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## **Physics of Semiconductor Devices** - Simon M. Sze 2021-03-03

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.

## **Recent Advances in Technology Research and Education** - Dumitru Luca 2017-09-08

This book presents selected contributions to the 16th International Conference on Global Research and Education Inter-Academia 2017 hosted by Alexandru Ioan Cuza University of Iasi, Romania from 25 to 28 September 2017. It is the third volume in the series, following the editions from 2015 and 2016. Fundamental and applied research in natural sciences have led to crucial developments in the ongoing 4th global industrial revolution, in the course of which information technology has become deeply embedded in industrial management, research and innovation - and just as deeply in education and everyday life. Materials science and nanotechnology, plasma and solid state physics, photonics, electrical and electronic engineering, robotics and metrology, signal processing, e-learning, intelligent and soft computing have long since been central research priorities for the Inter-Academia Community (I-AC) - a body comprising 14 universities and research institutes from Japan and Central/East-European countries that agreed, in 2002, to coordinate their research and education programs so as to better address today's challenges. The book is intended for use in academic, government, and industrial R&D departments as a reference tool in research and technology education. The 42 peer-reviewed papers were written by more than 119 leading scientists from 14 countries, most of them affiliated to the I-AC.

Fundamentals of Digital Logic with Verilog Design - Stephen Brown

2013-03-15

Fundamentals of Digital Logic With Verilog Design teaches the basic design techniques for logic circuits. It emphasizes the synthesis of circuits and explains how circuits are implemented in real chips. Fundamental concepts are illustrated by using small examples. Use of CAD software is well integrated into the book. A CD-ROM that contains Altera's Quartus CAD software comes free with every copy of the text. The CAD software provides automatic mapping of a design written in Verilog into Field Programmable Gate Arrays (FPGAs) and Complex Programmable Logic Devices (CPLDs). Students will be able to try, firsthand, the book's Verilog examples (over 140) and homework problems. Engineers use Quartus CAD for designing, simulating, testing and implementing logic circuits. The version included with this text supports all major features of the commercial product and comes with a compiler for the IEEE standard Verilog language. Students will be able to: enter a design into the CAD system compile the design into a selected device simulate the functionality and timing of the resulting circuit implement the designs in actual devices (using the school's laboratory facilities) Verilog is a complex language, so it is introduced gradually in the book. Each Verilog feature is presented as it becomes pertinent for the circuits being discussed. To teach the student to use the Quartus CAD, the book includes three tutorials.

## *Semiconductor Power Devices* - Josef Lutz 2018-02-16

Halbleiter-Leistungsbaulemente sind das Kernstück der Leistungselektronik. Sie bestimmen die Leistungsfähigkeit und machen neuartige und verlustarme Schaltungen erst möglich. In dem Band wird neben den Halbleiter-Leistungsbaulementen selbst auch die Aufbau- und Verbindungstechnik behandelt: von den physikalischen Grundlagen und der Herstellungstechnologie über einzelne Bauelemente bis zu thermomechanischen Problemen, Zerstörungsmechanismen und Störungseffekten. Die 2., überarbeitete Auflage berücksichtigt technische Neuerungen und Entwicklungen.

*The Theory and Practice of Microelectronics* - Sorab Khushro Gandhi 1968

## *Textbook of Nanoscience and Nanotechnology* - B.S. Murty 2013-12-06

This book is meant to serve as a textbook for beginners in the field of nanoscience and nanotechnology. It can also be used as additional reading in this multifaceted area. It covers the entire spectrum of nanoscience and technology: introduction, terminology, historical perspectives of this domain of science, unique and widely differing properties, advances in the various synthesis, consolidation and characterization techniques, applications of nanoscience and technology and emerging materials and technologies.

## Advances in Signal Processing and Communication - Banmali S. Rawat 2018-11-19

This book is a collection of selected peer-reviewed papers presented at the International Conference on Signal Processing and Communication (ICSC 2018). It covers current research and developments in the fields of communications, signal processing, VLSI circuits and systems, and embedded systems. The book offers in-depth discussions and analyses of latest problems across different sub-fields of signal processing and communications. The contents of this book will prove to be useful for students, researchers, and professionals working in electronics and electrical engineering, as well as other allied fields.

