

## Physics Of Semiconductor Devices Sze Solution

Graduate text with comprehensive treatment of semiconductor device physics and engineering, and descriptions of real optoelectronic devices.

*Resistivity -- Carrier and doping density -- Contact resistance and Schottky barriers -- Series resistance, channel length and width, and threshold voltage -- Defects -- Oxide and interface trapped charges, oxide thickness -- Carrier lifetimes -- Mobility -- Charge-based and probe characterization -- Optical characterization -- Chemical and physical characterization -- Reliability and failure analysis. --*
*Subsequent chapters teach the reader how to approach device design from the point of view of someone who wants to improve devices and can see the opportunity and challenges. It begins with coverage of basic physics concepts, including the physics behind polar heterostructures and strained heterostructures. The book then details the important devices ranging from p-n diodes to bipolar and field effect devices. By relating device design to device performance and then relating device needs to system use the student can see how device design works in the real world. Microfabrication is the key technology behind integrated circuits, microsenors, photonic crystals, ink jet printers, solar cells and flat panel displays. Microsystems can be complex, but the basic microstructures and processes of microfabrication are fairly simple. Introduction to Microfabrication shows how the common microfabrication concepts can be applied over and over again to create devices with a wide variety of structures and functions. Featuring: \* A comprehensive presentation of basic fabrication processes \* An emphasis on materials and microstructures, rather than device physics \* In-depth discussion on process integration showing how processes, materials and devices interact \* A wealth of examples of both conceptual and real devices Introduction to Microfabrication includes 250 homework problems for students to familiarise themselves with micro-scale materials, dimensions, measurements, costs and scaling trends. Both research and manufacturing topics are covered, with an emphasis on silicon, which is the workhorse of microfabrication. This book will serve as an excellent first text for electrical engineers, chemists, physicists and materials scientists who wish to learn about microstructures and microfabrication techniques, whether in MEMS, microelectronics or emerging applications.*

SEMICONDUCTOR DEVICES: PHYSICS AND TECHNOLOGY, 2ND ED

PHYSICS OF SEMICONDUCTOR DEVICES, 3RD ED

Semiconductor Physics

Physics, Characteristics, Reliability

Proceedings of IWSPD 2017

A complete guide to current knowledge and future trends in ULSI devices Ultra-Large-Scale Integration (ULSI), the next generation of semiconductor devices, has become a hot topic of investigation. ULSI Devices provides electrical and electronic engineers, applied physicists, and anyone involved in IC design and process development with a much-needed overview of key technology trends in this area. Edited by two of the foremost authorities on semiconductor device physics, with contributions by some of the best-known researchers in the field, this comprehensive reference examines such major ULSI devices as MOSFET, nonvolatile semiconductor memory (NVSM), and the bipolar transistor, and the improvements these devices offer in power consumption, low-voltage and high-speed operation, and system-on-chip for ULSI applications. Supplemented with introductory material and references for each chapter as well as more than 400 illustrations, coverage includes:
\* The physics and operational characteristics of the different components
\* The evolution of device structures the ultimate limitations on device and circuit performance
\* Device miniaturization and simulation
\* Issues of reliability and the hot carrier effect
\* Digital and analog circuit building blocks
\*An Instructor’s Manual presenting detailed solutions to all the problems in the book is available from the Wiley editorial department

A definitive and up-to-date handbook of semiconductor devices Semiconductor devices, the basic components of integrated circuits, are responsible for the rapid growth of the electronics industry over the past fifty years. Because there is a growing need for faster and more complex systems for the information age, existing semiconductor devices are constantly being studied for improvement, and new ones are being continually invented. As a result, a large number of types and variations of devices are available in the literature. The Second Edition of this unique engineering guide continues to be the only available complete collection of semiconductor devices, identifying 74 major devices and more than 200 variations of these devices. As in the First Edition, the value of this text lies in its comprehensive, yet highly readable presentation and its easy-to-use format, making it suitable for a wide range of audiences. Essential information is presented for a quick, balanced overview Each chapter is designed to cover only one specific device, for easy and focused reference Each device is discussed in detail, always including its history, its structure, its characteristics, and its applications The Second Edition has been significantly updated with eight new chapters, and the material rearranged to reflect recent developments in the field. As such, it remains an ideal reference source for graduate students who want a quick survey of the field, as well as for practitioners and researchers who need quick access to basic information, and a valuable pragmatic handbook for salespeople, lawyers, and anyone associated with the semiconductor industry.

