NZ5708S

0.1-3.0GHz SP8T Switch for Diversity Applications

Description

The NZ5708S is a SP8T (single-pole eight-throw) antenna switch module, designed for multimode broadband cellular applications, supporting UMTS, TD-SCDMA and LTE from 100MHz to 3.0GHz. The RF performance is optimized with low insertion loss and low harmonics to guarantee the stringent requirements of all 3G/LTE standards.

The NZ5708S integrates a SP8T switch and a GPIO controller on a single SOI chip. Equipped with 8 symmetrical RF ports for UMTS/TD-SCDMA/LTE, the NZ5708S is providing the most versatile combinations of operation in different modes.

Low insertion loss is exhibited in every path in NZ5708S, from the antenna port to any of the RF port, with high isolation between both opposite and adjacent paths. In addition, the NZ5708S also achieves excellent linearity performance, suitable for 3G and LTE applications. The internal decoder allows convenient GPIO connections and supports digital control signals. The SOI architecture in NZ5708S removes the external DC blocking capacitors to save the cost and PCB space for end customers.

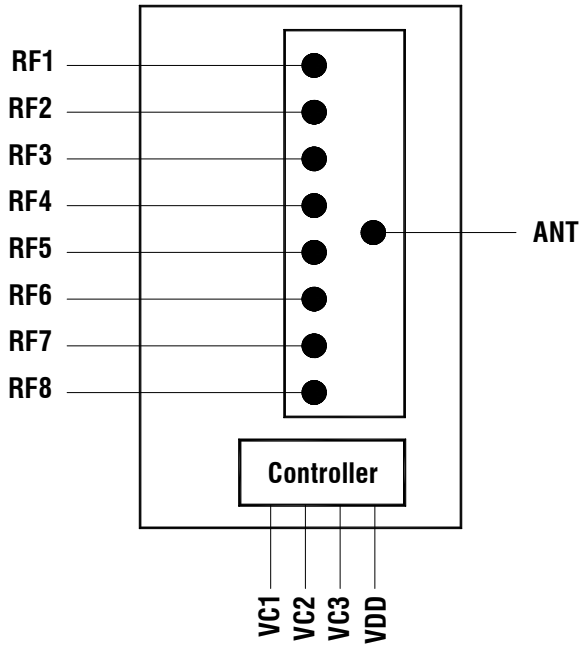
The NZ5708S is encapsulated in a compact 2mm x 2mm QFN package, with low profile of 0.525mm. This product is RoHS-compliant and halogen free.

The NZ5708S is rated to Moisture Sensitivity Level 1(MSL1) at 260°C per JEDEC J-STD-020.

Features

- **Broadband support 0.1-3.0GHz**
- **Compatible with UMTS, TD-SCDMA, and LTE**
- **Advanced SOI process**
- **Low insertion loss**
- **Excellent linearity**
- **8 symmetrical ports**
- **GPIO control interface**
- **No external DC blocking capacitor required**
- **Ultra small QFN footprint, 2mm x 2mm x 0.525mm, 14-pin**
- **ESD Class 1C**
- **Green product**

Block Diagram



Application

- **UMTS/TD-SCDMA/LTE Cellular handsets and data cards**
- **Diversity for UMTS/LTE**

NZ5708S

Absolute Maximum Ratings

Parameter	Rating	Unit
Supply Voltage(V_{DD})	4.5	V
Control Voltage(VC1,VC2, VC3)	3	V
RF Input Power	+30	dBm
Operating Temperature	-30 to 90	℃
Storage Temperature	-55 to 150	℃
ESD-Human Body Mode(HBM)	-1 to 1	kV

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

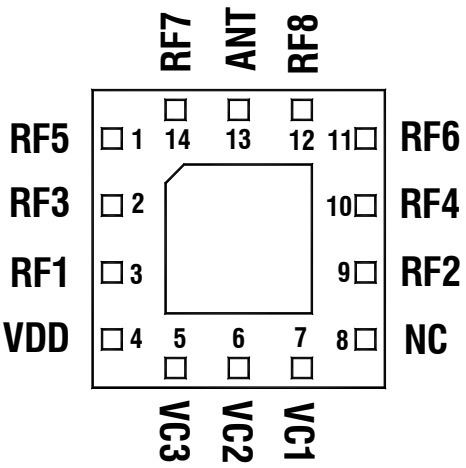
Recommended Operating Conditions

Parameter	Symbol	Condition	Minimum	Typical	Maximum	Unit
Supply Voltage	V_{DD}		2.5	3.0	3.5	V
Supply Current	I_{DD}			0.11	0.15	mA
Control Voltage(VC1,VC2, VC3)	VC	High Low	1.3	1.8 0	2.8 0.5	V
Control Current	I_{CTRL}			0.003	0.02	mA
RF Input Power	P_{IN}				30	dBm

