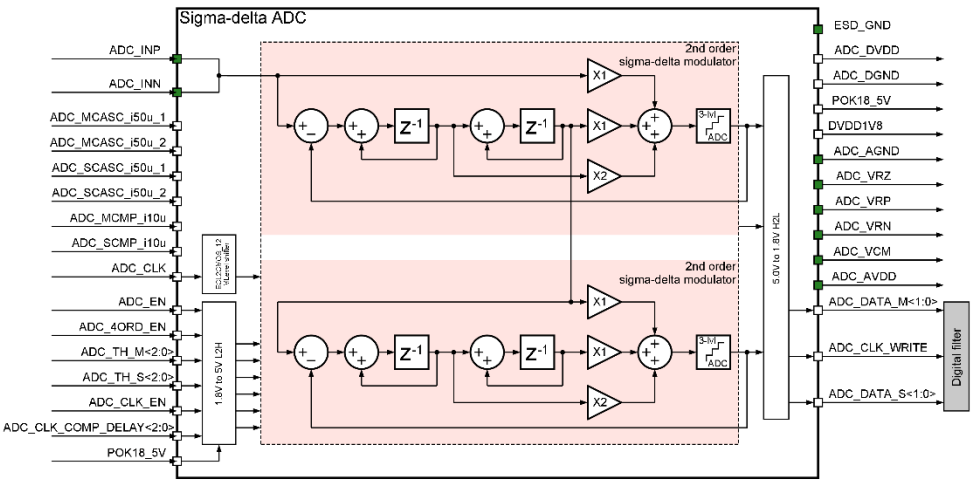
24-bit 1-channel 44.1 to 48kSPS delta-sigma ADC

OVERVIEW

180XFAB_ADC_01 is a 24-bit delta-sigma ADC with sampling rates from 44.1kSPS to 48kSPS.
Two second order feedforward modulators are used to create forth-order cascade 2-2 Sigma-Delta Modulator (Sigma-Delta ADC) with full differential signal processing. Each second order cascade utilizes a 3-level quantizer, so the output of each cascade is 1.5 bit signal in signed binary code (-1, 0 and 1 output codes). In order to combine outputs of sigma-delta second order cascades and obtain output data stream, noise cancellation logic is used, which is implemented in digital section.



IP technology: XFAB XT018 SOI 180nm.
IP status: silicon verification.
Area: 2.26mm^2.

ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Conditions	Value			Units
			min	typ.	max	
Analog supply voltage	AVDD	-	4.75	5	5.25	V
Digital supply voltage	DVDD	-	4.75	5	5.25	
	DVDD1V8	-		1.8		V
Current consumption	I_{AVDD}	AVDD = 5V, F_{CLK} = 12MHz	-	20	-	mA
	I_{DVDD}		-	6	-	mA
Shutdown current	Isd	Delta-sigma ADC disabled	-	-	1	uA
Full-scale differential input voltage	V_{FS_DIFF}	-	-	8	-	V
Common-mode input voltage range	V_{CM}	-	-	2.5	-	V
Differential reference voltage	Vref	-	-	-	10	V
Input clock frequency	F_{CLK}	-	11.28	-	12.29	MHz
Sampling rate	Fs	-	44.1	-	48	kSPS
Signal-to-Noise ratio	SNR	BW = 22kHz, F_{IN} = 1kHz	-	112	-	dB
Signal-to-Noise and Distortion ratio	SINAD	-2dB, F_{IN} = 1kHz	-	110	-	dB
		-60dB, F_{IN} = 1kHz	-	54	-	
Spurious free dynamic range	SFDR	F_{IN} = 11.6kHz	-	121	-	dB