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## **Design for Maintainability** - Louis J. Gullo 2021-03-26

How to design for optimum maintenance capabilities and minimize the repair time Design for Maintainability offers engineers a wide range of tools and techniques for incorporating maintainability into the design process for complex systems. With contributions from noted experts on the topic, the book explains how to design for optimum maintenance capabilities while simultaneously minimizing the time to repair equipment. The book contains a wealth of examples and the most up-to-date maintainability design practices that have proven to result in better system readiness, shorter downtimes, and substantial cost savings over the entire system life cycle, thereby, decreasing the Total Cost of Ownership. Design for Maintainability offers a wealth of design practices not covered in typical engineering books, thus allowing readers to think outside the box when developing maintainability design requirements. The book's principles and practices can help engineers to dramatically improve their ability to compete in global markets and gain widespread customer satisfaction. This important book: Offers a complete overview of maintainability engineering as a system engineering discipline Includes contributions from authors who are recognized leaders in the field Contains real-life design examples, both good and bad, from various industries Presents realistic illustrations of good maintainability design

principles Provides discussion of the interrelationships between maintainability with other related disciplines Explores trending topics in technologies Written for design and logistics engineers and managers, Design for Maintainability is a comprehensive resource containing the most reliable and innovative techniques for improving maintainability when designing a system or product.

## **5G for the Connected World** - Devaki Chandramouli 2019-04-29

Comprehensive Handbook Demystifies 5G for Technical and Business Professionals in Mobile Telecommunication Fields Much is being said regarding the possibilities and capabilities of the emerging 5G technology, as the evolution towards 5G promises to transform entire industries and many aspects of our society. 5G for the Connected World offers a comprehensive technical overview that telecommunication professionals need to understand and take advantage of these developments. The book offers a wide-ranging coverage of the technical aspects of 5G (with special consideration of the 3GPP Release 15 content), how it enables new services and how it differs from LTE. This includes information on potential use cases, aspects of radio and core networks, spectrum considerations and the services primarily driving 5G development and deployment. The text also looks at 5G in relation to the Internet of Things, machine to machine communication and technical

enablers such as LTE-M, NB-IoT and EC-GSM. Additional chapters discuss new business models for telecommunication service providers and vertical industries as a result of introducing 5G and strategies for staying ahead of the curve. Other topics include: Key features of the new 5G radio such as descriptions of new waveforms, massive MIMO and beamforming technologies as well as spectrum considerations for 5G radio regarding all possible bands Drivers, motivations and overview of the new 5G system - especially RAN architecture and technology enablers (e.g. service-based architecture, compute-storage split and network exposure) for native cloud deployments Mobile edge computing, Non-3GPP access, Fixed-Mobile Convergence Detailed overview of mobility management, session management and Quality of Service frameworks 5G security vision and architecture Ultra-low latency and high reliability use cases and enablers, challenges and requirements (e.g. remote control, industrial automation, public safety and V2X communication) An outline of the requirements and challenges imposed by massive numbers of devices connected to cellular networks While some familiarity with the basics of 3GPP networks is helpful, 5G for the Connected World is intended for a variety of readers. It will prove a useful guide for telecommunication professionals, standardization experts, network operators, application developers and business analysts (or students working in these fields) as well as infrastructure and device vendors looking to develop and integrate 5G into their products, and to deploy 5G radio and core networks.

RF Circuit Design - Richard C. Li 2012-08-24

Summarizes the schemes and technologies in RF circuit design, describes the basic parameters of an RF system and the fundamentals of RF system design, and presents an introduction of the individual RF circuit block design. Forming the backbone of today's mobile and satellite communications networks, radio frequency (RF) components and circuits are incorporated into everything that transmits or receives a radio wave, such as mobile phones, radio, WiFi, and walkie talkies. RF Circuit Design, Second Edition immerses practicing and aspiring industry professionals in the complex world of RF design. Completely

restructured and reorganized with new content, end-of-chapter exercises, illustrations, and an appendix, the book presents integral information in three complete sections: Part One explains the different methodologies between RF and digital circuit design and covers voltage and power transportation, impedance matching in narrow-band case and wide-band case, gain of a raw device, measurement, and grounding. It also goes over equipotentiality and current coupling on ground surface, as well as layout and packaging, manufacturability of product design, and radio frequency integrated circuit (RFIC). Part Two includes content on the main parameters and system analysis in RF circuit design, the fundamentals of differential pair and common-mode rejection ratio (CMRR), Balun, and system-on-a-chip (SOC). Part Three covers low-noise amplifier (LNA), power amplifier (PA), voltage-controlled oscillator (VCO), mixers, and tunable filters. RF Circuit Design, Second Edition is an ideal book for engineers and managers who work in RF circuit design and for courses in electrical or electronic engineering.