Logic Truth Table for Operation Modes

MODE	VC1	VC2	VC3
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

Pin-Out



Pin Definitions

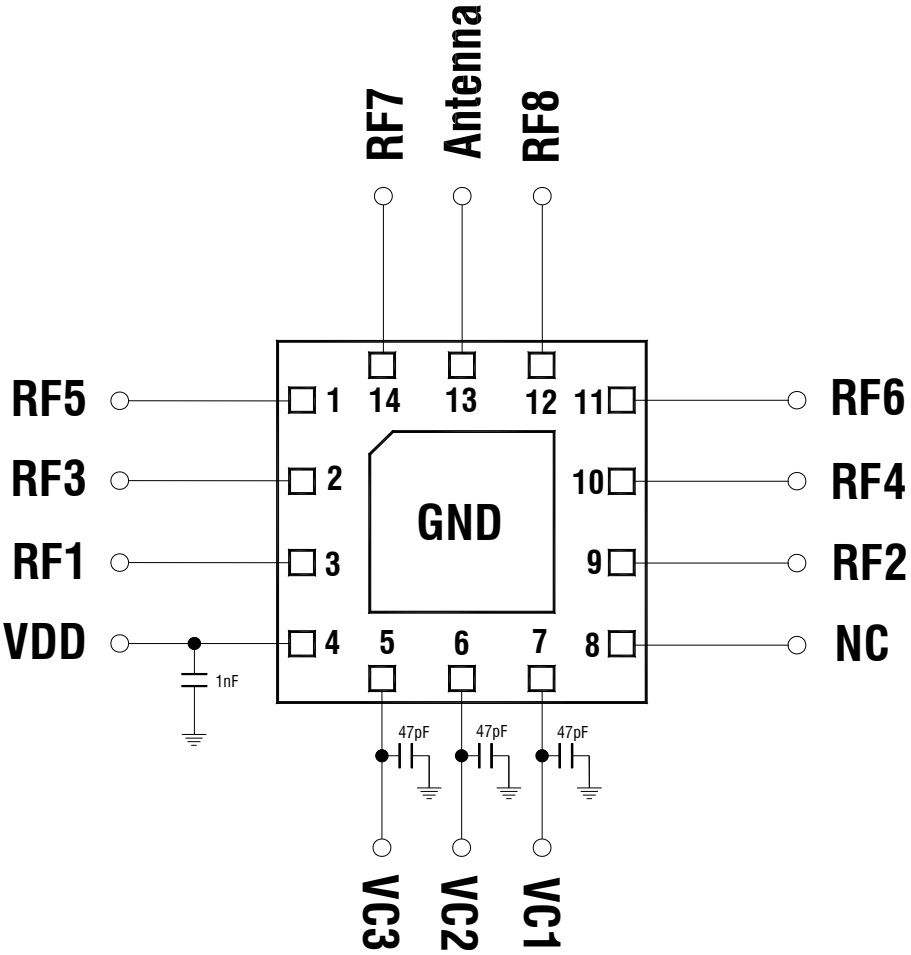
Pin	Name	Description
1	**RF5**	RF Port
2	**RF3**	RF Port
3	**RF1**	RF Port
4	**VDD**	Supply Voltage
5	**VC3**	Control logic signal
6	**VC2**	Control logic signal
7	**VC1**	Control logic signal
8	**NC**	Not connected
9	**RF2**	RF Port
10	**RF4**	RF Port
11	**RF6**	RF Port
12	**RF8**	RF Port
13	**ANT**	Antenna port
14	**RF7**	RF Port

