

High-Speed Electronics and Optoelectronics

This authoritative account of electronic and optoelectronic devices operating at frequencies greater than 1 GHz covers the concepts and fundamental principles of operation, and, uniquely, their circuit applications too.

Key features include:

- a comprehensive coverage of electron devices, such as MESFET, HEMT, RF MOS-FET, BJT and HBT, and their models;
- discussions of semiconductor devices fabricated in a variety of material systems, such as Si, III–V compound semiconductors and SiGe;
- a description of light-emitting diodes, semiconductor lasers and photodetectors;
- an executive summary at the beginning of each chapter;
- plentiful real-world examples; and
- end-of-chapter problems to test understanding of the material covered.

From crystal structure to atomic bonding, recombination and radiation in semiconductors to p–n junctions and heterojunctions, a wide range of critical topics is covered. Moreover, a chapter on analogue circuit applications provides an introduction to scattering parameter theory, followed by descriptions of different types of amplifier and oscillator utilising HBTs and HEMTs. Optimisation algorithms, such as simulated annealing and neural network applications, and parameter extraction of electronic device equivalent circuit models are also discussed. Graduate students in electrical engineering, industry professionals and researchers will all find this a valuable resource.

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High-Speed Electronics and Optoelectronics: Devices and Circuits

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