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CMOS VLSI Design: A Circuits and Systems Perspective-Neil H. E. Weste 2005

CMOS VLSI Design-Weste 2006

CMOS VLSI Design-Neil H. E. Weste 2005 The extensively revised 3rd edition of CMOS VLSI Design details modern techniques for the design of complex and high performance CMOS Systems-on-Chip. The authors draw upon extensive industry and classroom experience to explain modern practices of chip design. The introductory chapter covers transistor operation, CMOS gate design, fabrication, and layout at a level accessible to anyone with an elementary knowledge of digital electronics. Later chapters build up an in-depth discussion of the design of complex, high performance, low power CMOS Systems-on-Chip.

CMOS VLSI Design : A circuits and systems perspective-Neil H.E. Weste 2015 The fourth edition of the best-selling text details the modern techniques for the design of complex and high-performance CMOS systems on a chip. Covering the fundamentals of CMOS design from the digital systems level to the circuit level, this book explains the fundamental principles and is a guide to good design practices

CMOS Logic Circuit Design-John P. Uyemura 2007-05-08 This is an up-to-date treatment of the analysis and design of CMOS integrated digital logic circuits. The self-contained book covers all of the important digital circuit design styles found in modern CMOS chips, emphasizing solving design problems using the various logic styles available in CMOS.

Low-Power Cmos Vlsi Circuit Design-Kaushik Roy 2009-02-02 This is the first book devoted to low power circuit design, and its authors have been among the first to publish papers in this area. · Low-Power CMOS VLSI Design· Physics of Power Dissipation in CMOS FET Devices· Power Estimation· Synthesis for Low Power· Design and Test of Low-Voltage CMOS Circuits· Low-Power Static Ram Architectures· Low-Energy Computing Using Energy Recovery Techniques· Software Design for Low Power

Nanoscale CMOS VLSI Circuits: Design for Manufacturability-Sandip Kundu 2010-06-22 Cutting-Edge CMOS VLSI Design for Manufacturability Techniques This detailed guide offers proven methods for optimizing circuit designs to increase the yield, reliability, and manufacturability of products and mitigate defects and failure. Covering the latest devices, technologies, and processes, Nanoscale CMOS VLSI Circuits: Design for Manufacturability focuses on delivering higher performance and lower power consumption. Costs, constraints, and computational efficiencies are also discussed in the practical resource. Nanoscale CMOS VLSI Circuits covers: Current trends in CMOS VLSI design Semiconductor manufacturing technologies Photolithography Process and device variability: analyses and modeling Manufacturing-Aware Physical Design Closure Metrology, manufacturing defects, and defect extraction Defect impact modeling and yield improvement techniques Physical design and reliability DFM tools and methodologies

Integrated Circuit Design-Neil H. E. Weste 2011 This edition presents broad and in-depth coverage of the entire field of modern CMOS VLSI Design. The authors draw upon extensive industry and classroom experience to introduce today's most advanced and effective chip design practices.

Digital Integrated Circuit Design-Hubert Kaeslin 2008-04-28 Top-down approach to practical, tool-independent, digital circuit design, reflecting how circuits are designed.

Principles of CMOS VLSI Design-Neil West 2000-12-01 This book conveys an understanding of CMOS technology, circuit design, layout, and system design sufficient to the designer. The book deals with the technology down to the layout level of detail, thereby providing a bridge from a circuit to a form that may be fabricated. The early chapters provide a circuit view of the CMOS IC design, the middle chapters cover a sub-system view of CMOS VLSI, and the final section illustrates these techniques using a real-world case study.

Low-Power Digital VLSI Design-Abdellatif Bellaouar 2012-12-06 Low-Power Digital VLSI Design: Circuits and Systems addresses both process technologies and device modeling. Power dissipation in CMOS circuits, several practical circuit examples, and low-power techniques are discussed. Low-voltage issues for digital CMOS and BiCMOS circuits are emphasized. The book also provides an extensive study of advanced CMOS subsystem design. A low-power design methodology is presented with various power minimization techniques at the circuit, logic, architecture and algorithm levels. Features: Low-voltage CMOS device modeling, technology files, design rules Switching activity concept, low-power guidelines to engineering practice Pass-transistor logic families Power dissipation of I/O circuits Multi- and low-VT CMOS logic, static power reduction circuit techniques State of the art design of low-voltage BiCMOS and CMOS circuits Low-power techniques in CMOS SRAMS and DRAMS Low-power on-chip voltage down converter design Numerous advanced CMOS subsystems (e.g. adders, multipliers, data path, memories, regular structures, phase-locked loops) with several design options trading power, delay and area Low-power design methodology, power estimation techniques Power reduction techniques at the logic, architecture and algorithm levels More than 190 circuits explained at the transistor level.

