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# Semiconductor Physics And Devices 4th Edition

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An Introduction to Semiconductor Devices  
CRC Press

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. Semiconductor Physics and Devices Springer Science & Business Media Provides a basis for understanding the characteristics, operation, and limitations of semiconductor devices. This title deals with the electrical properties and characteristics of semiconductor materials and devices. It intends to bring together quantum mechanics, the quantum theory of solids, and semiconductor material physics. Semiconductor Physics John Wiley & Sons Neamen's Semiconductor Physics and

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Devices, Third Edition. deals with the electrical properties and characteristics of semiconductor materials and devices. The goal of this book is to bring together quantum mechanics, the quantum theory of solids, semiconductor material physics, and semiconductor device physics in a clear and understandable way.

The Physics of Semiconductors Springer Science & Business Media

"This dynamic text applies physics concepts and equations to practical, real-world applications of semiconductor device theory"--

Semiconductor Physics CRC Press

"This is the fifth edition of the most widely used introductory book on semiconductor materials, physics, devices and technology. The book was written with two basic goals in mind: 1) develop the basic semiconductor physics concepts to understand current and future devices; 2) provide a sound understanding of current semiconductor devices and technology so that their applications to electronic and optoelectronic circuits and systems can be appreciated."--BOOK JACKET. Title Summary field provided by Blackwell North America, Inc. All Rights Reserved

Semiconductor Optics Springer

Semiconductor Device Physics and Design teaches readers 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.

Fundamentals of Modern VLSI Devices

John Wiley & Sons

Modern Semiconductor Devices for

Integrated Circuits, First Edition

introduces readers to the world of modern semiconductor devices with an emphasis on integrated circuit applications. KEY TOPICS: Electrons and Holes in Semiconductors; Motion and Recombination of Electrons and Holes; Device Fabrication Technology; PN and Metal – Semiconductor Junctions; MOS Capacitor; MOS Transistor; MOSFETs in ICs—Scaling, Leakage, and Other Topics; Bipolar Transistor. MARKET: Written by an experienced teacher, researcher, and expert in industry practices, this succinct and forward-looking text is appropriate for anyone interested in semiconductor devices for integrated circuits, and serves as a suitable reference text for practicing engineers.

Electronic Circuit Analysis and Design Cambridge University Press

A comprehensive introduction and up-to-date reference to SiC power semiconductor devices covering topics from material properties to applications Based on a number of breakthroughs in SiC material science and fabrication technology in the 1980s and 1990s, the first SiC Schottky barrier diodes (SBDs) were released as commercial products in 2001. The SiC SBD market has grown significantly since that time, and SBDs are now used in a variety of power systems, particularly switch-mode power supplies and motor controls. SiC power MOSFETs entered commercial production in 2011, providing rugged, high-efficiency switches for high-frequency power

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systems. In this wide-ranging book, the authors draw on their considerable experience to present both an introduction to SiC materials, devices, and applications and an in-depth reference for scientists and engineers working in this fast-moving field. Fundamentals of Silicon Carbide Technology covers basic properties of SiC materials, processing technology, theory and analysis of practical devices, and an overview of the most important systems applications. Specifically included are: A complete discussion of SiC material properties, bulk crystal growth, epitaxial growth, device fabrication technology, and characterization techniques. Device physics and operating equations for Schottky diodes, pin diodes, JBS/MPS diodes, JFETs, MOSFETs, BJTs, IGBTs, and thyristors. A survey of power electronics applications, including switch-mode power supplies, motor drives, power converters for electric vehicles, and converters for renewable energy sources. Coverage of special applications, including microwave devices, high-temperature electronics, and rugged sensors. Fully illustrated throughout, the text is written by recognized experts with over 45 years of combined experience in SiC research and development. This book is intended for graduate students and researchers in crystal growth, material science, and semiconductor device technology. The book is also

useful for design engineers, application engineers, and product managers in areas such as power supplies, converter and inverter design, electric vehicle technology, high-temperature electronics, sensors, and smart grid technology. Modern Semiconductor Physics and Device Applications Prentice Hall For undergraduate electrical engineering students or for practicing engineers and scientists interested in updating their understanding of modern electronics One of the most widely used introductory books on semiconductor materials, physics, devices and technology, Solid State Electronic Devices aims to: 1) develop basic semiconductor physics concepts, so students can better understand current and future devices; and 2) provide a sound understanding of current semiconductor devices and technology, so that their applications to electronic and optoelectronic circuits and systems can be appreciated. Students are brought to a level of understanding that will enable them to read much of the current literature on new devices and applications. Teaching and Learning Experience This program will provide a better teaching and learning experience – for you and your students. It will help: Provide a Sound Understanding of Current Semiconductor Devices: With this background, students will be able to see how their applications to electronic and optoelectronic circuits and systems are meaningful. Incorporate the Basics of Semiconductor Materials and Conduction Processes in Solids: Most of the commonly used semiconductor terms and concepts are introduced and related to a broad range of devices. Develop Basic Semiconductor Physics Concepts: With this background, students will be better able to understand current and future devices. Semi-Conductor Physics & Devices

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McGraw-Hill Europe

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.