Microwave Devices, Circuits and Subsystems for Communications Engineering - Ian A. Glover 2006-05-01

Microwave Devices, Circuits and Subsystems for Communications Engineering provides a detailed treatment of the common microwave elements found in modern microwave communications systems. The treatment is thorough without being unnecessarily mathematical. The emphasis is on acquiring a conceptual understanding of the techniques and technologies discussed and the practical design criteria required to apply these in real engineering situations. Key topics addressed include: Microwave diode and transistor equivalent circuits Microwave transmission line technologies and microstrip design Network methods and s-parameter measurements Smith chart and related design techniques Broadband and low-noise amplifier design Mixer theory and design Microwave filter design Oscillators, synthesisers and phase locked loops Each chapter is written by specialists in their field and the whole is edited by experience authors whose expertise spans the fields of communications systems engineering and microwave circuit design. Microwave Devices, Circuits and Subsystems for Communications

Engineering is suitable for senior electrical, electronic or telecommunications engineering undergraduate students, first year postgraduate students and experienced engineers seeking a conversion or refresher text. Includes a companion website featuring: Solutions to selected problems Electronic versions of the figures Sample chapter

**An Introduction to Modern Electronics** - William L. Faissler  
1991-03-19

Offers a complete grounding in the principles and techniques of modern electronics. Designed to provide even beginning students with the knowledge and skills necessary for building useful and interesting circuits either in a laboratory situation or on their own. Concentrates on techniques and devices currently used in modern equipment and special attention is paid to the basic ideas and techniques used with important types of circuits. A substantial portion of the book is devoted to explaining the vocabulary and information presented in data sheets for these circuits. By instructing students in these techniques and familiarizing them with the ins-and-outs of electronic literature, it provides a sound introduction to the field and a means of keeping up with its extremely rapid changes.

**Wiley CIA Exam Review 2019, Part 3** - S. Rao Vallabhaneni  
2019-03-26

WILEY CIAexcel EXAM REVIEW 2019 THE SELF-STUDY SUPPORT YOU NEED TO PASS THE CIA EXAM Part 3: Internal Audit Knowledge Elements Provides comprehensive coverage based on the exam syllabus, along with multiple-choice practice questions with answers and explanations Deals with governance and business ethics, risk management, information technology, and the global business environment Features a glossary of CIA Exam terms—good source for candidates preparing for and answering the exam questions Assists the CIA Exam candidate in successfully preparing for the exam Based on the CIA body of knowledge developed by The Institute of Internal Auditors (IIA), Wiley CIAexcel Exam Review 2019 learning system provides a student-focused and learning-oriented experience for CIA candidates. Passing the CIA Exam on your first attempt is possible. We'd like to help.

Feature section examines the topics of Governance and Business Ethics, Risk Management, Organizational Structure and Business Processes and Risks, Communications, Management and Leadership Principles, IT and Business Continuity, Financial Management, and Global Business Environment

**Electric Power Systems** - Alexandra von Meier 2006-06-30

A clear explanation of the technology for producing and delivering electricity Electric Power Systems explains and illustrates how the electric grid works in a clear, straightforward style that makes highly technical material accessible. It begins with a thorough discussion of the underlying physical concepts of electricity, circuits, and complex power that serves as a foundation for more advanced material. Readers are then introduced to the main components of electric power systems, including generators, motors and other appliances, and transmission and distribution equipment such as power lines, transformers, and circuit breakers. The author explains how a whole power system is managed and coordinated, analyzed mathematically, and kept stable and reliable. Recognizing the economic and environmental implications of electric energy production and public concern over disruptions of service, this book exposes the challenges of producing and delivering electricity to help inform public policy decisions. Its discussions of complex concepts such as reactive power balance, load flow, and stability analysis, for example, offer deep insight into the complexity of electric grid operation and demonstrate how and why physics constrains economics and politics. Although this survival guide includes mathematical equations and formulas, it discusses their meaning in plain English and does not assume any prior familiarity with particular notations or technical jargon. Additional features include: \* A glossary of symbols, units, abbreviations, and acronyms \* Illustrations that help readers visualize processes and better understand complex concepts \* Detailed analysis of a case study, including a Web reference to the case, enabling readers to test the consequences of manipulating various parameters With its clear discussion of how electric grids work, Electric Power Systems is appropriate for a broad readership of professionals, undergraduate and

graduate students, government agency managers, environmental advocates, and consumers.

**Electrical Overstress (EOS)** - Steven H. Voldman 2013-08-27

Electrical Overstress (EOS) continues to impact semiconductor manufacturing, semiconductor components and systems as technologies scale from micro- to nano-electronics. This book teaches the fundamentals of electrical overstress and how to minimize and mitigate EOS failures. The text provides a clear picture of EOS phenomena, EOS origins, EOS sources, EOS physics, EOS failure mechanisms, and EOS on-chip and system design. It provides an illuminating insight into the sources of EOS in manufacturing, integration of on-chip, and system level EOS protection networks, followed by examples in specific technologies, circuits, and chips. The book is unique in covering the EOS manufacturing issues from on-chip design and electronic design automation to factory-level EOS program management in today's modern world. Look inside for extensive coverage on: Fundamentals of electrical overstress, from EOS physics, EOS time scales, safe operating area (SOA), to physical models for EOS phenomena EOS sources in today's semiconductor manufacturing environment, and EOS program management, handling and EOS auditing processing to avoid EOS failures EOS failures in both semiconductor devices, circuits and system Discussion of how to distinguish between EOS events, and electrostatic discharge (ESD) events (e.g. such as human body model (HBM), charged device model (CDM), cable discharge events (CDM), charged board events (CBE), to system level IEC 61000-4-2 test events) EOS protection on-chip design practices and how they differ from ESD protection networks and solutions Discussion of EOS system level concerns in printed circuit boards (PCB), and manufacturing equipment Examples of EOS issues in state-of-the-art digital, analog and power technologies including CMOS, LDMOS, and BCD EOS design rule checking (DRC), LVS, and ERC electronic design automation (EDA) and how it is distinct from ESD EDA systems EOS testing and qualification techniques, and Practical off-chip ESD protection and system level solutions to provide more robust systems Electrical Overstress (EOS): Devices, Circuits and

Systems is a continuation of the author's series of books on ESD protection. It is an essential reference and a useful insight into the issues that confront modern technology as we enter the nano-electronic era.

