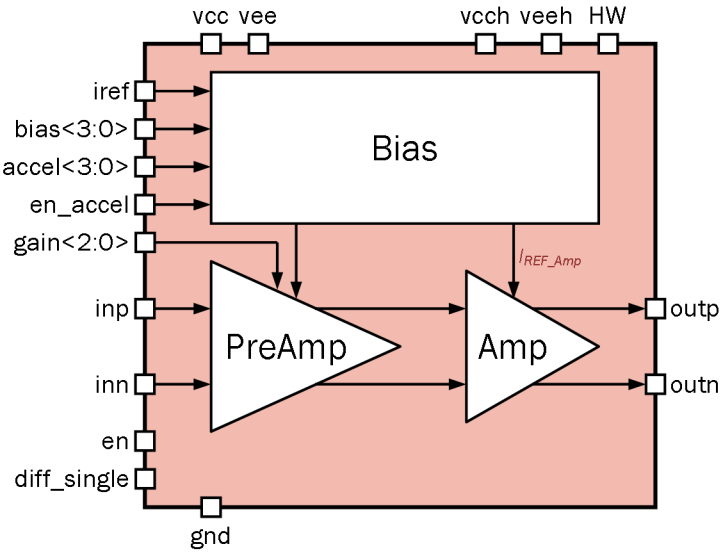
Up to +/-90V low power high-voltage single-ended amplifier

OVERVIEW

180XFAB_OpAmp_01 is two-stage amplifier. The first (low-voltage) cascade provides pre-amplification and matching of the common-mode component of the signal with the input of the second, high-voltage cascade. The second (high-voltage) cascade provides the main voltage gain, the output circuits of this cascade are powered by high-voltage voltages of ±100 Volts. The first stage of the single-ended amplifier is assembled on a single-ended op-amp with differential inputs and single-end output. It is possible to adjust the quiescent current of the output stage of the amplifier. Quiescent current can be adjusted by bits **bias<3:0>**. The input impedance of the amplifier can be in the range of 200 ÷ 320 kΩ and depends on the gain. There are two outputs in the amplifier: **outn** is the main output, **outp** should be connected to the analog ground. The maximum output amplitude is 90V.



IP technology: XFAB XT018.
IP status: pre-silicon verification.
Area: 0.508mm^2.

ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Conditions	Value			Units
			min	typ.	max	
Operating temperature range	T_j	-	0	+27	+60	°C
Input supply voltage	V_{CC}	-	3.3	3.7	4.2	V
	V_{CCH}	-	+95	+100	+105	V
	V_{EEH}	-	-105	-100	-95	V
	V_{EE}	-	-	-3.7	-	V
Reference current	I_{REF_Amp}	Adjustment bias<3:0> = “0000”	0.06	-	-	uA
		Adjustment bias<3:0> = “1111”	-	-	1.37	
Quiescent current	I_Q	Adjustment bias<3:0> = “0000”	0.23	-	-	uA
		Adjustment bias<3:0> = “1111”	-	-	4.15	
Current consumption	I_{CC}	V_{CC} = 3.7V	1.7	2.0	2.0	uA
	I_{EE}	V_{EE} = -3.7V	1.7	2.0	3.0	uA
	I_{CCH}	V_{CCH} = +100V	1.1	1.2	1.3	uA
	I_{EEH}	V_{EEH} = -100V	1.1	1.2	1.3	uA
Gain	G	Minimum	-	34	-	dB
		Maximum	-	41	-	
Output amplitude	A_{OUT_pp}	Peak-to-peak	-	±90	-	V
Power total quiescent	P_{TOTAL}	A_{OUT_pp}=±90V, C_{load_SE}=60pF	253	260.70	281.2	uW
Input impedance	R_{IN}	G = 34dB	-	320	-	kΩ
		G = 41dB	-	200	-	
Input amplitude	V_{IN}	G = 34dB	-	1.8	-	V
		G = 41dB	-	0.8	-	
Load capacitance	C_{LOAD}	Combined	20	60	-	pF
Quiescent power	P_Q	A_{OUT_pp}=±90V, C_{load_SE}=60pF	0.25	0.26	0.28	mW
Total power consumption	P	A_{OUT_pp}=±90V, C_{load_SE}=60pF, F=10kHz	-	36.4	-	mW
Signal-to-noise ratio	SNR	@ 10kHz, C_{LOAD} = 60pF	-	97	-	dB
Total harmonic distortion	THD	@ 10kHz, C_{LOAD}=60pF	0.1	0.14	0.19	%
Input logic-level low	V_{IL}	-	V_{CC} – 0.3	-	V_{CC}	V
Input logic-level high	V_{IH}	-	0	-	0.3	V