## **Advances in Communication, Devices and Networking** - Rabindranath Bera 2019-02-15

The book covers recent trends in the field of devices, wireless communication and networking. It presents the outcomes of the International Conference in Communication, Devices and Networking (ICCDN 2018), which was organized by the Department of Electronics

and Communication Engineering, Sikkim Manipal Institute of Technology, Sikkim, India on 2-3 June, 2018. Gathering cutting-edge research papers prepared by researchers, engineers and industry professionals, it will help young and experienced scientists and developers alike to explore new perspectives, and offer them inspirations on addressing real-world problems in the field of electronics, communication, devices and networking.

**Proceedings of Seventh International Conference on Bio-Inspired Computing: Theories and Applications (BIC-TA 2012)** - Jagdish C. Bansal 2012-12-04

The book is a collection of high quality peer reviewed research papers presented in Seventh International Conference on Bio-Inspired Computing (BIC-TA 2012) held at ABV-IIITM Gwalior, India. These research papers provide the latest developments in the broad area of "Computational Intelligence". The book discusses wide variety of industrial, engineering and scientific applications of nature/bio-inspired computing and presents invited papers from the inventors/originators of novel computational techniques.

**Integrated Circuit Fabrication** - Kumar Shubham 2021-04-29

This book covers theoretical and practical aspects of all major steps in the fabrication sequence. This book can be used conveniently in a semester length course on integrated circuit fabrication. This text can also serve as a reference for practicing engineer and scientist in the semiconductor industry. IC Fabrication are ever demanding of technology in rapidly growing industry growth opportunities are numerous. A recent survey shows that integrated circuit currently outnumber humans in UK, USA, India and China. The spectacular advances in the development and application of integrated circuit technology have led to the emergence of microelectronic process engineering as an independent discipline. Integrated circuit fabrication text books typically divide the fabrication sequence into a number of unit processes that are repeated to form the integrated circuit. The effect is to give the book an analysis flavor: a number of loosely related topics each with its own background material. Note: T& F does not sell or distribute the Hardback in India, Pakistan, Nepal, Bhutan, Bangladesh and Sri Lanka.

**Semiconductor Device Fundamentals** - Robert F. Pierret 1996

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 Highlig

**Soft Computing: Theories and Applications** - Millie Pant 2020-06-29

This book focuses on soft computing and how it can be applied to solve real-world problems arising in various domains, ranging from medicine and healthcare, to supply chain management, image processing and cryptanalysis. It gathers high-quality papers presented at the International Conference on Soft Computing: Theories and Applications (SoCTA 2019), organized by the National Institute of Technology Patna, India. Offering valuable insights into soft computing for teachers and researchers alike, the book will inspire further research in this dynamic field.

**The MEMS Handbook** - Mohamed Gad-el-Hak 2001-09-27

The revolution is well underway. Our understanding and utilization of microelectromechanical systems (MEMS) are growing at an explosive rate with a worldwide market approaching billions of dollars. In time, microdevices will fill the niches of our lives as pervasively as electronics do right now. But if these miniature devices are to fulfill their mammoth potential, today's engineers need a thorough grounding in the underlying physics, modeling techniques, fabrication methods, and materials of MEMS. The MEMS Handbook delivers all of this and more. Its team of authors-unsurpassed in their experience and standing in the scientific

community- explore various aspects of MEMS: their design, fabrication, and applications as well as the physical modeling of their operations. Designed for maximum readability without compromising rigor, it provides a current and essential overview of this fledgling discipline.

**Inventive Communication and Computational Technologies** - G. Ranganathan 2020-01-29

This book gathers selected papers presented at the Inventive Communication and Computational Technologies conference (ICICCT 2019), held on 29-30 April 2019 at Gnanamani College of Technology, Tamil Nadu, India. The respective contributions highlight recent research efforts and advances in a new paradigm called ISMAC (IoT in Social, Mobile, Analytics and Cloud contexts). Topics covered include the Internet of Things, Social Networks, Mobile Communications, Big Data Analytics, Bio-inspired Computing and Cloud Computing. The book is chiefly intended for academics and practitioners working to resolve practical issues in this area.

