

WS7804Z
<http://www.sh-willsemi.com>
0.1GHz – 3GHz SP4T Antenna Switch
Descriptions

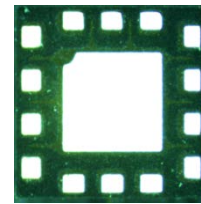
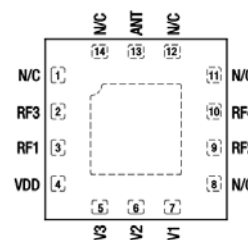
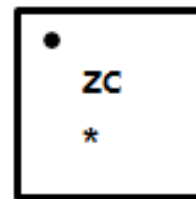
The WS7804Z is a Single Pole, Four-Throw (SP4T) switch, consisting of an SP4T switch that has 4 identical paths, and a GPIO controller. The device is optimized for GSM/EDGE, WCDMA, TD-SCDMA and LTE systems and can be used up to 3GHz applications. The low current consumption makes this device very suitable for battery operated applications. The WS7804Z is manufactured in a compact 2.0mm x 2.0 mm, 14-pin QFN package.

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
- Wide operation voltage (2.4V to 4.2V)
- Very good ESD performance

Applications

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


QFN 2X2-14L (Bottom view)

Pin configuration (Top view)


ZC = Device code

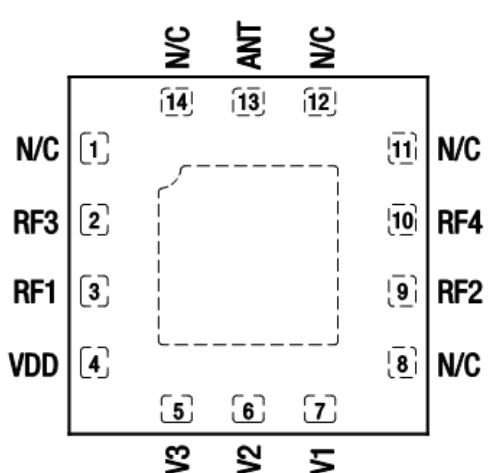
* = Month code (A~Z)

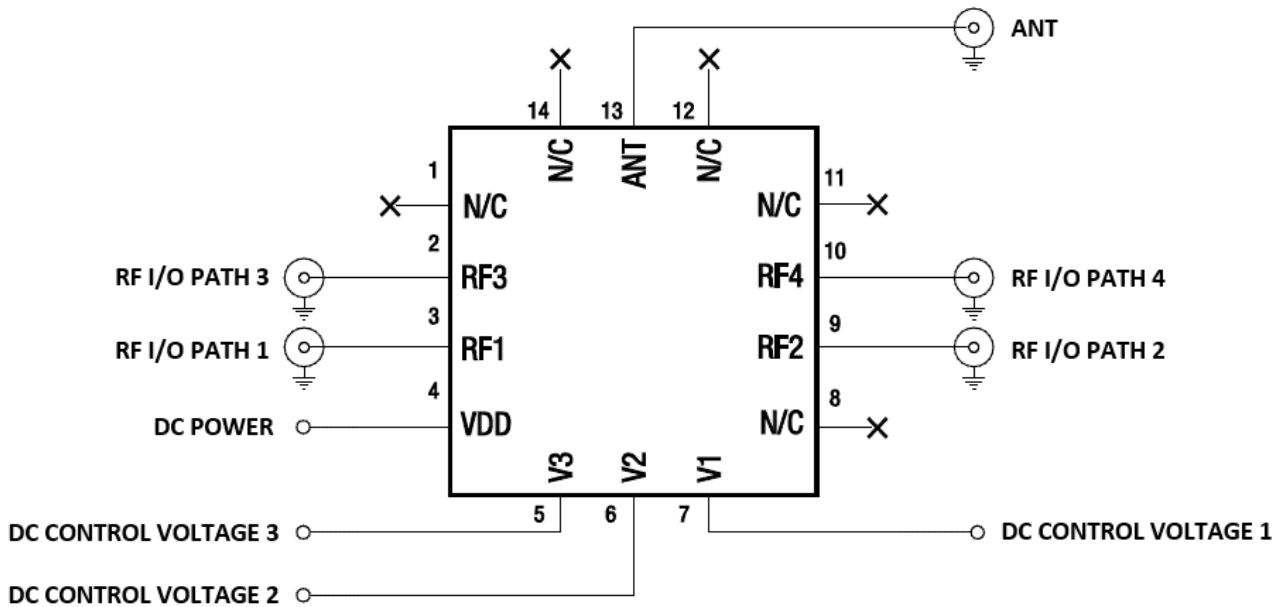
Marking(Top view)