UMTS/TD-SCDMA/LTE RF Electrical Specifications

(Test Condition V_{DD} = 2.8V, VC1/VC2/VC3 = 1.8V/0V, P_{IN} = 0dBm, Tc = 25°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		0.4 0.5 0.6	0.6 0.7 0.8	dB
Isolation	698MHz to 960MHz 1710MHz to 1980MHz 2300MHz to 2690MHz	28 21 18	30 23 20		dB
Switching Time	10% to 90% RF		2	5	μs

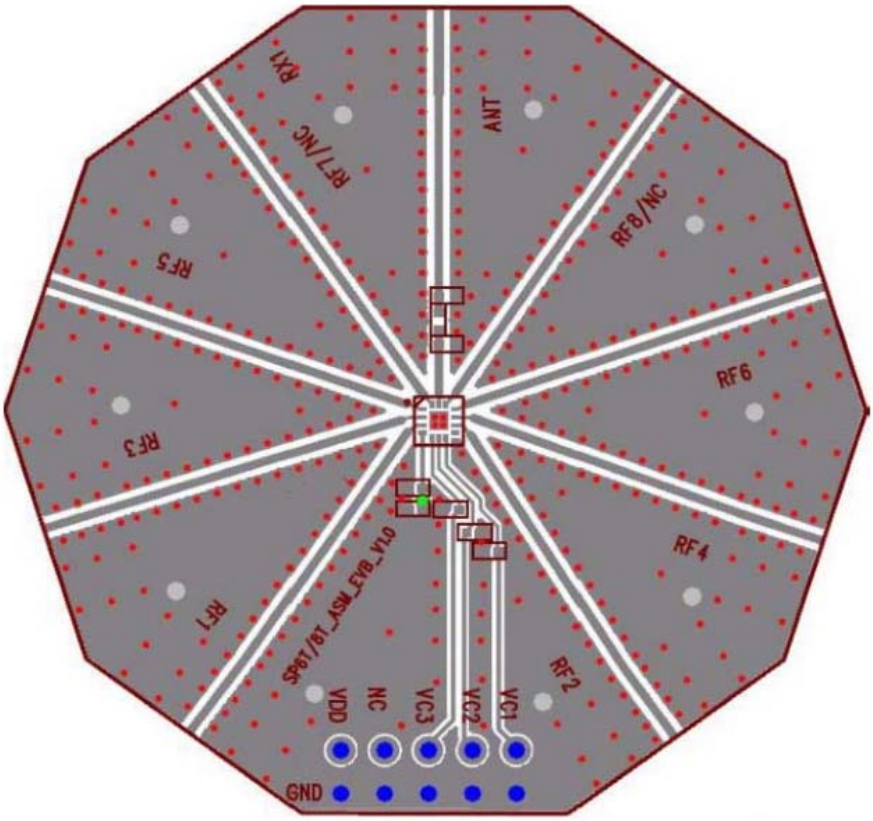
Application Schematic



1. RF input and output are 50-Ohm microstrip.
2. Decoupling capacitors may be added for VDD & VC1/VC2/VC3 according to different applications.

Evaluation Board Layout

Board Size 50mm x 50mm



Notes for Evaluation Board

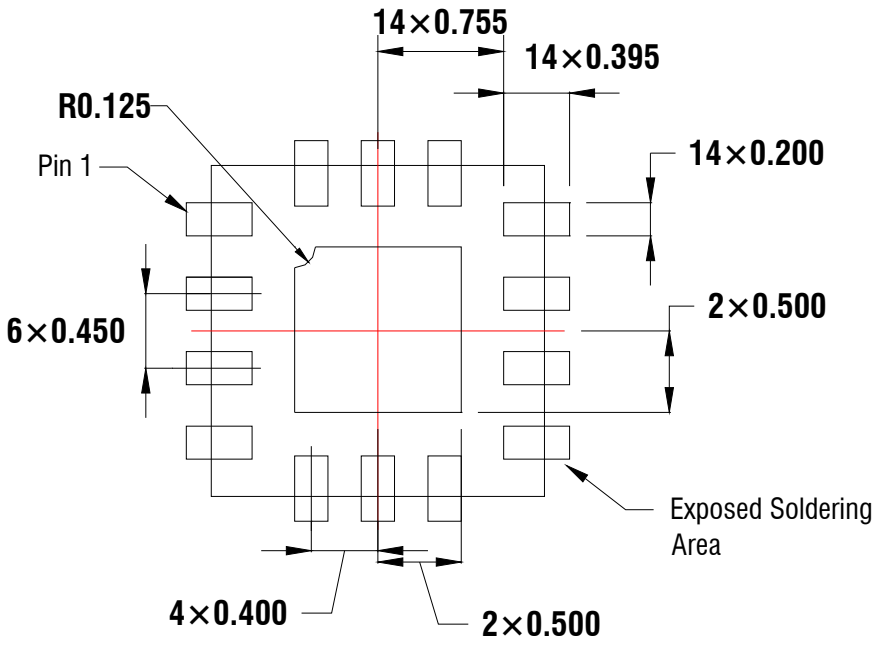
1. The copper pad on the bottom of the package should be soldered to the ground plane of the evaluation board.

