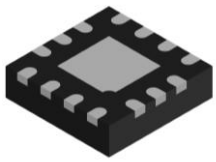
WS7806Q

0.1GHz – 3GHz SP6T Antenna Switch

http//:www.sh-willsemi.com

Descriptions

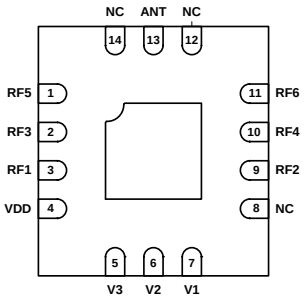
The WS7806Q is a single-pole, six-throw (SP6T) switch, consisting of a SP6T switch that has 6 identical paths, and a GPIO controller. The device is optimized for WCDMA and LTE systems and can be used up to 3GHz applications. The low current consumption makes this device very suitable for battery operated applications. The WS7806Q is manufactured in a compact 2.0mm x 2.0 mm, 14-pin QFN package.



QFN2X2-14L (Bottom view)

Features

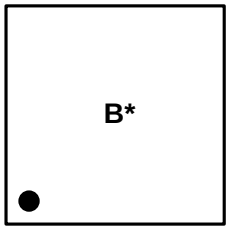
- Small, low profile package 2.0mm x 2.0mm x 0.55mm
- Working frequency up to 3GHz
- Very low insertion loss
- Excellent isolation performance
- Low power consumption
- Exceptional linearity performance for 3G/4G application
- Low harmonic generation
- Very good ESD performance



Pin configuration (Top view)

Applications

- Cell phones
- Tablets
- Other RF front-end modules



B = Device code

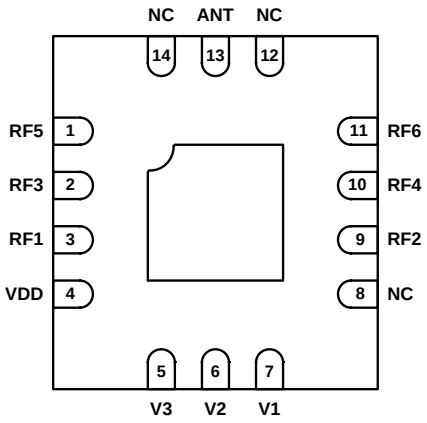
* = Month code（A~Z）

Marking(Top view)

Order information

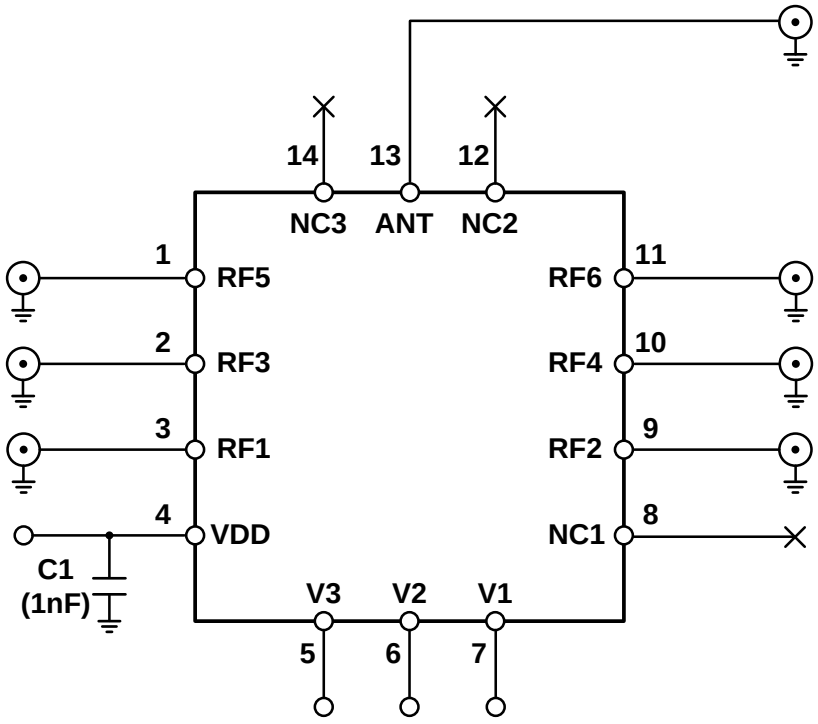
Device	Package	Shipping
WS7806Q-14/TR	QFN2X2-14L	3000/Reel &Tape

Pin information

Pin	Function	Description	Transparent top view
1	RF5	RF I/O path 5	
2	RF3	RF I/O path 3	
3	RF1	RF I/O path 1	
4	VDD	DC power supply	
5	V3	DC control voltage 3	
6	V2	DC control voltage 2	
7	V1	DC control voltage 1	
8	N/C	Not connected	
9	RF2	RF I/O path 2	
10	RF4	RF I/O path 4	
11	RF6	RF I/O path 6	
12	N/C	Not connected	
13	ANT	Antenna port	
14	N/C	Not connected	

Note: Bottom ground paddles must be connected to ground.

