

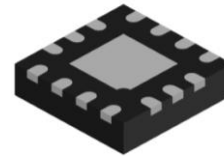
## WS7808QC

### 0.1GHz – 3GHz SP8T Antenna Switch

<http://www.sh-willsemi.com>

#### Descriptions

The WS7808QC is a single-pole, eight-throw (SP8T) switch, consisting of a SP8T switch that has 8 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 WS7808QC is manufactured in a compact 2.0mm x 2.0 mm, 14-pin QFN package.



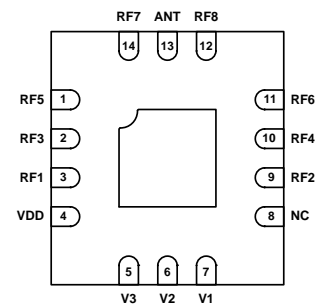
**QFN2X2-14L (Bottom view)**

#### Features

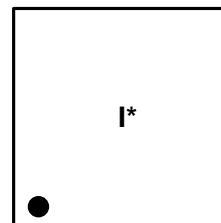
- Small, low profile package 2.0mm x 2.0mm x 0.55mm
- Working frequency up to 3GHz
- Very low insertion loss
- Excellent isolation performance
- Low power consumption
- Exceptional linearity performance for 3G/4G application
- Low harmonic generation
- Very good ESD performance

#### Applications

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



**Pin configuration (Top view)**



I = Device code

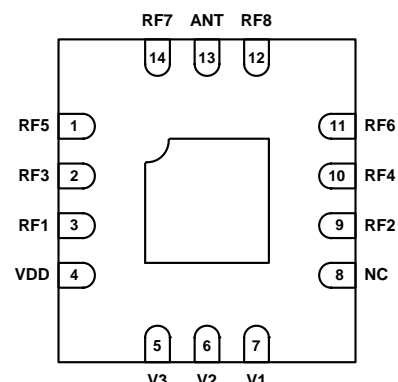
\* = Month code (A~Z)

**Marking(Top view)**

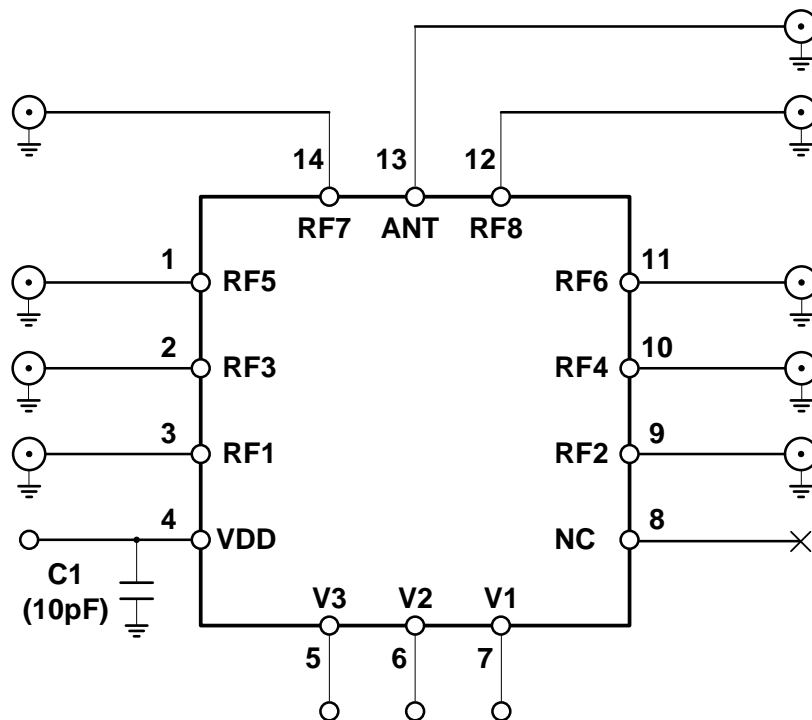
#### Order information

Device	Package	Shipping
WS7808QC-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	NC	Not connected	
9	RF2	RF I/O path 2	
10	RF4	RF I/O path 4	
11	RF6	RF I/O path 6	
12	RF8	RF I/O path 8	
13	ANT	Antenna port	
14	RF7	RF I/O path 7	

Note1: Bottom ground paddles must be connected to ground.