2. The ground pad area should be big enough and there should be many the through vias on this ground pad, which are critical for thermal and RF performance.

3. The thickness of copper on both surface sides of the evaluation board is recommended to be 1 or 2 ounce.

4. Measurement data in this datasheet is based on an Rogers board with 1.2 mm thickness and 1 ounce copper on surface.

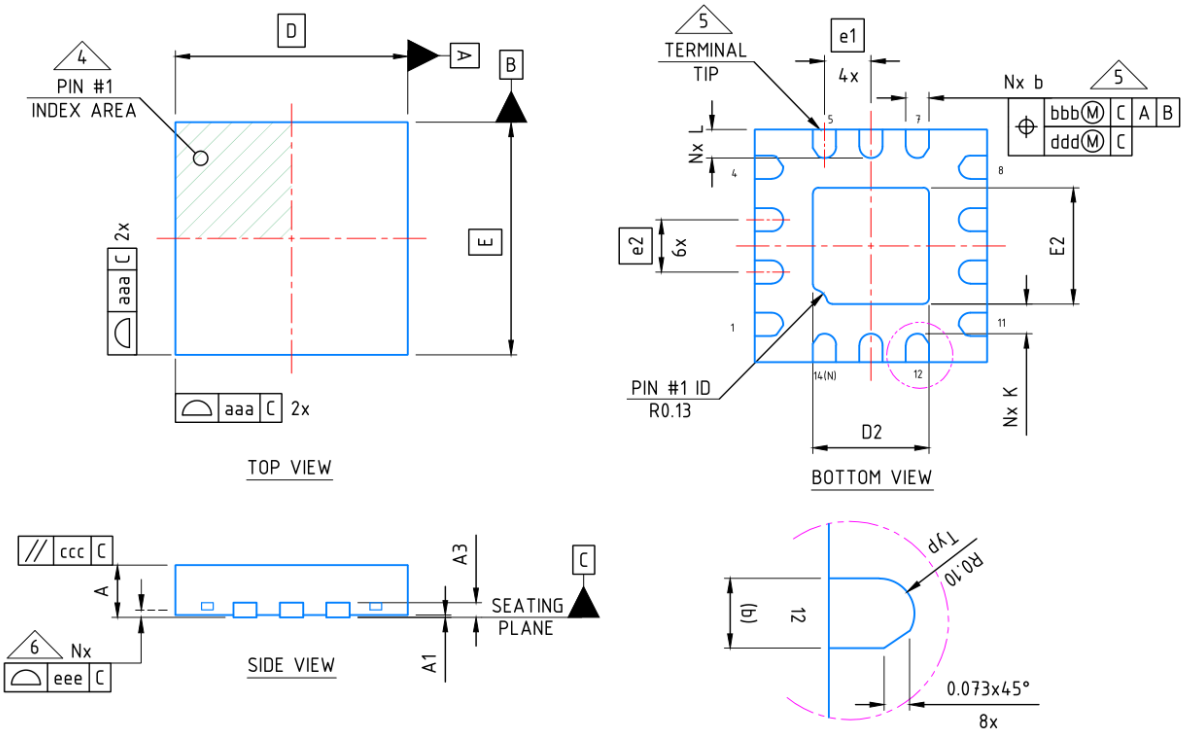
PCB Layout Footprint



PCB Metal Top View

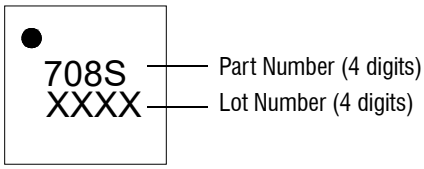
NZ5708S

Package Dimensions

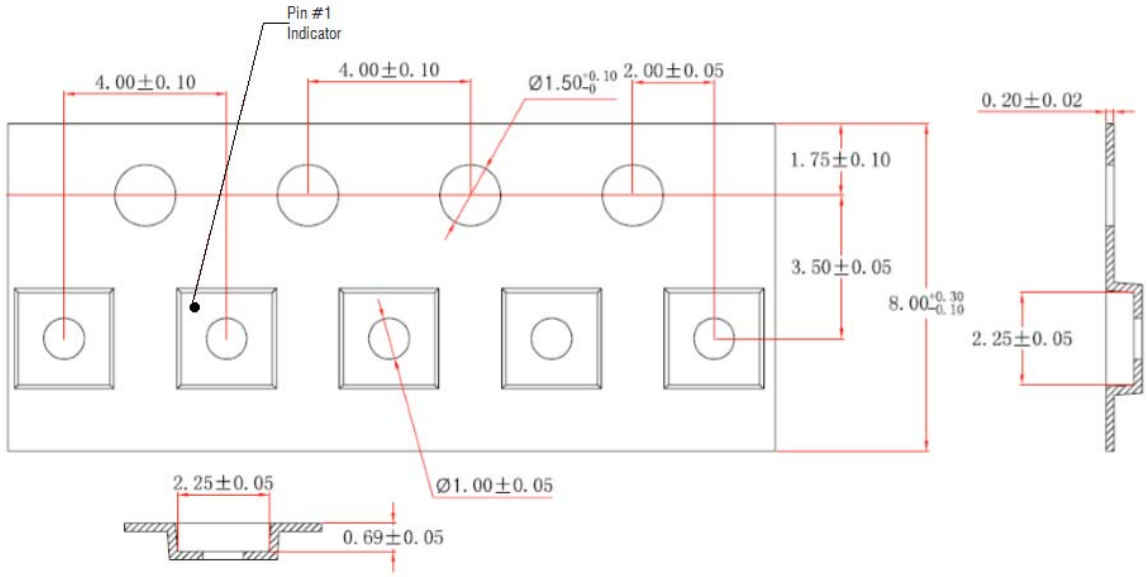


Dimension Table							
Thickness / Symbol	X1			UT1			NOTE
	MINIMUM	NOMINAL	MAXIMUM	MINIMUM	NOMINAL	MAXIMUM	
A	0.41	0.45	0.50	0.50	---	0.55	8
A1	0.00	0.02	0.05	0.00	0.02	0.05	
A3	---	0.127 Ref.	---	---	0.127 Ref.	---	
b	0.15	0.20	0.25	0.15	0.20	0.25	5
D		2.00 BSC			2.00 BSC		
E		2.00 BSC			2.00 BSC		