CMOS Digital Integrated Circuits Analysis & Design-Sung-Mo Kang 2014-01-31 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.

Introduction to NMOS and CMOS VLSI Systems Design-Amar Mukherjee 1986

CMOS-R. Jacob Baker 2008 Praise for CMOS: Circuit Design, Layout, and Simulation Revised Second Edition from the Technical Reviewers "A refreshing industrial flavor. Design concepts are presented as they are needed for 'just-in-time' learning. Simulating and designing circuits using SPICE is emphasized with literally hundreds of examples. Very few textbooks contain as much detail as this one. Highly recommended!" --Paul M. Furth, New Mexico State University "This book builds a solid knowledge of CMOS circuit design from the ground up. With coverage of process integration, layout, analog and digital models, noise mechanisms, memory circuits, references, amplifiers, PLLs/DLLs, dynamic circuits, and data converters, the text is an excellent reference for both experienced and novice designers alike." --Tyler J. Gomm, Design Engineer, Micron Technology, Inc. "The Second Edition builds upon the success of the first with new chapters that cover additional material such as oversampled converters and non-volatile memories. This is becoming the de facto standard textbook to have on every analog and mixed-signal designer's bookshelf." --Joe Walsh, Design Engineer, AMI Semiconductor CMOS circuits from design to implementation CMOS: Circuit Design, Layout, and Simulation, Revised Second Edition covers the practical design of both analog and digital integrated circuits, offering a vital, contemporary view of a wide range of analog/digital circuit blocks, the BSIM model, data converter architectures, and much more. This edition takes a two-path approach to the topics: design techniques are

developed for both long- and short-channel CMOS technologies and then compared. The results are multidimensional explanations that allow readers to gain deep insight into the design process. Features include: Updated materials to reflect CMOS technology's movement into nanometer sizes Discussions on phase- and delay-locked loops, mixed-signal circuits, data converters, and circuit noise More than 1,000 figures, 200 examples, and over 500 end-of-chapter problems In-depth coverage of both analog and digital circuit-level design techniques Real-world process parameters and design rules The book's Web site, CMOSedu.com, provides: solutions to the book's problems; additional homework problems without solutions; SPICE simulation examples using HSPICE, LTSpice, and WinSpice; layout tools and examples for actually fabricating a chip; and videos to aid learning

Logical Effort-Ivan Sutherland 1999 Designers of high-speed integrated circuits face a bewildering array of choices and too often spend frustrating days tweaking gates to meet speed targets. Logical Effort: Designing Fast CMOS Circuits makes high speed design easier and more methodical, providing a simple and broadly applicable method for estimating the delay resulting from factors such as topology, capacitance, and gate sizes. The brainchild of circuit and computer graphics pioneers Ivan Sutherland and Bob Sproull, "logical effort" will change the way you approach design challenges. This book begins by equipping you with a sound understanding of the method's essential procedures and concepts-so you can start using it immediately. Later chapters explore the theory and finer points of the method and detail its specialized applications. Features Explains the method and how to apply it in two practically focused chapters. Improves circuit design intuition by teaching simple ways to discern the consequences of topology and gate size decisions. Offers easy ways to choose the fastest circuit from among an array of potential circuit designs. Reduces the time spent on tweaking and simulations-so you can rapidly settle on a good design. Offers in-depth coverage of specialized areas of application for logical effort: skewed or unbalanced gates, other circuit families (including pseudo-NMOS and domino), wide structures such as decoders, and irregularly forking circuits. Presents a complete derivation of the method-so you see how and why it works.