**Mosfet Modeling for VLSI Simulation** - Narain Arora 2007-02-14

' 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. Contents: OverviewReview of Basic Semiconductor and pn Junction TheoryMOS Transistor Structure and OperationMOS CapacitorThreshold VoltageMOSFET DC ModelDynamic ModelModeling Hot-Carrier EffectsData Acquisition and Model Parameter MeasurementsModel Parameter Extraction Using Optimization MethodSPICE Diode and MOSFET Models and Their ParametersStatistical Modeling and Worst-Case Design Parameters Readership: Integrated circuit chip designers, device model developers and circuit simulators. '

**VLSI FABRICATION PRINCIPLES: SILICON AND GALLIUM ARSENIDE, 2ND ED** - Sorab K Ghandhi 2008-08

About The Book: Fully updated with the latest technologies, this edition covers the fundamental principles underlying fabrication processes for semiconductor devices along with integrated circuits made from silicon and gallium arsenide. Stresses fabrication criteria for such circuits as CMOS, bipolar, MOS, FET, etc. These diverse technologies are introduced separately and then consolidated into complete circuits.

**ULSI Technology** - C. Y. Chang 1996

"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."--*Proceedings of International Conference on Communication and Computational Technologies* - Sunil Dutt Purohit 2020-08-27

This book offers a collection of high-quality peer-reviewed research papers presented at the Second International Conference on Communication and Computational Technologies (ICCCT 2019), held at Rajasthan Institute of Engineering and Technology, Jaipur, Rajasthan, India, on 30-31 August 2019. In contributions prepared by researchers from academia and industry alike, the book discusses a wide variety of industrial, engineering and scientific applications of emerging techniques.

*Advances in VLSI, Communication, and Signal Processing* - David Harvey 2020-10-14

This book comprises select peer-reviewed papers from the International Conference on VLSI, Communication and Signal processing (VCAS) 2019, held at Motilal Nehru National Institute of Technology (MNNIT) Allahabad, Prayagraj, India. The contents focus on latest research in different domains of electronics and communication engineering, in particular microelectronics and VLSI design, communication systems and networks, and signal and image processing. The book also discusses the emerging applications of novel tools and techniques in image, video and multimedia signal processing. This book will be useful to students, researchers and professionals working in the electronics and communication domain.

**Smart Trends in Computing and Communications: Proceedings of SmartCom 2020** - Yu-Dong Zhang 2020-07-17

This book gathers high-quality papers presented at the International Conference on Smart Trends for Information Technology and Computer Communications (SmartCom 2020), organized by the Global Knowledge Research Foundation (GR Foundation) from 23 to 24 January 2020. It covers the state-of-the-art and emerging topics in information, computer communications, and effective strategies for their use in engineering and managerial applications. It also explores and discusses the latest technological advances in, and future directions for, information and knowledge computing and its applications.

**Engineering for Sustainable Future** - Annamária R. Várkonyi-Kóczy 2020-01-13

This book presents selected papers from the 18th International Conference on Global Research and Education, Inter-Academia 2019, held in Budapest and Balatonfüred on September 4-7, 2019. The main goal of the conference was to provide an international forum for reviewing and assessing recent trends in both fundamental and applied research. In addition to sparking interest in recent research findings, the conference aimed to strengthen cooperation among the partners of the Inter-Academia community in the pursuit of new theoretical and practical research advances. The book contains a selection of papers based on lectures presented at the Inter-Academia 2019 conference and covering hot and challenging topics in the fields of machine intelligence and computer science, modeling and simulation, measurement, monitoring, and identification, electronics and nanoelectronics, bio- and environmental engineering, chemical processes and material science, together with related educational aspects. Accordingly, it offers a valuable resource for the global scientific community.

**Mosfet Modeling for Circuit Analysis and Design** -

**VLSI Technology** - S. M. Sze 2000

**Semiconductor Physics and Devices** - Donald A. Neamen 2003

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.

**Advances in Smart Grid Technology** - Pierluigi Siano 2020-09-22

This book comprises the select proceedings of the International Conference on Power Engineering Computing and Control (PECCON) 2019. This volume focuses on the different renewable energy sources which are integrated in a smart grid and their operation both in the grid connected mode and islanded mode. The contents highlight the role of power converters in the smart grid environment, battery management, electric vehicular technology and electric charging station as a load for the power network. This book can be useful for beginners, researchers as well as professionals interested in the area of smart grid technology.

