

**RFIC 2019. 05 Update Rev2.2**

**DESCRIPTION**

The LS5601 is an high integration Front-End-Module (FEM), included a SPDT T/R switch and a low noise amplifier (LNA) for wireless applications. The device is typically operated at 3.3V and has excellent NF of 2.2dB in the receiving mode . The FEM is manufactured in a compact, 2.5 x 2.5 (mm), 16-pin, QFN leadless package. The small footprint provides designers the convenience when make the compact product design, and still can meet the system requirement easily .

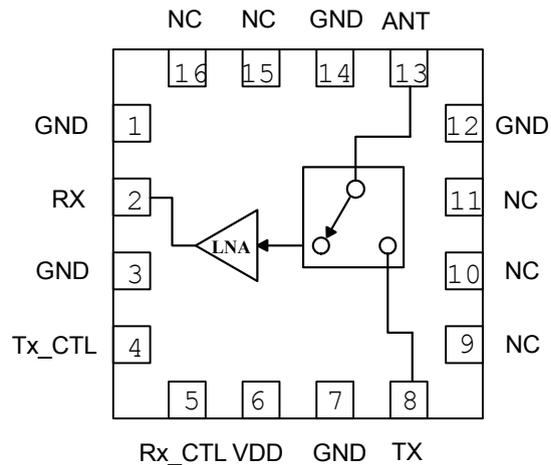
**KEY FEATURES**

- Frequency range: 2.4GHz ~ 2.5GHz**
- **High IIP3: +1dBm**
- **High gain: 20dB**
- Frequency range: 5GHz ~ 5.9GHz**
- **High IIP3: +5dBm**
- **High gain: 14dB**
- **LNA Current Consumption: 14mA**
- **Small QFN (16-pin, 2.5 x 2.5 mm) package**

**Major Applications**

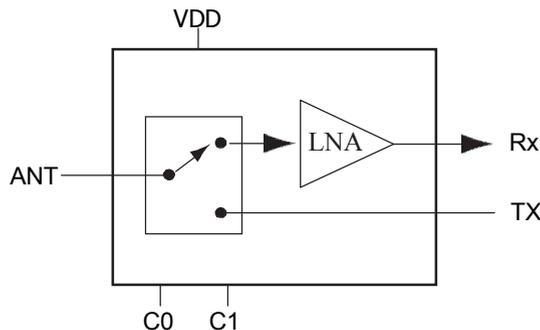
- 802.11 a/b/g/n WLAN
- 802.11 ac WLAN
- 5 GHz ISM radio
- Notebook, Tablet etc portable device
- Router, Access point, Gateway
- Wireless video system

**Pin Assignment**



QFN 16 pins, 2.5 x 2.5 (mm)

**Functional Block**



## Pin Details

Pin No.	Name	Description
1	GND	Ground
2	RX	LNA output signal
3	GND	Ground
4	Tx_CTL	Tx path logical control signal
5	Rx_CTL	Rx path logical control signal
6	VDD	LNA supply voltage
7	GND	Ground
8	TX	Transmit input signal
9	NC	No connection.
10	NC	No connection.
11	NC	No connection.
12	GND	Ground
13	ANT	Antenna output
14	GND	Ground
15	NC	No connection.
16	NC	No connection.

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Control Logic Characteristics; TA = 25°C; unless otherwise noted.

Parameter	Specification			Units	Notes
	Min	Typ.	Max		
Control voltage					
High	2.7		5	V	
Low	-0.3		+0.3	V	
Control current:					
High		250	300	μA	Control Voltage = 3V
Low		<1		μA	

Transmit AC Characteristics Tx\_CTL= 3.3 V, Rx\_CTL= 0 V ; CW signal; TA = 25°C; unless otherwise noted.

Parameter	Specification			Units	Notes
	Min	Typ.	Max		
Freq	2.4		2.5	GHz	
Insertion loss (IL)		-0.5		dB	
Input return loss (S11)		-20		dB	@ TX input port
Output return loss (S22)		-19		dB	@ ANT port
Freq	5		5.9	GHz	
Insertion loss (IL)		-1.2		dB	
Input return loss (S11)		-11		dB	@ TX input port
Output return loss (S22)		-11		dB	@ ANT port

### Absolute Maximum Ratings

Parameter	Rating	Unit
LNA Supply Voltage	+6	V
LNA power (receive mode)	-3	dBm
TX power (transmit mode)	+36/+40 @ 3.3/5V	dBm
Switch logic control	+6	V
Operating Ambient Temperature	-40 ~ +85	°C
Storage Temperature	-40 ~ +125	°C

### Important Note:

The information provided in this datasheet is deemed to be accurate and reliable only at present time. RFIC Technology Corp. reserves the right to make any changes to the specifications in this datasheet without prior notice.

