Managing Reliability of Integrated Circuits: Lifetime Metering and Design for Healing

In nanoscale CMOS devices, manufacturing control, process variations and device reliability have emerged as dominant concerns. Reliability problems manifest over lifetime of ICs in multiple ways, from gradual degradation in performance to increasing leakage current to catastrophic failures. Each of these effects are modulated by workloads executing on ICs and ambient conditions which influence circuit operating conditions such as temperature and supply voltage noise, which in turn affect the rate of aging. The rate at which a device ages determine its remaining lifetime. There are 3 papers in this session that deal with (i) modeling rate of aging for predicting lifetime, (ii) monitoring IC health through proxy monitors to predict lifetime and (iii) healing of IC against degradation due to NBTI.

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