**Application information**


Note2: filter capacitor is needed on VDD

**Recommended operating conditions**

Parameters	Conditions	Specifications			Unit
		Min.	Typ.	Max.	
<b>ESD Rating</b>					
ESD All Pins	HBM, JESD22-A114			1500	V
<b>Power Supply</b>					
Power Supply Voltage	Operating Voltage	2.5	2.8	3.1	V
Power Supply Current	VDD≤3.0V		43	59	μA
<b>Control Voltage</b>					
Logic Control "Low"		0	0	0.2	V
Logic Control "High"		1.2	1.8	3.1	V
<b>RF Impedance</b>					
RF Port Input and Output Impedance			50		Ω
Turn-On Switching Time	50% of final control voltage to 90% of final RF power, switching between RF ports		2		μs

Note3: Logic Control "High" must be < Power Supply Voltage

**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 +3.3	V
Control Voltage	-0.3 to +3.3	V
Momentary, infrequent occurrence, 50 ohms	+26	dBm
Momentary, infrequent occurrence, 6:1	+24	dBm
Continuous Operation, 50 ohms	+25	dBm
Continuous Operation, 6:1	+23	dBm
Operation Temperature	-40 to +85	°C
Storage Temperature	-65 to +150	°C

**Characteristics (RF spec)**

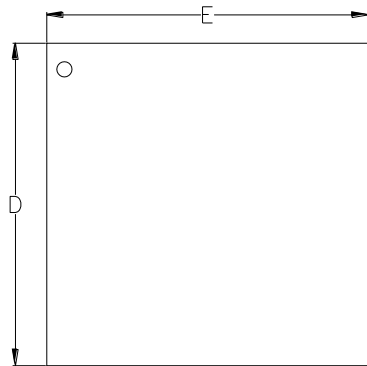
Nominal test condition unless otherwise stated. All unused ports are 50Ω terminated.

VDD= 2.8V, Temp= +25°C, P<sub>IN</sub>= 0dBm.

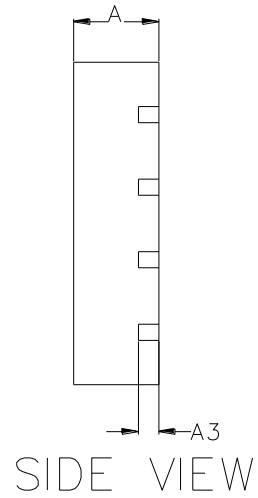
Parameters	Conditions	Specifications			Unit
		Min.	Typ.	Max.	
Insertion Loss (RFX)	0.1GHz to 1.0GHz		0.35	0.60	dB
	1.0GHz to 2.0GHz		0.40	0.70	
	2.0GHz to 2.7GHz		0.50	0.75	
Isolation (ANT to RFX RFXm to RFXn)	0.1GHz to 1.0GHz	25	30		dB
	1.0GHz to 2.0GHz	17	22		
	2.0GHz to 2.7GHz	14	19		
Second Harmonics (ANT to RFX)	0.7GHz to 1.0GHz, P <sub>IN</sub> =+25dBm		95		dBc
	1.0GHz to 2.0GHz, P <sub>IN</sub> =+25dBm		93		
	2.0GHz to 2.7GHz, P <sub>IN</sub> =+25dBm		91		
Third Harmonics (ANT to RFX)	0.7GHz to 1.0GHz, P <sub>IN</sub> =+25dBm		80		dBc
	1.0GHz to 2.0GHz, P <sub>IN</sub> =+25dBm		77		
	2.0GHz to 2.7GHz, P <sub>IN</sub> =+25dBm		74		
0.1dB Compression Point (ANT to RFX)	0.7GHz to 2.7GHz		25		dBm
3 <sup>rd</sup> Order Input Intercept Point (ANT to RFX)	0.7GHz to 2.7GHz P <sub>IN</sub> =+25dBm Δf=1MHz		59		dBm

**Truth Table for Operation**

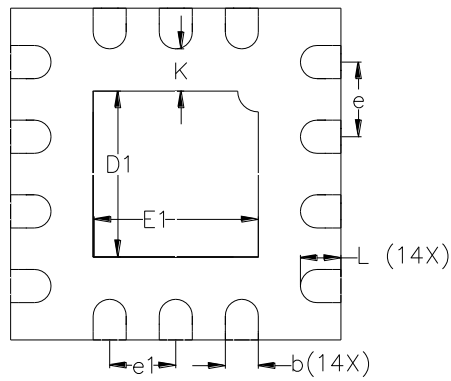
SP8T Mode	V1	V2	V3
RF1	0	0	0
RF2	0	0	1
RF3	0	1	0
RF4	0	1	1
RF5	1	0	0
RF6	1	0	1
RF7	1	1	0
RF8	1	1	1

