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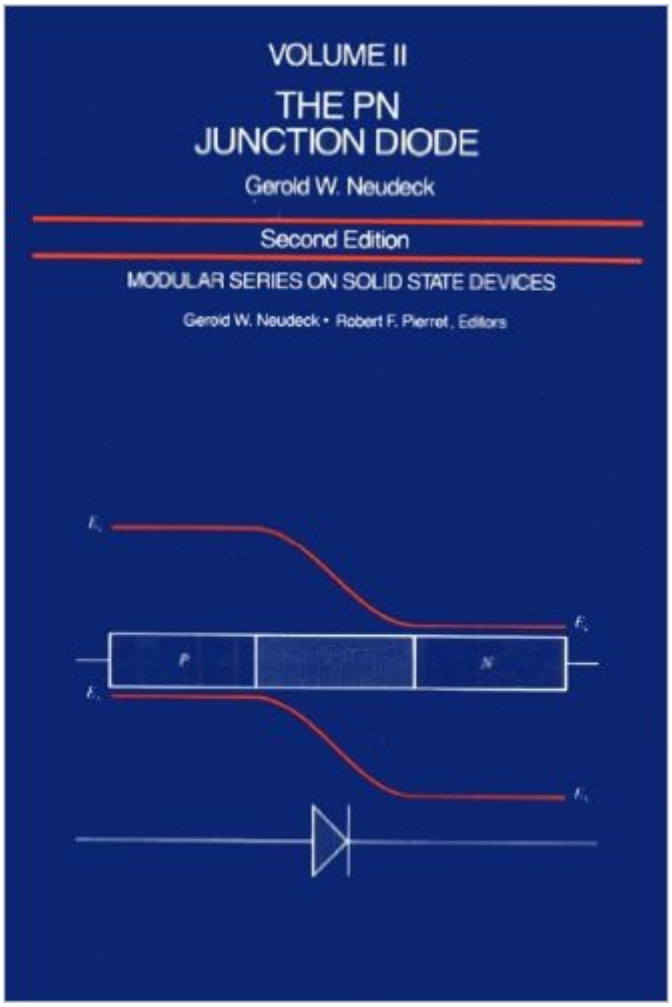
The PN Junction Diode: Volume II (2nd Edition) (Modular Series On Solid State Dev., Vol 2)



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Synopsis

This text builds a firm foundation in PN junction theory from a conceptual and mathematical viewpoint. The second edition adds a large number of end-of-chapter problems, solved exercises, and a new chapter on metal-semiconductor contacts.

Book Information

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Customer Reviews

The book is a decent read for getting a better understanding on the basics in this subject. The best thing about the book is the qualitative and quanitative arangement and explanation of the material. However, the book may be somewhat confusing if this is your first time dealing with the subject. You should at least have some experience using the diode current equation and some familiarity with how this device works in an actual circuit. I also recommend that become comfortable with using Poisson’s equation. Chapter 2 is based entirely on it’s use. The book is ideal for someone wanting to review pn junction physics but not wanting the drawn out detail that you would find in Shur. If you decide to buy this book, buy Volume I, "Semiconductors Fundementals." The authors will make reference to equations in Volume I that won’t be found in this one. Yes, they want mo’ money!!!

This book contains errors. The book attempts to simplify the physics of PN junction diodes, especially by using suggestive sketches in place of mathematical reasoning. As a result it sometimes attracts readers who are learning this material for the first time. Unfortunately the book contains errors which makes its use in this fashion unacceptable. It teaches students untruths which

if repeated in an exam would be marked incorrect.For example in the derivation of the ideal diode equation, the author claims that both drift and diffusion currents flow from one side of the junction to the other, which when no bias is applied balance for both electrons and holes. In fact no drift currents flow across an ideal PN junction, since no carriers exist where there is an electric field. It is true that within the depletion layer, large diffusion and drift currents flow, which balance in thermal equilibrium so that the Fermi level is flat through the junction. However under bias, quite separate currents flow from one side of the junction to the other, which have nothing to do with drift. For a full explanation refer to the book by Muller & Kamins, "Device Electronics for Integrated Circuits" (2nd ed.), Wiley, 1986, ISBN 0471887587.Such fundamental errors are inexcusable in a book purporting to teach fundamentals.

This book offers the clearest explanation of the physics of a diode that I’ve seen, i.e., what exactly those holes and electrons are doing! It isn’t simple; that’s the nature of the physics, but it is clearly explained and in the text and the drawings.

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