Introduction to Semiconductor Devices
For Computing and Telecommunications Applications

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Features
• Covers current and emerging semiconductor devices
• Includes coverage of nanoelectronics
• Presents key devices in telecoms and computing
From semiconductor fundamentals to state-of-the-art semiconductor devices used in the telecommunications and computing industries, this book provides a solid grounding in the most important devices used in the hottest areas of electronic engineering today.

The book includes coverage of future approaches to computing hardware and RF power amplifiers, and explains how emerging trends and system demands of computing and telecommunications systems influence the choice, design and operation of semiconductor devices. It begins with a discussion of the fundamental properties of semiconductors. Next, state-of-the-art field effect devices are described, including MODFETs and MOSFETs. Short channel effects and the challenges faced by continuing miniaturization are then addressed. The balance of the book discusses the structure, behavior, and operating requirements of semiconductor devices used in lightwave and wireless telecommunications systems.

This is both an excellent graduate text, and a valuable reference for engineers and researchers, covering semiconductor fundamentals through to the latest telecommunications and computing devices.
Beyond CMOS

Figure 8.14 (b) Stable states for a four quantum dot cell. Notice that there are two stable states, each with a different logic state, used to encode binary information. Let us consider how these states are generated.

Figure 6.22 Unstable states for a four-quantum-dot cell. Notice that the cell 1, which corresponds to two electrons at two of the four corners. The larger spatial separation reduces the Coulomb repulsion thus leading to a lower energy state.

Figure 8.15 (a) The state of the two electrons exists which correspond to two different polarization states in a four-site cellular automaton: (a) two electrons on opposite corners, (b) both sites have the same energy of configuration when independent states, each with a different logic state

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