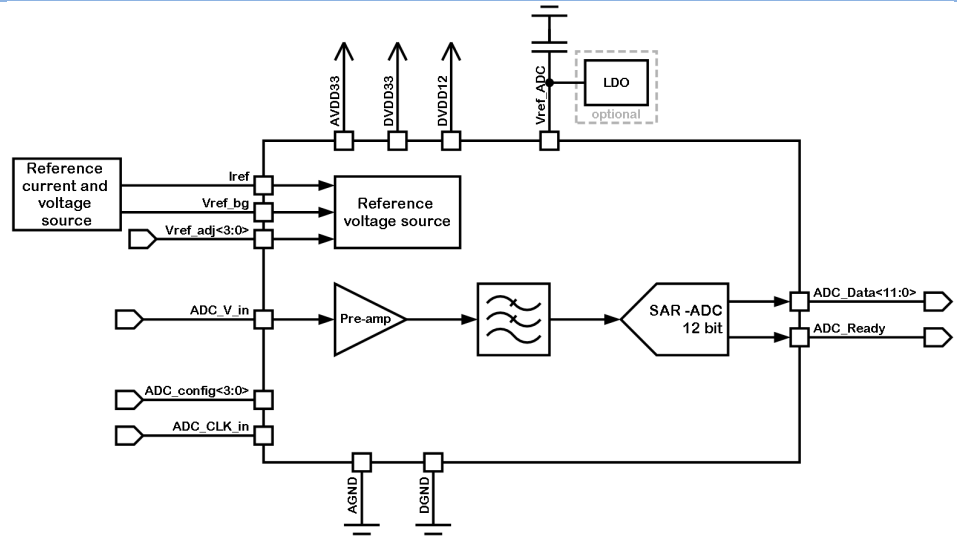


12-bit 1-channel 5-100 kSPS SAR ADC

OVERVIEW

055TSMC_ADC_02 is a 12-bit 1-channel SAR ADC that designed to processing audio signals from linear microphone input. The block consists of SAR ADC core, preamplifier, low pass filter and reference voltage source. The preamplifier has a gain in range from 0 to 36 dB and allows to amplify the input signal to the full amplitude of the ADC.



IP technology: TSMC CMOS 55nm technology.

IP status: silicon proven.

Silicon area: 0.055 mm².

ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Conditions	Value			Units
			min	typ.	max	
Supply voltage	AVDD33	-	2.25	2.5	3.6	V
	DVDD33	-	2.25	2.5	3.6	
	DVDD12	-	1.08	1.2	1.32	
Operating temperature range	T _j	-	-45	+27	+85	°C
Current consumption	IDD	@ F _{IN} = 1kHz, F _S = 50kSPS, Pre-amplifier on	-	291	-	uA
Resolution	N	-	-	12	-	bit
Sampling rate	F _S	Minimal	-	5	-	kSPS
		Maximal	-	100	-	
Input voltage range	V _{IN(p-p)}	-	-	1.4	-	V
Bandwidth	BW	-	-	20	-	kHz
Pre-amplifier gain	G	Minimal	-	0	-	dB
		Maximal	-	36	-	
Gain step	ΔG	-	-	3	-	dB
Gain error	δG	-	-5	-	+5	%
Spurious-free dynamic range	SFDR	@ F _{IN} = 1kHz, G = 0 dB	-	49	-	dB
		@ F _{IN} = 20kHz, G = 0 dB	-	45	-	
Signal to noise ratio	SNR	@ F _{IN} = 1kHz, G = 0 dB	-	52	-	dB
		@ F _{IN} = 20kHz, G = 0 dB	-	52	-	
Effective number of bits	ENOB	@ F _{IN} = 1kHz	-	7.2	-	bits
		@ F _{IN} = 20kHz	-	6.9	-	
Input logic-high level	V _{IL}	For digital inputs	0	-	0.2*DVDD12	V
Input logic-low level	V _{IH}		0.8*DVDD12	-	DVDD12	
Output logic-high level	V _{OL}	For digital outputs	0	-	0.4	V
Output logic-low level	V _{OH}		DVDD12-0.4	-	DVDD12	