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VLSI Design in Terms of Power System

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Abstract: ***Power dissipation has become an important consideration as performance and area for VLSI Chip design. With shrinking technology reducing power consumption and over all power management on chip are the key challenges below 100nm due to increased complexity. For many designs, optimization of power is important as timing due to the need to reduce package cost and extended battery life. It has been shown that scheming VLSI for power entails a design methodology at every level of the design grading. The main components of such a methodology are estimation and optimization, the classical analysis and amalgamation pair. In order to estimate and optimize the power consumption of a digital circuit it is necessary to know how energy is intemperate. The way each factor interrelates with the others will also clarify the effects these elements have on every VLSI design stage. This analysis will determine which elements can be disregarded within a specific design environment.***

Keywords: VLSI Design **,** Very Large Scale Integrated , Current Characterization Methodology ,Power Methodology

1. Introduction

I choose VLSI design so I can deeply understand the several parameters of VLSI in terms of power dissipation and tried to improve them for future use. In this work I first analyzed the parameters of VLSI using CMOS (Complementary metal-oxide semiconductor) and then I analyzed and calculated that same parameters of power circuit and modeled power system by creating a mesh. These circuits will be simulated on Spice and then performed a healthy comparison between all the parameters which I have found.

So at last I deeply analyzed all the important parameters which play the important role in the performance of power system in VLSI design for industrial and scientific purposes and reached to a result that Power Dissipation in cell based CMOS design discussed. A flow is proposed to do power estimation in various design stages that can improve the accuracy of estimation. The flow also helps user to make run time and accuracy tradeoffs discussed a prototype flow developed for instantaneous IR drop estimation based on average toggle rate computed by the proposed toggle methodology in this work.This flow estimates instantaneous as well as average IR drop numbers during same simulations

2. Tanner Tool

Spice is a general purpose circuit simulator capable of performing three main types of analysis: nonlinear DC, nonlinear transient and linear small-signal AC circuit analysis Nonlinear DC analysis or simply DC analysis, calculates the behavior of the circuit when a DC voltage or current is applied to it. In most cases, this analysis is performed first. The result of this analysis is commonly referred to as the DC bias or operating-point characteristic. The Transient analysis, probably the most important analysis type, computes the voltages and currents in the circuit with respect to time. The third type of analysis is a small-signal AC analysis. It liberalizes the circuit around the DC operating point and then calculates the network variables as functions of frequency.

The T-Spice user interface consists of the following elements:

- Title bar
- Menu bar
- Toolbars
- Status bar
- Simulation Manager
- Simulation status window

3. Power Scrutiny Using CMOS

I have done simulation of using CMOS and IR Drop estimation

3.1 Power Design in CMOS Design

A detailed schematic graph of power design which I have used in all my analysis is shown in figure 1. It consists of two main parts. These are power trend increment per year .There is static power , memory dynamic power etc.

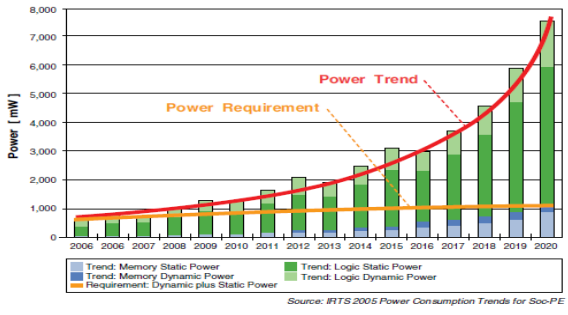

Figure 1: Power Dissipation in CMOS designs

3.2 Paper **Body paragraphs**

The main text for your paragraphs should be 10pt font. All body paragraphs (except the beginning of a section/sub-section) should have the first line indented about 3.6 mm (0.14").

3.3 Figures and Tables

Place illustrations (figures, tables, drawings, and photographs) throughout the paper at the places where they are first discussed in the text, rather than at the end of the paper. Number illustrations sequentially (but number tables separately). Place the illustration numbers and caption under the illustration in 10 pt font. Do not allow illustrations to extend into the margins or the gap between columns (except 2-column illustrations may cross the gap). If your figure has two parts, include the labels "(a)" and "(b)".

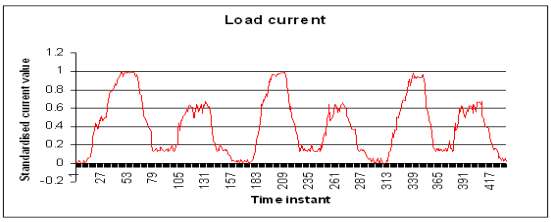

Figure 1: Testing data- load current (amperes)

3.4 Tables

Place table titles above the tables.

Table 1: Margin specifications

Margin	*A4 Paper*	*US Letter Paper*
Left	18.5 mm	14.5 mm (0.58 in)
Right	18mm	13 mm (0.51 in)

3.5 Sections headings

Section headings come in several varieties:
1. first level headings: 1. Heading 1
2. second level: 1.2. Heading 2
3. third level: 1.2.3 Heading 3
4. forth level: (a) Heading 4
5. fifth level: (1) Heading 5

3.6 References

Number citations consecutively in square brackets [1]. The sentence punctuation follows the brackets [2]. Multiple references [2], [3] are each numbered with separate brackets [1]–[3]. Please note that the references at the end of this document are in the preferred referencing style. Please ensure that the provided references are complete with all the details and also cited inside the manuscript (example: page numbers, year of publication, publisher's name etc.).

4. Equations

If you are using *Word*, use either the Microsoft Equation Editor or the *MathType* add-on (http://www.mathtype.com) for equations in your paper (Insert | Object | Create New | Microsoft Equation *or* MathType Equation). "Float over text" should not be selected. Number equations consecutively with equation numbers in parentheses flush with the right margin, as in (1). First use the equation editor to create the equation. Then select the "Equation" markup style. Press the tab key and write the equation number in parentheses.

$$E = \sum_{p=1}^{P} \sum_{k=1}^{K} (\delta_{pk}^{o})^2 \quad (1)$$

5. Other recommendations

Equalize the length of your columns on the last page. If you are using *Word*, proceed as follows: Insert/Break/Continuous.

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