
Digital Integrated Circuits Jan M Rabaey

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Introduction to Microelectronic Fabrication McGraw-Hill Incorporated

Low Power Design Methodologies presents the first in-depth coverage of all the layers of the design hierarchy, ranging from the technology, circuit, logic and architectural levels, up to the system layer. The book gives insight into the mechanisms of power dissipation in digital circuits and presents state of the art approaches to power reduction. Finally, it introduces a global view of low power design methodologies and how these are being captured in the latest design automation environments. The individual chapters are written by the leading researchers in the area, drawn from both industry and academia. Extensive references are included at the end of each chapter. Audience: A broad introduction for anyone interested in low power design. Can also be used as a text book for an advanced graduate class. A starting point for any aspiring researcher.

Design of Analog CMOS Integrated Circuits Springer
 The 2nd Edition of Analog Integrated Circuit Design focuses on

more coverage about several types of circuits that have increased in importance in the past decade. Furthermore, the text is enhanced with material on CMOS IC device modeling, updated processing layout and expanded coverage to reflect technical innovations. CMOS devices and circuits have more influence in this edition as well as a reduced amount of text on BiCMOS and bipolar information. New chapters include topics on frequency response of analog ICs and basic theory of feedback amplifiers.

Verilog HDL Elsevier

Beginning with discussions on the operation of electronic devices and analysis of the nucleus of digital design, the text addresses: the impact of interconnect, design for low power, issues in timing and clocking, design methodologies, and the effect of design automation on the digital design perspective.

Digital Integrated Circuit Design CRC Press

Contains the most extensive coverage of digital integrated circuits available in a single source. Provides complete qualitative descriptions of circuit operation followed by in-depth analytical analyses and spice simulations. The circuit families described in detail are transistor-transistor logic (TTL, STTL, and ASTTL), emitter-coupled logic (ECL), NMOS logic, CMOS logic, dynamic

CMOS, BiCMOS structures and various GASFET technologies. In addition to detailed presentation of the basic inverter circuits for each digital logic family, complete details of other logic circuits for these families are presented.

Digital Integrated Circuits Cambridge University Press

The third edition of Hodges and Jackson's Analysis and Design of Digital Integrated Circuits has been thoroughly revised and updated by a new co-author, Resve Saleh of the University of British Columbia. The new edition combines the approachability and concise nature of the Hodges and Jackson classic with a complete overhaul to bring the book into the 21st century. The new edition has replaced the emphasis on BiPolar with an emphasis on CMOS. The outdated MOS transistor model used throughout the book will be replaced with the now standard deep submicron model. The material on memory has been expanded and updated. As well the book now includes more on SPICE simulation and new problems that reflect recent technologies. The emphasis of the book is on design, but it does not neglect analysis and has as a goal to provide enough information so that a student can carry out analysis as well as be able to design a circuit. This book provides an excellent and balanced introduction to digital circuit design for both students and professionals.

Signal Processing and Integrated Circuits CRC Press

Computer Architecture: A Quantitative Approach, Sixth Edition has been considered essential reading by instructors, students and practitioners of computer design for over 20 years. The sixth edition of this classic textbook from Hennessy and Patterson, winners of the 2017 ACM A.M. Turing Award recognizing contributions of lasting and major technical importance to the computing field, is fully revised with the latest developments in processor and system architecture. The text now features examples from the RISC-V (RISC Five) instruction set architecture, a modern RISC instruction set developed and designed to be a free and openly adoptable standard. It also includes a new chapter on domain-specific architectures and an updated chapter on warehouse-scale computing that features the first public information on Google's newest WSC. True to its original mission of demystifying computer architecture, this edition continues the longstanding tradition of focusing on areas where the most exciting computing innovation is happening, while always keeping an emphasis on good engineering design. Winner of a 2019 Textbook Excellence Award (Texty) from the Textbook and Academic Authors Association Includes a new chapter on domain-specific architectures, explaining how they are the only path forward for improved performance and energy efficiency given the end of Moore's Law and Dennard scaling Features the first publication of several DSAs from industry Features extensive updates to the chapter on warehouse-scale computing, with the first public information on the newest Google WSC Offers updates to other chapters including new material dealing with the use of stacked DRAM; data on the performance of new NVIDIA Pascal GPU vs. new AVX-512 Intel Skylake CPU; and extensive additions to content covering multicore architecture and organization Includes "Putting It All Together" sections near the end of every chapter, providing real-world technology examples that demonstrate the principles covered in each chapter Includes review appendices in the printed text and additional reference appendices available online Includes updated and improved case studies and exercises ACM named John L. Hennessy and David A. Patterson, recipients of the 2017 ACM A.M. Turing Award for pioneering a systematic, quantitative approach to the design and evaluation of computer architectures with enduring impact on the microprocessor industry