Special Features
\*Computer-based exercises and homework problems -- unique to this text and comprising 25% of the total number of problems -- encourage students to address realistic and challenging problems, experiment with what if scenarios, and easily obtain graphical outputs. Problems are designed to progressively enhance MATLAB-use proficiency, so students need not be familiar with MATLAB at the start of your course. Program scripts that are answers to exercises in the text are available at no charge in electronic form (see Teaching Resources below).
\*Supplement and Review Mini-Chapters after each of the text’s three parts contain an extensive review list of terms, test-like problem sets with answers, and detailed suggestions on supplemental reading to reinforce students’ learning and help them prepare for exams.
\*Read-Only Chapters, strategically placed to provide a change of pace during the course, provide informative, yet enjoyable reading for students.
\*Measurement Details and Results samples offer students a realistic perspective on the seldom-perfect nature of device characteristics, contrary to the way they are often represented in introductory texts. Content Highlight

The basic semiconductor devices are explored at two levels: (1) a mathematically rigorous but simple model for each device is developed and then; (2) the motivations of modern devices which are more complex are provided. By discussing silicon, gallium arsenide and other semiconductor based devices, the text provides a state-of-the-art discussion of modern electronic devices. Most subsections end with a solved example so that the reader develops a feel of real numbers and the importance of device design.

Physics and Materials Properties

Electronic Properties of Semiconductor Interfaces

Introduction to Microfabrication

Compound Semiconductor Device Physics

Principles of Transistor Circuits

*This book covers the physics of semiconductors on an introductory level, assuming that the reader already has some knowledge of condensed matter physics. Crystal structure, band structure, carrier transport, phonons, scattering processes and optical properties are presented for typical semiconductors such as silicon, but III-V and II-VI compounds are also included. In view of the increasing importance of wide-gap semiconductors, the electronic and optical properties of these materials are dealt with too.*

*An in-depth, up-to-date presentation of the physics and operational principles of all modern semiconductor devices The companion volume to Dr. Sze's classic Physics of Semiconductor Devices, Modern Semiconductor Device Physics covers all the significant advances in the field over the past decade. To provide the most authoritative, state-of-the-art information on this rapidly developing technology, Dr. Sze has gathered the contributions of world-renowned experts in each area. Principal topics include bipolar transistors, compound-semiconductor field-effect-transistors, MOSFET and related devices, power devices, quantum-effect and hot-electron devices, active microwave devices, active microwave diodes, high-speed photonic devices, and solar cells. Supported by hundreds of illustrations and references and a problem set at the end of each chapter, Modern Semiconductor Device Physics is the essential text/reference for integrated engineers, physicists, material scientists, and graduate students actively working in microelectronics and related fields.*

*The Third Edition of the standard textbook and reference in the field of semiconductor devices This classic book has set the standard for advanced study and reference in the semiconductor device field. Now completely updated and reorganized to reflect the tremendous advances in device concepts and performance, this Third Edition remains the most detailed and exhaustive single source of information on the most important semiconductor devices. It gives readers immediate access to detailed descriptions of the underlying physics and performance characteristics of all major bipolar, field-effect, microwave, photonic, and sensor devices. Designed for graduate textbook adoption and reference needs, this new edition includes: A complete update of the latest developments New devices such as three-dimensional MOSFETs, MODFETs, resonant-tunneling diodes, semiconductor sensors, quantum-cascade lasers, single-electron transistors, real-space transfer devices, and more Materials completely reorganized Problem sets at the end of each chapter All figures reproduced at the highest quality Physics of Semiconductor Devices, Third Edition offers engineers, research scientists, faculty, and students a practical basis for understanding the most important devices in use today and for evaluating future device performance and limitations. A Solutions Manual is available from the editorial department.*