For more information, please contact us at:

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**Electrical Characteristics**

Receive AC Characteristics Rx\_CTL = 3.3 V, Tx\_CTL= 0 V ; CW signal; TA = 25°C; unless otherwise noted.

Parameter	Specification			Units	Notes
	Min	Typ.	Max		
Freq	2.4		2.5	GHz	
Receive Gain		20		dB	
Noise Figure (NF)		2		dB	
Idle Current		14	20	mA	
Input return loss (S11)		-9		dB	@ ANT port
Output return loss (S22)		-18		dB	@ RX output port
1 dB Input Compression Point (IP1dB)		-10		dBm	@ ANT port
Freq	5		5.9	GHz	
Receive gain		14		dB	
Idle Current		14	20	mA	
Noise Figure (NF)		2.2		dB	
Input return loss (S11)		-7		dB	@ ANT port
Output return loss (S22)		-10		dB	@ RX output port
1 dB Input Compression Point (IP1dB)		-6		dBm dBm	@ ANT port

Note : Performance is guaranteed only under the conditions listed in this Table.

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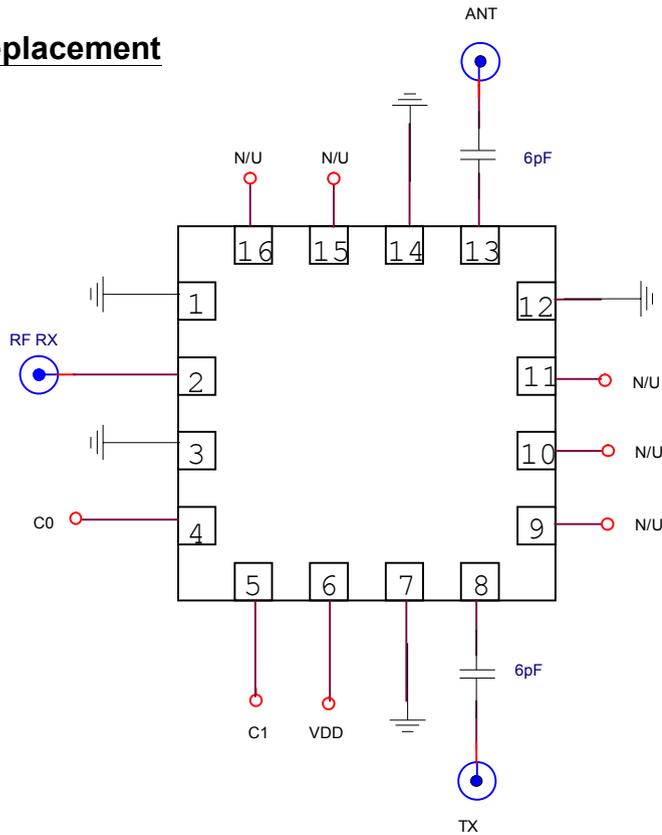
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## Schematic

