HIGH SPEED 4-BIT FLASH ADC FOR PIPELINE ADC USING 0.18µm CMOS TECHNOLOGY

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ABSTRACT

This paper describes a high speed 4-bit Flash Analog to Digital Converter (ADC) for Pipeline ADC. A high speed ADC is obtained by improving the comparator and the encoder design. In this paper, the conventional comparator is replaced with an open loop comparator and the XOR encoder is used as the alternative for non-ROM type encoder. It is implemented in 0.18µm CMOS technology. Generally, the Silvaco Electronic Design Automation (EDA) Tools is used for drawing the schematics, do the simulations and designing the layout of the proposed Flash ADC. The simulation results show differential nonlinearity (DNL) and integral nonlinearity (INL) are -0.7~0.3 and -0.5~0.8 respectively. The results also include 1.8V analog input range and 24.2662 mW of power dissipation at maximum sampling frequency of 500MHz with the lowest propagation delay time of 539.61ps.

TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Data conversion circuit plays an important role in high-rate data communications. Analog to Digital Converter (ADC) can be found in almost every modern mixed-signal integrated circuit. This thesis presents the best topology of analog and digital parts are chosen for Flash ADC. For analog part, an open loop comparator topology is used and on the other hand, XOR encoder is used as the best topology for the digital part. The main objective of this project is to design high speed 4-bit Flash ADC using the chosen topologies by using 0.18µm CMOS technology. The chosen topologies are proved that have high speed for Flash ADC.

In this project, the proposed Flash ADC design used an open loop comparator which it has a very minimal number of transistor and a XOR encoder to encode the thermometer code to binary code.