*A modern take on microelectronic device engineering Microelectronics is a 50-year-old engineering discipline still undergoing rapid evolution and societal adoption. Integrated Microelectronic Devices: Physics and Modeling fills the need for a rigorous description of semiconductor device physics that is relevant to modern nanoelectronics. The central goal is to present the fundamentals of semiconductor device operation with relevance to modern integrated microelectronics. Emphasis is devoted to frequency response, layout, geometrical effects, parasitic issues and modeling in integrated microelectronics devices (transistors and diodes). In addition to this focus, the concepts learned here are highly applicable in other device contexts. This text is suitable for a one-semester junior or senior-level course by selecting the front sections of selected chapters (e.g. 1-9). It can also be used in a two-semester senior-level or a graduate-level course by taking advantage of the more advanced sections.*

Semiconductor Device Fundamentals

Compound Semiconductors

Physics and Modeling

The Physics of Semiconductors

Semiconductor Fundamentals

*Market Desc:* Design Engineers Research Scientists Industrial and Electronics Engineering Managers Graduate Students Special Features:
· Completely updated with 30-50% revisions: Will include worked examples and end-of-the-chapter problems (with a solutions manual)
· First edition was the most cited work in contemporary engineering and applied science publications (over 12000 citations since 1969)
*About The Book:* This classic reference provides detailed information on the underlying physics and operational characteristics of all major bipolar, unipolar, special microwave, and optoelectronic devices. It integrates nearly 1,000 references to important original research papers and review articles, and includes more than 650 high-quality technical illustrations and 25 tables of material parameters for device analysis.

*The awaited revision of Semiconductor Devices: Physics and Technology offers more than 50% new or revised material that reflects a multitude of important discoveries and advances in device physics and integrated circuit processing. Offering a basic introduction to physical principles of modern semiconductor devices and their advanced fabrication technology, the third edition presents students with theoretical and practical aspects of every step in device characterizations and fabrication, with an emphasis on integrated circuits. Divided into three parts, this text covers the basic properties of semiconductor materials, emphasizing silicon and gallium arsenide; the physics and characteristics of semiconductor devices bipolar, unipolar special microwave and photonic devices; and the latest processing technologies, from crystal growth to lithographic pattern transfer.*

*For over thirty years, Stan Amos has provided students and practitioners with a text they could rely on to keep them at the forefront of transistor circuit design. This seminal work has now been presented in a clear new format and completely updated to include the latest equipment technology such as laser diodes, Trapatt diodes, optocouplers and GaAs transistors, and the most recent line output stages and switch-mode power supplies. Although integrated circuits have widespread application, the role of discrete transistors is undiminished, both as important building blocks which students must understand and as important devices, especially where appreciable power output or high voltage is required. New circuit techniques covered for the first time in this edition include current-damping amplifiers, bridge output stages, dielectric resonator oscillators, crowbar protection circuits, thyristor field timebases, laser output stages, and SHF amplifiers in satellite receivers, video clamps, picture enhancement circuits, motor drive circuits in video recorders and camcorders, and UHF modulators. The plan of the book remains the same: semiconductor physics is introduced, followed by details of the design of transistors, amplifiers, receivers, oscillators and generators. Appendices provide information on transistor manufacture and parameters, and a new appendix on transistor letter symbols has been included.*

*Semiconductor physics; Bipolar devices; Unipolar devices; Special microwave devices; Photonic devices; International system of units; Unit prefixes; Greek alphabet; Physical constants; Lattice constants; Propeties of important semiconductors; Properties of Ge, Si, and GaAs at 300K; Properties of SiO2 and Si3NA at 300K.*

Fundamentals of Semiconductors

Semiconductor Device Physics and Design

Physics of Semiconductor Devices

The Physics of Semiconductor Devices

Semiconductor Sensors

A collection of 141 important papers on semiconductor devices covering a period of 100 years, from the earliest systematic investigation of metal-semiconductor contacts in 1874 to the first observation of the resonant tunneling in 1974. The papers are divided into four parts: bipolar, unipolar, microwave, and photonic devices, with a commentary for each part to highlight the importance of each of the papers. Acidic paper. Annotation copyrighted by Book News, Inc., Portland, OR

This book presents those terms, concepts, equations, and models that are routinely used in describing the operational behavior of solid state devices. The second edition provides many new problems and illustrative examples.