**Asynchronous Circuit Design** - Chris J. Myers 2004-04-05

With asynchronous circuit design becoming a powerful tool in the development of new digital systems, circuit designers are expected to have asynchronous design skills and be able to leverage them to reduce power consumption and increase system speed. This book walks readers through all of the different methodologies of asynchronous circuit design, emphasizing practical techniques and real-world applications instead of theoretical simulation. The only guide of its kind, it also features an FTP site complete with support materials. Market: Electrical Engineers, Computer Scientists, Device Designers, and Developers in industry. An Instructor Support FTP site is available from the Wiley editorial department.

**The Wave Concept in Electromagnetism and Circuits** - Henri Baudrand 2016-08-17

The Wave Concept Iterative Procedure (WCIP) method has found an increasing number of users within electromagnetic theory and applications to planar circuits, antennas and diffraction problems. This book introduces in detail this new formulation of integral methods, based on the use of a wave concept with two bounded operators, and applications in a variety of domains in electromagnetics. This approach presents a number of benefits over other integral methods, including overcoming the problem of singularity, and reduced computing time. Through the presentation of mathematical equations to characterize studied structures and explanation of the curves obtained, via validated examples, the authors provide a thorough background to electromagnetism as well as a professional reference to students and researchers.

**Wiley CIA Exam Review 2021, Part 3** - S. Rao Vallabhaneni 2021-01-13

Get effective and efficient instruction on all CIA business knowledge exam competencies in 2021 Updated for 2021, the Wiley CIA Exam

Review 2021, Part 3 Business Knowledge for Internal Auditing offers readers a comprehensive overview of the internal auditing process as set out by the Institute of Internal Auditors. The Exam Review covers the four domains tested by the Certified Internal Auditor exam, including: Business acumen Information security Information technology Financial management The Wiley CIA Exam Review 2021, Part 3 Business Knowledge for Internal Auditing is a perfect resource for candidates preparing for the CIA exam. It provides an accessible and efficient learning experience for students regardless of their current level of proficiency.

*Electronic Beam Steering and Polarization Agile Planar Antennas* by Nur Hamza Karabey 2013-08-04

This book describes the characterization of liquid crystal materials at microwave frequencies and the usage of these materials in reconfigurable planar antennas and in their electrical tunable components. It reports for the first time the realization of a two-dimensional electronic beam steering antenna and polarization agile planar antennas with liquid crystal display technology. It gives a detailed description of all the theoretical analyses, modeling and design methods that were involved in the realization of these devices as well as their validation using measurement of demonstrative prototypes. This book also shows that low profile, low cost, high gain, electronic beam steering and polarization agile antennas can be fabricated in larger sizes by using existing automated liquid crystal display manufacturing techniques. The innovative ideas and method described in this work represent a considerable advancement in the field of electronically reconfigurable antennas based on liquid crystal technology and are expected to draw significant interest in the future. Such antennas may become important, for example, in mobile terminals integrated into the body of laptops (in the cover) or of automobiles (in the rooftop), ships or boats, for which flat, low-profile and low-cost antennas are required.

**Transient Analysis of Power Systems** - Juan A. Martinez-Velasco  
2020-02-10

A hands-on introduction to advanced applications of power system

transients with practical examples Transient Analysis of Power Systems: A Practical Approach offers an authoritative guide to the traditional capabilities and the new software and hardware approaches that can be used to carry out transient studies and make possible new and more complex research. The book explores a wide range of topics from an introduction to the subject to a review of the many advanced applications, involving the creation of custom-made models and tools and the application of multicore environments for advanced studies. The authors cover the general aspects of the transient analysis such as modelling guidelines, solution techniques and capabilities of a transient tool. The book also explores the usual application of a transient tool including over-voltages, power quality studies and simulation of power electronics devices. In addition, it contains an introduction to the transient analysis using the ATP. All the studies are supported by practical examples and simulation results. This important book: Summarises modelling guidelines and solution techniques used in transient analysis of power systems Provides a collection of practical examples with a detailed introduction and a discussion of results Includes a collection of case studies that illustrate how a simulation tool can be used for building environments that can be applied to both analysis and design of power systems Offers guidelines for building custom-made models and libraries of modules, supported by some practical examples Facilitates application of a transients tool to fields hardly covered with other time-domain simulation tools Includes a companion website with data (input) files of examples presented, case studies and power point presentations used to support cases studies Written for EMTP users, electrical engineers, Transient Analysis of Power Systems is a hands-on and practical guide to advanced applications of power system transients that includes a range of practical examples.

AC Circuits and Power Systems in Practice - Graeme Vertigan  
2017-12-18

The essential guide that combines power system fundamentals with the practical aspects of equipment design and operation in modern power

systems Written by an experienced power engineer, *AC Circuits and Power Systems in Practice* offers a comprehensive guide that reviews power system fundamentals and network theorems while exploring the practical aspects of equipment design and application. The author covers a wide-range of topics including basic circuit theorems, phasor diagrams, per-unit quantities and symmetrical component theory, as well as active and reactive power and their effects on network stability, voltage support and voltage collapse. Magnetic circuits, reactor and transformer design are analyzed, as is the operation of step voltage regulators. In addition, detailed introductions are provided to earthing systems in LV and MV networks, the adverse effects of harmonics on power equipment and power system protection. Finally, European and American engineering standards are presented where appropriate throughout the text, to familiarize the reader with their use and application. This book is written as a practical power engineering text for engineering students and recent graduates. It contains more than 400 illustrations and is designed to provide the reader with a broad introduction to the subject and to facilitate further study. Many of the examples included come from industry and are not normally covered in undergraduate syllabi. They are provided to assist in bridging the gap between tertiary study and industrial practice, and to assist the professional development of recent graduates. The material presented is easy to follow and includes both mathematical and visual representations using phasor diagrams. Problems included at the end of most chapters are designed to walk the reader through practical applications of the associated theory.

