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Power Electronics : Devices and Circuits

Electronic Devices and Circuit Design

TESSA ROWAN

BASIC ELECTRONICS Springer Science & Business Media

Ever wanted to know how things work, especially electronic devices? Electronics in easy steps tells you all about the building blocks that make up electronic circuits and the components that make an electronic device tick. It explains electronics in an easy to understand way and then takes you through some simple but useful circuits that you can build for yourself. Areas covered include:

- the basic fundamentals of electricity
- getting started in electronics
- electronic theory explained
- resistors and capacitors – what they do
- transistors – how they work
- crystals and coils
- basic electronic building blocks
- simple circuits described and explained
- how a radio works
- designing simple circuits
- circuit design software
- making printed circuit boards
- building electronic circuits
- soldering techniques
- test equipment
- circuit testing and fault finding

Electronics in easy steps is ideal for anyone who has always wanted to know how electricity works and what electronic components do – from simple theory through to actually building, testing and troubleshooting useful and interesting circuits. Suitable for:

- Students
- DIY and Electronics Enthusiasts
- Hobbyists
- Radio Hobbyists
- Short Wave Listeners and Radio Amateur Foundation Exam students
- Members of the Cadets, Scouts, etc. and anyone with an inquisitive mind who wants to know how electricity and electronics works!

Fundamentals of Electronics Prentice Hall

Transistor Electronics: Use of Semiconductor Components in Switching Operations presents the semiconductor components as well as their elementary circuits. This book discusses the scope of application of electronic devices to increase productivity. Organized into eight chapters, this book begins with an overview of the general equation for the representation of integer positive numbers. This text then examines the properties and characteristics of basic electronic components, which relates to an understanding of the operation of semiconductors. Other chapters consider the electronic circuit arrangements containing semiconductor component parts. This book discusses as well the comprehensive unification and standardization of elementary circuits and their conditions of connection that allow the rational development, manufacture, and maintenance of electronic devices. The final chapter deals with the use of elementary, standardized circuits, which permits rational high production rates. This book is primarily intended for design and development engineers and technicians. Students who wish to make Electronics their career will also find this book useful.

Designing Analog Chips Independently Published

Special Features:

- The book comprehensively covers fundamentals, operational aspects and applications of discrete semiconductor devices such as diodes, bipolar transistors, field effect transistors, unijunction transistors, and thyristors and optoelectronic devices in the discrete devices category and detail explanation of operational amplifiers is covered in the linear integrated circuits category.
- The text is written in a lucid style and uses reader-friendly language.

The layout of the text is very methodical with sections and sub-sections, making reading easy and interesting from beginning to end of each chapter. Each chapter concludes in a comprehensive self-evaluation exercise comprising objective-type questions (with answers), review questions and numerical problems (with answers). The text has sufficient worked problems, design examples, review questions and self-evaluation exercises for each chapter. Adequate study material and self-evaluation exercises are included to help students in both conventional and competitive exams. About The Book: Understanding basic operational and applications of electronic devices is fundamental in understanding the functional and design aspects of electronics techniques, sub-system or system irrespective of whether it is analog or digital. The study of electronics devices and circuits is essential since majority of electronics systems have both analog and digital content. Though present day electronics is dominated by linear and digital integrated circuits, the importance of discrete devices cannot be undervalued as they continue to be used in large numbers in a variety of electronic circuits. In addition, understanding operational basics of these devices makes it easier to understand more complex integrated circuits. This textbook covers electronic devices and circuits in entirety, for undergraduate and graduate level courses. This study is pertinent for students of electronics, electrical, communication, instrumentation and control, information technology and even computer science engineering.

Planar Double-Gate Transistor
Elsevier

The book constitutes peer-reviewed proceedings of a workshop on Emerging Electronics Devices, Circuits, and Systems (EEDCS) held in conjunction with International Symposium on Devices, Circuits, and Systems (ISDCS 2022). The book focuses on the recent development in devices, circuits, and systems. It also discusses innovations, trends, practical challenges, and solutions adopted in device design, modeling, fabrication, characterization, and their circuit implementation with pertinent system applications. It will be useful for researchers, developers, engineers, academicians, and students. *Digital Electronics 1* Virtualbookworm Publishing

This book explains the physics and properties of multi-gate field-effect transistors (MuGFETs), how they are made and how circuit designers can use them to improve the performances of integrated circuits. It covers the emergence of quantum effects due to the reduced size of the devices and describes the evolution of the MOS transistor from classical structures to SOI (silicon-on-insulator) and then to MuGFETs.

