Solid State Electronic Devices Streetman 4th Edition

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Solid State Electronic Devices Streetman 4th Edition *2020-05-03*

RAMOS CUEVAS

For Computing and Telecommunications Applications Springer Science & Business Media

From semiconductor fundamentals to semiconductor devices used in the telecommunications and computing industries, this 2005 book provides a solid grounding in the most important devices used in the hottest areas of electronic engineering. 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 semiconductors. Next, the field effect devices are described, including MODFETs and MOSFETs. Short channel effects and the challenges faced by continuing miniaturisation are then addressed. The rest of the book discusses the structure, behaviour, and operating requirements of semiconductor devices used in lightwave and wireless telecommunications systems. This is both an excellent senior/graduate text, and a valuable reference for engineers and researchers in the field.

Semiconductor Physics

And Devices Springer Science & Business Media Semiconductor Physics and MaterialsIntrinsic and extrinsic semiconductors, Conduction mechanism in extrinsic semiconductors, Carrier concentrations, Drift and diffusion mechanisms, Drift and diffusion current densities, Excess carriers, Recombination process, Mean carrier lifetime, Conductivity, Mobility, Mass action law, Einstein relationship.Semiconductor materials used in optoelectronic devices and modern semiconductor devices and integrated circuits - GaAs, SiGe, GaAsP.Semiconductor Diodes A brief overview of following types of diodes, their peculiarities and applications Rectifier, Signal, Switching, Power, Tunnel, Shockley, Gunn, PIN.Semiconductor P-N Junction Diode : Open circuited step graded junction, Metallurgical junctions and ohmic contacts, Depletion region, Barrier potential, Forward and reverse biased diode operation.V-I characteristic equation of diode (no derivation). Volt equivalent of temperature, Temperature dependence of V-I characteristics, DC load line. Forward and reverse dynamic resistance, Small signal and large signal diode models. Diode data sheet specifications - PIV, IFMSurge, Iav.Switching Diodes - Diode switching times,

Junction capacitances.(No derivations).Field Effect Transistors An overview of different types of FETs viz. JFET, MOSFET, MESFET, Peculiarities of these types and their application areas.JFET : JFET construction, Symbol, Basic operation, V-I characteristics, Transfer characteristics (Shockley's equation), Cut-off & Pinch-off voltages, Transconductance, Input resistance & Capacitance. Drain to source resistance. Universal JFET bias curve. Biasing arrangements for JFET - Biasing against device variation, Biasing for zero current drift. JFET as voltage controlled current source. JFET data sheet specifications - IDSS, VP, gm, rd, RDS or RD (ON).JFET Amplifiers : CS, CD, CG amplifiers. Their analysis using small signal JFET model.MOSFETsAn overview of following MOSFET types - D-MOSFET, E-MOSFET, Power MOSFET, n-MOS, p-MOS and CMOS devices. Handling precautions for CMOS devices. D and E-MOSFET characteristics and parameters, Non ideal voltage current characteristics viz. Finite output resistance, body effect, sub threshold conduction, Breakdown effects and temperature effects. MOSFET biasing, Introduction to MOSFET as VLSI device.Bipolar Junction transistor An overview of different types of BJTs - Small signal and large signal low frequency types,

Switching/RF, Heterojunction types. Peculiarities of these types and their application areas.BJT Biasing and Basic Amplifier Configurations : Need for biasing BJT, DC analysis of BJT circuits, Typical junction voltages for cut-off, Active and saturation regions, Voltage divider bias and its analysis for stability factors, Small signal-low frequency h-parameter model, Variation of h-parameters with operating point, Other small signal models, Derivations for CE configuration for Ai, Ri, Ro, Avs, Avs interms of h-parameters, Comparison of performance parameters with CB and CC configurations in tabular form. Need for multistage amplifiers and suitability of CE, CC and CB configurations in multistage amplifiers, Small signal and DC data sheet specifications for BJT.Concept of frequency response, Human ear response to audio frequencies, Significance of Octaves and Dacades. The decibel unit. Square wave testing of amplifiers. Miller's theorem. Effect of coupling, bypass, junction and stray capacitances on frequency response for BJT and FET amplifiers. Concept of dominant pole. N stage cascade amplifier, Band pass of cascaded stages (effect on frequency response). Concept of GBW. (No derivations). *Solid State Electronic Devices* CRC Press

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.

Solid State Electronic Devices; 2nd Ed Pearson Education India

The second edition of Solid State Electronic Devices serves as a textbook for an introductory course on solid state electronic devices.

Fundamentals of Quantum Mechanics Wiley-Interscience

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.

