

Low pass filter

SPECIFICATION

1 FEATURES

- AMS035 BiCMOS 0.35 μm
- Wide pass band frequency adjustment range (9.6 MHz...25 MHz)
- Low group delay time ripple vs. Frequency
- Low pass filter cut-off frequency adjustment system (LPF CFAS)
- Supported foundries: TSMC, UMC, Global Foundries, SMIC, iHP, AMS, Vanguard, SilTerra

2 APPLICATION

- Signal processing systems
- Navigation systems

3 OVERVIEW

Low pass filter (3rd order Chebyshev filter) is based on the gyrators with cut-off frequency adjustment in wide range. There are two modes for cut-off frequency programming: manually and automatically. The generator is used to adjust filter cut-off (CO) frequency in automatic mode. Also CO frequency can be fixed by the digital code CFAS_Code<6:0>.

The block fabricated on AMS035 BiCMOS 0.35 μm technology.

4 STRUCTURE

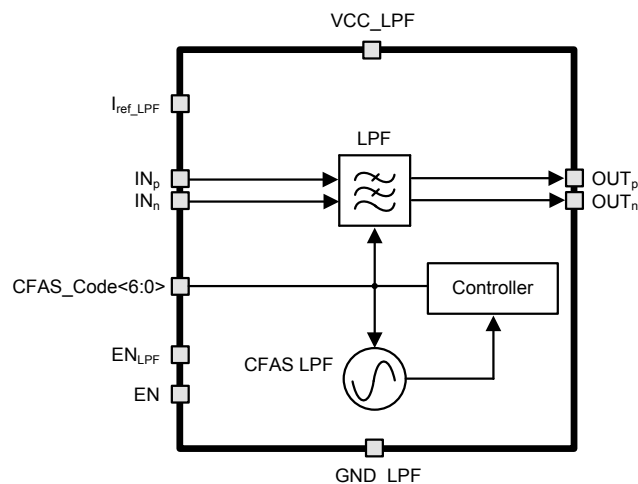


Figure 1: Low pass filter structure.

5 PIN DESCRIPTION

Name	Direction	Description
I _{ref_LPF}	I	Reference current 20 μ A
IN _p	I	LPF differential input
IN _n	I	
CFAS_Code<6:0>	I	Cut-off frequency preset
EN	I	LPF enable/disable
OUT _p	O	LPF differential output
OUT _n	O	
VCC_LPF	IO	Supply voltage
GND_LPF	IO	Ground

6 LAYOUT DESCRIPTION

Low pass filter dimensions are given in the table 1.

Table 1: Block dimensions.

Dimension	Value	Unit
Height	450	μm
Width	250	μm

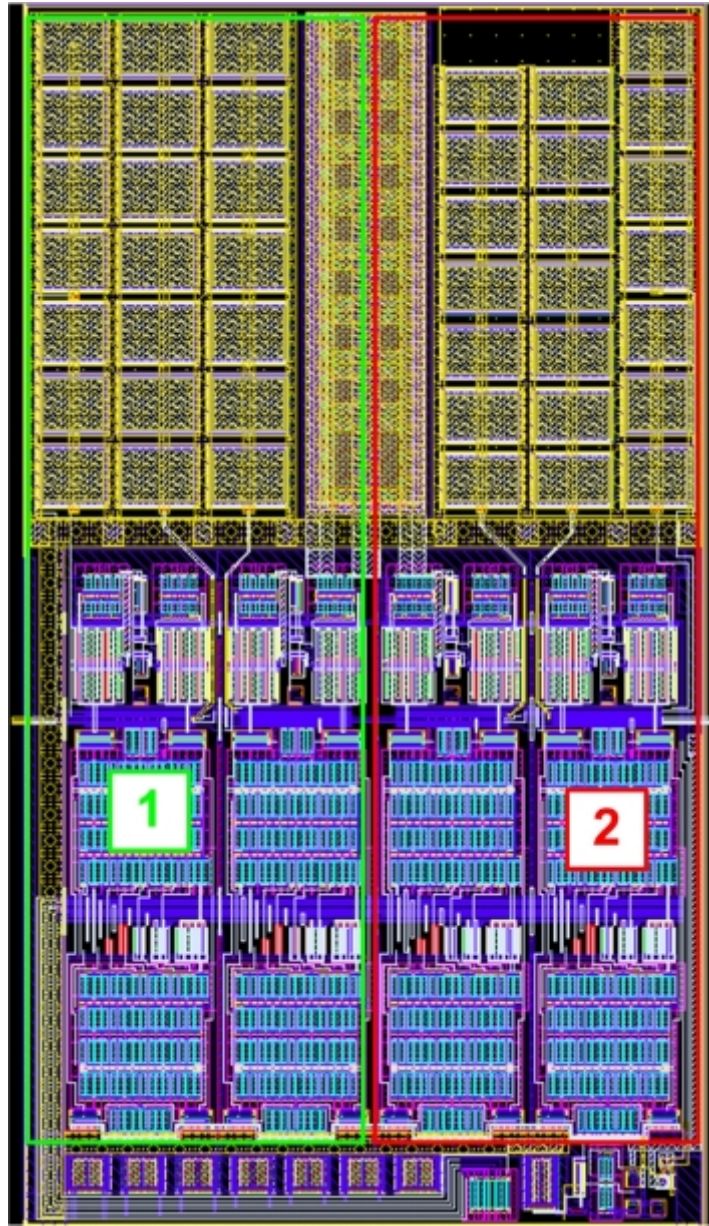


Figure 2: Low pass filter layout view.

