

Embedded Tutorial

Challenges in nanometer technology scaling: trends and projections

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Abstract

Many problems are compounded by the rapidly escalating complexity of technology and designs. In addition, defect behavior is becoming more and more complex resulting in increased unpredictable faulty responses. Moreover, the excessive leakage and parameter variations in nanometer technologies impact the effectiveness of parametric based test techniques. With this scenario, research and development of effective test techniques requires a detailed knowledge of technology characteristics and their trends. We will examine the trends in transistor characteristics, clock frequency, transistor density, multilevel interconnections, power, and die size of high-performance microprocessors. Key barriers to continued scaling of supply voltage and technology for microprocessors to achieve low-power and high-performance will be discussed.