**Wiley CIA Exam Review 2020, Part 3** - S. Rao Vallabhaneni  
2019-11-19

Get effective and efficient instruction on all CIA business knowledge exam competencies in 2020 Updated for 2020, the *Wiley CIA Exam Review 2020, Part 3 Business Knowledge for Internal Auditing* offers readers a comprehensive overview of the internal auditing process as set out by the Institute of Internal Auditors. The Exam Review covers the four domains tested by the Certified Internal Auditor exam, including: ??? Business acumen ??? Information security ??? Information technology

??? Financial management The *Wiley CIA Exam Review 2020, Part 3 Business Knowledge for Internal Auditing* is a perfect resource for candidates preparing for the CIA exam. It provides an accessible and efficient learning experience for students regardless of their current level of proficiency.

**Photodetectors** - Silvano Donati 2021-01-07

Explore this comprehensive introduction to the foundations of photodetection from one of the leading voices in the field The newly revised *Photodetectors: Devices, Circuits and Applications* delivers a thoroughly updated exploration of the fundamentals of photodetection and the novel technologies and concepts that have arisen since the release of the first edition twenty years ago. The book offers discussions of established and emerging photodetection technologies, including photomultipliers, the SPAD, the SiPM, the SNSPD, the UTC, the WGPD/TWPD, the QWIP, and the LT-GaAs. New examinations of correlation measurements on ultrafast pulses and single-photon detectors for quantum communications and LiDARs have also been added. Each chapter includes selected problems for students to work through to aid in learning and retention. A booklet of solutions is also provided. The book is especially ideal for students and faculties of Engineering, with an emphasis on first principles, design, and the engineering of photodetectors. Issues in the book are grouped through the development of concepts, as opposed to collections of technical details. Perfect for undergraduate students interested in the science or design of modern optoelectronics, *Photodetectors: Devices, Circuits and Applications* also belongs on the bookshelves of professors teaching PhD seminars in advanced courses on photodetection and noise, as well as engineers and physicists seeking a guide to an optimum photodetection solution.

**Guide to State-of-the-Art Electron Devices** - Joachim N. Burghartz  
2013-03-19

Winner, 2013 PROSE Award, *Engineering and Technology Concise*, high quality and comparative overview of state-of-the-art electron device development, manufacturing technologies and applications *Guide to*

State-of-the-Art Electron Devices marks the 60th anniversary of the IRE electron devices committee and the 35th anniversary of the IEEE Electron Devices Society, as such it defines the state-of-the-art of electron devices, as well as future directions across the entire field.

Spans full range of electron device types such as photovoltaic devices, semiconductor manufacturing and VLSI technology and circuits, covered by IEEE Electron and Devices Society Contributed by internationally respected members of the electron devices community A timely desk reference with fully-integrated colour and a unique lay-out with sidebars to highlight the key terms Discusses the historical developments and speculates on future trends to give a more rounded picture of the topics covered A valuable resource R&D managers; engineers in the semiconductor industry; applied scientists; circuit designers; Masters students in power electronics; and members of the IEEE Electron Device Society.

Emerging Nanoelectronic Devices - An Chen 2015-01-27

Emerging Nanoelectronic Devices focuses on the future direction of semiconductor and emerging nanoscale device technology. As the dimensional scaling of CMOS approaches its limits, alternate information processing devices and microarchitectures are being explored to sustain increasing functionality at decreasing cost into the indefinite future. This is driving new paradigms of information processing enabled by innovative new devices, circuits, and architectures, necessary to support an increasingly interconnected world through a rapidly evolving internet. This original title provides a fresh perspective on emerging research devices in 26 up to date chapters written by the leading researchers in their respective areas. It supplements and extends the work performed by the Emerging Research Devices working group of the International Technology Roadmap for Semiconductors (ITRS). Key features: • Serves as an authoritative tutorial on innovative devices and architectures that populate the dynamic world of “Beyond CMOS” technologies. • Provides a realistic assessment of the strengths, weaknesses and key unknowns associated with each technology. • Suggests guidelines for the directions of future development of each technology. • Emphasizes physical

concepts over mathematical development. • Provides an essential resource for students, researchers and practicing engineers.

**Wiley CIA 2022 Exam Review, Part 3** - S. Rao Vallabhaneni  
2021-10-19

Complete exam review for the third part of the Certified Internal Auditor exam The Wiley CIA 2022 Part 3 Exam Review: Business Knowledge for Internal Auditing offers students preparing for the Certified Internal Auditor 2022 exam complete coverage of the business knowledge portion of the test. Entirely consistent with the guidelines set by the Institute of Internal Auditors (IIA), this resource covers each of the four domains explored by the test, including: Business acumen. Information security. Information technology. Financial management. This reference provides an accessible and efficient learning experience for students, regardless of their current level of comfort with the material.

