Embedded Electrical and Computer Engineering

MASTER ORAL DEFENSE

TITLE: ***Time dependent Breakdown of Gate Oxide and Prediction of Oxide Gate lifetime***

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TIME & DATE: FRIDAY, APRIL 27 2012, 3:00 PM **LOCATION: SCI 110**

COMMITTEE CHAIR: **Dr. Hamid Mahmoodi**

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ABSTRACT

With the scaling of the CMOS technology and the associated gate oxide thickness, the reliability of the gate oxide has become a major barrier for reliable circuit design in nano-scale. The gate oxide breakdown caused by excessive electric field in the gate oxide causes increased gate leakage degrading the circuit performance. Models for predicting the Time to Dielectric Breakdown (TDDB) are valuable in designing reliable circuits. Our research objective is to develop a TDDB model that designers can use to predict the lifetime of a given circuit. We review several physical explanations and models that try to explain TDDB. The gate breakdown problem, according to recent experiments, could be divided into three phenomena. We test these assumptions under very thin oxide regime and compare results with the empirical data to check the validity of the models.