Application information



Recommended operating conditions

Parameters	Conditions	Specifications			Unit
		Min.	Typ.	Max.	
ESD Rating					
ESD All Pins	HBM, JESD22-A114			1500	V
Power Supply					
Power Supply Voltage	Operating Voltage	2.4	2.8	3.0	V
Power Supply Current (Standby)	VDD≤3.0V	20	28	70	μA
Shutdown Mode Supply Current	V1/2/3=1.8V, VDD=3V	4	7	10	μA
Control Voltage					
Logic Control "Low"		0	0	0.3	V
Logic Control "High"		1.2	1.8	2.7	V
RF Impedance					
RF Port Input and Output Impedance			50		Ω

Absolute maximum ratings

Maximum ratings are absolute ratings, exceeding only one of these values may cause irreversible damage to the integrated circuit.

Items	Value	Unit
VDD Voltage	-0.3 to +3.0	V
Control Voltage	-0.3 to +2.7	V
Maximum Input Power @ RF ports 50Ω, CW, +25°C	31@0.7GHz to 1.0GHz 32@1.0GHz to 2.0GHz 33@2.0GHz to 2.7GHz	dBm
Operation Temperature	-40 to +85	°C
Storage Temperature	-65 to +150	°C

Characteristics (RF spec)

Nominal test condition unless otherwise stated. All unused ports are 50Ω terminated.

VDD=2.8V, Temp=+25°C, P_{IN}=0dBm.

Insertion loss in V1/V2/V3 = 110 state is 3 dB lower than typical insertion loss.

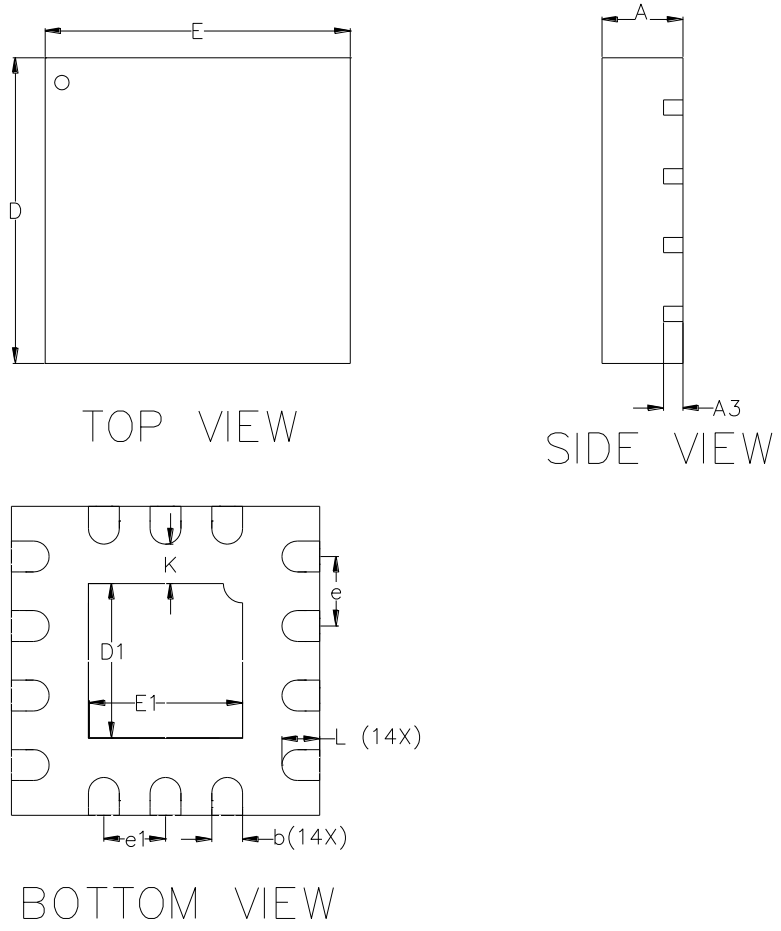
Parameters	Conditions	Specifications			Unit
		Min.	Typ.	Max.	
Insertion Loss (RF1/RF2/RF3/RF4/RF5/RF6)	0.1GHz to 1.0GHz		0.40	0.55	dB
	1.0GHz to 2.0GHz		0.50	0.65	
	2.0GHz to 2.7GHz		0.70	0.85	
Isolation (ANT to RF1/RF2/RF3/RF4/RF5/RF6)	0.1GHz to 1.0GHz	28	30		dB
	1.0GHz to 2.0GHz	22	25		
	2.0GHz to 2.7GHz	18	20		
Input Return Loss (ANT to RF1/RF2/RF3/RF4/RF5/RF6)	0.1GHz to 1.0GHz	22	25		dB
	1.0GHz to 2.0GHz	15	20		
	2.0GHz to 2.7GHz	16	22		
Second Harmonics (RF1/RF2/RF3/RF4/RF5/RF6)	0.7GHz to 1.0GHz, P_{IN}=+26dBm		82		dBc
	1.0GHz to 2.0GHz, P_{IN}=+26dBm		83		
	2.0GHz to 2.7GHz, P_{IN}=+26dBm		85		
Third Harmonics (RF1/RF2/RF3/RF4/RF5/RF6)	0.7GHz to 1.0GHz, P_{IN}=+26dBm		83		dBc
	1.0GHz to 2.0GHz, P_{IN}=+26dBm		84		
	2.0GHz to 2.7GHz, P_{IN}=+26dBm		86		
0.1dB Compression Point (RF1/RF2/RF3/RF4/RF5/RF6)	0.7GHz to 1.0GHz		31		dBm
	1.0GHz to 2.0GHz		32		
	2.0GHz to 2.7GHz		33		
3rd Order Input Intercept Point (RF1/RF2/RF3/RF4/RF5/RF6)	0.7GHz to 2.7GHz P_{IN}=+26dBm Δf=1MHz		64		dBm