Analog Design for CMOS VLSI Systems-Franco Maloberti 2006-04-18 - Applicable for bookstore catalogue

Introduction to VLSI Circuits and Systems-Uyemura 2002 Market_Desc: · Electronics Designers· System Level Engineers Special Features: · This book presents modern CMOS logic circuits, fabrication, and layout in a cohesive manner that links the material together with the system-level considerations· It illustrates the top-down design procedure used in modern VLSI chip design with an emphasis on variations in the HDL, logic, circuits and layout About The Book: This book provides a comprehensive treatment of modern VLSI design. It stresses the relationship among high-level system considerations, logic design, and silicon circuitry and fabrication in a manner that allows the reader to understand the field as a single composite discipline. The approach emphasizes the unique features of state-of-the-art CMOS VLSI that sets it apart from traditional digital systems design.

Circuit Design for CMOS VLSI-John P. Uyemura 2012-12-06 During the last decade, CMOS has become increasingly attractive as a basic integrated circuit technology due to its low power (at moderate frequencies), good scalability, and rail-to-rail operation. There are now a variety of CMOS circuit styles, some based on static complementary con ductance properties, but others borrowing from earlier NMOS techniques and the advantages of using clocking disciplines for precharge-evaluate se quencing. In this comprehensive book, the reader is led systematically through the entire range of CMOS circuit design. Starting with the in dividual MOSFET, basic circuit building blocks are described, leading to a broad view of both combinatorial and sequential circuits. Once these circuits are considered in the light of CMOS process technologies, impor tant topics in circuit performance are considered, including characteristics of interconnect, gate delay, device sizing, and I/O buffering. Basic circuits are then composed to form macro elements such as multipliers, where the reader acquires a unified view of architectural performance through par allelism, and circuit performance through careful attention to circuit-level and layout design optimization. Topics in analog circuit design reflect the growing tendency for both analog and digital circuit forms to be combined on the same chip, and a careful treatment of BiCMOS forms introduces the reader to the combination of both FET and bipolar technologies on the same chip to provide improved performance.

Low-Voltage SOI CMOS VLSI Devices and Circuits-James B. Kuo 2004-04-05 A practical, comprehensive survey of SOI CMOS devices and circuitsfor microelectronics engineers The microelectronics industry is becoming increasingly dependent onSOI CMOS VLSI devices and circuits. This book is the first toaddress this important topic with a practical focus on devices andcircuits. It provides an up-to-date survey of the current knowledgeregarding SOI device behaviors and describes state-of-the-artlow-voltage CMOS VLSI analog and digital circuit techniques. Low-Voltage SOI CMOS VLSI Devices and Circuits covers the entirefield, from basic concepts to the most advanced ideas.

Topicsinclude: * SOI device behavior: fundamental and floating body effects, hotcarrier effects, sensitivity, reliability, self-heating, breakdown,ESD, dual-gate devices, accumulation-mode devices, short channeleffects, and narrow channel effects * Low-voltage SOI digital circuits: floating body effects, DRAM,SRAM, static logic, dynamic logic, gate array, CPU, frequencydivider, and DSP * Low-voltage SOI analog circuits: op amps, filters, ADC/DAC,sigma-delta modulators, RF circuits, VCO, mixers, low-noiseamplifiers, and high-temperature circuits With over 300 references to the state of the art and over 300important figures on low-voltage SOI CMOS devices and circuits,this volume serves as an authoritative, reliable resource forengineers designing these circuits in high-tech industries.

Chip Design for Submicron VLSI-John Paul Uyemura 2006 The text is organized around first introducing the global view of digital integrated circuit design, VLSI and design automation, and then sequentially developing the topics from the materials and devices level, up through the circuits and then system level. This mirrors the structural hierarchy of the chip design field itself. While building a solid foundation and reference for the chip design, it integrates the discussion with hands-on examples of the design automation software, included in the book, to illustrate not only the layout and simulation concepts, but also how an industry designer would put them into practice. Both theory and application are effectively integrated into a cohesive treatment of the subject and art of chip design.

Low-Voltage CMOS VLSI Circuits-James B. Kuo 1999 Geared to the needs of engineers and designers in the field, this unique volume presents a remarkably detailed analysis of one of the hottest and most compelling research topics in microelectronics today - namely, low-voltage CMOS VLSI circuit techniques for VLSI systems. It features complete guidelines to diversified low-voltage and low-power circuit techniques, emphasizing the role of submicron and CMOS processing technology and device modeling in the circuit designs of low-voltage CMOS VLSI.

