

## 1220 to 1610 MHz Low noise amplifier

### SPECIFICATION

#### 1 FEATURES

- iHP SiGe BiCMOS 0.25  $\mu\text{m}$
- Operating frequency range 1220 to 1610 MHz
- High gain
- Low noise figure
- Very high linearity
- Current source type: temperature dependent or temperature independent
- Portable to other technologies (upon request)

#### 2 APPLICATION

- Front-end HF signal amplification in receivers

#### 3 OVERVIEW

Low noise amplifier (LNA) is usually used as the first stage of receivers and is characterized by low noise figure and high linearity.

LNA is based on a cascode circuit with output resonant circuit. The external elements are used matching the output to  $50\ \Omega$  and for frequency range adjustment.

The block is fabricated on iHP SiGe BiCMOS 0.25  $\mu\text{m}$  technology.

#### 4 STRUCTURE

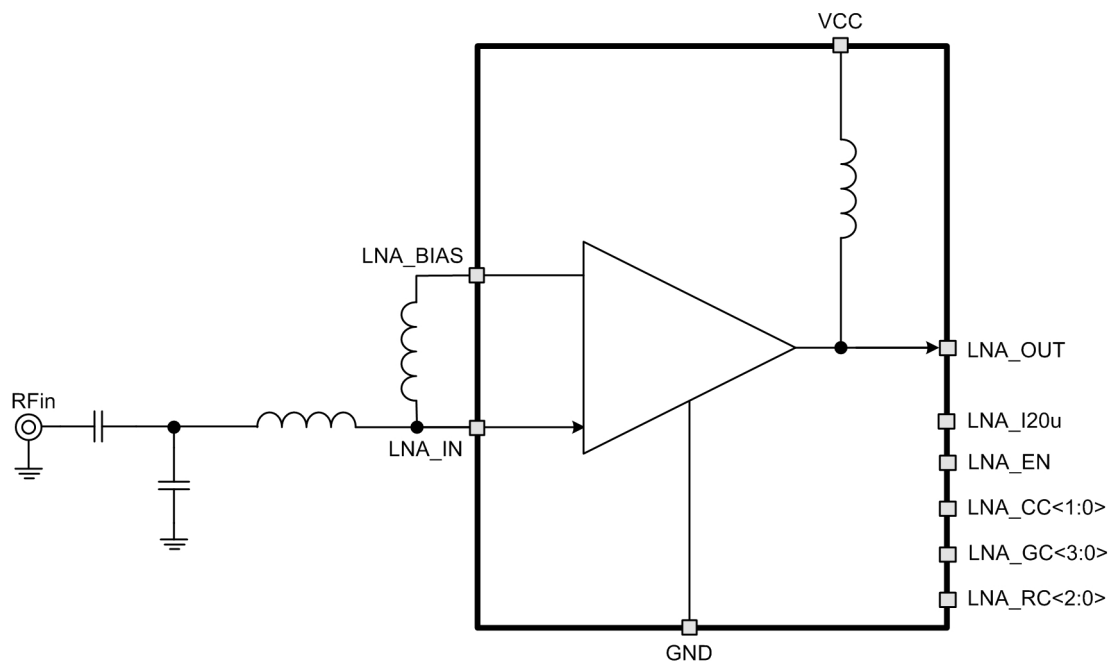


Figure 1: Low noise amplifier structure.

