capacity
Tape and Reel	2mm x 2mm x 0.55mm	7"	8mm	4mm	3000

Order Information

ORDER NUMBER	TEMPERATURE	PACKAGE DESCRIPTION	TYPE
HX13526-485-Q	-40°C ~ 90°C	14-Pin, 2mm x 2mm x 0.55mm LGA Module Halogen Free	Tape & Reel, 3000 pcs per Reel