Electronic and Optoelectronic Properties of Semiconductor Structures Springer Science & Business Media

Learn the basic properties and designs of modern VLSI devices, as well as the factors affecting performance, with this thoroughly updated second edition. The first edition has been widely adopted as a standard textbook in microelectronics in many major US universities and worldwide. The internationally renowned authors highlight the intricate interdependencies and subtle trade-offs between various practically important device parameters, and provide an in-depth discussion of device scaling and scaling limits of CMOS and bipolar devices.

Equations and parameters provided are checked continuously against the reality of silicon data, making the book equally useful in practical transistor design and in the classroom. Every chapter has been updated to include the latest developments, such as MOSFET scale length theory, high-field transport model and SiGe-base bipolar devices.

Semiconductor Physics and Devices Springer Science & Business Media  
The 4th edition of this highly

successful textbook features copious material for a complete upper-level undergraduate or graduate course, guiding readers to the point where they can choose a specialized topic and begin supervised research. The textbook provides an integrated approach beginning from the essential principles of solid-state and semiconductor physics to their use in various classic and modern semiconductor devices for applications in electronics and photonics. The text highlights many practical aspects of semiconductors: alloys, strain, heterostructures, nanostructures, amorphous semiconductors, and noise, which are essential aspects of modern semiconductor research but often omitted in other textbooks. This textbook also covers advanced topics, such as Bragg mirrors, resonators, polarized and magnetic semiconductors, nanowires, quantum dots, multi-junction solar cells, thin film transistors, and transparent conductive oxides. The 4th edition includes many updates and chapters on 2D materials and aspects of topology. The text derives explicit formulas for many results to facilitate a better understanding of the topics. Having evolved from a highly regarded two-semester course on the topic, The Physics of Semiconductors requires little or no prior knowledge of solid-state physics. More than 2100 references guide the reader to historic and current literature including original papers, review

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articles and topical books, providing a go-to point of reference for experienced researchers as well.

McGraw-Hill Europe

Market\_Desc: · Graduate and Advanced Undergraduate Students of Electrical Engineering About The Book: This comprehensive

introduction to the elementary theory and properties of semiconductors describes the basic physics of semiconductor materials and technologies for fabrication of semiconductor devices. Addresses approaches to modeling and provides details of measurement techniques. It also includes numerous illustrative examples and graded problems.

Semiconductor Physics Oxford University Press, USA

An Introduction to Semiconductor Devices by Donald Neamen provides an understanding of the characteristics, operations and limitations of semiconductor devices. In order to provide this understanding, the book brings together the fundamental physics of the semiconductor material and the semiconductor device physics. This new text provides an accessible and modern presentation of material. Quantum mechanic material is minimal, and the most advanced material is designated with an icon. This modern approach means that coverage of the MOS transistor precedes the material on the bipolar transistor, which reflects the dominance of MOS technology in today's world. Excellent pedagogy is present throughout the book in the form of interesting chapters openers, worked examples, a variety of exercises, key terms, and end of chapter problems.

Semiconductor Physics Semiconductor Physics and Devices

This junior level electronics text provides a foundation for analyzing and designing analog and digital electronics throughout the book. Extensive pedagogical features including numerous design examples, problem solving technique sections, Test Your Understanding questions, and chapter checkpoints lend to this classic text. The author, Don Neamen, has many years experience as an Engineering Educator. His experience shines through each chapter of the book, rich with realistic examples and practical rules of thumb. The Third Edition continues to offer the same hallmark features that made the previous editions such a success. Extensive Pedagogy: A short introduction at the beginning of each chapter links the new chapter to the material presented in previous chapters. The objectives of the chapter are then presented in the Preview section and then are listed in bullet form for easy reference. Test Your Understanding Exercise Problems with provided answers have all been updated. Design Applications are included at the end of chapters. A specific electronic design related to that chapter is presented. The various stages in the design of an electronic thermometer are explained throughout the text. Specific Design Problems and Examples are highlighted throughout as well.

Solid State Electronic Devices World Scientific Publishing Company 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.

Fundamentals of Solid State Engineering Oxford University Press, USA

The Third Edition of the standard textbook and reference in the field of

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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 adoptions 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. The Physics of Semiconductors McGraw-Hill Science/Engineering/Math The updated and enlarged new edition of this book provides an introduction to and an overview of semiconductor optics from the IR through the visible to the UV. It

includes coverage of linear and nonlinear optical properties, dynamics, magneto- and electrooptics, high-excitation effects, some applications, experimental techniques and group theory. The mathematics is kept as elementary as possible. The subjects covered extend from physics to materials science and optoelectronics. New or updated chapters add coverage of current topics, while the chapters on bulk materials have been revised and updated.

Solid State Electronic Devices, Global Edition John Wiley & Sons 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.

Microelectronics Cambridge University

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## Press

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.