Electronic Devices and Circuits John Wiley & Sons

This Book Provides A Systematic And Thorough Exposition Of Electronic Devices And Circuits. The Various Principles Are Explained In Detail And The Interconnections Between Different Concepts Are Suitably Highlighted. The Book Begins By Explaining The Transition From Physics To Electronic Devices And Highlights The Linkages Between The Two. A Detailed Treatment Of Semiconductor Devices And Circuits Is Then Presented, Followed By A Comprehensive Discussion Of Bipolar Junction Transistor (Bjt). The Next Two

Chapters Focus On Field Effect Transistor (Fet). Power Devices And Cathode Ray Oscilloscope Are Then Explained. The Book Includes A Large Number Of Solved Examples To Illustrate The Concepts And Techniques Discussed. Review Questions, Unsolved Problems With Answers And Objective Questions Are Included Throughout The Book. The Book Would Serve As An Excellent Text For Both Degree And Diploma Students Of Electrical, Electronics, Computer And Instrumentation Engineering. Amie Candidates Would Also Find It Extremely Useful.

Digital Electronics 2 BPB Publications
This book presents three aspects of digital circuits: digital principles, digital electronics, and digital design. The modern design methods of using electronic design automation (EDA) are also introduced, including the hardware description language (HDL), designs with programmable logic devices and large scale integrated circuit (LSI). The applications of digital devices and integrated circuits are discussed in detail as well.

Digital Electronics - Logic Gates PHI Learning Pvt. Ltd.

Electronic Devices, Circuits, and Systems for Biomedical Applications: Challenges and Intelligent Approaches explains the latest information on the design of new technological solutions for low-power, high-speed efficient biomedical devices, circuits and systems. The book outlines new methods to enhance system performance, provides key parameters to explore the electronic devices and circuit biomedical applications, and discusses innovative materials that improve device performance, even for those with smaller dimensions and lower costs. This book is ideal for graduate students in biomedical engineering and

medical informatics, biomedical engineers, medical device designers, and researchers in signal processing. Presents major design challenges and research potential in biomedical systems
Walks readers through essential concepts in advanced biomedical system design
Focuses on healthcare system design for low power-efficient and highly-secured biomedical electronics

MOS Devices for Low-Voltage and Low-Energy Applications Springer Nature

This book is an undergraduate level textbook. The prerequisites for this text are first year calculus and physics, and a two-semester course in circuit analysis including the fundamental theorems and the Laplace transformation. This text begins with is an introduction to the nature of small signals used in electronic devices, amplifiers, definitions of decibels, bandwidth, poles and zeros, stability, transfer functions, and Bode plots. It continues with an introduction to solid state electronics, bipolar junction transistors, FETs op amps, integrated devices used in logic circuits, and their internal construction. It concludes with a discussion on amplifier circuits and contains several examples with MATLAB computations and Simulink models. A supplementary text to this title is our Digital Circuit Analysis & Design with Simulink Modeling and Introduction to CPLDs and FPGAs, ISBN

978-1-934404-06-5. For additional information contact the publisher at info@orchardpublications.com

ELECTRONIC DEVICES AND CIRCUITS

Orchard Publications

This book, Electronic Devices and Circuit Application, is the first of four books of a larger work, Fundamentals of Electronics. It is comprised of four chapters describing the basic operation of each of the four fundamental building

blocks of modern electronics: operational amplifiers, semiconductor diodes, bipolar junction transistors, and field effect transistors. Attention is focused on the reader obtaining a clear understanding of each of the devices when it is operated in equilibrium. Ideas fundamental to the study of electronic circuits are also developed in the book at a basic level to lessen the possibility of misunderstandings at a higher level. The difference between linear and non-linear operation is explored through the use of a variety of circuit examples including amplifiers constructed with operational amplifiers as the fundamental component and elementary digital logic gates constructed with various transistor types. Fundamentals of Electronics has been designed primarily for use in an upper division course in electronics for electrical engineering students. Typically such a course spans a full academic year consisting of two semesters or three quarters. As such, Electronic Devices and Circuit Applications, and the following two books, Amplifiers: Analysis and Design and Active Filters and Amplifier Frequency Response, form an appropriate body of material for such a course. Secondary applications include the use in a one-semester electronics course for engineers or as a reference for practicing engineers.