The purpose of this workshop is to spread the vast amount of information available on semiconductor physics to every possible field throughout the scientific community. As a result, the latest findings, research and discoveries can be quickly disseminated. This workshop provides all participating research groups with an excellent platform for interaction and collaboration with other members of their respective scientific community. This workshop’s technical sessions include various current and significant topics for applications and scientific developments, including
• Optoelectronics
• VLSI & ULSI Technology
• Photovoltaics
• MEMS & Sensors
• Device Modeling and Simulation
• High Frequency/Power Devices
• Nanotechnology and Emerging Areas
• Organic Electronics
• Displays and Lighting
Many eminent scientists from various national and international organizations are actively participating with their latest research works and also equally supporting this mega event by joining the various organizing committees.

This book provides an overview of compound semiconductor materials and their technology. After presenting a theoretical background, it describes the relevant material preparation technologies for bulk and thin-layer epitaxial growth. It then briefly discusses the electrical, optical, and structural properties of semiconductors, complemented by a description of the most popular characterization tools, before more complex hetero- and low-dimensional structures are discussed. A special chapter is devoted to GaN and related materials, owing to their huge importance in modern optoelectronic and electronic devices, on the one hand, and their particular properties compared to other compound semiconductor, on the other. In the last part of the book, the physics and functionality of optoelectronic and electronic device structures (LEDs, laser diodes, solar cells, field-effect and heterojunction bipolar transistors) are discussed on the basis of the specific properties of compound semiconductors presented in the preceding chapters of the book. Compound semiconductors form the back-bone of all opto-electronic and electronic devices besides the classical Si electronics. Currently the most important field is solid state lighting with highly efficient LEDs emitting visible light. Also laser diodes of all wavelength ranges between mid-infrared and near ultraviolet have been the enabler for a huge number of unprecedented applications like CDs and DVDs for entertainment and data storage, not to speak about the internet, which would be impossible without optical data communications with infrared laser diodes as key elements. This book provides a concise overview over this class of materials, including the most important technological aspects for their fabrication and characterisation, also covering the most relevant devices based on compound semiconductors. It presents therefore an excellent introduction into this subject not only for students, but also for engineers and scientist who intend to put their focus on this field of science.

Modern Semiconductor Device Physics, Solutions Manual

Integrated Microelectronic Devices

Semiconductor Devices

ULSI Technology

Modern Semiconductor Device Physics

***This text aims to provide the fundamentals necessary to understand semiconductor device characteristics, operations and limitations. Quantum mechanics and quantum theory are explored, and this background helps give students a deeper understanding of the essentials of physics and semiconductors.***

***Semiconductor Sensors provides complete coverage of all important aspects of all modern semiconductor sensing devices. It is the only book that offers detailed coverage of the fabrication, characterization, and operational principles of the entire spectrum of devices made from silicon and other semiconductors; and it is written by world-renowned experts in the sensor field. This authoritative guide combines user-friendly organization for quick reference with a masterful pedagogical design that helps build the reader’s understanding from section to section and from one chapter to the next. It begins with a discussion of semiconductor sensor classification and terminology and moves on to a broad description of semiconductor technology, emphasizing bulk and surface micromachining. Senior undergraduate and first-year graduate students will appreciate the 300 illustrations and tables that help to clarify difficult points and encourage visualization of the devices under discussion. They will also benefit from the interdisciplinary nature of the presentation, which encompasses applied physics, chemical engineering, electrical and mechanical engineering, and materials science. For engineers and scientists involved in sensor research and development or in designing sensor-dependent devices and systems, Semiconductor Sensors is the ultimate one-stop source for the latest information on existing technologies.***