**Thin-Film Capacitors for Packaged Electronics** - Jain Pushkar 2011-06-27

Thin-Film Capacitors for Packaged Electronics deals with the capacitors of a wanted kind, still needed and capable of keeping pace with the demands posed by ever greater levels of integration. It spans a wide range of topics, from materials properties to limits of what's the best one can achieve in capacitor properties to process modeling to application examples. Some of the topics covered are the following: -Novel insights into fundamental relationships between dielectric constant and the breakdown field of materials and related capacitance density and breakdown voltage of capacitor structures, -Electrical characterization techniques for a wide range of frequencies (1 kHz to 20 GHz), -Process modeling to determine stable operating points, -Prevention of metal (Cu) diffusion into the dielectric, -Measurements and modeling of the dielectric micro-roughness.

**SEMICONDUCTOR DEVICES** - NANDITA DASGUPTA 2004-01-01

Aimed primarily at the undergraduate students pursuing courses in semiconductor physics and semiconductor devices, this text emphasizes the physical understanding of the underlying principles of the subject. Since engineers use semiconductor devices as circuit elements, device models commonly used in the circuit simulators, e.g. SPICE, have been discussed in detail. Advanced topics such as lasers, heterojunction bipolar transistors, second order effects in BJTs, and MOSFETs are also covered. With such in-depth coverage and a practical approach, practising engineers and PG students can also use this book as a ready reference.

**The Power Electronics Handbook** - Timothy L. Skvarenina 2018-10-03

Less expensive, lighter, and smaller than its electromechanical counterparts, power electronics lie at the very heart of controlling and converting electric energy, which in turn lies at the heart of making that energy useful. From household appliances to space-faring vehicles, the applications of power electronics are virtually limitless. Until now, however, the same could not be said for access to up-to-date reference books devoted to power electronics. Written by engineers for engineers, The Power Electronics Handbook covers the full range of relevant topics, from basic principles to cutting-edge applications. Compiled from contributions by an international panel of experts and full of illustrations, this is not a theoretical tome, but a practical and enlightening presentation of the usefulness and variety of technologies that encompass the field. For modern and emerging applications, power electronic devices and systems must be small, efficient, lightweight, controllable, reliable, and economical. The Power Electronics Handbook is your key to understanding those devices, incorporating them into controllable circuits, and implementing those systems into applications from virtually every area of electrical engineering.

**VLSI Fabrication Principles** - Sorab K. Ghandhi 1994-03-28

In some places, the order of presentation has been changed to fine-tune the book's effectiveness as a senior and graduate-level teaching text. Fabrication principles covered include those for such circuits as CMOS, BIPOLAR, BICMOS, FET, and more.

**Tunneling Field Effect Transistor Technology** - Lining Zhang 2016-04-09

This book provides a single-source reference to the state-of-the art in tunneling field effect transistors (TFETs). Readers will learn the TFETs physics from advanced atomistic simulations, the TFETs fabrication process and the important roles that TFETs will play in enabling integrated circuit designs for power efficiency.

**Semiconductor Devices, Physics and Technology** - S. M. Sze 2013

**Information Technology and Mobile Communication** - Vinu V Das 2011-04-13

This book constitutes the refereed proceedings of the International Conference on Advances in Information Technology and Mobile Communication, AIM 2011, held at Nagpur, India, in April 2011. The 31 revised full papers presented together with 27 short papers and 34 poster papers were carefully reviewed and selected from 313 submissions. The papers cover all current issues in theory, practices, and applications of Information Technology, Computer and Mobile Communication Technology and related topics.

**Internet of Things in Smart Technologies for Sustainable Urban Development** - G. R. Kanagachidambaresan 2020-04-29

This book provides solution for challenges facing engineers in urban environments looking towards smart development and IoT. The authors address the challenges faced in developing smart applications along with the solutions. Topics addressed include reliability, security and financial issues in relation to all the smart and sustainable development solutions discussed. The solutions they provide are affordable, resistive to threats, and provide high reliability. The book pertains to researchers, academics, professionals, and students. Provides solutions to urban sustainable development problems facing engineers in developing and developed countries Discusses results with industrial problems and current issues in smart city development Includes solutions that are reliable, secure and financially sound

**Materials for Advanced Packaging** - Daniel Lu 2016-11-18

Significant progress has been made in advanced packaging in recent years. Several new packaging techniques have been developed and new packaging materials have been introduced. This book provides a comprehensive overview of the recent developments in this industry, particularly in the areas of microelectronics, optoelectronics, digital health, and bio-medical applications. The book discusses established techniques, as well as emerging technologies, in order to provide readers

with the most up-to-date developments in advanced packaging.