Electronic Devices and Circuit Fundamentals Springer Nature

The omnipresence of electronic devices in our everyday lives has been accompanied by the downscaling of chip feature sizes and the ever increasing complexity of digital circuits. This book is devoted to the analysis and design of digital circuits, where the signal can assume only two possible logic levels. It deals with the basic principles and concepts of digital electronics. It

addresses all aspects of combinational logic and provides a detailed understanding of logic gates that are the basic components in the implementation of circuits used to perform functions and operations of Boolean algebra. Combinational logic circuits are characterized by outputs that depend only on the actual input values. Efficient techniques to derive logic equations are proposed together with methods of analysis and synthesis of combinational logic circuits. Each chapter is well structured and is supplemented by a selection of solved exercises covering logic design practices.

Principles of Electronic Devices & Circuits John Wiley & Sons

This book presents the fundamentals of digital electronics in a focused and comprehensive manner with many illustrations for understanding of the subject with high clarity. Digital Signal Processing (DSP) application information is provided for many topics of the subject to appreciate the practical significance of learning. To summarize, this book lays a foundation for students to become DSP engineers.

Electrical and Electronic Devices, Circuits and Materials PHI Learning Pvt. Ltd.

The increasing demand in home and industry for electronic devices has encouraged designers and researchers to investigate new devices and circuits using new materials that can perform several tasks efficiently with low IC (integrated circuit) area and low power consumption. Furthermore, the increasing demand for portable devices intensifies the search to design sensor elements, an efficient storage cell, and large-capacity memory elements. Electrical and Electronic Devices, Circuits and Materials: Design and Applications will assist the development of basic

concepts and fundamentals behind devices, circuits, materials, and systems. This book will allow its readers to develop their understanding of new materials to improve device performance with even smaller dimensions and lower costs. Additionally, this book covers major challenges in MEMS (micro-electromechanical system)-based device and thin-film fabrication and characterization, including their applications in different fields such as sensors, actuators, and biomedical engineering. Key Features: Assists researchers working on devices and circuits to correlate their work with other requirements of advanced electronic systems. Offers guidance for application-oriented electrical and electronic device and circuit design for future energy-efficient systems. Encourages awareness of the international standards for electrical and electronic device and circuit design. Organized into 23 chapters, *Electrical and Electronic Devices, Circuits and Materials: Design and Applications* will create a foundation to generate new electrical and electronic devices and their applications. It will be of vital significance for students and researchers seeking to establish the key parameters for future work.

Inkjet-Configurable Gate Array Springer Nature

A comprehensive introduction to CMOS and bipolar analog IC design. The book presumes no prior knowledge of linear design, making it comprehensible to engineers with a non-analog background. The emphasis is on practical design, covering the entire field with hundreds of examples to explain the choices. Concepts are presented following the history of their discovery. Content: 1. Devices Semiconductors, The

Bipolar Transistor, The Integrated Circuit, Integrated NPN Transistors, The Case of the Lateral PNP Transistor, CMOS Transistors, The Substrate PNP Transistor, Diodes, Zener Diodes, Resistors, Capacitors, CMOS vs. Bipolar; 2. Simulation, DC Analysis, AC Analysis, Transient Analysis, Variations, Models, Diode Model, Bipolar Transistor Model, Model for the Lateral PNP Transistor, MOS Transistor Models, Resistor Models, Models for Capacitors; 3. Current Mirrors; 4. Differential Pairs; 5. Current Sources; 6. Time Out: Analog Measures, dB, RMS, Noise, Fourier Analysis, Distortion, Frequency Compensation; 7. Bandgap References; 8. Op Amps; 9. Comparators; 10. Transimpedance Amplifiers; 11. Timers and Oscillators; 12. Phase-Locked Loops; 13. Filters; 14. Power, Linear Regulators, Low Drop-Out Regulators, Switching Regulators, Linear Power Amplifiers, Switching Power Amplifiers; 15. A to D and D to A, The Delta-Sigma Converter; 16. Odds and Ends, Gilbert Cell, Multipliers, Peak Detectors, Rectifiers and Averaging Circuits, Thermometers, Zero-Crossing Detectors; 17. Layout.

