0.1 to 4MHz Intermediate frequency amplifier with AGC

OVERVIEW

180SMIC_IFA_01 is a dual intermediate frequency amplifier (IFA) designed to amplify and transmit differential signals in the frequency range from 0.1MHz to 4MHz. The amplifier consists of 4 stages amplifier with tunable gain, input linear buffer for analog output and analog-digital converter (ADC) for digital output and detector of output level.

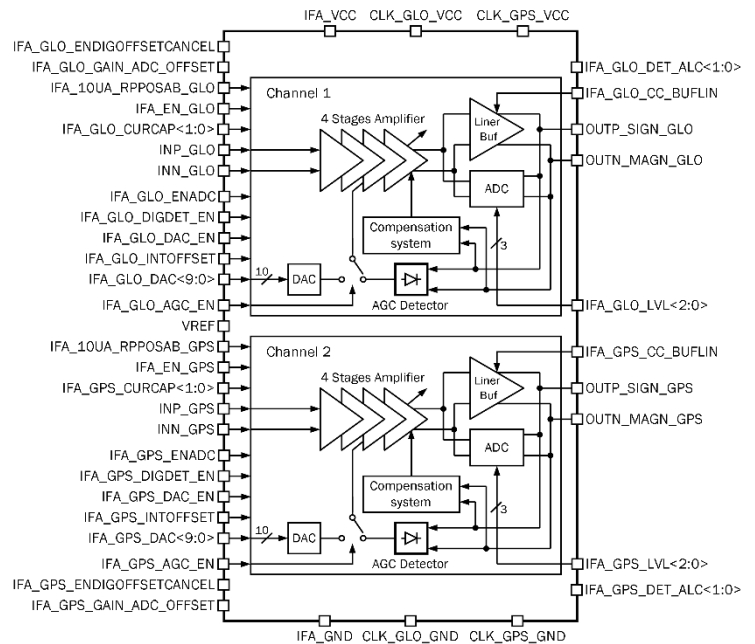The amplifier can operate in the following modes:

- linear output with automatic gain control (AGC);
- digital output with AGC for analog signal;
- digital output with AGC for digital signal.

The AGC system provides a discrete gain change in the range from 0dB to 62dB.

IP technology: SMIC CMOS 180 nm.
IP status: silicon proven.
Area: 1.1mm^2.

ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Conditions	Value			Units
			min	typ.	max	
Supply voltage	V_{CC}	-	1.7	1.8	1.9	V
Operating temperature range	T_j	-	-45	27	85	ºC
Supply current	I_{cc}	Linear mode	-	3.1	3.7	mA
	I_{dig}	Digital mode	-	3	-	
Stand-by current	I_{stb}	-	-	15	1800	nA
Frequency range	F	-	7	-	20	MHz
Noise figure	NF	Maximum gain mode	-	6.5	9.4	dB
		30 dB less than maximum amplification	-	6.8	9.8	dB
Group delay time ripple	t_{del}	Bandwidth 7…20 MHz	-	1.8	-	ns
Gain	G_{IFA}	-	0	-	62	dB
Input impedance	R_{in}	-	-	2	-	kOhm
Output impedance	R_{out}	IFA_GLO_CC_BUFLIN = "1"	-	-	260	Ohm
		IFA_GLO_CC_BUFLIN = "0"	-	-	320	
Peak-to-peak differential output voltage	$A_{in\ p-p}$	2pF load, sin signal OUTPUT_SIGN_GLO, OUTPUT_MAGN_GLO, OUTPUT_SIGN_GPS, OUTPUT_MAGN_GPS	-	200	-	mV
DC voltage	V_{IFA_dif}	Linear mode: for OUTPUT_SIGN_GLO, OUTPUT_MAGN_GLO, OUTPUT_SIGN_GPS, OUTPUT_MAGN_GPS	-	1.46	-	V
ADC resolution	K	-	-	2	-	bit
Output logic-level high (digital output)	V_{OH_dig}	OUTPUT_SIGN_GLO, OUTPUT_MAGN_GLO, OUTPUT_SIGN_GPS, OUTPUT_MAGN_GPS	V_{dig}-100	-	-	mV
Output logic-level low (digital output)	V_{OL_dig}	OUTPUT_SIGN_GLO, OUTPUT_MAGN_GLO, OUTPUT_SIGN_GPS, OUTPUT_MAGN_GPS	-	-	100	mV