**Advances in VLSI, Communication, and Signal Processing** -

Debashis Dutta 2019-12-03

This book comprises select proceedings of the International Conference on VLSI, Communication and Signal processing (VCAS 2018). It looks at latest research findings in VLSI design and applications. The book covers a wide range of topics in electronics and communication engineering, especially in the area of microelectronics and VLSI design, communication systems and networks, and image and signal processing. The contents of this book will be useful to researchers and professionals alike.

**Proceedings of International Conference on Recent Trends in Machine Learning, IoT, Smart Cities and Applications** - Vinit Kumar Gunjan 2020-10-17

This book gathers selected research papers presented at the International Conference on Recent Trends in Machine Learning, IOT, Smart Cities & Applications (ICMISC 2020), held on 29-30 March 2020 at CMR Institute of Technology, Hyderabad, Telangana, India. Discussing current trends in machine learning, Internet of things, and smart cities applications, with a focus on multi-disciplinary research in the area of artificial intelligence and cyber-physical systems, this book is a valuable resource for scientists, research scholars and PG students wanting formulate their research ideas and find the future directions in these areas. Further, it serves as a reference work anyone wishing to understand the latest technologies used by practicing engineers around the globe.

**Microelectronics, Electromagnetics and Telecommunications** - P. Satish Rama Chowdary 2020-06-24

This book discusses the latest developments and outlines future trends in the fields of microelectronics, electromagnetics and telecommunication. It includes original research presented at the International Conference on Microelectronics, Electromagnetics and Telecommunication (ICMEET 2019), organized by the Department of ECE, Raghu Institute of Technology, Andhra Pradesh, India. Written by scientists, research scholars and practitioners from leading universities, engineering colleges and R&D institutes around the globe, the papers share the latest breakthroughs in and promising solutions to the most important issues facing today's society.

Futuristic Communication and Network Technologies - A.

Sivasubramanian 2021-10-11

This book presents select proceedings of the International Conference on Futuristic Communication and Network Technologies (CFCNT 2020) conducted at Vellore Institute of Technology, Chennai. It covers various domains in communication engineering and networking technologies.

This volume comprises of recent research in areas like optical communication, optical networks, optics and optical computing, emerging trends in photonics, MEMS and sensors, active and passive RF components and devices, antenna systems and applications, RF devices and antennas for microwave emerging technologies, wireless communication for future networks, signal and image processing, machine learning/AI for networks, internet of intelligent things, network security and blockchain technologies. This book will be useful for researchers, professionals, and engineers working in the core areas of electronics and communication.

*Topics in Adaptive Optics* - Robert Tyson 2012-01-20

Advances in adaptive optics technology and applications move forward at a rapid pace. The basic idea of wavefront compensation in real-time has been around since the mid 1970s. The first widely used application of adaptive optics was for compensating atmospheric turbulence effects in astronomical imaging and laser beam propagation. While some topics have been researched and reported for years, even decades, new applications and advances in the supporting technologies occur almost daily. This book brings together 11 original chapters related to adaptive optics, written by an international group of invited authors. Topics include atmospheric turbulence characterization, astronomy with large telescopes, image post-processing, high power laser distortion compensation, adaptive optics and the human eye, wavefront sensors, and deformable mirrors.

**Fundamentals of Tunnel Field-Effect Transistors** - Sneha Saurabh 2016-10-26

During the last decade, there has been a great deal of interest in TFETs. To the best authors' knowledge, no book on TFETs currently exists. The proposed book provides readers with fundamental understanding of the TFETs. It explains the interesting characteristics of the TFETs, pointing to their strengths and weaknesses, and describes the novel techniques that can be employed to overcome these weaknesses and improve their characteristics. Different tradeoffs that can be made in designing TFETs have also been highlighted. Further, the book provides simulation example files of TFETs that could be run using a commercial device simulator.