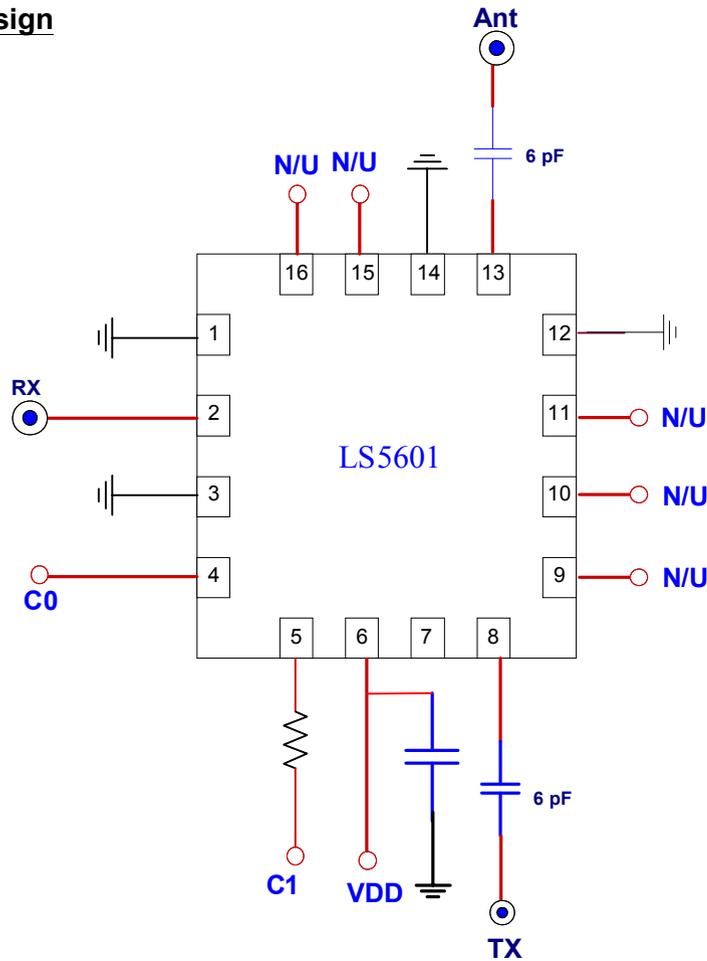
### Pin to pin replacement



	C0	C1
Receive LNA on	Off	On
Transmit on	On	Off

## Schematic

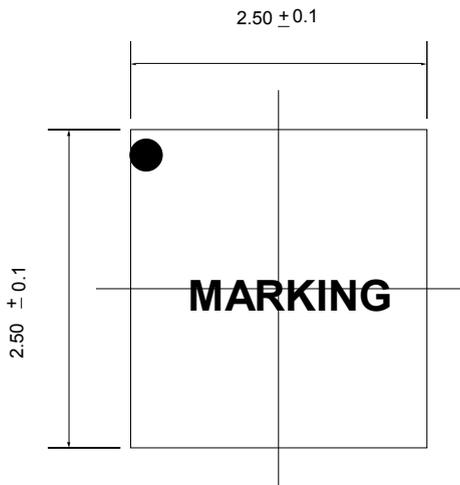
### New design



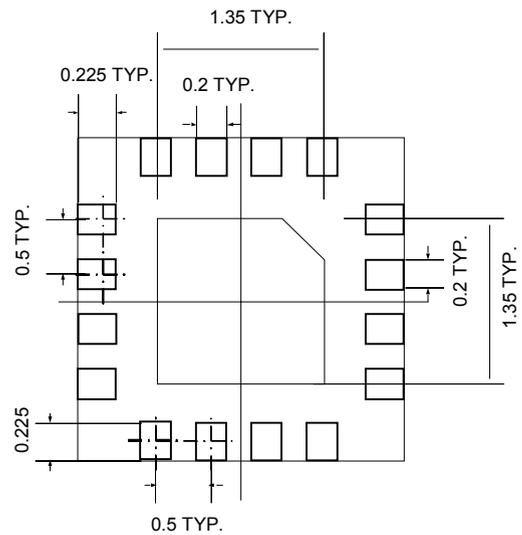
	C0	C1
Receive LNA on	Off	On
Transmit on	On	Off

## Package Dimensions

**Top View**

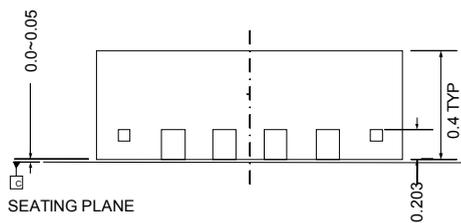


**Bottom View**



Unit: mm

**Side View**



**Note :**

1. Dimension and tolerance conform to ASME Y14.5M-1994.
2. Refer to JEDEC STD. MO-220



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The product is designed and manufactured for consumer application only and is not intended for any application listed below which requires especially high reliability for the prevention of such defect which could lead to personal injury, death, physical or environmental damage.

- Aircraft equipment.
- Aerospace equipment.
- Undersea equipment.
- Medical equipment.
- Life-saving or life-sustaining applications
- Transportation equipment (vehicles, trains, ships, etc.).
- Traffic signal equipment.
- Disaster prevention / crime prevention equipment.
- Application of similar complexity and/ or reliability requirements to the applications listed in the above.