Flash Type ADC

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***Abstract*— Generally, In our daily applications we experiences the analog to digital converters. The analog to digital converters (ADCs) are used in the high bandwidth applications such as communications, radar processing, satellite communications and data acquisition system. So, we design and optimized the low power and high speed 3-bit flash Analog-to-Digital Converter (ADC) using sky130 technology. High integrated flash ADC is designed at three bit precision with operating voltage in range of 5v to 9v.**

Keywords—Flash adc, Priority encoder, comparator.

REFERENCE CIRCUIT DETAILS

Fig. 1 shows the entire topology of a Flash type analog to digital converter. It consists of a voltage reference ;a voltage input ;the priority encoder and a comparator/operational amplifier(sky130avsdopamp) as the pass between the voltage input and the priority encoder. In high speed and low power application flash ADC is used for the Analog to digital converter (ADCs) ,is a mixed signal integrated a component that converts analog signals to digital signal. Comparators are the important component of flash ADCs. Typical 3 bit flash converter is implemented here. Flash"3" bit converter, simply require 23 -1= 7 comparators. A resistive divider that incorporated in converter employ 23 = 8 resisters requires for providing the reference voltage to comparators and the priority encoder is digital device which gets the input signals and gives the digital output signal. The output signal is calculated by using the below formula

$$Vout= R2 \times Vin / R1+R2$$

For resister divider section : For 'n' bit flash ADC, double of n bit that is the 2n resistances is required .Each resistor having the same value R but two extreme position resisters are evaluated to delimit the input voltage range. Each resister in divider section divides the reference voltage that is applied in upper extreme resister to feed a comparator .Higher the resistance value then currently is consumed by the device become lower.

Fig. 2. Shows about wave form of the analog input signal and the digital output signal and the major advantages of this flash type converter are

i) It is the fastest type of ADC because it produces an equivalent digital output for a corresponding analog input in no time.

ii) The construction is simple and easier to design.

iii) The time required for the typical conversion is less it requires 100ns and less

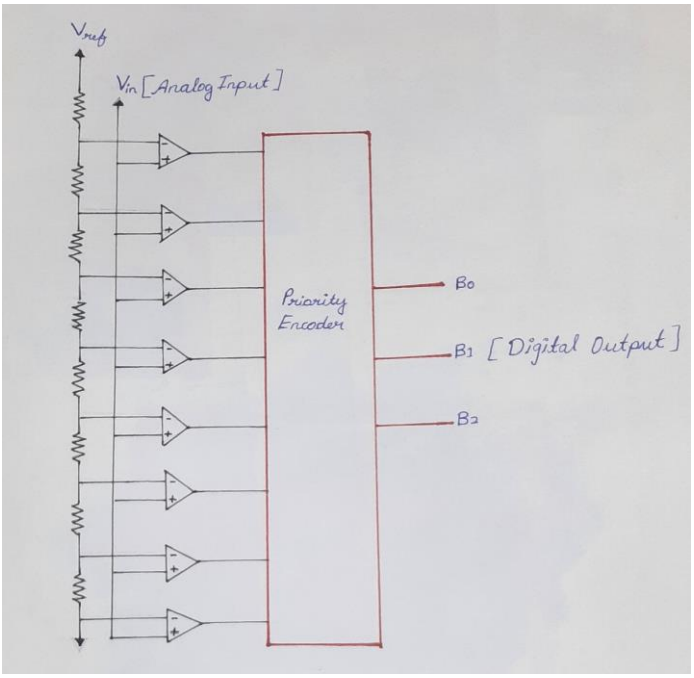

Fig1 : Flash type ADC Converter

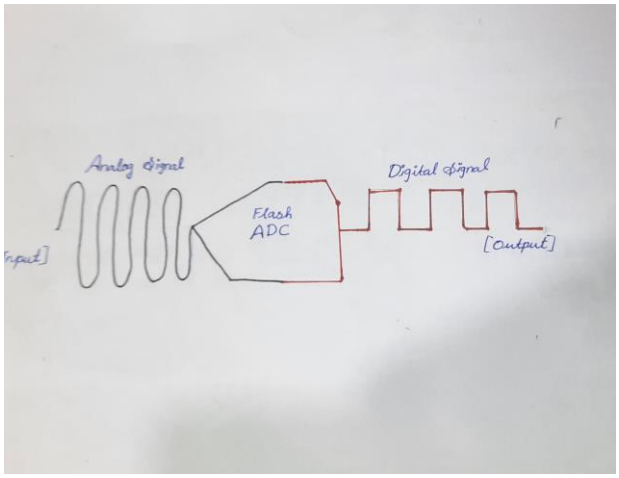

Fig2 : Reference circuit waveform

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