Order information

Device	Package	Shipping
WS7804Z-14/TR	QFN2X2-14L	3000/Reel&Tape

Pinning information

Pin	Function	Description	Transparent top view
1	N/C	Not connected	
2	RF3	RF I/O path 3	
3	RF1	RF I/O path 1	
4	VDD	DC power supply	
5	VC3	DC control voltage3	
6	VC2	DC control voltage2	
7	VC1	DC control voltage1	
8	N/C	Not connected	
9	RF2	RF I/O path 2	
10	RF4	RF I/O path 4	
11	N/C	Not connected	
12	N/C	Not connected	
13	ANT	Antenna port	
14	N/C	Not connected	

Application information


Recommended operating conditions

Parameters	Conditions	Specifications			Unit
		Min.	Typ.	Max.	
ESD Rating					
ESD RF Pins	HBM, JESD22-A114			1000	V
	CDM, JESD22-C101C			500	V
ESD All Other Pins	HBM, JESD22-A114			1000	V
Power Supply					
Power Supply Voltage	Operating Voltage	2.4	2.8	4.2	V
Power Supply Current (Standby)	$V_{DD} \leq 4.2V$		10		μA
Control Voltage					
Logic Control "Low"		0	0	0.5	V
Logic Control "High"		1.2	2	3	V
RF Impedance					
RF Port Input and Output Impedance			50		Ω

Maximum Rating

Items	Value	Unit
VDD Voltage	-0.3 to +4.8	V
Control Voltage	-0.3 to +3.0	V
Maximum Input Power @ RF ports	40	dBm
Output Load VSWR	20:1	
Operation Temperature	-30 to +85	Deg. C
Storage Temperature	-60 to +150	Deg. C

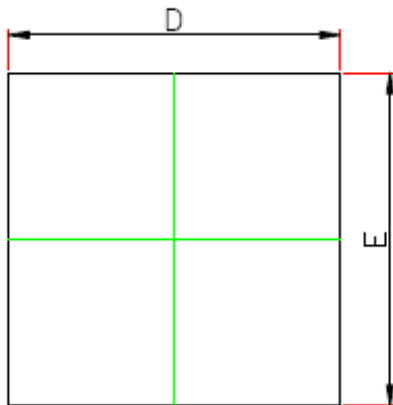
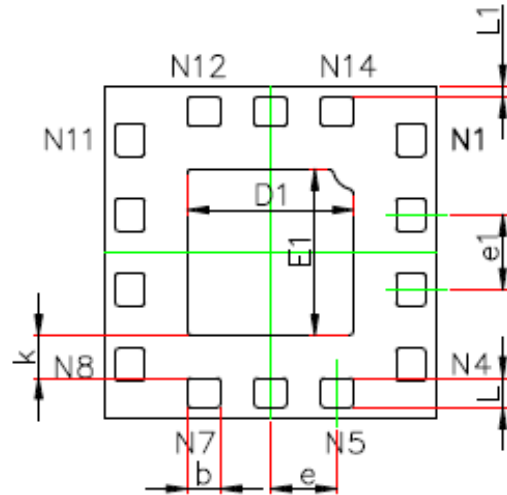
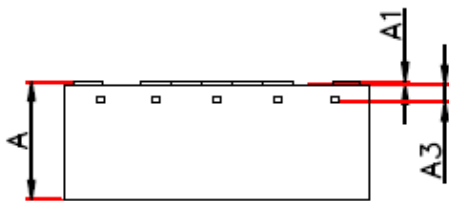
Characteristics (RF spec)

Nominal test condition unless otherwise stated. All unused ports are 50Ω terminated. $V_{DD} = 2.8V$, Temp = +25°C.