Radio Frequency Integrated Circuits and Systems McGraw-Hill Higher Education

This book provides comprehensive coverage of the latest research into integrated circuits' ageing, explaining the causes of this phenomenon, describing its effects on electronic systems, and providing mitigation techniques to build ageing-resilient circuits.

Digital Circuits Springer Science & Business Media

Equips students with essential industry-relevant knowledge through in-depth explanations, practical applications, examples, and exercises.

Electromagnetics for High-Speed Analog and Digital Communication Circuits IET

This practical, tool-independent guide to designing digital circuits takes a unique, top-down approach, reflecting the nature of the design process in industry. Starting with architecture design, the book comprehensively explains the why and how of digital circuit design, using the physics designers need to know, and no more.

Radio Frequency Integrated Circuits and Technologies

Prentice Hall Professional

For those with a basic understanding of digital design, this book teaches the essential skills to design digital integrated circuits using Verilog and the relevant extensions of SystemVerilog. In addition to covering the syntax of Verilog and SystemVerilog, the author provides an appreciation of design challenges and solutions for producing working circuits. The book covers not only the syntax and limitations of HDL coding, but deals extensively with design problems such as partitioning and synchronization, helping you to produce designs that are not only logically correct, but will actually work when turned into physical circuits.

Throughout the book, many small examples are used to validate concepts and demonstrate how to apply design skills. This book takes readers who have already learned the fundamentals of digital design to the point where they can produce working circuits using modern design methodologies. It clearly explains what is useful for circuit design and what parts of the languages are only software, providing a non-theoretical, practical guide to robust, reliable and optimized hardware design and development. Produce working hardware: Covers not only syntax, but also provides design know-how, addressing problems such as synchronization and partitioning to produce working solutions Usable examples: Numerous small examples throughout the book demonstrate concepts in an easy-to-grasp manner Essential knowledge: Covers the vital design topics of synchronization, essential for producing working silicon; asynchronous interfacing techniques; and design techniques for circuit optimization, including partitioning

Digital Integrated Circuits Springer

The book provides a comprehensive overview of electromigration and its effects on the reliability of electronic circuits. It introduces the physical process of electromigration, which gives the reader the requisite understanding and knowledge for adopting appropriate counter measures. A comprehensive set of options is presented for modifying the present IC design methodology to prevent electromigration. Finally, the authors show how specific effects can be exploited in present and future technologies to reduce electromigration's negative impact on circuit reliability.

Power Management Integrated Circuit Analysis and Design John Wiley & Sons

A timely one-stop pioneering book presenting all four major power management integrated circuits Existing analog IC books usually focus on amplifier and comparator designs, with some extend to switched capacitor filter designs and analog-to-digital and digital-to-analog converters design. There is no book yet on power management integrated circuits. Ki's book fills the void. This self-contained book discusses all fundamental concepts in switching converters, low dropout regulators, charge pumps and

voltage references systematically, and in the context of analog integrated circuit design. Furthermore, concepts are discussed in both qualitative and quantitative aspects. Qualitative understanding is important in getting the essential operation of a circuit, but quantitative analysis supplies the solid foundation on which qualitative discussion is based. First book covering all four major power management circuits All concepts discussed in both qualitative and quantitative aspects Written as a self-contained text - well-organized and systematic Authored by a pioneering scientist in the field Supplementary instructional materials available for lecturers MATLAB simulation code for readers to download and practice on their own

CMOS VLSI Design: A Circuits and Systems Perspective
Springer

Environmental electromagnetic pollution has drastically increased over the last decades. The omnipresence of communication systems, various electronic appliances and the use of ever increasing frequencies, all contribute to a noisy electromagnetic environment which acts detrimentally on sensitive electronic equipment. Integrated circuits must be able to operate satisfactorily while cohabiting harmoniously in the same appliance, and not generate intolerable levels of electromagnetic emission, while maintaining a sound immunity to potential electromagnetic disturbances: analog integrated circuits are in particular more easily disturbed than their digital counterparts, since they don't have the benefit of dealing with predefined levels ensuring an innate immunity to disturbances. The objective of the research domain presented in EMC of Analog Integrated Circuits is to improve the electromagnetic immunity of considered analog integrated circuits, so that they start to fail at relevantly higher conduction levels than before.