***The new edition of the most detailed and comprehensive single-volume reference on major semiconductor devices The Fourth Edition of Physics of Semiconductor Devices remains the standard reference work on the fundamental physics and operational characteristics of all major bipolar, unipolar, special microwave, and optoelectronic devices. This fully updated and expanded edition includes approximately 1,000 references to original research papers and review articles, more than 650 high-quality technical illustrations, and over two dozen tables of material parameters. Divided into five parts, the text first provides a summary of semiconductor properties, covering energy band, carrier concentration, and transport properties. The second part surveys the basic building blocks of semiconductor devices, including p-n junctions, metal-semiconductor contacts, and metal-insulator-semiconductor (MIS) capacitors. Part III examines bipolar transistors, MOSFETs (MOS field-effect transistors), and other field-effect transistors such as JFETs (junction field-effect-transistors) and MESFETs (metal-semiconductor field-effect transistors). Part IV focuses on negative-resistance and power devices. The book concludes with coverage of photonic devices and sensors, including light-emitting diodes (LEDs), solar cells, and various photodetectors and semiconductor sensors. This classic volume, the standard textbook and reference in the field of semiconductor devices: Provides the practical foundation necessary for understanding the devices currently in use and evaluating the performance and limitations of future devices Offers completely updated and revised information that reflects advances in device concepts, performance, and application Features discussions of topics of contemporary interest, such as applications of photonic devices that convert optical energy to electric energy Includes numerous problem sets, real-world examples, tables, figures, and illustrations; several useful appendices; and a detailed solutions manual for Instructor’s only Explores new work on leading-edge technologies such as MODFETs, resonant-tunneling diodes, quantum-cascade lasers, single-electron transistors, real-space-transfer devices, and MOS-controlled thyristors Physics of Semiconductor Devices, Fourth Edition is an indispensable resource for design engineers, research scientists, industrial and electronics engineering managers, and graduate students in the field.***

***Semiconductor Physics and Devices provides an introduction to the physics of semiconductor materials and devices. The text is supported by a large number of examples and exercises to test the understanding of topics.***

ULSI Devices

17th International Workshop on the Physics of Semiconductor Devices 2013

Complete Guide to Semiconductor Devices

An Introduction

With Applications to Optoelectronic Devices

*The first true introduction to semiconductor optoelectronic devices, this book provides an accessible, well-organized overview of optoelectric devices that emphasizes basic principles.Coverage begins with an optional review of key concepts—such as properties of compound semiconductor, quantum mechanics, semiconductor statistics, carrier transport properties, optical processes, and junction theory—then progress gradually through more advanced topics. The Second Edition has been both updated and expanded to include the recent developments in the field.*

Physics of Semiconductor DevicesJohn Wiley & Sons

*This book disseminates the current knowledge of semiconductor physics and its applications across the scientific community. It is based on a biennial workshop that provides the participating research groups with a stimulating platform for interaction and collaboration with colleagues from the same scientific community. The book discusses the latest developments in the field of III-nitrides; materials & devices, compound semiconductors, VLSI technology, optoelectronics, sensors, photovoltaics, crystal growth, epitaxy and characterization, graphene and other 2D materials and organic semiconductors.*