**Circuits, Devices and Systems** - Ralph J. Smith 1992-04-16

This book is also available through the Introductory Engineering Custom Publishing System. If you are interested in creating a course-pack that includes chapters from this book, you can get further information by calling 212-850-6272 or sending email inquiries to [engineerjwiley.com](mailto:engineerjwiley.com). The authors offer a set of objectives at the beginning of each chapter plus a clear, concise description of abstract concepts. Focusing on preparing students to solve practical problems, it includes numerous colorful illustrative examples. Along with updated material on MOSFETS, the CRO for use in lab work, a thorough treatment of digital electronics and rapidly developing areas of electronics, it contains an expansive glossary of new terms and ideas.

Design and Development of Efficient Energy Systems - Suman Lata Tripathi 2021-04-13

There is not a single industry which will not be transformed by machine learning and Internet of Things (IoT). IoT and machine learning have altogether changed the technological scenario by letting the user monitor and control things based on the prediction made by machine learning algorithms. There has been substantial progress in the usage of platforms, technologies and applications that are based on these

technologies. These breakthrough technologies affect not just the software perspective of the industry, but they cut across areas like smart cities, smart healthcare, smart retail, smart monitoring, control, and others. Because of these "game changers," governments, along with top companies around the world, are investing heavily in its research and development. Keeping pace with the latest trends, endless research, and new developments is paramount to innovate systems that are not only user-friendly but also speak to the growing needs and demands of society. This volume is focused on saving energy at different levels of design and automation including the concept of machine learning automation and prediction modeling. It also deals with the design and analysis for IoT-enabled systems including energy saving aspects at different level of operation. The editors and contributors also cover the fundamental concepts of IoT and machine learning, including the latest research, technological developments, and practical applications. Valuable as a learning tool for beginners in this area as well as a daily reference for engineers and scientists working in the area of IoT and machine technology, this is a must-have for any library.

Power Electronics in Renewable Energy Systems and Smart Grid - Bimal K. Bose 2019-06-27

The comprehensive and authoritative guide to power electronics in renewable energy systems Power electronics plays a significant role in modern industrial automation and high- efficiency energy systems. With contributions from an international group of noted experts, Power Electronics in Renewable Energy Systems and Smart Grid: Technology and Applications offers a comprehensive review of the technology and applications of power electronics in renewable energy systems and smart grids. The authors cover information on a variety of energy systems including wind, solar, ocean, and geothermal energy systems as well as fuel cell systems and bulk energy storage systems. They also examine smart grid elements, modeling, simulation, control, and AI applications. The book's twelve chapters offer an application-oriented and tutorial viewpoint and also contain technology status review. In addition, the book contains illustrative examples of applications and discussions of

future perspectives. This important resource: Includes descriptions of power semiconductor devices, two level and multilevel converters, HVDC systems, FACTS, and more Offers discussions on various energy systems such as wind, solar, ocean, and geothermal energy systems, and also fuel cell systems and bulk energy storage systems Explores smart grid elements, modeling, simulation, control, and AI applications Contains state-of-the-art technologies and future perspectives Provides the expertise of international authorities in the field Written for graduate students, professors in power electronics, and industry engineers, Power Electronics in Renewable Energy Systems and Smart Grid: Technology and Applications offers an up-to-date guide to technology and applications of a wide-range of power electronics in energy systems and smart grids.

Circuits, Devices And Systems, 5Th Ed - Ralph J. Smith 2009-06

ESD - Steven H. Voldman 2011-04-04

Electrostatic discharge (ESD) continues to impact semiconductor components and systems as technologies scale from micro- to nano-electronics. This book studies electrical overstress, ESD, and latchup from a whole-chip ESD design synthesis approach. It provides a clear insight into the integration of ESD protection networks from a generalist perspective, followed by examples in specific technologies, circuits, and chips. Uniquely both the semiconductor chip integration issues and floorplanning of ESD networks are covered from a 'top-down' design approach. Look inside for extensive coverage on: integration of cores, power bussing, and signal pins in DRAM, SRAM, CMOS image processing chips, microprocessors, analog products, RF components and how the integration influences ESD design and integration architecturing of mixed voltage, mixed signal, to RF design for ESD analysis floorplanning for peripheral and core I/O designs, and the implications on ESD and latchup guard ring integration for both a 'bottom-up' and 'top-down' methodology addressing I/O guard rings, ESD guard rings, I/O to I/O, and I/O to core classification of ESD power clamps and ESD signal pin circuitry, and how to make the correct choice for a given

semiconductor chip examples of ESD design for the state-of-the-art technologies discussed, including CMOS, BiCMOS, silicon on insulator (SOI), bipolar technology, high voltage CMOS (HVCMOS), RF CMOS, and smart power practical methods for the understanding of ESD circuit power distribution, ground rule development, internal bus distribution, current path analysis, quality metrics ESD: Design and Synthesis is a continuation of the author's series of books on ESD protection. It is an essential reference for: ESD, circuit, and semiconductor engineers; design synthesis team leaders; layout design, characterisation, floorplanning, test and reliability engineers; technicians; and groundrule and test site developers in the manufacturing and design of semiconductor chips. It is also useful for graduate and undergraduate students in electrical engineering, semiconductor sciences, and manufacturing sciences, and on courses involving the design of ESD devices, chips and systems. This book offers a useful insight into the issues that confront modern technology as we enter the nano-electronic era.

