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Semiconductor Device Fundamentals

*with Computer-Based Exercises
and Homework Problems*



Robert F. Pierret

Semiconductor Device Fundamentals

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Semiconductor Device Fundamentals:

Semiconductor Device Fundamentals Robert F. Pierret, 1996-01 *Semiconductor Device Fundamentals* Betty Lise Anderson, Richard L. Anderson, 2003-12-01 **Semiconductor Device Fundamentals**, 2005 **Solutions Manual** Robert F. Pierret, 1996 Semiconductor Fundamentals Robert F. Pierret, 1983 *Fundamentals of Semiconductor Physics and Devices*, 1997 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 Advanced Semiconductor Fundamentals Robert F. Pierret, 2003 Advanced Semiconductor Fundamentals Second Edition by Robert F Pierret is an advanced level presentation of the underlying functional formalism routinely used in describing the operational behavior of solid state devices The second edition provides an update of the topic presentation semiconductor parametric information and relevant references throughout the volume There is also a 50% increase in the end of chapter problems Given the success of the first edition the second edition retains the same overall material coverage and a pedagogical approach in introducing necessary concepts models and formalism Semiconductor Device Physics and Simulation J.S. Yuan, Juin Jei Liou, 2013-11-22 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 employed 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 modern 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 **An Introduction to Semiconductor Devices** Donald A Neamen, 2006 An Introduction to Semiconductor Devices by Donald Neamen is designed to provide a fundamental understanding of the characteristics operations and limitations of semiconductor devices In order to meet this goal the book brings together explanations of fundamental physics of semiconductor materials and semiconductor device physics This new text provides an accessible and modern approach to the

material Aimed at the undergraduate Neamen keeps coverage of quantum mechanics to a minimum and labels the most advanced material as optional MOS transistors are covered before bipolar transistors to reflect the dominance of MOS coverage in today's world **BOOK JACKET** **Introduction to Semiconductor Devices** Kevin F. Brennan, 2005-02-03 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 Fundamentals of Semiconductor Devices Betty L. Anderson, 2017 **Fundamentals of Power Semiconductor Devices** B. Jayant Baliga, 2018-09-28 Fundamentals of Power Semiconductor Devices provides an in depth treatment of the physics of operation of power semiconductor devices that are commonly used by the power electronics industry Analytical models for explaining the operation of all power semiconductor devices are shown The treatment here focuses on silicon devices but includes the unique attributes and design requirements for emerging silicon carbide devices The book will appeal to practicing engineers in the power semiconductor device community *Fundamentals of Semiconductor Devices* Betty Lise Anderson, Richard L. Anderson, 2018 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

Fundamentals of Semiconductors Peter YU, Manuel Cardona, 2010-04-07 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 **Studyguide for**

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9780201554243 Advanced Semiconductor Fundamentals Pierret,2002-12 *Semiconductor Device Fundamentals* ,2006

Computers, Software Engineering, and Digital Devices Richard C. Dorf,2018-10-03 In two editions spanning more than a decade The Electrical Engineering Handbook stands as the definitive reference to the multidisciplinary field of electrical engineering Our knowledge continues to grow and so does the Handbook For the third edition it has expanded into a set of six books carefully focused on a specialized area or field of study Each book represents a concise yet definitive collection of key concepts models and equations in its respective domain thoughtfully gathered for convenient access Computers Software Engineering and Digital Devices examines digital and logical devices displays testing software and computers presenting the fundamental concepts needed to ensure a thorough understanding of each field It treats the emerging fields of programmable logic hardware description languages and parallel computing in detail Each article includes defining terms references and sources of further information Encompassing the work of the world s foremost experts in their respective specialties Computers Software Engineering and Digital Devices features the latest developments the broadest scope of coverage and new material on secure electronic commerce and parallel computing **Fundamentals of Semiconductor Devices** Joseph Lindmayer,Charles Y. Wrigley,1965 **Introduction to Semiconductor Physics and Devices** Mykhaylo Evstigneev,2022-09-29 This classroom tested textbook provides a self contained one semester course in semiconductor physics and devices that is ideal preparation for students to enter burgeoning quantum industries Unlike other textbooks on semiconductor device physics it provides a brief but comprehensive introduction to quantum physics and statistical physics with derivations and explanations of the key facts that are suitable for second year undergraduates rather than simply postulating the main results The book is structured into three parts each of which can be covered in around ten lectures The first part covers fundamental background material such as quantum and statistical physics and elements of crystallography and band theory of solids Since this provides a vital foundation for the rest of the text concepts are explained and derived in more detail than in comparable texts For example the concepts of measurement and collapse of the wave function which are typically omitted are presented in this text in language accessible to second year students The second part covers semiconductors in and out of equilibrium and gives details which are not commonly presented such as a derivation of the density of states using dimensional analysis and calculation of the concentration of ionized impurities from the grand canonical distribution Special attention is paid to the solution of Poisson s equation a topic that is feared by many undergraduates but is brought back down to earth by techniques and analogies from first year physics Finally in the third

part the material in parts 2 and 3 is applied to describe simple semiconductor devices including the MOSFET the Schottky and PN junction diodes and optoelectronic devices With a wide range of exercises this textbook is readily adoptable for an undergraduate course on semiconductor physics devices and with its emphasis on consolidating and applying knowledge of fundamental physics it will leave students in engineering and the physical sciences well prepared for a future where quantum industries proliferate

Unveiling the Magic of Words: A Report on "**Semiconductor Device Fundamentals**"

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