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SCHOOL OF ENGINEERING

FINAL YEAR PROJECT

FINAL REPORT

SIMULATION OF INTERFACE STATES IN MOSFETs

STUDENT'S NAME : LEE JO LYNN

STUDENT'S ID : 99208811

MAJOR : ELECTRICAL & ELECTRONIC ENGINEERING

FIRST SUPERVISOR'S NAME : DR. KHEDR M. M. ABOHASSAN

SECOND SUPERVISOR'S NAME: MR. MOEY LIP KEAN

PROJECT'S COORDINATOR : DR. KHEDR M. M. ABOHASSAN

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ABSTRACT

The metal-oxide-semiconductor field effect transistor (MOSFET) has become the dominant device for very large-scale integrated circuits. The performance and reliability of an MOS device are heavily influenced by the quality and properties of the interface between the oxide and silicon region.

Although controlled successfully by semiempirical design, fabrication and operational regimens, ever-smaller device size - approaching the scale in which a single trap can be important. It makes further extension of knowledge on the basic physical and chemical aspects of the interface states essential for confident technological progress.

Basically, in this project, the effects of interface states on the electrical characteristics of the MOSFETs are studied. Theoretical models proposed by other researchers were employed to investigate the effects of acceptor-type and donor-type interface states in the *n*-type and *p*-type MOSFETs respectively. The results of this study are plotted in 2D-graphs. Discussion and interpretation were made to explain this effect. The results obtained were compared with other researchers' work and found to be in a reasonable agreement.