

Solid State Electronic Devices 6th Edition

Understanding Solid State Electronics Solid-State Electronic Devices Solid-State Electronic Devices Solid State Electronic Devices The Physics of Instabilities in Solid State Electron Devices Solid State Electronic Devices (2nd Edition) Fundamentals of Solid-state Electronics Fundamentals of Solid-state Electronics Semiconductor Device Physics and Simulation Solid State Electronic Devices, Anniversary Edition Electronic Technology Solid State Electronic Devices Electronics and Power United States Navy Occupational Handbook MOS Devices 电子技术 MOS Devices Electronic Industries The Log Railway Signaling and Communications British Books in Print Don L. Cannon Christo Papadopoulos Beniamino Cipriani Ben G. Streetman Harold L. Grubin D. K. Bhattacharya Chih-Tang Sah Chih-Tang Sah J.S. Yuan Ben Garland Streetman Walter J. Brooking D. V. Morgan United States. Bureau of Naval Personnel A. D. Milne 电子技术 (Japan)

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for devices courses found in electronics technology and electronics engineering technology departments written in an engaging personable style this guide to solid state electronic devices explores the latest in semiconductor theory and applications showing how semiconductors fit within circuits how circuits and logic gates make decisions and how to properly adapt solid state devices into a circuit design designed with the non technical student in mind it requires minimal mathematical knowledge and goes out of its way to explain new ideas and concepts step by step in a clear succinct and easily understandable manner

a modern and concise treatment of the solid state electronic devices that are fundamental to electronic systems and information technology is provided in this book the main devices that comprise semiconductor integrated circuits are covered in a clear manner accessible to the wide range of scientific and engineering disciplines that are impacted by this technology catering to a wider audience is becoming increasingly important as the field of electronic materials and devices becomes more interdisciplinary with applications in biology chemistry and electro mechanical devices to name a few becoming more prevalent updated and state of the art advancements are included along with emerging trends in electronic devices and their applications in addition an appendix containing the relevant physical background will be included to assist readers from different disciplines and provide a review for those more familiar with the area readers of this book can expect to derive a solid foundation for understanding modern electronic devices and also be prepared for future developments and advancements in this far reaching area of science and technology

this book provides a modern and concise treatment of the solid state electronic devices that are fundamental to electronic systems and information technology solid state electronic devices are those circuits or devices built completely from solid materials and in which the electrons or other charge carriers are kept entirely within the solid material the term is often used to contrast with the earlier technologies of vacuum and gas discharge tube devices and it is also conventional to exclude electro mechanical devices from the

term solid state while solid state can include crystalline polycrystalline and amorphous solids and refer to electrical conductors insulators and semiconductors the building material is most often a crystalline semiconductor the main devices that comprise semiconductor integrated circuits are covered in a clear manner accessible to the wide range of scientific engineering disciplines that are impacted by this technology this book can expect to derive a solid foundation for understanding modern electronic devices and also be prepared for future developments and advancements in this far reaching area of science and technology it presents basic and state of the art topics on materials physics device physics and basic circuit building blocks which will be useful to researchers as well as practicing engineers

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

the past three decades have been a period where useful current and voltage instabilities in solids have progressed from exciting research problems to a wide variety of commercially available devices materials and electronics research has led to devices such as the tunnel esaki diode transferred electron gunn diode avalanche diodes real space transfer devices and the like these structures have proven to be very important in the generation amplification switching and processing of microwave signals up to frequencies exceeding 100 ghz in this treatise we focus on a detailed theoretical understanding of devices of the kind that can be made unstable against circuit oscillations large amplitude switching events and in some cases internal rearrangement of the electric field or current density distribution the book is aimed at the semiconductor device physicist engineer and graduate student a knowledge of solid state physics

on an elementary or introductory level is assumed furthermore we have geared the book to device engineers and physicists desirous of obtaining an understanding substantially deeper than that associated with a small signal equivalent circuit approach we focus on both analytical and numerical treatment of specific device problems concerning ourselves with the mechanism that determines the constitutive relation governing the device the boundary conditions contact effects and the effect of the local circuit environment

this is perhaps the most comprehensive undergraduate textbook on the fundamental aspects of solid state electronics it presents basic and state of the art topics on materials physics device physics and basic circuit building blocks not covered by existing textbooks on the subject each topic is introduced with a historical background and motivations of device invention and circuit evolution fundamental physics is rigorously discussed with minimum need of tedious algebra and advanced mathematics another special feature is a systematic classification of fundamental mechanisms not found even in advanced texts it bridges the gap between solid state device physics covered here with what students have learnt in their first two years of study used very successfully in a one semester introductory core course for electrical and other engineering materials science and physics junior students the second part of each chapter is also used in an advanced undergraduate course on solid state devices the inclusion of previously unavailable analyses of the basic transistor digital circuit building blocks and cells makes this an excellent reference for engineers to look up fundamental concepts and data design formulae and latest devices such as the gesi heterostructure bipolar transistors

this solution manual a companion volume of the book fundamentals of solid state electronics provides the solutions to selected problems listed in the book most of the solutions are for the selected problems that had been assigned to the engineering undergraduate students who were taking an introductory device core course using this book this solution manual also contains an extensive appendix which illustrates the application of the fundamentals to solutions of state of the art transistor reliability problems which have been taught to advanced undergraduate and graduate students

the advent of the microelectronics technology has made ever increasing numbers of small devices on a same chip the rapid emergence of ultra large scaled integrated ulsi technology has moved device dimension into the sub quarter micron regime and put more than 10 million transistors on a single chip while traditional closed form analytical models furnish useful intuition into how semiconductor devices behave they no longer provide consistently accurate results for all modes of operation of these very small devices the reason is that in such devices various physical mechanisms affect the device performance in a complex manner and the conventional assumptions i e one dimensional treatment low level injection quasi static approximation etc em ployed in developing analytical models become questionable thus the use of numerical device simulation becomes important in device modeling researchers and engineers will rely even more on device simulation for device design and analysis in the future this book provides comprehensive coverage of device simulation and analysis for various modem semiconductor devices it will serve as a reference for researchers engineers and students who require in depth up to date information and understanding of semiconductor device physics and characteristics the materials of the book are limited to conventional and mainstream semiconductor devices photonic devices such as light emitting and laser diodes are not included nor does the book cover device modeling device fabrication and circuit applications

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