Truth Table for Operation

SP6T Mode	V1	V2	V3
RF1	0	0	0
RF2	0	0	1
RF3	0	1	0
RF4	0	1	1
RF5	1	0	0
RF6	1	0	1
RF3/RF5	1	1	0
Shutdown	1	1	1

Package outline dimensions

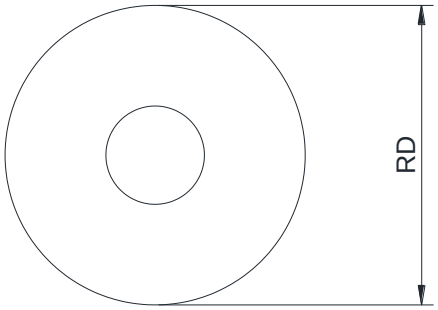
QFN2x2-14L



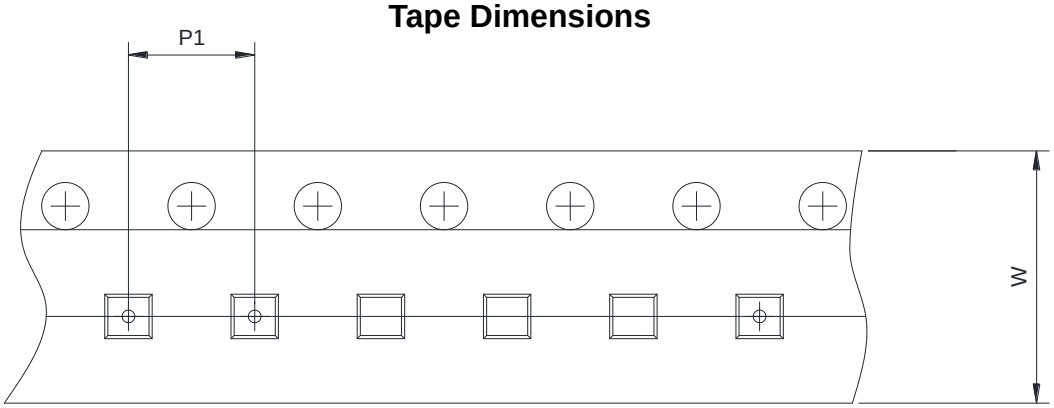
Symbol	Dimensions in Millimeters		
	Min.	Typ.	Max.
A	0.52	0.55	0.58
A3	0.13 Ref.		
b	0.15	0.20	0.25
D	1.95	2.00	2.05
E	1.95	2.00	2.05
D1	0.95	1.00	1.05
E1	0.95	1.00	1.05
e	0.45 BSC		
e1	0.40 BSC		
K	0.20	0.25	0.31
L	0.19	0.24	0.30

Tape and Reel Information

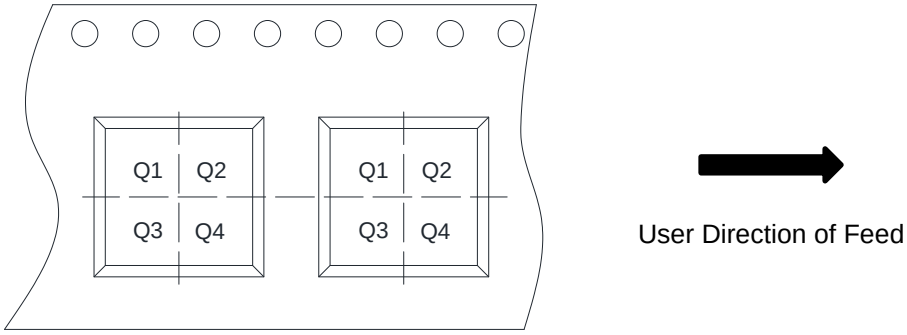
Reel Dimensions



Tape Dimensions



Quadrant Assignments For PIN1 Orientation In Tape



RD	Reel Dimension	☑ 7inch	☐ 13inch		
W	Overall width of the carrier tape	☑ 8mm	☐ 12mm	☐ 16mm	
P1	Pitch between successive cavity centers	☐ 2mm	☑ 4mm	☐ 8mm	
Pin1	Pin1 Quadrant	☑ Q1	☐ Q2	☐ Q3	☐ Q4