

Reference frequency oscillator

SPECIFICATION

1 FEATURES

- iHP SiGe BiCMOS 250 nm
- Operation at the 1st or the 3rd harmonic of a quartz resonator
- The 2nd or the 3rd output harmonic selection
- External frequency oscillator operation in a buffer mode
- Low current consumption
- High temperature stability using temperature-compensated resonator
- Low frequency time response
- Small area
- Portable to other technologies (upon request)

2 APPLICATION

- Frequency multiplier
- Reference signal former
- PLL frequency synthesizer

3 OVERVIEW

Reference oscillator is used to generate reference frequency and can work at the 1st or the 3rd harmonic of quartz crystal resonator. Operating frequency is defined by external quartz resonator and external component values. Output peak-to-peak limitation system is used to reduce current consumption. Output resonant circuit is used to select the 2nd or 3rd harmonic (see section 7.3).

The block is fabricated on iHP SiGe BiCMOS 250 nm technology.

4 STRUCTURE

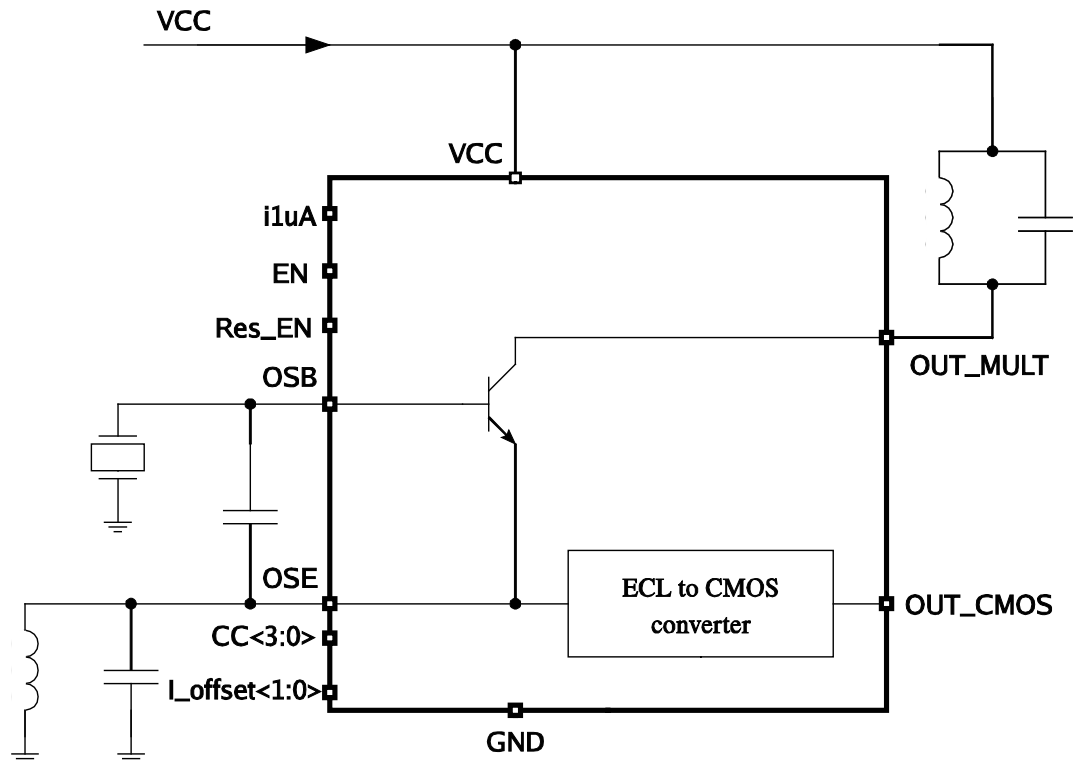


Figure 1: Structure of the device with the harmonic selection at the oscillator output.

