

Hu Modern Semiconductor Devices For Integrated Circuits

Modern Semiconductor Devices for Integrated Circuits
Modern Semiconductor Devices For Integrated Circuits
Modern Semiconductor Device Physics
Modern Semiconductor Devices for Integrated Circuits
Modern Semiconductor Physics and Device Applications
Semiconductor Devices
SEMICONDUCTOR DEVICES: PHYSICS AND TECHNOLOGY, 2ND ED
Semiconductor Devices
Modern Semiconductor Device Physics, Solutions Manual
Semiconductor Devices
Theory of Modern Electronic Semiconductor Devices
Fundamentals Of Semiconductor Physics And Devices
Modern Semiconductor Devices
Contemporary Trends in Semiconductor Devices
Fundamentals of Semiconductor Devices
Modern Semiconductor Fabrication Technology
Semiconductor Devices
Handbook of Advanced Electronic and Photonic Materials and Devices: Semiconductor devices
Semiconductor Devices, Physics and Technology
High-Speed Semiconductor Devices Chenming Hu Chenming C Hu S. M. Sze
Vitalii Dugaev Simon M. Sze S.M.Sze Simon M. Sze Simon M. Sze Jasprit Singh Kevin F. Brennan Rolf Enderlein Rupam Goswami
Betty Lise Anderson Peter E. Gise Jasprit Singh Hari Singh Nalwa S. M. Sze S. M. Sze
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for courses in semiconductor devices prepare your students for the semiconductor device technologies of today and

tomorrow modern semiconductor devices for integrated circuits first edition introduces students to the world of modern semiconductor devices with an emphasis on integrated circuit applications written by an experienced teacher researcher and expert in industry practices this succinct and forward looking text is appropriate for both undergraduate and graduate students and serves as a suitable reference text for practicing engineers

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 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 electrical engineers physicists material scientists and graduate students actively working in microelectronics and related fields

this textbook provides a theoretical background for contemporary trends in solid state theory and semiconductor device physics it discusses advanced methods of quantum mechanics and field theory and is therefore primarily intended for graduate students in theoretical and experimental physics who have already studied electrodynamics statistical physics and quantum mechanics it also relates solid state physics fundamentals to semiconductor device applications and includes auxiliary results from mathematics and quantum mechanics making the book useful also for graduate students in electrical engineering and material science key features explores concepts common in textbooks on semiconductors in addition to topics not included in similar books currently available on the market such as the topology of hilbert space in crystals contains the latest research and developments in the field written in an accessible yet rigorous manner

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

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

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

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this introductory text designed for the first course in semiconductor physics presents a well balanced coverage of semiconductor physics and device operation and shows how devices are optimized for applications the text begins with an exploration of the basic physical processes upon which all semiconductor devices diodes transistor light emitters and detectors

are based topics such as bandstructure effective masses holes doping carrier transport and lifetimes are discussed next the author focuses on the operation of the important semiconductor devices along with issues relating to the optimization of device performance issues such as how doping device dimensions and parasitic effects influence device operation are also included the book is appropriate for the following courses device physics semiconductor devices device electronics physics of semiconductor devices integrated circuit devices device electronics solid state devices

a thorough examination of the present and future of semiconductor device technology engineers continue to develop new electronic semiconductor devices that are almost exponentially smaller faster and more efficient than their immediate predecessors theory of modern electronic semiconductor devices endeavors to provide an up to date extended discussion of the most important emerging devices and trends in semiconductor technology setting the pace for the next generation of the discipline's literature kevin brennan and april brown focus on three increasingly important areas telecommunications quantum structures and challenges and alternatives to cmos technology specifically the text examines the behavior of heterostructure devices for communications systems quantum phenomena that appear in miniaturized structures and new nanoelectronic device types that exploit these effects the challenges faced by continued miniaturization of cmos devices and futuristic alternatives device structures on the commercial and research levels analyzed in detail include heterostructure field effect transistors bipolar and cmos transistors resonant tunneling diodes real space transfer transistors quantum dot cellular automata single electron transistors the book contains many homework exercises at the end of each chapter and a solution manual can be obtained for instructors emphasizing the development of new technology theory of modern electronic semiconductor devices is an ideal companion to electrical and computer engineering graduate level courses and an essential reference for semiconductor device engineers

this book is an introduction to the principles of semiconductor physics linking its scientific aspects with practical applications it is addressed to both readers who wish to learn semiconductor physics and those seeking to understand semiconductor devices it is particularly well suited for those who want to do both intended as a teaching vehicle the book is written in an expository manner aimed at conveying a deep and coherent understanding of the field it provides clear and complete derivations of the basic concepts of modern semiconductor physics the mathematical arguments and physical interpretations are well balanced they are presented in a measure designed to ensure the integrity of the delivery of the subject matter in a fully comprehensible form experimental procedures and measured data are included as well the reader is generally not

