

1220 to 1610 MHz mixer

SPECIFICATION

1 FEATURES

- iHP SiGe BiCMOS 0.25 um
- Operating frequency range from 1220 to 1610 MHz
- Adjustable transmission coefficient
- Input 1 dB compression point 1 dBm
- Mode with temperature compensation gain
- Supported foundries: TSMC, UMC, Global Foundries, SMIC, iHP, AMS, Vanguard, SilTerra

2 APPLICATION

- Receivers

3 OVERVIEW

The mixer based on Gilbert cell and converts RF frequency to a low intermediate frequency. Buffer amplifier is used to improve qualitative characteristics, reduce harmonic and intermodulation distortions and provides high linearity.

The block is fabricated on iHP SiGe BiCMOS 0.25 um technology.

4 STRUCTURE

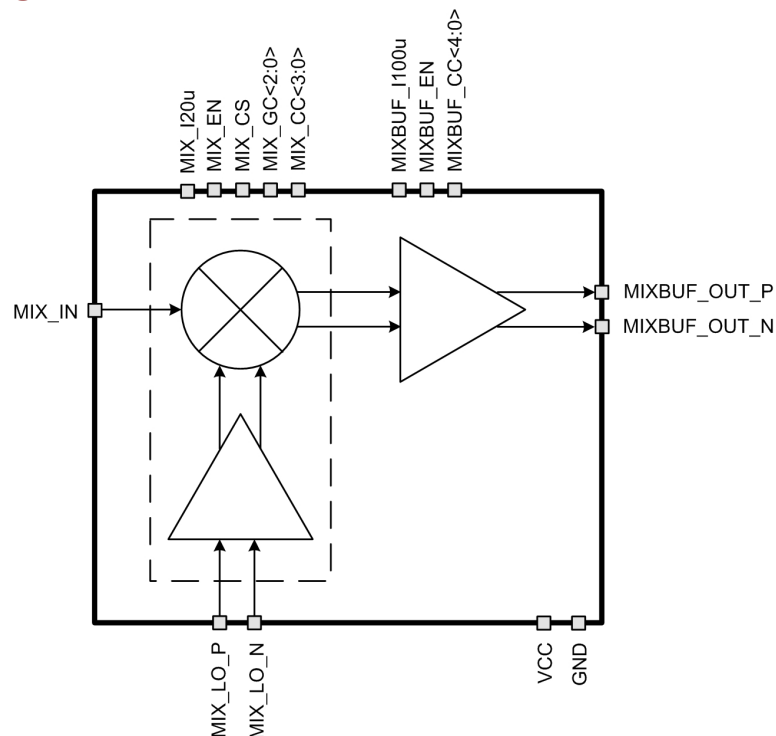


Figure 1: 1220 to 1610 MHz mixer structure

5 PIN DESCRIPTION

Name	Direction	Description
MIX_I20u	IO	Reference current 20 uA
MIXBUF_I100u	IO	Mixer output buffer reference current 20 uA
MIX_IN	I	Mixer input
MIX_CS	I	Supply voltage source type
MIX_LO_P	I	Local-oscillator differential input
MIX_LO_N		
MIXBUF_GC	I	Mixer output buffer gain adjustment
MIX_EN	I	Mixer enable/disable
MIXBUF_EN	I	Mixer output buffer enable/disable
MIX_GC<2:0>	I	Mixer gain control
MIX_CC<3:0>	I	Mixer current consumption adjustment
MIXBUF_CC<4:0>	I	Mixer output buffer current consumption adjustment
MIXBUF_OUT_P	O	Mixer differential output
MIXBUF_OUT_N		
VCC	IO	Supply voltage
GND	IO	Ground

6 LAYOUT DESCRIPTION

Mixer dimensions are given in the table 1.