e1		0.40 BSC			0.40 BSC		
e2		0.45 BSC			0.45 BSC		
D2	0.95	1.00	1.10	0.95	1.00	1.10	
E2	0.95	1.00	1.10	0.95	1.00	1.10	
K	0.20	---	---	0.20	---	---	
L	0.145	0.245	0.345				
aaa		0.05			0.05		
bbb		0.07			0.07		
ccc		0.10			0.10		
ddd		0.05			0.05		
eee		0.08			0.08		
N		14			14		3
ND		3			3		7
NE		4			4		7
NOTES		1, 2					
LF PART NO.		444289					
LF DWG. NO.		CARSEM-HDS-096A					

Marking Specification



Packaging Information



Package Type	Unit Size	Max Reel Diameter	Type Width	Pocket Pitch	Reel Capacity
Tape and Reel	2mm x 2mm x 0.525mm	7”	12mm	8mm	3000

Order Information

ORDER NUMBER	TEMPERATURE	PACKAGE DESCRIPTION	TYPE
NZ5708STR1	-30°C ~ 90°C	14-Pin, 2mm x 2mm x 0.525mm QFN Module Halogen Free	Tape & Reel, 3000 pcs per Reel

Revision History

Revision	Description
DS20161102	Initial release.
DS20170425	Update PCB Layout Footprint.

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