*The first edition of "Semiconductor Physics" was published in 1973 by Springer-Verlag Wien-New York as a paperback in the Springer Study Edition. In 1977, a Russian translation by Professor Yu. K. Pozhela and coworkers at Vilnius/USSR was published by Izdatelstvo "MIR", Mo scow. Since then new ideas have been developed in the field of semi conductors such as electron hole droplets, dangling bond saturation in amorphous silicon by hydrogen, or the determination of the fine struc ture constant from surface quantization in inversion layers. New tech niques such as molecular beam epitaxy which has made the realization of the Esaki superlattice possible, deep level transient spectroscopy, and refined a. c. Hall techniques have evolved. Now that the Viennese edition is about to go out of print, Springer-Verlag, Berlin-Heidelberg-New York is giving me the opportunity to include these new subjects in a monograph to appear in the Solid-State Sciences series. Again it has been the intention to cover the field of semiconductor physics comprehensively, although some chapters such as diffusion of hot carriers and their galvanomagnetic phenomena, as well as super conducting degenerate semiconductors and the appendices, had to go for commercial reasons. The emphasis is more on physics than on device as pects.*

Semiconductor Optoelectronic Devices

Semiconductor Devices: Physics and Technology, 3rd Edition

Physics and Technology

Introduction to Semiconductor Physics

Semiconductor power devices are the heart of power electronics. They determine the performance of power converters and allow topologies with high efficiency. Semiconductor properties, pn-junctions and the physical phenomena for understanding power devices are discussed in depth. Working principles of state-of-the-art power diodes, thyristors, MOSFETs and IGBTs are explained in detail, as well as key aspects of semiconductor device production technology. In practice, not only the semiconductor, but also the thermal and mechanical properties of packaging and interconnection technologies are essential to predict device behavior in circuits. Wear and aging mechanisms are identified and reliability analyses principles are developed. Unique information on destructive mechanisms, including typical failure pictures, allows assessment of the ruggedness of power devices. Also parasitic effects, such as device induced electromagnetic interference problems, are addressed. The book concludes with modern power electronic system integration techniques and trends.

Physics of Semiconductor Devices covers both basic classic topics such as energy band theory and the gradual-channel model of the MOSFET as well as advanced concepts and devices such as MOSFET short-channel effects, low-dimensional devices and single-electron transistors. Concepts are introduced to the reader in a simple way, often using comparisons to everyday-life experiences such as simple fluid mechanics. They are then explained in depth and mathematical developments are fully described. Physics of Semiconductor Devices contains a list of problems that can be used as homework assignments or can be solved in class to exemplify the theory. Many of these problems make use of Matlab and are aimed at illustrating theoretical concepts in a graphical manner.

This manual contains the PLOTf software, user’s guide and program description to accompany Michael Shur’s Physics of semiconductor devices - rear cover.

The purpose of this text is to assist the reader with a self-contained treatment of fundamen tal solid state and semiconductor device physics. The material presented in the text is based upon the lecture notes of a one-year graduate course sequence taught by this author for many years in the Department of Electrical Engineering of the University of Florida. It is intended as an introductory textbook for graduate students in electrical engineering. However, many students from other disciplines and backgrounds such as chemical engineering, materials science, and physics have also taken this course sequence, and will be interested in the material presented herein. This book may also serve as a general reference for device engineers in the semiconductor industry. The present volume covers a wide variety of topics on basic solid state physics and physical principles of various semiconductor devices. The main subjects covered include crystal structures, lattice dynamics, semiconductor statistics, energy band theory, excess carrier phenomena and recombination mechanisms, carrier transport and scattering mechanisms, optical properties, photoelectric effects, metal-semiconductor devices, the p–n junction diode, bipolar junction transistor, MOS devices, photonic devices, quantum effect devices, and high speed III-V semiconductor devices. The text presents a unified and balanced treatment of the physics of semiconductor materials and devices. It is intended to provide physicists and mat erials scientists with more device backgrounds, and device engineers with a broader knowledge of fundamental solid state physics.

