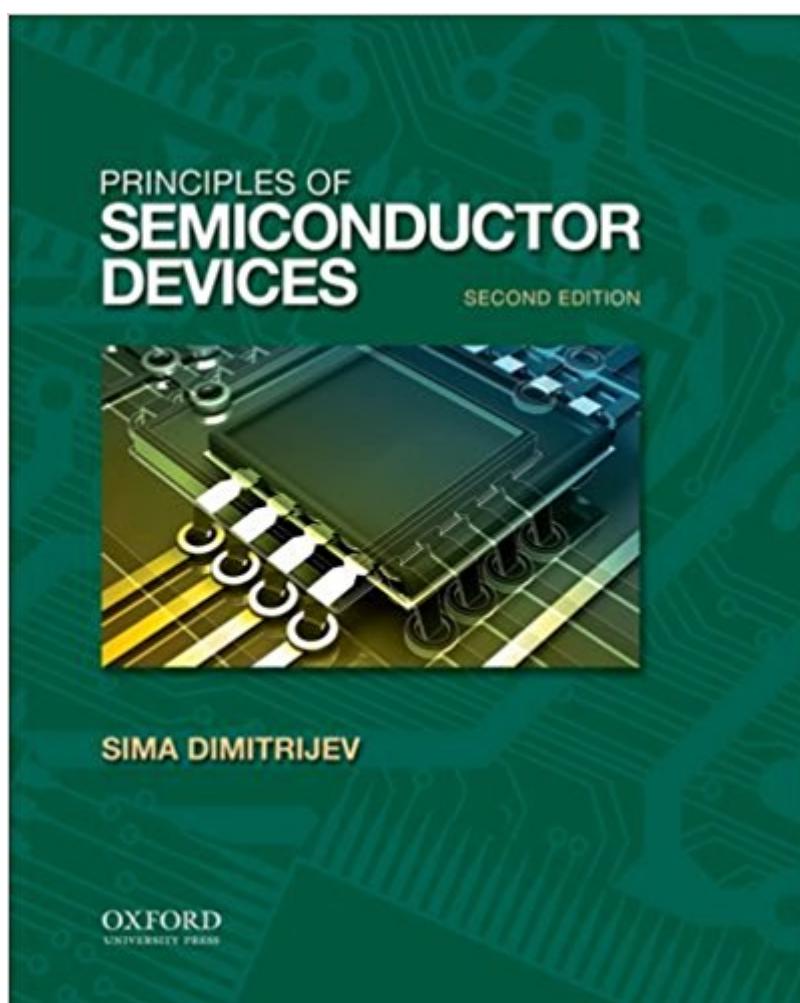


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# Principles Of Semiconductor Devices (The Oxford Series In Electrical And Computer Engineering)



## 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

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## Customer Reviews

"This book is better than other texts available on this topic because of its straightforward intuitive descriptions combined with the artfully presented, detailed, and quantitatively rendered illustrations."-- Matthew Grayson, Northeastern University "The author is eloquent and presents complex material in a logical sequence, which provides for comparatively easy reading. I find the many numerical examples (including the MatLab scripts) particularly useful from a pedagogical perspective since they invite students to become more actively engaged with the novel material and concepts. In addition, they provide visual support for some otherwise abstract mathematical relationships."--Godi Fischer, University of Rhode Island

Sima Dimitrijevic is Professor at the Griffith School of Engineering and Deputy Director of Queensland Micro- and Nanotechnology Centre at Griffith University in Australia. He is the author of Understanding Semiconductor Devices (OUP, 2000) as well as numerous other publications in the areas of MOSFET technology, modeling, and applications.

I used this book for a course I took on introduction to semiconductor devices (grad. course). I found it a delight to read for several reasons: Concepts were explained in a clear, concise manner; Questions per chapter could easily be solved following what was discussed in the chapter (not very much flipping back and forth to find the appropriate equation); Examples were plentiful, highlighted (for easy location), easy to follow, and related to the questions at the end of the book. Overall, a good read, accessible to anyone with some knowledge of calculus (Chemistry or Physics preknowledge is not really necessary)

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). So to sum up, because the nature of this book is a book on LEARNING the principles of semiconductors it does a fair job at explaining the core concepts of how and why semiconductors work and the specifics of each "how" and "why" (conductivity, diffusion, junctions, doping, etc). But when it comes to the calculations of specific problems or applications, this book does NOT help me at all -- it doesn't make it easy or interesting to learn, its just complicated right away. Nearly everyone else in my class is feeling the same way, none of us know what we're doing when it comes to our homework, so we all end up doing all the homework incorrectly (which is all straight out of the book). Hopefully this review helps at least a few of you.

Clear understanding

love it

I don't know what color scale the folks in the land down under go by but the rest of the world thinks 400nm is violet. This text book is riddled with errors and the verbage is bloated while the examples are mildly applicable to the real world and for the most part unapplicable to helping you solve the problems at the end of the chapter. Ch2 is the worst written chapter and the most important subject to understand, thus the this textbook will leave you frustrated. Waste of money, if the author would like to contact me please do I'd like money back.

The overall development of semiconductors from scratch can be difficult. The practical approach and the step by step rendering process is explained in detail. The review questoins for each chapter and the examples with the solutions in between create for a complete understanding of semiconductor manufacturing.

This review is for the first edition. The book is simply wonderful. Before I start reading a subject I generally look at more than 5 books to choose the best. This one is: 1) pedagogical, 2) rigorous but not a math book, 3) detailed but not a reference manual and 4) up to date with the modern

developments in the field. Recommended.

I have only currently read up to chapter two. Here is what I've noticed about the book. The content in the chapters is very straightforward and to the point. The summary at the end of the chapter does a good job reviewing the main points and formulas that were in the text. However I found that the questions at the end of the chapter are somewhat vague about what they are asking for and you have to assume several things to get an answer.

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