Analog Integrated Circuit Design Pearson

Digital Integrated Circuits Digital Integrated Circuits
Cambridge University Press

This book offers the first comprehensive view on integrated circuit and system design for the Internet of Things (IoT), and in particular for the tiny nodes at its edge. The authors provide a fresh perspective on how the IoT will evolve based on recent and foreseeable trends in the semiconductor industry, highlighting the key challenges, as well as the opportunities for circuit and system innovation to address them. This book describes what the IoT really means from the design point of view, and how the constraints imposed by applications translate into integrated circuit requirements and design guidelines. Chapter contributions equally come from industry and academia. After providing a system perspective on IoT nodes, this book focuses on state-of-the-art design techniques for IoT applications, encompassing the fundamental sub-systems encountered in Systems on Chip for IoT: ultra-low power digital architectures and circuits low- and zero-leakage memories (including emerging technologies) circuits for hardware security and authentication System on Chip design methodologies on-chip power management and energy harvesting ultra-low power analog interfaces and analog-digital conversion short-range radios miniaturized battery technologies packaging and assembly of IoT integrated systems (on silicon and non-silicon substrates). As a common thread, all chapters conclude with a prospective view on the foreseeable evolution of the related technologies for IoT. The concepts developed throughout the book are exemplified by two IoT node system demonstrations from industry. The unique balance between breadth and depth of this book: enables expert readers quickly to develop an understanding of the specific challenges and state-of-the-art solutions for IoT, as well as their evolution in the foreseeable future provides non-experts with a comprehensive introduction to integrated circuit design for IoT, and serves as an

excellent starting point for further learning, thanks to the broad coverage of topics and selected references makes it very well suited for practicing engineers and scientists working in the hardware and chip design for IoT, and as textbook for senior undergraduate, graduate and postgraduate students (familiar with analog and digital circuits).

Enabling the Internet of Things John Wiley & Sons

VERILOG HDL, Second Edition by Samir Palnitkar With a Foreword by Prabhu Goel Written for both experienced and new users, this book gives you broad coverage of Verilog HDL. The book stresses the practical design and verification perspective of Verilog rather than emphasizing only the language aspects. The information presented is fully compliant with the IEEE 1364-2001 Verilog HDL standard. Among its many features, this edition-
- Describes state-of-the-art verification methodologies
- Provides full coverage of gate, dataflow (RTL), behavioral and switch modeling
- Introduces you to the Programming Language Interface (PLI)
- Describes logic synthesis methodologies
- Explains timing and delay simulation
- Discusses user-defined primitives
- Offers many practical modeling tips
Includes over 300 illustrations, examples, and exercises, and a Verilog resource list. Learning objectives and summaries are provided for each chapter. About the CD-ROM The CD-ROM contains a Verilog simulator with a graphical user interface and the source code for the examples in the book.

What people are saying about Verilog HDL - "Mr. Palnitkar illustrates how and why Verilog HDL is used to develop today's most complex digital designs. This book is valuable to both the novice and the experienced Verilog user. I highly recommend it to anyone exploring Verilog based design." - Rajeev Madhavan, Chairman and CEO, Magma Design Automation
"This book is unique in its breadth of information on Verilog and Verilog-related topics. It is fully compliant with the IEEE 1364-2001 standard, contains all the information that you need on the basics, and devotes several chapters to advanced topics such as verification, PLI, synthesis and modeling techniques." - Michael McNamara, Chair, IEEE 1364-2001 Verilog Standards Organization
This has been my favorite Verilog book since I picked it up in college. It is the only book that covers practical Verilog. A must have for beginners and experts." - Berend Ozceri, Design Engineer, Cisco Systems, Inc.
"Simple, logical and well-organized material with plenty of illustrations, makes this an ideal textbook." - Arun K. Somani, Jerry R. Junkins Chair Professor, Department of Electrical and Computer Engineering, Iowa State University, Ames
PRENTICE HALL Professional Technical Reference Upper Saddle River, NJ 07458 www.phptr.com ISBN: 0-13-044911-3

