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Principles Of Semiconductor Devices (The Oxford Series In Electrical And Computer Engineering)



Synopsis

The dimensions of modern semiconductor devices are reduced to the point where classical semiconductor theory, including the concepts of continuous particle concentration and continuous current, becomes questionable. Further questions relate to two-dimensional transport in the most important field-effect devices and one-dimensional transport in nanowires and carbon nanotubes. Designed for upper-level undergraduate and graduate courses, *Principles of Semiconductor Devices*, Second Edition, presents the semiconductor-physics and device principles in a way that upgrades classical semiconductor theory and enables proper interpretations of numerous quantum effects in modern devices. The semiconductor theory is directly linked to practical applications, including the links to the SPICE models and parameters that are commonly used during circuit design. The text is divided into three parts: Part I explains semiconductor physics; Part II presents the principles of operation and modeling of the fundamental junctions and transistors; and Part III provides supplementary topics, including a dedicated chapter on the physics of nanoscale devices, description of the SPICE models and equivalent circuits that are needed for circuit design, introductions to the most important specific devices (photonic devices, JFETs and MESFETs, negative-resistance diodes, and power devices), and an overview of integrated-circuit technologies. The chapters and the sections in each chapter are organized so as to enable instructors to select more rigorous and design-related topics as they see fit.

Book Information

Series: The Oxford Series in Electrical and Computer Engineering

Hardcover: 640 pages

Publisher: Oxford University Press; 2 edition (February 14, 2011)

Language: English

ISBN-10: 0195388038

ISBN-13: 978-0195388039

Product Dimensions: 9.3 x 1.2 x 7.8 inches

Shipping Weight: 2.6 pounds (View shipping rates and policies)

Average Customer Review: 4.1 out of 5 stars [See all reviews](#) (9 customer reviews)

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Customer Reviews

First off I must say that I would rate this book at least a 4 stars if it were not the fact that I have to use it as homework for one of my classes. Let me explain: Whenever I read the book it does a fairly good job at explaining the core concepts like what "this" is for or "why" (although note, this is a complex textbook so you will have to read a lot to fully understand a specific concept). It even has some great example of applications that I can easily follow, and I think to myself: "Ok, yeah that makes sense...ok....ok....gotcha.....", but then when I get to the end of a chapter, where they ask all the problem sets, they ask significantly harder problems that DO NOT build off the previous problems or only sort of build off of an example from the chapter. Essentially each problem requires a thorough understanding of the chapter, which means you REALLY have to understand it. I'm one of those students that has to teach myself the concepts for this class using just the book because my teacher is horrible at explaining and/or teaching. The ability of this book to teach you the principles of semiconductor devices only does half of its job. This book doesn't really assist in the learning process of the applications and problem sets. I find myself struggling to grasp the math concepts, or applications of them. There IS NOT a solutions manual out there and there aren't answers in the back of the book (well there are some for selected problems, but they doesn't show ANY steps, just the answer).

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