10-bit 700MS/s SAR-ADC

Product Brief:

IC4X's **ADC10_700MS** is a compact, ultra-fast analog-to-digital converter optimized for advanced mixed-signal and RF systems requiring multi-hundred-MS/s performance with deterministic latency. Operating with a clock frequency of up to 9.8 GHz, the SAR-ADC achieves an impressive 700 MS/s conversion rate, enabled by a streamlined architecture featuring 1 clock cycle for sampling followed by 13 conversion cycles.

Digital output data becomes available after 21 clock cycles, providing predictable timing for high-speed digital processing pipelines. The SAR-ADC occupies a highly efficient 153µm × 28µm footprint, making it ideal for dense SoCs, multi-channel ADC arrays, and next-generation communication ICs.

Key Features:

SAR ADC:

- fclk ≤ 9.8GHz → 700MS/s conversion rate
- 1 clock cycles sampling, 13 conversion cycles
- Digital output is available after 21 clock cycles
- Intrinsic 11-bit cap array matching

ADC area:

- 153µm x 28µm (W x H)

Technology Requirements:

- Fully Silicon verified
- GF22FDX Metall Stack #19

Applications:

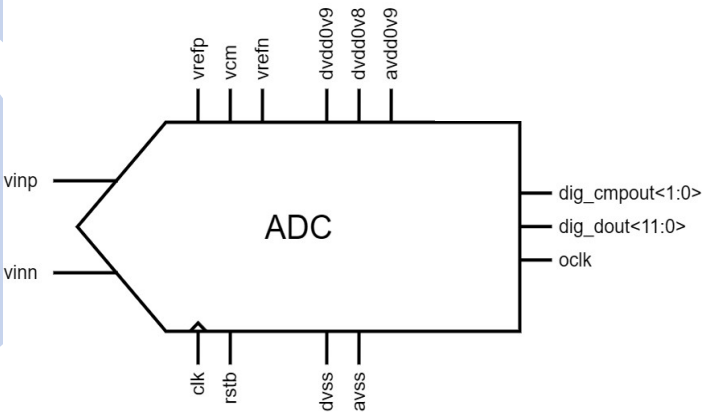
- Wireline, wireless and optical applications
- Highly time-interleaved ADCs

Contact us!

contact@ic4x.com

IP #: ADC10_700MS_ADC

System Block Diagram:



Specifications and Characteristics:

Parameter	Comment	Min.	Typ.	Max.	Unit	Cond.
Bandwidth	3dB input attenuation	>5			GHz	sim
Sampling Frequency, f_S		1		700	MS/s	sim
Input Clock, f_{clk}			$14 \cdot f_S$			info
ENOB	RCC extracted, f_S = 700MS/s, Noise on, 256pts, f_{in}=8MHz		7.6		bit	sim
SNDR			48		dB	
SNR			48		dB	
SFDR			62		dBc	
ENOB	Measured, f_S = 430MS/s Speed limited by measuring equipment		7.7		bit	meas.
SNDR			48		dB	
SNR			48		dB	
SFDR			67		dBc	
Supply		-5%	0.9	+5%	V	info
Temperature	Junction Temperature	-40	25	125	°C	info
Input Common Mode	DC-Coupled		0.6		V	info
Input Full Scale	Peak-to-peak, differential, V(vrefp) = 0.9V, V(vrefn) = 0V		1.3		V	sim
Power Consumption	ADC Core		8.5		mW	sim

Measurements Results:

For the tapeout, an on-chip decimator was added. It resamples the digital output at 1/8th of the original sampling rate.