Principles of Electronic Devices & Circuits CRC Press

This book, now in its Second Edition, provides a basis for understanding the characteristics, working principle, operation and limitations of semiconductor devices. In this new edition, many sections are re-written to present the concepts related to device physics in more clearer and easy to understand manner. The primary objective of this textbook is to provide all the relevant topics on the semiconductor materials and semiconductor devices in a single volume. It includes enough mathematical expressions to provide a good foundation for the basic

understanding of the semiconductor devices. It covers not only the state-of-the-art devices but also future approaches that go beyond the current technology. Designed primarily as a text for the postgraduate students of physics and electronics, the book would also be useful for the undergraduate students of electronics and electrical engineering, and electronics and communication engineering. Highlights of the Book : Includes topics on the latest technologies Covers important points in each chapter Provides a number of solved and unsolved problems along with explanation type questions Emphasizes on the mathematical derivation

Electronics Devices And Circuits

Academic Press

This thesis reports on an outstanding research advance in the development of Application Specific Printed Electronic (ASPE) circuits. It proposes the novel Inkjet-Configurable Gate Array (IGA) concept as a design-manufacturing method for the direct mapping of digital functions on top of new prefabricated structures. The thesis begins by providing details on the generation of the IGA bulk, and subsequently presents Drop-on-Demand configurable methodologies for the metallization of IGAs. Lastly, it demonstrates IGAs' suitability for personalization and yield improvement, and reports on the integration of various circuits into IGA bulk. In addition to highlighting novel results, the thesis also offers a comprehensive introduction to printed electronics, from technology development, to design methods, tools and kits.

Electronic Devices and Integrated Circuits CRC Press

Until the 1990s, the reduction of the

minimum feature sizes used to fabricate integrated circuits, called "scaling", has highlighted serious advantages as integration density, speed, power consumption, functionality and cost. Direct consequence was the decrease of cost-per-function, so the electronic productivity has largely progressed in this period. Another usually cited trend is the evolution of the integration density as expressed by the well-known Moore's Law in 1975: the number of devices per chip doubles every 2 years. This evolution has allowed improving significantly the circuit complexity, offering a great computing power in the case of microprocessor, for example. However, since few years, significant issues appeared such as the increase of the circuit heating, device complexity, variability and difficulties to improve the integration density. These new trends generate an important growth in development and production costs. Though is it, since 40 years, the evolution of the microelectronics always followed the Moore's law and each difficulty has found a solution.

Transistor Electronics New Age International

Designed specifically for undergraduate students of Electronics and Electrical Engineering and its related disciplines, this book offers an excellent coverage of all essential topics and provides a solid foundation for analysing electronic circuits. It covers the course named Electronic Devices and Circuits of various universities. The book will also be useful to diploma students, AMIE students, and those pursuing courses in B.Sc. (Electronics) and M.Sc. (Physics). The students are thoroughly introduced to the full spectrum of fundamental topics beginning with the theory of semiconductors and p-n junction

behaviour. The devices treated include diodes, transistors—BJTs, JFETs and MOSFETs—and thyristors. The circuitry covered comprises small signal (ac), power amplifiers, oscillators, and operational amplifiers including many important applications of those versatile devices. A separate chapter on IC fabrication technology is provided to give an idea of the technologies being used in this area. There are a variety of solved examples and applications for conceptual understanding. Problems at the end of each chapter are provided to test, reinforce and enhance learning.

Digital Electronics S. Chand Publishing
This book provides an overview of emerging semiconductor devices and their applications in electronic circuits, which form the foundation of electronic devices. Device Circuit Co-Design Issues in FETs provides readers with a better understanding of the ever-growing field of low-power electronic devices and their applications in the wireless, biosensing, and circuit domains. The book brings researchers and engineers from various disciplines of the VLSI domain together to tackle the emerging challenges in the field of engineering and applications of advanced low-power devices in an effort to improve the performance of these technologies. The chapters examine the challenges and scope of FinFET device circuits, 3D FETs, and advanced FET for circuit applications. The book also

discusses low-power memory design, neuromorphic computing, and issues related to thermal reliability. The authors provide a good understanding of device physics and circuits, and discuss transistors based on the new channel/dielectric materials and device architectures to achieve low-power dissipation and ultra-high switching speeds to fulfill the requirements of the semiconductor industry. This book is intended for students, researchers, and professionals in the field of semiconductor devices and nanodevices, as well as those working on device-circuit co-design issues.

Electronics in easy steps Pearson South Africa

In this book we have included more examples, tutorial problems and objective test questions in almost all the chapters. The chapter on Optoelectronic Devices has been expanded to include more application examples in the area of optical fibre networks. The chapter on Regulated Power Supply carries more detailed study of fixed positive-Fixed negative and adjustable-linear IC voltage regulators as well as switching voltage regulator. The topic on OP-AMPs has been separated from the chapter on integrated Circuits. A new chapter is prepared on OP-AMPs and its Applications. The Chapter on OP-AMPs and its Applications includes OP-AMP based Oscillator circuits, active filters etc.