Digital Integrated Circuits Morgan Kaufmann

Analog CMOS integrated circuits are in widespread use for communications, entertainment, multimedia, biomedical, and many other applications that interface with the physical world. Although analog CMOS design is greatly complicated by the design choices of drain current, channel width, and channel length present for every MOS device in a circuit, these design choices afford significant opportunities for optimizing circuit performance. This book addresses tradeoffs and optimization of device and circuit performance for selections of the drain current, inversion coefficient, and channel length, where channel width is implicitly considered. The inversion coefficient is used as a technology independent measure of MOS inversion that permits design freely in weak, moderate, and strong inversion. This book details the significant performance tradeoffs available in analog CMOS design and guides the designer towards optimum design by describing: An interpretation of MOS modeling for the analog designer, motivated by the EKV MOS model, using tabulated hand expressions and figures that give performance and tradeoffs for

the design choices of drain current, inversion coefficient, and channel length; performance includes effective gate-source bias and drain-source saturation voltages, transconductance efficiency, transconductance distortion, normalized drain-source conductance, capacitances, gain and bandwidth measures, thermal and flicker noise, mismatch, and gate and drain leakage current. Measured data that validates the inclusion of important small-geometry effects like velocity saturation, vertical-field mobility reduction, drain-induced barrier lowering, and inversion-level increases in gate-referred, flicker noise voltage. In-depth treatment of moderate inversion, which offers low bias compliance voltages, high transconductance efficiency, and good immunity to velocity saturation effects for circuits designed in modern, low-voltage processes. Fabricated design examples that include operational transconductance amplifiers optimized for various tradeoffs in DC and AC performance, and micropower, low-noise preamplifiers optimized for minimum thermal and flicker noise. A design spreadsheet, available at the book web site, that facilitates rapid, optimum design of MOS devices and circuits. Tradeoffs and Optimization in Analog CMOS Design is the first book dedicated to this important topic. It will help practicing analog circuit designers and advanced students of electrical engineering build design intuition, rapidly optimize circuit performance during initial design, and minimize trial-and-error circuit simulations.

CMOS Digital Integrated Circuits Cambridge University Press

This textbook is intended to introduce the student of electronics to the fundamentals of digital circuits, both combinational and sequential, in a reasonable and systematic manner. It proceeds from basic logic concepts to circuits and designs.

Digital Integrated Circuits John Wiley & Sons

Exponential improvement in functionality and performance of digital integrated circuits has revolutionized the way we live and work. The continued scaling down of MOS transistors has broadened the scope of use for circuit technology to the point that texts on the topic are generally lacking after a few years. The second edition of Digital Integrated Circuits: Analysis and Design focuses on timeless principles with a modern interdisciplinary view that will serve integrated circuits engineers

from all disciplines for years to come. Providing a revised instructional reference for engineers involved with Very Large Scale Integrated Circuit design and fabrication, this book delves into the dramatic advances in the field, including new applications and changes in the physics of operation made possible by relentless miniaturization. This book was conceived in the versatile spirit of the field to bridge a void that had existed between books on transistor electronics and those covering VLSI design and fabrication as a separate topic. Like the first edition, this volume is a crucial link for integrated circuit engineers and those studying the field, supplying the cross-disciplinary connections they require for guidance in more advanced work. For pedagogical reasons, the author uses SPICE level 1 computer simulation models but introduces BSIM models that are indispensable for VLSI design. This enables users to develop a strong and intuitive sense of device and circuit design by drawing direct connections between the hand analysis and the SPICE models. With four new chapters, more than 200 new illustrations, numerous worked examples, case studies, and support provided on a dynamic website, this text significantly expands concepts presented in the first edition.

□□VLSI□□□□ Morgan Kaufmann

The fourth edition of CMOS Digital Integrated Circuits: Analysis and Design continues the well-established tradition of the earlier editions by offering the most comprehensive coverage of digital CMOS circuit design, as well as addressing state-of-the-art technology issues highlighted by the widespread use of nanometer-scale CMOS technologies. In this latest edition, virtually all chapters have been re-written, the transistor model equations and device parameters have been revised to reflect the significant changes that must be taken into account for new technology generations, and the material has been reinforced with up-to-date examples. The broad-ranging coverage of this textbook starts with the fundamentals of CMOS process technology, and continues with MOS transistor models, basic CMOS gates, interconnect effects, dynamic circuits, memory circuits, arithmetic building blocks, clock and I/O circuits, low power design techniques, design for manufacturability and design for testability.

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