Pioneering Papers

Semiconductor Material and Device Characterization

Semiconductor Physics and Devices

Semiconductor Physical Electronics

Semiconductor Power Devices

***Excellent bridge between general solid-state physics textbook and research articles packed with providing detailed explanations of the electronic, vibrational, transport, and optical properties of semiconductors "The most striking feature of the book is its modern outlook ... provides a wonderful foundation. The most wonderful feature is its efficient style of exposition ... an excellent book." Physics Today "Presents the theoretical derivations carefully and in detail and gives thorough discussions of the experimental results it presents. This makes it an excellent textbook both for learners and for more experienced researchers wishing to check facts. I have enjoyed reading it and strongly recommend it as a text for anyone working with semiconductors ... I know of no better text ... I am sure most semiconductor physicists will find this book useful and I recommend it to them." Contemporary Physics Offers much new material: an extensive appendix about the important and by now well-established, deep center known as the DX center, additional problems and the solutions to over fifty of the problems at the end of the various chapters.***

***Using the continuum of interface-induced gap states (IFIGS) as a unifying theme, Mönch explains the band-structure lineup at all types of semiconductor interfaces. These intrinsic FIGS are the wave-function tails of electron states, which overlap a semiconductor band-gap exactly at the interface, so they originate from the quantum-mechanical tunnel effect. He shows that a more chemical view relates the IFIGS to the partial ionic character of the covalent interface-bonds and that the charge transfer across the interface may be modeled by generalizing Pauling’s electronegativity concept. The IFIGS-and-electronegativity theory is used to quantitatively explain the barrier heights and band offsets of well-characterized Schottky contacts and semiconductor heterostructures, respectively.***

***Market Desc:* "Electrical Engineers Scientists Special Features:
· Provides strong coverage of all key semiconductor devices. Includes basic physics and material properties of key semiconductors- Covers all important processing technologies About The Book: This book is an introduction to the physical principles of modern semiconductor devices and their advanced fabrication technology. It begins with a brief historical review of major devices and key technologies and is then divided into three sections: Semiconductor material properties, physics of semiconductor devices and processing technology to fabricate these semiconductor devices.**

***"This text follows the tradition of Sze's highly successful pioneering text on VLSI technology and is updated with the latest advances in the field of microelectronic chip fabrication. Since computer chips are foundations of modern electronics, these topics are essential for the next generation of USLI technologies, allowing more transistors to be packaged on a single chip. Contributing to each chapter are industry experts, specializing in topics such as epitaxy with low temperature process, rapid thermal processes, low damage plasma reactive ion etching, fine line lithography, cleaning technology, clean room technology, packing and reliability."--***

Electronic and Optoelectronic Properties of Semiconductor Structures

Introduction to the Design of Amplifiers, Receivers and Digital Circuits

Semiconductor Devices, Physics and Technology

Basic Principles

Physics, Technology, and Device Concepts

A graduate textbook presenting the underlying physics behind devices that drive today’s technologies. The book covers important details of structural properties, bandstructure, transport, optical and magnetic properties of semiconductor structures. Effects of low-dimensional physics and strain -two important driving forces in modern device technology - are also discussed. In addition to conventional semiconductor physics the book discusses self-assembled structures, mesoscopic structures and the developing field of spintronics. The book utilizes carefully chosen solved examples to convey important concepts and has over 250 figures and 200 homework exercises. Many real-world applications are highlighted throughout the book, stressing the links between physical principles and actual devices. Electronic and Optoelectronic Properties of Semiconductor Structures provides engineering and physics students and practitioners with complete and coherent coverage of key modern semiconductor concepts. A solutions manual and set of viewgraphs for use in lectures are available for instructors, from solutions@cambridge.org.

This book provides one of the most rigorous treatments of compound semiconductor device physics yet published. A complete understanding of modern devices requires a working knowledge of low-dimensional physics, the use of statistical methods, and the use of one-, two-, and three-dimensional analytical and numerical analysis techniques. With its systematic and detailed\*\*discussion of these topics, this book is ideal for both the researcher and the student. Although the emphasis of this text is on compound semiconductor devices, many of the principles discussed will also be useful to those interested in silicon devices. Each chapter ends with exercises that have been designed to reinforce concepts, to complement arguments or derivations, and to emphasize the nature of approximations by critically evaluating realistic conditions. One of the most rigorous treatments of compound semiconductor device physics yet published\*\*Essential reading for a complete understanding of modern devices\*\*Includes chapter-ending exercises to facilitate understanding