Advanced Semiconducting Materials and Devices

CRC Press

Describing the fundamental physical properties of materials used in electronics, the thorough coverage of this book will facilitate an understanding of the technological processes used in the fabrication of

electronic and photonic devices. The book opens with an introduction to the basic applied physics of simple electronic states and energy levels. Silicon and copper, the building blocks for many electronic devices, are used as examples. Next, more advanced theories are developed to better account for the electronic and optical behavior of ordered materials, such as diamond, and disordered materials, such as amorphous silicon. Finally, the principal quasi-particles (phonons, polarons, excitons, plasmons, and polaritons) that are fundamental to explaining phenomena such as component aging (phonons) and optical performance in terms of yield (excitons) or communication speed (polarons) are discussed.

SEMICONDUCTOR DEVICES: PHYSICS AND TECHNOLOGY, 2ND ED OUP India

Solid state electronic devicesSolid State Electronic Devices

Solid State Devices and Technology Oxford University Press, USA

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.

Semiconductor Devices: Physics and Technology, 3rd Edition John Wiley & Sons Incorporated 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 curcuits, and serves as a suitable reference text for practicing engineers.

Avalanche Transit-time Devices Prentice Hall This book provides a complete overview of the field of carbon nanotube electronics. It covers materials and physical properties, synthesis and fabrication processes, devices and circuits, modeling, and finally novel applications of nanotube-based electronics. The book introduces fundamental device physics and circuit concepts of 1-D electronics. At the same time it provides specific examples of the state-of-the-art nanotube devices.

Microelectronics Tata McGraw-Hill Education The purpose of this book is to provide 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.

Carbon Nanotube Electronics Univ of Wisconsin Press 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.

Solid State Electronic Devices Prentice Hall Introduction to Semiconductor Device Physics is a popular and established text that offers a thorough introduction to the underlying physics of semiconductor devices. It begins with a review of basic solid state physics, then goes on to describe the properties of

semiconductors including energy bands, the concept of effective mass, carrier concentration, and conduction in more detail. Thereafter the book is concerned with the principles of operation of specific devices, beginning with the Gunn Diode and the p-n junction. The remaining chapters cover the on specific devices, including the LED, the bipolar transistor, the field-effect transistor, and the semiconductor laser. The book concludes with a chapter providing a brief introduction to quantum theory. Not overtly mathematical, Introduction to Semiconductor Device Physics introduces only those physical concepts required for an understanding of the semiconductor devices being considered. The author's intuitive style, coupled with an extensive set of worked problems, make this the ideal introductory text for those concerned with understanding electrical and electronic engineering, applied physics, and related subjects.

Solid State Electronic Devices Prentice Hall

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.

Control Systems Engineering Springer The basic concepts of quantum mechanics are explained in this book in a concise and easy-to-read manner, leading toward applications in solid-state electronics and optics. Following a logical sequence, the book focuses on key ideas and is conceptually and mathematically self-contained.

Mosfet Modeling for VLSI Simulation John Wiley & Sons Introduces the physical principles and operational characteristics of high speed semiconductor devices. Intended for use by advanced students as well as professional engineers and scientists involved in semiconductor device research, it includes the most advanced and important topics in high speed

semiconductor devices. Initial chapters cover material properties, advanced technologies and novel device building blocks, and serve as the basis for understanding and analyzing devices in subsequent chapters. The following chapters cover a group of closely related devices that includes MOSFETs, MESFETs, heterojunction FETs and permeable-base transistors, hot electron transistors, microwave diodes and photonic devices, among others. Each chapter is self-contained and features a summary section, a discussion of future device trend, and an instructional problem set.

Silicon and III-V Compound Semiconductors

Cambridge University Press

A reprint of the classic text, this book popularized compact modeling of electronic and semiconductor devices and components for college and graduate-school classrooms, and manufacturing engineering, over a decade ago. The first comprehensive book on MOS transistor compact modeling, it was the most cited among similar books in the area and remains the most frequently cited today. The coverage is device-physics based and continues to be relevant to the latest advances in MOS transistor modeling. This is also the only book that discusses in detail how to measure device model

parameters required for circuit simulations. The book deals with the MOS Field Effect Transistor (MOSFET) models that are derived from basic semiconductor theory. Various models are developed, ranging from simple to more sophisticated models that take into account new physical effects observed in submicron transistors used in today's (1993) MOS VLSI technology. The assumptions used to arrive at the models are emphasized so that the accuracy of the models in describing the device characteristics are clearly understood. Due to the importance of designing reliable circuits, device reliability models are also covered. Understanding these models is essential when designing circuits for state-of-the-art MOS ICs.

Semiconductor Devices & Circuits Vikas Publishing House

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, this text 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.
Semiconductor Materials John Wiley & Sons
"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
Solid State Electronic Devices, Anniversary Edition Solid state electronic devicesSolid State Electronic Devices"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 ReservedSolid State Electronic Devices: Global Edition 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.
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