**Package outline dimensions**
**QFN2x2-14L**


TOP VIEW



SIDE VIEW

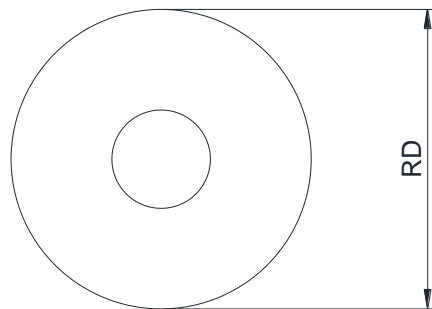


BOTTOM VIEW

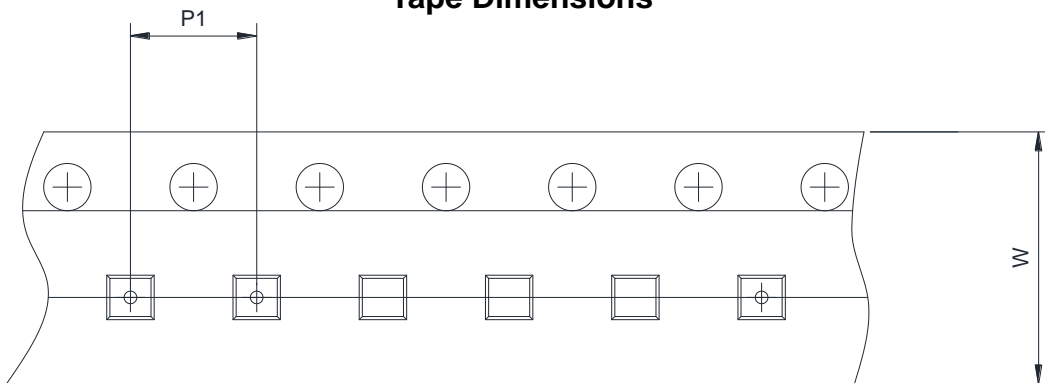
Symbol	Dimensions in Millimeters		
	Min.	Typ.	Max.
A	0.52	0.55	0.58
A3	0.13 Ref.		
b	0.15	0.20	0.25
D	1.95	2.00	2.05
E	1.95	2.00	2.05
D1	0.95	1.00	1.05
E1	0.95	1.00	1.05
e	0.45 BSC		
e1	0.40 BSC		
K	0.20	0.25	0.31
L	0.19	0.24	0.30

## Tape and Reel Information

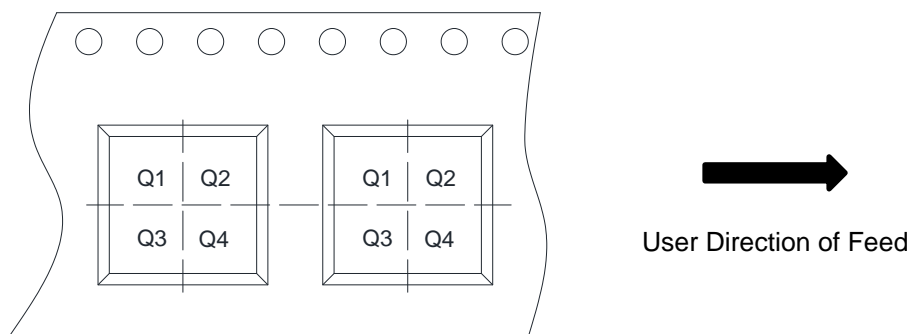
### Reel Dimensions



### Tape Dimensions



### Quadrant Assignments For PIN1 Orientation In Tape



RD	Reel Dimension	<input checked="" type="checkbox"/> 7inch	<input type="checkbox"/> 13inch
W	Overall width of the carrier tape	<input checked="" type="checkbox"/> 8mm	<input type="checkbox"/> 12mm <input type="checkbox"/> 16mm
P1	Pitch between successive cavity centers	<input type="checkbox"/> 2mm	<input checked="" type="checkbox"/> 4mm <input type="checkbox"/> 8mm
Pin1	Pin1 Quadrant	<input checked="" type="checkbox"/> Q1	<input type="checkbox"/> Q2 <input type="checkbox"/> Q3 <input type="checkbox"/> Q4

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