expected to have background in quantum mechanics and solid state physics beyond the most elementary level nonetheless the presentation of this book is planned to bring the student to the point of research design capability as a scientist or engineer moreover it is sufficiently well endowed with detailed knowledge of the field including recent developments bearing on submicron semiconductor structures that the book also constitutes a valuable reference resource in chapter 1 basic features of the atomic structures chemical nature and the macroscopic properties of semiconductors are discussed the band structure of ideal semiconductor crystals is treated in chapter 2 together with the underlying one electron picture and other fundamental concepts chapter 2 also provides the requisite background of the tight binding method and the $k-p$ method which are later used extensively the electron states of shallow and deep centers clean semiconductor surfaces quantum wells and superlattices as well as the effects of external electric and magnetic fields are treated in chapter 3 the one or multi band effective mass theory is used wherever this method is applicable a summary of group theory for application in semiconductor physics is given in an appendix chapter 4 deals with the statistical distribution of charge carriers over the band and localized states in thermodynamic equilibrium non equilibrium processes in semiconductors are treated in chapter 5 the physics of semiconductor junctions pn hetero metal and insulator is developed in chapter 6 under conditions of thermodynamic equilibrium and in chapter 7 under non equilibrium conditions on this basis the most important electronic and opto electronic semiconductor devices are treated among them uni and bi polar transistors photodetectors solar cells and injection lasers a summary of group theory for applications in semiconductors is given in an appendix

this book covers evolution concept and applications of modern semiconductor devices such as tunnel field effect transistors tfets vertical super thin body mosfets ion sensing fets isfets non conventional solar cells opto electro mechanical devices and thin film transistors tfts comprising of theory experimentation and applications of devices the chapters describe state of art methods and techniques which shall be highly assistive in having an overall perspective on emerging technologies and working on a research area the book is aimed at the scholars enthusiasts and researchers who are currently working on devices in the contemporary era of semiconductor devices additionally the chapters are lucid and descriptive and carry the potential of serving as a reference book for scholars in their undergraduate studies who are looking ahead for a prospective career in semiconductor devices

provides a realistic and practical treatment of modern semiconductor devices in this book an understanding of the physical processes responsible for the electronic properties of semiconductor materials and devices is emphasized it helps the reader

appreciate the underlying physics behind the equations derived and their range of applicability

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

electronic and photonic materials discussed in this handbook are the key elements of continued scientific and technological advances in the 21st century the electronic and photonic materials comprising this handbook include semiconductors superconductors ferroelectrics liquid crystals conducting polymers organic and superconductors conductors nonlinear optical and optoelectronic materials electrochromic materials laser materials photoconductors photovoltaic and electroluminescent materials dielectric materials nanostructured materials supramolecular and self assemblies silicon and glasses photosynthetic and respiratory proteins etc etc some of these materials have already been used and will be the most important components of the semiconductor and photonic industries computers internet information processing and storage telecommunications satellite communications integrated circuits photocopiers solar cells batteries light emitting diodes liquid crystal displays magneto optic memories audio and video systems recordable compact discs video cameras x ray technology color imaging printing flat panel displays optical waveguides cable televisions computer chips molecular sized transistors and switches as well as other emerging cutting edge technologies electronic and photonic materials are expected to grow to a trillion dollar industry in the new millennium and will be the most dominating forces in the emerging new technologies in the fields of science and engineering this handbook is a unique source of the in depth knowledge of synthesis processing fabrication spectroscopy physical properties and applications of electronic and photonic materials covering everything for today's and developing future technologies this handbook consists of over one hundred state of the art review chapters written by more than 200 world leading experts from 25 different countries with more than 23 000 bibliographic citations and several thousands of figures tables photographs chemical structures and equations this handbook is an invaluable major reference source for scientists and students working in the field of materials science solid state physics chemistry electrical and optical engineering polymer science device engineering and computational engineering photophysics data storage and information technology and technocrats everyone who is involved in science and engineering of electronic and photonic materials key features this is

the first handbook ever published on electronic and photonic materials 10 volumes summarize the advances in electronic and photonic materials made over past the two decades this handbook is a unique source of the in depth knowledge of synthesis processing spectroscopy physical properties and applications of electronic and photonic materials over 100 state of the art review chapters written by more than 200 leading experts from 25 different countries about 25 000 bibliographic citations and several thousand figures tables photographs chemical structures and equations easy access to electronic and photonic materials from a single reference each chapter is self contained with cross references single reference having all inorganic organic and biological materials written in very clear and concise fashion for easy understanding of structure property relationships in electronic and photonic materials

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

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