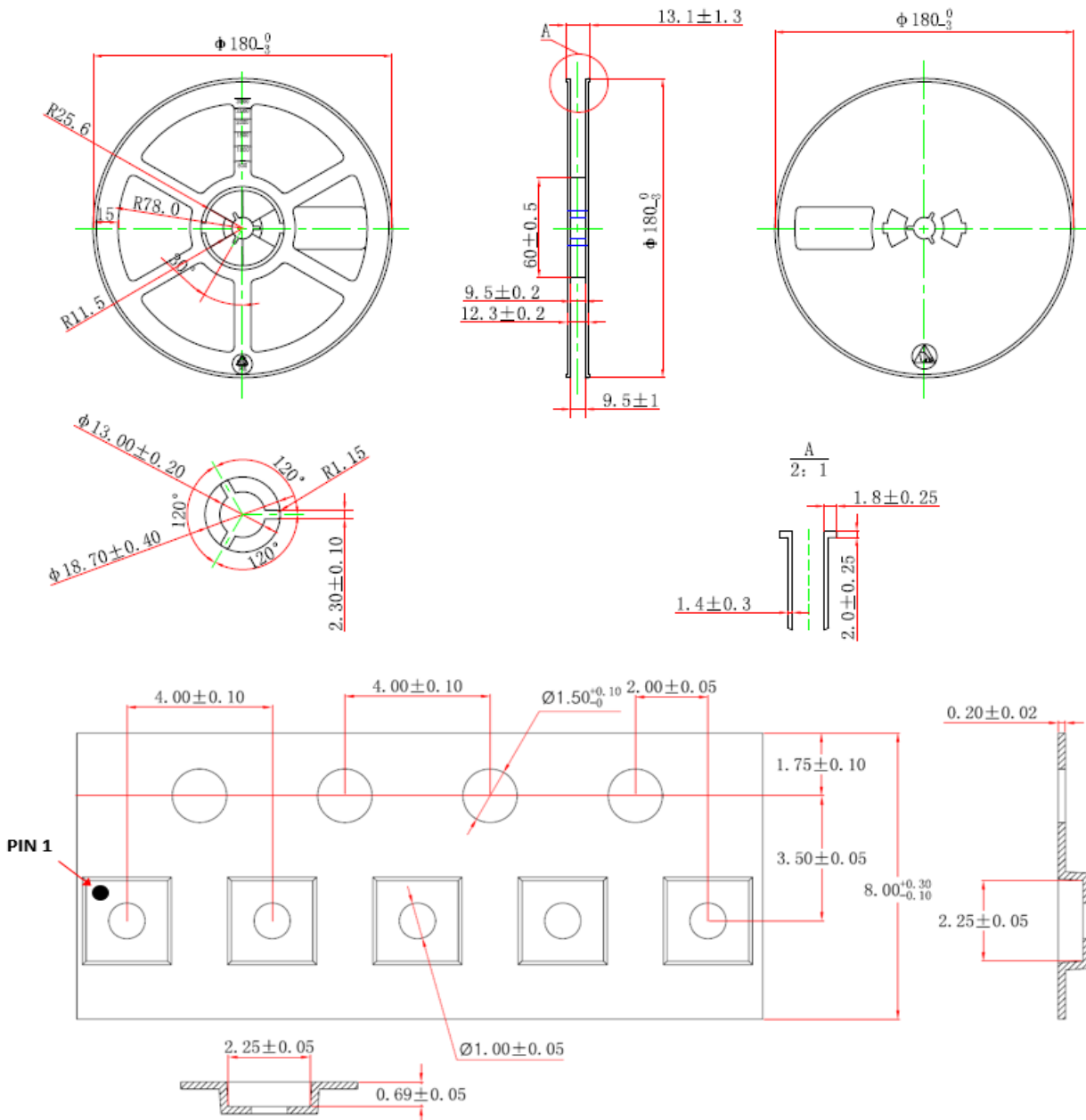
Parameters	Conditions	Specifications			Unit
		Min.	Typ.	Max.	
Insertion Loss (RF1/RF2/RF3/RF4)	0.1GHz to 1GHz 1.0GHz to 2.0GHz 2.0GHz to 2.7GHz		0.35 0.50 0.70	0.5 0.7 0.9	dB
Isolation (ANT to RF1/RF2/RF3/RF4)	0.1GHz to 1GHz 1.0GHz to 2.0GHz 2.0GHz to 2.7GHz	30 28 20			dBc
Second harmonics (RF1/RF2/RF3/RF4)	PIN=+26dBm 0.1GHz to 2.7GHz		77	80	dBc
Third harmonics (RF1/RF2/RF3/RF4)	PIN=+26dBm 0.1GHz to 2.7GHz		80	85	dBc
0.1dB Compression Point (RF1/RF2/RF3/RF4)	0.1GHz to 2.7GHz		39		dBm
3 rd Order Input Intercept Point	@2GHz, PIN=+26dBm, Δf=1MHz		69		dBm

Truth Table for Operation

SP4T Mode	Vc1	Vc2	Vc3
RF1	0	0	0
RF2	0	0	1
RF3	0	1	0
RF4	0	1	1
Shutdown	1	1	1

Package outline dimensions
QFN 2X2-14L

TOP VIEW

BOTTOM VIEW

SIDE VIEW

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.500	0.600	0.020	0.024
A1	-0.004	0.046	0.000	0.002
A3	0.110REF.		0.004REF.	
D	1.950	2.050	0.077	0.081
E	1.950	2.050	0.077	0.081
D1	0.900	1.100	0.035	0.043
E1	0.900	1.100	0.035	0.043
k	0.200MIN.		0.008MIN.	
b	0.150	0.250	0.006	0.010
e	0.400TYP.		0.016TYP.	
e1	0.450TYP.		0.018TYP.	
L	0.130	0.230	0.005	0.009
L1	0.015	0.115	0.001	0.005

Tape and Reel Information

Note:

1. CARRIER TAPE COLOR IS BLACK;
2. COVER TAPE WIDTH: 9.50 ± 0.1 ;
3. COVER TAPE COLOR IS WHITE;
4. ESD-SURFACE RESISTIVITY MEET EIA/JEDEC TNR SPECIFICATION;
5. ALL DEMENSIONS ARE IN MILLIMETER.