## 5 PIN DESCRIPTION

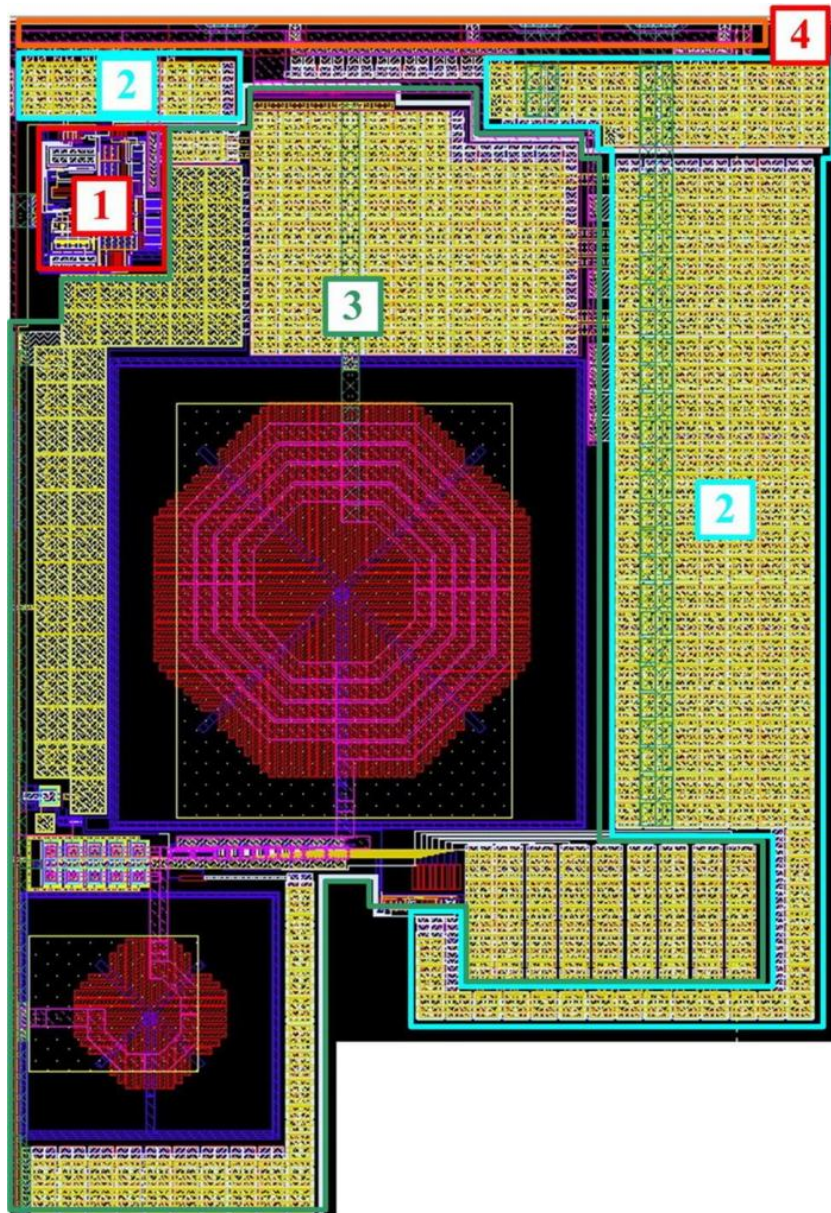
Name	Direction	Description
LNA_I20u	IO	Reference current 20 uA
LNA_IN	I	LNA input
LNA_EN	I	Enable/disable
LNA_BIAS	I	LNA operating point setting
LNA_CS	I	Digital code defined the current source type (temperature independent/temperature dependent)
LNA_OUT	O	LNA output
LNA_CC<1:0>	I	LNA current consumption control
LNA_GC<3:0>	I	LNA gain control
LNA_RC<2:0>	I	LNA output resonant circuit control
LNA_VCC	IO	Supply voltage
LNA_GND	IO	Ground

## 6 LAYOUT DESCRIPTION

Low noise amplifier dimensions are given in the table 1.

**Table 1:** Block dimensions.

Dimension	Value	Unit
Height	1000	um
Width	680	um



**Figure 2:** Low noise amplifier layout view.

1. Reference current source
2. Filter capacitors
3. LNA
4. Supply voltage bus

## 7 OPERATING CHARACTERISTICS

### 7.1 TECHNICAL CHARACTERISTICS

Technology \_\_\_\_\_ iHP SiGe BiCMOS 0.25 um  
 Status \_\_\_\_\_ silicon proven  
 Area \_\_\_\_\_ 0.68 mm<sup>2</sup>

### 7.2 ELECTRICAL CHARACTERISTICS

The values of electrical characteristics are specified for  $V_{cc} = 2.8 \div 3.6$  V and  $T_a = -60 \div +125^\circ\text{C}$ . Typical values are at  $V_{cc} = 3.0$  V,  $T_a = +27^\circ\text{C}$ , unless otherwise specified.

Parameter	Symbol	Condition	Value			Unit
			min	typ	max	
Supply voltage	$V_{cc}$	-	2.8	3.0	3.3	V
Operating temperature range	$T_a$	-	-60	27	125	°C
Operating frequency	$F_{IN}$	-	1220		1610	MHz
Gain	G	-	-	18	-	dB
Noise figure	NF	-	-	1.8	-	dB
Input VSWR	$VSWR_{IN}$	50 $\Omega$	-	1.2	-	-
Output VSWR	$VSWR_{OUT}$	50 $\Omega$	-	1.6	-	-
Input 1dB compression point	$P_{1dB}$	-	-	-14	-	dBm
3 <sup>rd</sup> order intercept point	IIP3	-	-	+5	-	dBm
Current consumption	$I_{cc}$	-	5.5	7.1	9.1	mA
Stand-by current	$I_{stb}$	-	-	-	200	nA
Input logic-level high	$V_{IH}$	For digital inputs	$0.7V_{cc}$	-	$V_{cc}+0.25$	V
Input logic-level low	$V_{IL}$		-0.25	-	0.3	V

## 8 DELIVERABLES

IP contents:

- Schematic or NetList
- Layout or blackbox
- Extracted view (optional)
- GDSII
- DRC, LVS, antenna report
- Test bench with saved configurations (optional)
- Documentation