**Flexible and Stretchable Triboelectric Nanogenerator Devices** -

Mengdi Han 2019-09-17

The book starts with the fundamentals of triboelectric nanogenerators (TENGs), and continues through to fabrication technologies to achieve flexible and stretchable. Then self-powered flexible microsystems are introduced and application examples are presented, including TENG-based active sensors, TENG-powered actuators, artificial intelligence and integrated systems.

**DNA- and RNA-Based Computing Systems** - Evgeny Katz 2021-04-12

Discover the science of biocomputing with this comprehensive and forward-looking new resource DNA- and RNA-Based Computing Systems delivers an authoritative overview of DNA- and RNA-based biocomputing systems that touches on cutting-edge advancements in computer science, biotechnology, nanotechnology, and materials science. Accomplished researcher, academic, and author Evgeny Katz offers readers an examination of the intersection of computational, chemical, materials, and engineering aspects of biomolecular information processing. A

perfect companion to the recently published Enzyme-Based Computing by the same editor, the book is an authoritative reference for those who hope to better understand DNA- and RNA-based logic gates, multi-component logic networks, combinatorial calculators, and related computational systems that have recently been developed for use in biocomputing devices. DNA- and RNA-Based Computing Systems summarizes the latest research efforts in this rapidly evolving field and points to possible future research foci. Along with an examination of potential applications in biosensing and bioactuation, particularly in the field of biomedicine, the book also includes topics like: A thorough introduction to the fields of DNA and RNA computing, including DNA/enzyme circuits A description of DNA logic gates, switches and circuits, and how to program them An introduction to photonic logic using DNA and RNA The development and applications of DNA computing for use in databases and robotics Perfect for biochemists, biotechnologists, materials scientists, and bioengineers, DNA- and RNA-Based Computing Systems also belongs on the bookshelves of computer technologists and electrical engineers who seek to improve their understanding of biomolecular information processing. Senior undergraduate students and graduate students in biochemistry, materials science, and computer science will also benefit from this book.

**Digital Electronics** - Anil K. Maini 2007-09-27

The fundamentals and implementation of digital electronics are essential to understanding the design and working of consumer/industrial electronics, communications, embedded systems, computers, security and military equipment. Devices used in applications such as these are constantly decreasing in size and employing more complex technology. It is therefore essential for engineers and students to understand the fundamentals, implementation and application principles of digital electronics, devices and integrated circuits. This is so that they can use the most appropriate and effective technique to suit their technical need. This book provides practical and comprehensive coverage of digital electronics, bringing together information on fundamental theory, operational aspects and potential applications. With worked problems,

examples, and review questions for each chapter, Digital Electronics includes: information on number systems, binary codes, digital arithmetic, logic gates and families, and Boolean algebra; an in-depth look at multiplexers, de-multiplexers, devices for arithmetic operations, flip-flops and related devices, counters and registers, and data conversion circuits; up-to-date coverage of recent application fields, such as programmable logic devices, microprocessors, microcontrollers, digital troubleshooting and digital instrumentation. A comprehensive, must-read book on digital electronics for senior undergraduate and graduate students of electrical, electronics and computer engineering, and a valuable reference book for professionals and researchers.

*Fundamentals of Silicon Carbide Technology* Tsunenobu Kimoto  
2014-11-24

A comprehensive introduction and up-to-date reference to SiC power semiconductor devices covering topics from material properties to applications. Based on a number of breakthroughs in SiC material science and fabrication technology in the 1980s and 1990s, the first SiC Schottky barrier diodes (SBDs) were released as commercial products in 2001. The SiC SBD market has grown significantly since that time, and SBDs are now used in a variety of power systems, particularly switch-mode power supplies and motor controls. SiC power MOSFETs entered commercial production in 2011, providing rugged, high-efficiency switches for high-frequency power systems. In this wide-ranging book, the authors draw on their considerable experience to present both an introduction to SiC materials, devices, and applications and an in-depth reference for scientists and engineers working in this fast-moving field. *Fundamentals of Silicon Carbide Technology* covers basic properties of SiC materials, processing technology, theory and analysis of practical devices, and an overview of the most important systems applications. Specifically included are: A complete discussion of SiC material properties, bulk crystal growth, epitaxial growth, device fabrication technology, and characterization techniques. Device physics and operating equations for Schottky diodes, pin diodes, JBS/MPS diodes, JFETs, MOSFETs, BJTs, IGBTs, and thyristors. A survey of power

electronics applications, including switch-mode power supplies, motor drives, power converters for electric vehicles, and converters for renewable energy sources. Coverage of special applications, including microwave devices, high-temperature electronics, and rugged sensors. Fully illustrated throughout, the text is written by recognized experts with over 45 years of combined experience in SiC research and development. This book is intended for graduate students and researchers in crystal growth, material science, and semiconductor device technology. The book is also useful for design engineers, application engineers, and product managers in areas such as power supplies, converter and inverter design, electric vehicle technology, high-temperature electronics, sensors, and smart grid technology.