1. Gyrator 1
2. Gyrator 2

LPF oscillator dimensions are given in the table 2.

Table 2: Block dimensions.

Dimension	Value	Unit
Height	445	μm
Width	345	μm

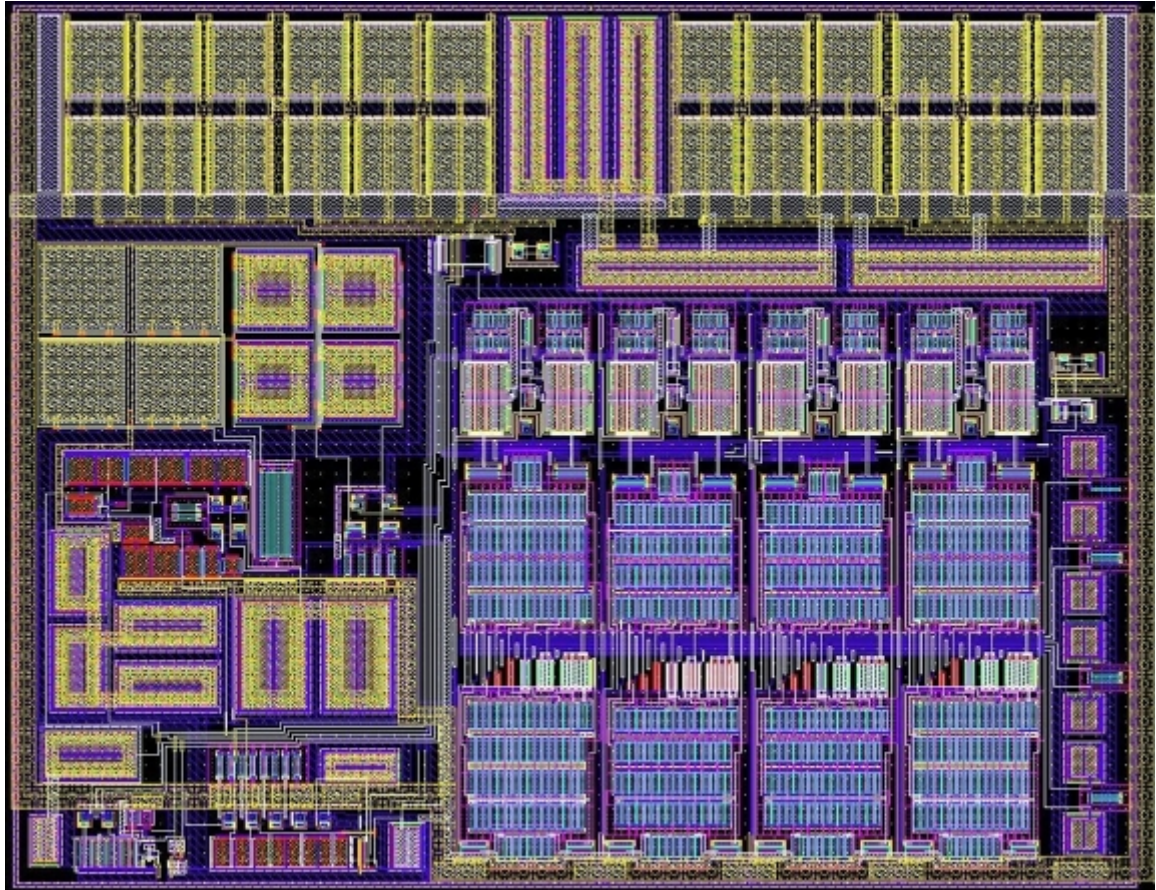


Figure 3: LPF oscillator layout view.

7 OPERATING CHARACTERISTICS

7.1 TECHNICAL CHARACTERISTICS

Technology _____ AMS035 BiCMOS 0.35 um
 Status _____ silicon proven
 Area _____ 0.267mm²

7.2 ELECTRICAL CHARACTERISTICS

The values of electrical characteristics are specified for $V_{cc} = 2.65 \div 3.15$ V, $T = -40 \div +85^{\circ}\text{C}$. Typical values are at $V_{cc} = 2.7$ V, $T = +27^{\circ}\text{C}$, unless otherwise specified.

Parameter	Symbol	Condition	Value			Unit
			min	typ	max	
Supply voltage	V_{cc}	-	2.65	2.7	3.15	V
Operating temperature range	T	-	-40	27	85	$^{\circ}\text{C}$
Cut-off frequency	F	-1dB	9.6	-	25	MHz
Group delay time ripple	t_{del}	-	-	2	-	ns
Noise figure	NF	-	-	12.7	16	dB
Transmission gain	G	-	-1.5	-0.3	+0.3	dB
Input/output impedance	R	-	-	2000	-	Ω
Supply current	I_{cc}	-	-	1.32	1.33	mA
Stand-by current	I_{stb}	-	-	0.01	0.02	μA
Input logic-level high	V_{IH}	For digital inputs	$0.9V_{cc}$	-	V_{cc}	V
Input logic-level low	V_{IL}		-0.2	0	0.2	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