Table 1: Block dimensions

Dimension	Value	Unit
Height	1000	um
Width	680	um

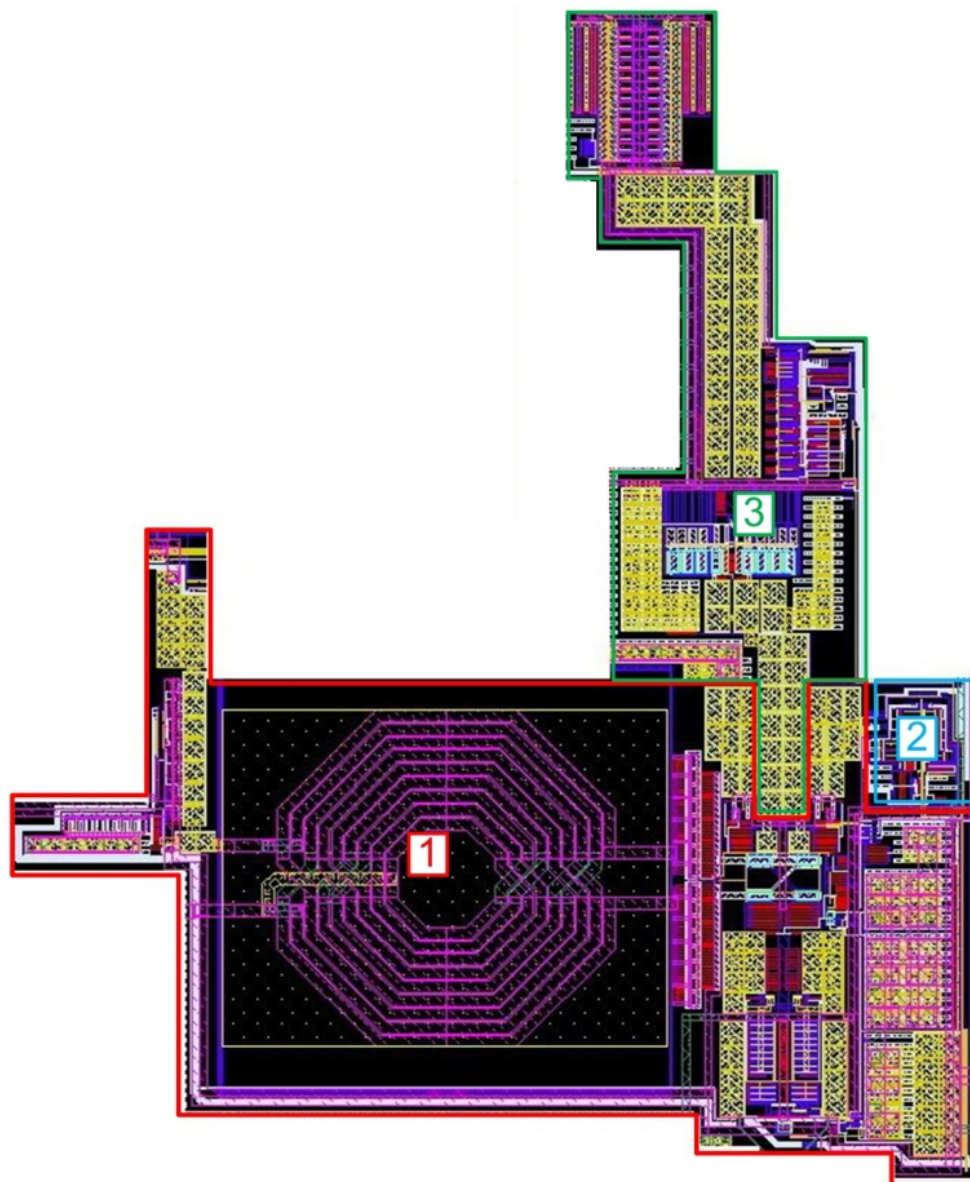


Figure 2: Mixer layout

1. Mixer core
2. Reference current source
3. Output buffer

7 OPERATING CHARACTERISTICS

7.1 TECHNICAL CHARACTERISTICS

Technology _____ iHP SiGe BiCMOS 0.25 um
 Status _____ silicon proven
 Area _____ 0.68 mm²

7.2 ELECTRICAL CHARACTERISTICS

The values of electrical characteristics are specified for $V_{cc} = 2.6 \div 3.3$ V and $T_a = -60 \div +125^\circ\text{C}$. Typical values are at $V_{cc} = 2.7$ V, $T_a = 27^\circ\text{C}$, unless otherwise specified.

Parameter	Symbol	Condition	Value			Unit
			min	typ.	max	
Supply voltage	V_{cc}	-	2.6	2.7	3.3	V
Operating temperature range	T_a	-	-60	27	125	°C
Input frequency	F_{IN}	-	1220	-	1610	MHz
Local-oscillator output frequency.	F_{RO}	-	1140	-	1690	MHz
Output frequency	F_{OUT}	-	30	-	80	MHz
Gain	G	-	-	5	-	dB
Noise figure	NF	-	-	1.8	-	dB
Input resistance	R_{IN}	-	-	50	-	Ω
Peak-to-peak differential input voltage	A_{p-p}	-	200	400	600	mV
Output resistance	R_{OUT}	-	-	50	-	Ω
Input 1dB compression point	$P_{1dB\ MIX}$	-	-	+1	-	dBm
3 rd order intercept point	IIP3	-	-	+13	-	dBm
Current consumption	I_{cc}	-	64	65	66	mA
Stand-by current	I_{stb}	-	-	-	100	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

Depending on license type IP may include:

- Schematic or NetList
- Abstract view (.lef and .lib files)
- Layout (optional)
- Verilog behavior model
- Extracted view (optional)
- GDSII
- DRC, LVS, antenna report
- Test bench with saved configurations (optional)
- Documentation