

類比至數位轉換IC設計之研究

蔡政翰、陳勝利

E-mail: 9015775@mail.dyu.edu.tw

摘要

類比至數位轉換(ANALOG-TO-DIGITAL CONVERSION)是資訊或訊號處理過程中，不可或缺的一種介面技術。目前類比至數位轉換器中，並列比較方式(FLASH A/D)是屬於最高速的一種，轉換速度可高達奈秒(10⁻⁹SEC)，但這種方式的缺點是使用太多的比較器，晶片面積過大，成本較高。本論文希望提出一種兩階段並列放大比較式電路架構，可減少一半以上之比較器。最後並利用CMOS製程技術，設計製作出適當的運算放大器用於此A/D CONVERTER中。

關鍵詞：無

目錄

第一章 簡介 --P1 1.1 ADC介紹--P 1 1.2 研究背景與動機--P 2 1.3 論文架構--P 3 第二章 兩階段並列比較A/D--P 4 2.1 兩階段比較--P 4 2.2 兩階段並列比較A/D電路架構--P 5 2.3 六位元兩階段並列比較A/D電路架構(一) --P 7 2.4 六位元兩階段並列比較A/D電路架構(二) --P 9 2.5 誤差修正--P 10 2.6 影響轉換速度因素之探討--P 11 第三章 運算放大器--P 15 3.1 CMOS製程--P 15 3.2 運算放大器之要求--P 16 3.3 運算放大器之設計與模擬--P 17 第四章 結果討論與分析--P 22 第五章 結論--P 24

參考文獻

- [1]DAVID F. HOESCHELE, "ANALOG-TO-DIGITAL AND DIGITAL-TO-ANALOG CONVERSION TECHNIQUES," SECOND EDITION, JOHN WILEY & SONS, NEW YORK, 1994 [2]PHILLIPE E. ALLEN AND DOUGLAS R. HOLBERG, "CMOS ANALOG CIRCUIT DESIGN," HOLT, RINEHART AND WINSTON, INC. 1987 [3]BEHZAD RAZAVI, "DESIGN OF ANALOG CMOS INTEGRATED CIRCUIT," PREVIEW EDITION, MCGRAW-HILL -L,1999 [4]陳丁在編譯, "A/D轉換器入門" 全華科技圖書股份有限公司發行。
- [5]EUGENE R. HNATEK, " A USER'S HANDBOOK OF D/A AND A/D CONVERTERS," ROBERT E. KRIEGER, 1988 [6]CREMONESI, A.; MALOBERTI, F.; TORELLI, G.; VACCHI, C. "AN 8-BT TWO-STEP FLASH A/D CONV -ERTER FOR VIDEO APPLICATIONS" CUSTOM INTEGRATED CIRCUITS CONFERENCE,1989.,PROCEEDINGS OF THE IEEE, 1989 , PAGE(S): 6.3/1 -6.3/4 [7]KEVIN M. DAUGHERTY, "ANALOG-TO-DIGITAL CONVERSION," MCGRAW-HILL,1995 [8]SEDR A, A. S.,AND K. C. SMITH, "MICROELECTRONIC CIRCUIT," 4TH ED. PHILADELPHIA: SAUNDER -S COLLEGE PUBLISHING, 1997 [9]YEN S. YEE, LEWIS M. TERMAN, " A 1MV CMOS COMPARATOR, "IEEE J. SOLID-STATE CIRCUIT, VOL. SC-13, PP.294-297, JUNE 1978. [10]HSIANG-LIN HSU, DESIGN AND ANALYSIS OF CMOS FLASH A/D CONVERTER IMPLEMENTED WITH CHOPP -ER-TYPE COMPARATOR, THE THESIS.
- [11]ABO,A.M.; GRAY, P.R. , "A 1.5V,10-BIT,14MS/S CMOS PINELINE ANALOG-TO-DIGITAL CONVERTER, " VLSI CIRCUITS, 1998. DIGEST OF TECHNICAL PAPERS. 1998 SYMPOSIUM ON , 1998 , PAGE(S): 166 -169 [12]S. M. SZE, "SEMICONDUCTOR DEVICES PHYSICS AND TECHNOLOGY," JOHN WILEY & SONS .
- [13]D. Y. KIM* ; O. S. KWON** ; J. H. BANG* , "THE DESIGN OF THE HIGH SPEED AMPLIFIER CIRC -UIT FOR USING IN THE ANALOG SUBSYSTEMS," CIRCUITS AND SYSTEMS, 1992 , PAGE(S): 485 -488 VOL.1 [14]STANESCU, C.; HANGANU, A. , "SYMMETRICAL CMOS OPERATIONAL AMPLIFIER," SEMICONDUCTOR CONFERENCE, 1995. CAS'95 PROCEEDINGS., 1995 INTERNATIONAL , 1995 , PAGE(S): 359 -362 [15]ANDREW M.ABO ; PAUL R. GRAY, "A 1.5-V, 10-BIT,14.3-MS/S CMOS PINELINE ANALOG-TO-DIGI -TAL CONVERTER," SOLID-STATE CIRCUITS, IEEE JOURNAL OF VOLUME: 34 NO. 5 , MAY 1999, PAGE(S): 599 -606