*3D and Circuit Integration of MEMS* Masayoshi Esashi 2021-04-06  
3D and Circuit Integration of MEMS Explore heterogeneous circuit integration and the packaging needed for practical applications of microsystems. MEMS and system integration are important building blocks for the "More-Than-Moore" paradigm described in the International Technology Roadmap for Semiconductors. And, in *3D and Circuit Integration of MEMS*, distinguished editor Dr. Masayoshi Esashi delivers a comprehensive and systematic exploration of the technologies for microsystem packaging and heterogeneous integration. The book focuses on the silicon MEMS that have been used extensively and the technologies surrounding system integration. You'll learn about topics as varied as bulk micromachining, surface micromachining, CMOS-MEMS, wafer interconnection, wafer bonding, and sealing. Highly relevant for researchers involved in microsystem technologies, the book is also ideal for anyone working in the microsystems industry. It demonstrates the key technologies that will assist researchers and professionals deal with current and future application bottlenecks. Readers will also benefit from the inclusion of: A thorough introduction to enhanced bulk micromachining on MIS process, including pressure sensor fabrication and the extension of MIS process for various advanced MEMS devices. An exploration of epitaxial poly Si surface micromachining, including process condition of epi-poly Si, and MEMS devices using epi-poly Si

Practical discussions of Poly SiGe surface micromachining, including SiGe deposition and LP CVD polycrystalline SiGe. A concise treatment of heterogeneously integrated aluminum nitride MEMS resonators and filters. Perfect for materials scientists, electronics engineers, and electrical and mechanical engineers. 3D and Circuit Integration of MEMS will also earn a place in the libraries of semiconductor physicists seeking a one-stop reference for circuit integration and the practical application of microsystems.

**Analog and Mixed-Signal Electronics** - Karl Stephan 2015-04-06

A practical guide to analog and mixed-signal electronics, with an emphasis on design problems and applications. This book provides an in-depth coverage of essential analog and mixed-signal topics such as power amplifiers, active filters, noise and dynamic range, analog-to-digital and digital-to-analog conversion techniques, phase-locked loops, and switching power supplies. Readers will learn the basics of linear systems, types of nonlinearities and their effects, op-amp circuits, the high-gain analog filter-amplifier, and signal generation. The author uses system design examples to motivate theoretical explanations and covers system-level topics not found in most textbooks. Provides references for further study and problems at the end of each chapter. Includes an appendix describing test equipment useful for analog and mixed-signal work. Examines the basics of linear systems, types of nonlinearities and their effects, op-amp circuits, the high-gain analog filter-amplifier, and signal generation. Comprehensive and detailed, *Analog and Mixed-Signal Electronics* is a great introduction to analog and mixed-signal electronics for EE undergraduates, advanced electronics students, and for those involved in computer engineering, biomedical engineering, computer science, and physics.

**Understanding Microelectronics** - Franco Maloberti 2011-12-12

The microelectronics evolution has given rise to many modern benefits but has also changed design methods and attitudes to learning. Technology advancements shifted focus from simple circuits to complex systems with major attention to high-level descriptions. The design methods moved from a bottom-up to a top-down approach. For today's

students, the most beneficial approach to learning is this top-down method that demonstrates a global view of electronics before going into specifics. Franco Maloberti uses this approach to explain the fundamentals of electronics, such as processing functions, signals and their properties. Here he presents a helpful balance of theory, examples, and verification of results, while keeping mathematics and signal processing theory to a minimum. Key features: Presents a new learning approach that will greatly improve students' ability to retain key concepts in electronics studies. Match the evolution of Computer Aided Design (CAD) which focuses increasingly on high-level design. Covers sub-functions as well as basic circuits and basic components. Provides real-world examples to inspire a thorough understanding of global issues, before going into the detail of components and devices. Discusses power conversion and management; an important area that is missing in other books on the subject. End-of-chapter problems and self-training sections support the reader in exploring systems and understanding them at increasing levels of complexity. Inside this book you will find a complete explanation of electronics that can be applied across a range of disciplines including electrical engineering and physics. This comprehensive introduction will be of benefit to students studying electronics, as well as their lecturers and professors. Postgraduate engineers, those in vocational training, and design and application engineers will also find this book useful.

*Wide Bandgap Semiconductors for Power Electronics* Peter Wellmann 2022-01-10

Wide Bandgap Semiconductors for Power Electronic. A guide to the field of wide bandgap semiconductor technology. Wide Bandgap Semiconductors for Power Electronics is a comprehensive and authoritative guide to wide bandgap materials silicon carbide, gallium nitride, diamond and gallium(III) oxide. With contributions from an international panel of experts, the book offers detailed coverage of the growth of these materials, their characterization, and how they are used in a variety of power electronics devices such as transistors and diodes and in the areas of quantum information and hybrid electric vehicles. The

book is filled with the most recent developments in the burgeoning field of wide bandgap semiconductor technology and includes information from cutting-edge semiconductor companies as well as material from leading universities and research institutions. By taking both scholarly and industrial perspectives, the book is designed to be a useful resource for scientists, academics, and corporate researchers and developers. This important book: Presents a review of wide bandgap materials and recent developments Links the high potential of wide bandgap semiconductors with the technological implementation capabilities Offers a unique combination of academic and industrial perspectives Meets the demand for a resource that addresses wide bandgap materials in a comprehensive manner Written for materials scientists, semiconductor physicists, electrical engineers, Wide Bandgap Semiconductors for Power Electronics provides a state of the art guide to the technology and application of SiC and related wide bandgap materials.

