Synthesis of a Pulse-Width Modulator

鄭榮智、郭永超

E-mail: 9607392@mail.dyu.edu.tw

ABSTRACT

According to the progress of fabrication, supply voltage of system is descended and the power consumption is also decreased in theory. But more and more transistors can be fabricated on a signal chip, so power consumption is larger. Recently, most of devices especially portable systems are expanded to economical energy because of maximizing the whole run time. The circuits of different kinds of functions in the system usually have demand for different supply voltages. Due to cost, the system can't support different supply voltage to each function. As a result, a good power management is needed for system. Our research goal is to convert fixed supply voltage to different DC levels which the functions need. This thesis investigates the design for pulse width modulation of system based on fabrication of TSMC 0.35um 2P4M Mixed-Signal CMOS technology. It provides a viewpoint of simulation to synthesize PWM and completes the tapeout of design through CIC.

Keywords : Pulse-Width Modulation, voltage converter, economical energy

Table of Contents

REFERENCES

[1] Stratakos, C. Sullivan, S. Sander, and R. Bridersen, " DC power supply design in portable system, " Univ. California, Berkeley, Tech. Rep. ERL Memo. No.95/4, 1995.

[2] Cheung Fai Lee, Mok, P.K.T. " A monolithic current-mode CMOS DC-DC converter with on-chip current-sensing technique " Solid-State Circuits, IEEE Journal of Volume 39, Issue 1, Jan. 2004 Page(s):3 - 14 [3] Patella, B.J.; Prodic, A.; Zirger, A.; Maksimovic, D. " High-frequency digital PWM controller IC for DC-DC converters " Power Electronics, IEEE Transactions on Volume 18, Issue 1, Jan. 2003 Page(s):438 – 446

[4] Vorperian, V. " Simplified analysis of PWM converters using model of PWM switch. Continuous conduction mode " Aerospace and Electronic Systems, IEEE Transactions on Volume 26, Issue 3, May 1990 Page(s):490 - 496 [5] Vorperian, V. " Simplified analysis of PWM converters using model of PWM switch. II. Discontinuous conduction mode " erospace and Electronic Systems, IEEE Transactions on Volume 26, Issue 3, May 1990 Page(s):497 - 505 [6] Taherzadeh-Sani, M., Lotfi, R., Shoaei, O. " A pseudo-class-AB telescopic-cascode operational amplifier " Circuits and Systems, 2004. ISCAS '04. Proceedings of the 2004 International Symposium on Volume 1, 23-26 May 2004 Page（s）:I - 737-40 Vol.1 [7] B. Razavi, Desgin of Analog CMOS Integrated Circuits. Boston, MA: McGraw-Hill, 2001.

[8] R. Gregorian, " Introduction To CMOS Op-Amp And Comparators. " John Wiley and sons, New York, 1990.

[9] Jie Yuan; Farhat, N. " A compensation-based optimization methodology for gain-boosted opamp " Circuits and Systems, 2004. ISCAS '04. Proceedings of the 2004 International Symposium on Volume 1, 23-26 May 2004 Page（s）:I - 669-72 Vol.1 [10] R. Gregorian, " Introduction To CMOS Op-Amp And Comparators. " John Wiley and sons, New York, 1990.

[11] N. Retdian, S. Takagi, N. Fujii, " Voltage controlled ring oscillator with wide tuning range and fast voltage swing " ASIC, 2002. Proceedings. 2002 IEEE Asia-Pacific Conference on 6-8 Aug. 2002 Page（s）:201 – 204.

[12] L. Spruiell, " Optimization Error Surfaces, " Meta-Software Journal, Volume 1, Number 4,December 1994.