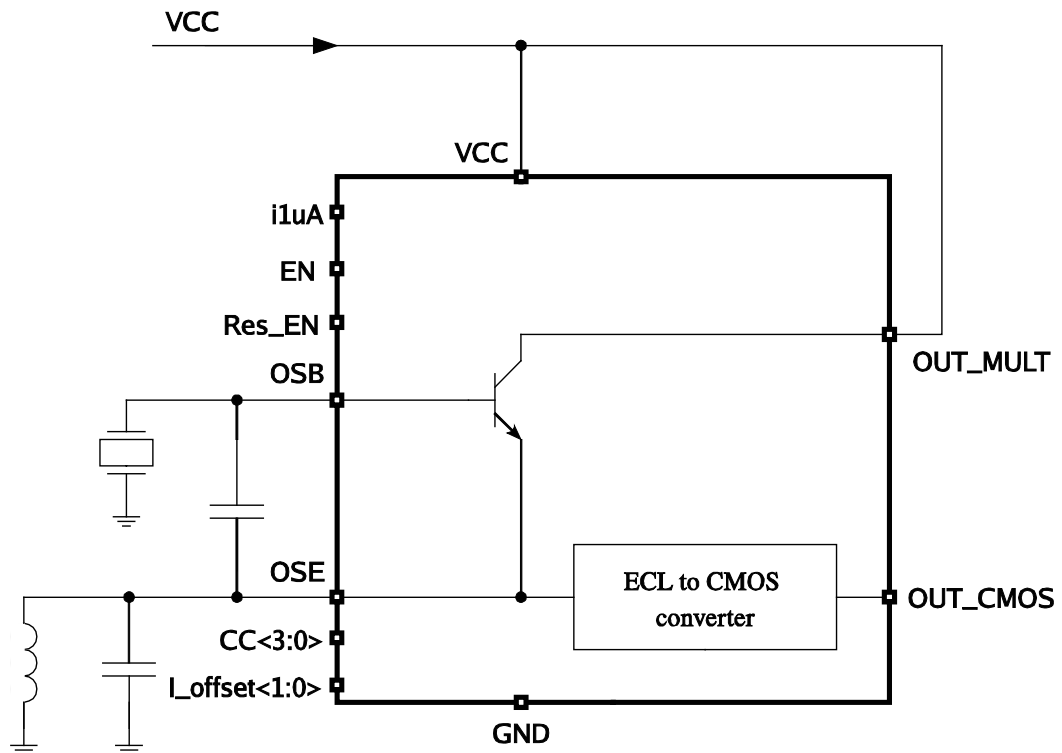


Figure 2: Structure of the device without the harmonic selection at the oscillator output.

5 PIN DESCRIPTION

Name	Direction	Description
i1uA	IO	Reference current (1 uA)
EN	I	Enable/disable
Res_EN	I	Additional limitation enable/disable
OSB	IO	Analog output for quartz resonator connection
OSE	IO	Oscillator core collector output
OUT_MULT	O	Analog output
OUT_CMOS	O	CMOS output
CC<3:0>	I	Current control
I_offset<1:0>	I	Frequency oscillator core peak-to-peak limitation
GND	IO	Ground
VCC	IO	Supply voltage

6 LAYOUT DESCRIPTION

The block dimensions are given in the table 1.

Table 1: Block dimensions.

Dimension	Value	Unit
Height	372.21	um
Width	128.82	um

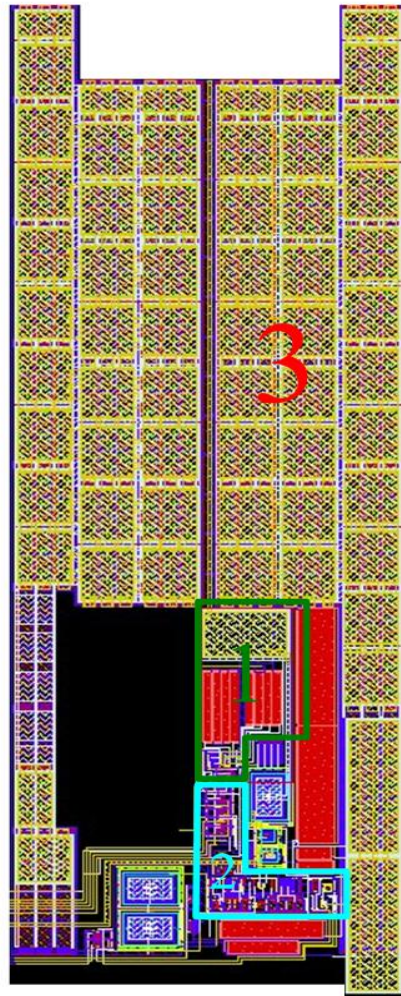


Figure 3: Device layout view.

1. ECL to CMOS converter
2. Reference current source
3. Capacitors

7 OPERATING CHARACTERISTICS

7.1 TECHNICAL CHARACTERISTICS

Technology _____ iHP SiGe BiCMOS 250 nm
 Status _____ silicon proven
 Area _____ 0.048 mm²

7.2 ELECTRICAL CHARACTERISTICS

The values of electrical characteristics are specified for $V_{cc} = 1.8 \div 2.3$ V and $T_a = -45 \div +85$ °C. Typical values are at $V_{cc} = 2.2$ V, $T_a = +27$ °C, unless otherwise specified.

Parameter	Symbol	Condition	Value			Unit
			min	typ	max	
Supply voltage	V_{cc}	-	1.8	2.2	2.3	V
Operating temperature range	T_a	-	-45	27	85	°C
Output frequency	F_{out}	Depends on connected crystal; 1 st harmonic of oscillator	18	26	90	MHz
Peak-to-peak output voltage	A_{XTALL}	-	350	550	-	mV
Peak-to-peak CMOS	$A_{out XTALLcmos}$	-	1.8	2.2	2.3	V
Frequency time response	t_{stab}	-	-	1.4	2	ms
Current consumption in an active mode	I_{cc}	-	135	160	260	uA
Current consumption in a standby mode	I_{stb}	-	-	1	2	nA
Input logic-high level	V_{IH}	For digital inputs	$0.7V_{cc}$	-	$V_{cc}+0.25$	V
Input logic-low level	V_{IL}		-0.25	-	0.3	V

7.3 FREQUENCY OPERATING MODE

	Selected harmonic of the output signal		
	1 st oscillator harmonic	2 nd oscillator harmonic	3 rd oscillator harmonic
1 st resonator harmonic	19...30 MHz	38...60 MHz	57...90 MHz
3 rd resonator harmonic	57...90 MHz	114...180 MHz	171...270 MHz
In a buffer mode	19...90 MHz	38...180 MHz	57...270 MHz

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