



High Performance Integrated Circuit Design

Emre Salman, Eby Friedman

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The latest techniques for designing robust, high performance integrated circuits in nanoscale technologies. Focusing on a new technological paradigm, this practical guide describes the interconnect-centric design methodologies that are now the major focus of nanoscale integrated circuits (ICs). *High Performance Integrated Circuit Design* begins by discussing the dominant role of on-chip interconnects and provides an overview of technology scaling. The book goes on to cover data signaling, power management, synchronization, and substrate-aware design.

Specific design constraints and methodologies unique to each type of interconnect are addressed. This comprehensive volume also explains the design of specialized circuits such as tapered buffers and repeaters for data signaling, voltage regulators for power management, and phase-locked loops for synchronization. This is an invaluable resource for students, researchers, and engineers working in the area of high performance ICs.

High Performance Integrated Circuit Design

Coverage includes:

- Technology scaling
- Interconnect modeling and extraction
- Signal propagation and delay analysis
- Interconnect coupling noise
- Power generation
- Power distribution networks
- CAD of power networks
- Techniques to reduce power supply noise
- Power dissipation
- Synchronization theory and tradeoffs
- Synchronous system characteristics
- On-chip clock generation
- Clock distribution networks
- Substrate noise in mixed-signal ICs
- Techniques to reduce substrate noise



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