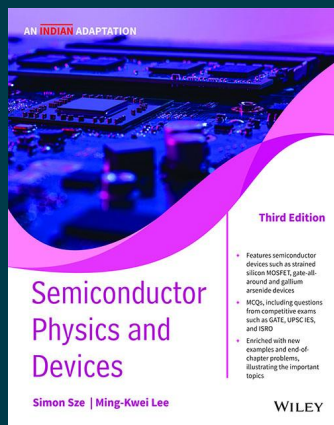


WILEY

Semiconductor Physics And Devices, 3ed, An Indian Adaptation

By S. M. Sze, M. K. Lee

Paperback

ISBN: 9789354243226

Publication: [NOT PROVIDED] *publication_date*

Page Count: 608 pages

₹969.00

• Description

Semiconductor Physics and Devices is a comprehensive textbook written for the undergraduate students of electronics engineering, electrical engineering, applied science, and materials science. The book first provides a summary of the basic properties of semiconductor materials, covering energy band, carrier concentration, and transport properties, emphasizing silicon and gallium arsenide. It then examines p–n diodes, bipolar transistors, MOSFETs, and other field-effect transistors such as MESFETs, MODEFTs, negative-resistance and power devices, and photonic devices and sensors, including light-emitting diodes, photodetectors, and solar cells.

• About the Author

S. M. Sze, M. K. Lee

Simon Sze is EtronTech Distinguished Chair Professor, College of Electrical and Computer Engineering, National Chiao Tung University, Hsinchu

• Table of Contents

Chapter 0 Introduction

0.1 Semiconductor Devices

0.2 Semiconductor Technology

0.3 Summary

Chapter 1 Basic Physics of Semiconductors

1.1 Semiconductor Materials

1.2 Basic Crystal Structures

1.3 Valence Bonds

1.4 Quantum Physics of Semiconductors

1.5 Band Structure Calculations

1.6 Bandgaps in Semiconductors

1.7 Intrinsic Carrier Concentration

1.8 Donors and Acceptors

1.9 Density of States

1.10 Summary

Chapter 2 Carrier Transport Phenomena

- 2.1 Carrier Drift
- 2.2 Carrier Diffusion
- 2.3 Generation and Recombination Processes
- 2.4 Continuity Equation
- 2.5 Thermionic Emission Process
- 2.6 Tunneling Process
- 2.7 Space-Charge Effect
- 2.8 High-Field Effects
- 2.9 Summary

Chapter 3 p-n Junction

- 3.1 Thermal Equilibrium Condition
- 3.2 Depletion Region
- 3.3 Depletion Capacitance
- 3.4 Current-Voltage Characteristics
- 3.5 Charge Storage and Transient Behavior
- 3.6 Junction Breakdown
- 3.7 Heterojunction
- 3.8 Summary

Chapter 4 Bipolar Transistors

- 4.1 Transistor Action
- 4.2 Static Characteristics of Bipolar Transistors
- 4.3 Frequency Response and Switching of Bipolar Transistors
- 4.4 Nonideal Effects
- 4.5 AC Equivalent Circuits
- 4.6 Heterojunction Bipolar Transistors
- 4.7 Summary

Chapter 5 Field Effect Transistors

- 5.1 Ideal MOS Capacitor
- 5.2 SiO_2 -Si MOS Capacitor
- 5.3 Carrier Transport in MOS Capacitors
- 5.4 Charge-Coupled Devices (CCD)
- 5.5 JFET Fundamentals
- 5.6 JFET Device Characteristics
- 5.7 MOSFET Fundamentals
- 5.8 Summary

Chapter 6 Advanced MOSFET Devices

- 6.1 MOSFET Scaling
- 6.2 CMOS and BiCMOS

6.3 MOSFET on Insulator

6.4 Gate-All-Around (GAA) Device

6.5 MOS Memory Structures

6.6 Summary

Chapter 7 MESFET and Related Devices

7.1 Metal-Semiconductor Contacts

7.2 MESFET

7.3 MODFET

7.4 Summary

Chapter 8 Microwave Diodes; Power, Quantum-Effect, and Hot-Electron Devices

8.1 Microwave Frequency Bands

8.2 Tunnel Diode

8.3 Gunn Diode

8.4 IMPATT Diode

8.5 Zener Diode

8.6 Varactor Diode

8.7 Gallium Arsenide Devices

8.8 Thyristors and Related Power Devices

8.9 Power MOSFET

8.10 Power BJT

8.11 Transferred-Electron Devices

8.12 Quantum-Effect Devices

8.13 Hot-Electron Devices

8.14 Summary

Chapter 9 Optical Devices: Light-Emitting Diodes and Lasers

9.1 Radiative Transitions and Optical Absorption

9.2 Light-Emitting Diodes

9.3 Various Light-Emitting Diodes

9.4 Semiconductor Lasers

9.5 Summary

Chapter 10 Optical Devices: Photodetectors and Solar Cells

10.1 Photodetectors

10.2 Solar Cells

10.3 Silicon and Compound-Semiconductor Solar Cells

10.4 Third-Generation Solar Cells

10.5 Optical Concentration

10.6 Summary

Chapter 11 Semiconductor Process Technology

- 11.1 Oxidation
- 11.2 Diffusion
- 11.3 Ion Implantation
- 11.4 Silicon Crystal Growth from the Melt
- 11.5 GaAs Crystal-Growth Techniques
- 11.6 Molecular Beam Epitaxy Techniques
- 11.7 Chemical Vapor Deposition of Dielectrics
- 11.8 Sputtering
- 11.9 Lithography and Etching
- 11.10 Next-Generation Lithographic Methods
- 11.11 Wet Chemical Etching
- 11.12 Dry Etching
- 11.13 Twin-Tub CMOS Process
- 11.14 Summary

Chapter 12 Integrated Devices

- 12.1 Passive Components
- 12.2 Bipolar Technology
- 12.3 MOSFET Technology
- 12.4 MESFET Technology
- 12.5 Challenges for Nanoelectronics
- 12.6 Summary

Appendix A Glossary

Appendix B List of Symbols

Appendix C International System of Units (SI Units)

Appendix D Unit Prefixes*

Appendix E Greek Alphabet

Appendix F Physical Constants

Appendix G Properties of Important Element and Binary Compound Semiconductors at 300 K

Appendix H Properties of Si and GaAs at 300 K

Appendix I Derivation of the Density of States in a Semiconductor

Appendix J Derivation of Recombination Rate for Indirect Recombination

Appendix K Calculation of the Transmission Coefficient for a Symmetric Resonant-Tunneling Diode

Appendix L Basic Kinetic Theory of Gases

Supplements

To purchase this product, please visit:

<https://wiley.indiafin.com/semiconductor-physics-and-devices-3ed-an-indian-adaptation.html>



Scan to buy