**Neuromorphic Devices for Brain-inspired Computing** - Qing Wan  
2021-12-10

Explore the cutting-edge of neuromorphic technologies with applications in Artificial Intelligence In Neuromorphic Devices for Brain-Inspired Computing: Artificial Intelligence, Perception, and Robotics, a team of expert engineers delivers a comprehensive discussion of all aspects of neuromorphic electronics designed to assist researchers and professionals to understand and apply all manner of brain-inspired computing and perception technologies. The book covers both memristic and neuromorphic devices, including spintronic, multi-terminal, and neuromorphic perceptual applications. Summarizing recent progress made in five distinct configurations of brain-inspired computing, the authors explore this promising technology's potential applications in two specific areas: neuromorphic computing systems and neuromorphic perceptual systems. The book also includes: A thorough introduction to two-terminal neuromorphic memristors, including memristive devices and resistive switching mechanisms Comprehensive explorations of spintronic neuromorphic devices and multi-terminal neuromorphic devices with cognitive behaviors Practical discussions of neuromorphic

devices based on chalcogenide and organic materials In-depth examinations of neuromorphic computing and perceptual systems with emerging devices Perfect for materials scientists, biochemists, and electronics engineers, Neuromorphic Devices for Brain-Inspired Computing: Artificial Intelligence, Perception, and Robotics will also earn a place in the libraries of neurochemists, neurobiologists, and neurophysiologists.

**Flexible and Stretchable Medical Devices** - Kuniharu Takei  
2018-02-07

The book introduces flexible and stretchable wearable electronic systems and covers in detail the technologies and materials required for healthcare and medical applications. A team of excellent authors gives an overview of currently available flexible devices and thoroughly describes their physical mechanisms that enable sensing human conditions. In dedicated chapters, crucial components needed to realize flexible and wearable devices are discussed which include transistors and sensors and deal with memory, data handling and display. Additionally, suitable power sources based on photovoltaics, thermoelectric energy and supercapacitors are reviewed. A special chapter treats implantable flexible sensors for neural recording. The book editor concludes with a perspective on this rapidly developing field which is expected to have a great impact on healthcare in the 21st century.

**Microwave Engineering** - David M. Pozar 2011-11-22

Pozar's new edition of Microwave Engineering includes more material on active circuits, noise, nonlinear effects, and wireless systems. Chapters on noise and nonlinear distortion, and active devices have been added along with the coverage of noise and more material on intermodulation distortion and related nonlinear effects. On active devices, there's more updated material on bipolar junction and field effect transistors. New and updated material on wireless communications systems, including link budget, link margin, digital modulation methods, and bit error rates is also part of the new edition. Other new material includes a section on transients on transmission lines, the theory of power waves, a discussion of higher order modes and frequency effects for microstrip line, and a

discussion of how to determine unloaded.

Nanoelectronics - Robert Puers 2017-06-19

Offering first-hand insights by top scientists and industry experts at the forefront of R&D into nanoelectronics, this book neatly links the underlying technological principles with present and future applications. A brief introduction is followed by an overview of present and emerging logic devices, memories and power technologies. Specific chapters are dedicated to the enabling factors, such as new materials, characterization techniques, smart manufacturing and advanced circuit design. The second part of the book provides detailed coverage of the current state and showcases real future applications in a wide range of fields: safety, transport, medicine, environment, manufacturing, and social life, including an analysis of emerging trends in the internet of things and cyber-physical systems. A survey of main economic factors and trends concludes the book. Highlighting the importance of nanoelectronics in the core fields of communication and information technology, this is essential reading for materials scientists, electronics and electrical engineers, as well as those working in the semiconductor and sensor industries.

Wiley Encyclopedia of Electrical and Electronics Engineering - John G. Webster 1999-03-25

Electrical and electronics engineering entails the design, development and implementation of electrical and electronic power systems. This may be as simple as designing a light bulb or as complex as the development of robotics for automating manufacturing. This Encyclopedia covers both the theory of electrical and electronics engineering as well as practical applications for industry. The annual update volume describes the latest developments in the field.

**Linear Integrated Circuits** - D Choudhury Roy 2003

Designed Primarily For Courses In Operational Amplifier And Linear Integrated Circuits For Electrical, Electronic, Instrumentation And Computer Engineering And Applied Science Students. Includes Detailed Coverage Of Fabrication Technology Of Integrated Circuits. Basic Principles Of Operational Amplifier, Internal Construction And

Applications Have Been Discussed. Important Linear Ics Such As 555 Timer, 565 Phase-Locked Loop, Linear Voltage Regulator Ics 78/79 Xx And 723 Series D-A And A-D Converters Have Been Discussed In Individual Chapters. Each Topic Is Covered In Depth. Large Number Of Solved Problems, Review Questions And Experiments Are Given With Each Chapter For Better Understanding Of Text. Salient Features Of Second Edition \* Additional Information Provided Wherever Necessary To Improve The Understanding Of Linear Ics. \* Chapter 2 Has Been Thoroughly Revised. \* Dc & Ac Analysis Of Differential Amplifier Has Been Discussed In Detail. \* The Section On Current Mirrors Has Been Thoroughly Updated. \* More Solved Examples, Pspice Programs And Answers To Selected Problems Have Been Added.

**Electrical and Electronic Devices, Circuits and Materials** - Suman Lata Tripathi 2021-03-15

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.

**Robust Electronic Design Reference Book: no special title** - John R. Barnes 2004

If you design electronics for a living, you need Robust Electronic Design Reference Book. Written by a working engineer, who has put over 115 electronic products into production at Sycor, IBM, and Lexmark, Robust Electronic Design Reference covers all the various aspects of designing and developing electronic devices and systems that: -Work. -Are safe and reliable. -Can be manufactured, tested, repaired, and serviced. -May be sold and used worldwide. -Can be adapted or enhanced to meet new and changing requirements.