CO RELATION STUDY OF GATE OXIDE THICKNESS AND MOSFET I-V CHARACTERISTIC

NURUL ARINA BINTI ZAHAIMI

BACHELOR OF SCIENCE (Hons.)
INDUSTRIAL PHYSICS
FACULTY OF APPLIED SCIENCES
UNIVERSITI TEKNOLOGI MARA

MAY 2011

ACKNOWLEDGEMENTS

In the name of Allah, Most Gracious, Most Merciful. Praise is to Allah, the Cherisher and Sustainer of the worlds. First of all is thank you to Allah that has given me the strength and knowledge in completing this final year project. I would like to express sincere gratitude to my parents and family, thanks a lot for all their supports, motivates, loves and prayers. I would like to take the opportunity to thanks my beloved supervisor En. Azlan Bin Zakaria for all his greatest supervision, guidance, and always giving me information from time to time since the beginning stage until the end of this thesis. Besides that, I also want to thanks all hardworking and friendly assistant laboratory of Semiconductor Lab for their vital technical support in this project. In addition, I also would like to say thank you to all my friends that help me through the research officially or not. May Allah bless all of us.

Thank you for your kindness.
Nurul Arina Binti Zahaimi

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ABSTRACT

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A MOSFET (Metal Oxide Semiconductor Field Effect Transistor) is a semiconductor device. A MOSFET is most commonly used in the field of power electronics. Silicon dioxide (SiO_2) is the gate component on N-type Metal Oxide Semiconductor (NMOS) which play a very important role in the transistor operation. Growing SiO_2 on the wafer substrate can be done by two methods which are by dry and wet oxidation. Hence, this study is to determine the quality of gate oxide produced in lab and to study the effect of different thickness oxide towards MOSFET I-V characteristics. The NMOS is tested with respect to the ideal IV curve characteristic.

CHAPTER 1

INTRODUCTION

1.1 Background

1.1.1 Semiconductor

A semiconductor is a material with electrical conductivity due to electron intermediate in magnitude between that of a conductor and an insulator. However, there are several ways to defining semiconductor. Semiconductor device fabrication is the process used to create the integrated circuits (silicon chips) that are present in everyday electrical and electronic devices. It is a multiple-step sequence of photographic and chemical processing steps during which electronic circuits are gradually created on a wafer made of pure semiconducting material. Silicon is the most commonly used semiconductor material today, along with various compound semiconductors. The entire manufacturing process, from start to packaged chips ready for shipment, takes six to eight weeks and is performed in highly specialized facilities referred to as fabs (semiconductor fabrication plant). Historically the term semiconductor has been used to denote materials with a much higher conductivity than insulators, but a much lower conductivity than metals at room temperature. Today there are two more type of conductors; superconductor and semimetals. What really make it difference between metal and semiconductor are temperature dependence of