Computer Aids for VLSI Design-Sтивен M. Rubin 2009 This textbook, originally published in 1987, broadly examines the software required to design electronic circuitry, including integrated circuits. Topics include synthesis and analysis tools, graphics and user interface, memory representation, and more. The book also describes a real system called "Electric."

Basic VLSI Design Technology-Cherry Bhargava 2020-05-30 The book aims to give future and current VSLI design engineers a robust understanding of the underlying principles of basic VSLI design technology. It not only focuses on circuit design processes obeying VLSI rules but also on technological aspects of fabrication. The Hardware Description Language (HDL) Verilog is explained along with its modelling style. The book also covers CMOS design from the digital systems level to the circuit level. The book clearly explains fundamental principles and is a guide to good design practices.

Introduction to VLSI Systems-Ming-Bo Lin 2011-11-28 With the advance of semiconductors and ubiquitous computing, the use of system-on-a-chip (SoC) has become an essential technique to reduce product cost. With this progress and continuous reduction of feature sizes, and the development of very large-scale integration (VLSI) circuits, addressing the harder problems requires fundamental understanding of circuit and layout design issues. Furthermore, engineers can often develop their physical intuition to estimate the behavior of circuits rapidly without relying predominantly on computer-aided design (CAD) tools. Introduction to VLSI Systems: A Logic, Circuit, and System Perspective addresses the need for teaching such a topic in terms of a logic, circuit, and system design perspective. To achieve the above-mentioned goals, this classroom-tested book focuses on: Implementing a digital system as a full-custom integrated circuit Switch logic design and useful paradigms that may apply to various static and dynamic logic families The fabrication and layout designs of complementary metal-oxide-semiconductor (CMOS) VLSI Important issues of modern CMOS processes, including deep submicron devices, circuit optimization, interconnect modeling and optimization, signal integrity, power integrity, clocking and timing, power dissipation, and electrostatic discharge (ESD) Introduction to VLSI Systems builds an understanding of integrated circuits from the bottom up, paying much attention to logic circuit, layout, and system designs. Armed with these tools, readers can not only comprehensively understand the features and limitations of modern VLSI technologies, but also have enough background to adapt to this ever-changing field.

Digital CMOS Circuit Design-Silvia Annaratone 2012-12-06

VLSI and Post-CMOS Electronics-Rohit Dhiman 2019-09 VLSI, or Very-Large-Scale-Integration, is the practice of combining billions of transistors to create an integrated circuit. At present, VLSI circuits are realised using CMOS technology. However, the demand for ever smaller, more efficient circuits is now pushing the limits of CMOS. Post-CMOS refers to the possible future digital logic technologies beyond the CMOS scaling limits. This 2-volume set addresses the current state of the art in VLSI technologies and presents potential options for post-CMOS processes. VLSI and Post-CMOS Electronics is a useful reference guide for researchers, engineers and advanced students working in the area of design and modelling of VLSI and post-CMOS devices and their circuits. Volume 1 focuses on design, modelling and simulation, including applications in low voltage and low power VLSI, and post-CMOS devices and circuits. Volume 2 addresses a wide range of devices, circuits and interconnects.

The Design and Analysis of VLSI Circuits-Lance A. Glasser 1985

Vlsi Technology, 2/E-Sze 2003-10-01

Principles of CMOS VLSI Design-Neil H. E. Weste 1985

Multi-voltage CMOS Circuit Design-Volkan Kursun 2006-08-30 This book presents an in-depth treatment of various power reduction and speed enhancement techniques based on multiple supply and threshold voltages. A detailed discussion of the sources of power consumption in CMOS circuits will be provided whilst focusing primarily on identifying the mechanisms by which sub-threshold and gate oxide leakage currents are generated. The authors present a comprehensive review of state-of-the-art dynamic, static supply and threshold voltage scaling techniques and discuss the pros and cons of supply and threshold voltage scaling techniques.

Low-Power VLSI Circuits and Systems-Ajit Pal 2014-11-17 The book provides a comprehensive coverage of different aspects of low power circuit synthesis at various levels of design hierarchy; starting from the layout level to the system level. For a seamless understanding of the subject, basics of MOS circuits has been introduced at transistor, gate and circuit level; followed by various low-power design methodologies, such as supply voltage scaling, switched capacitance minimization techniques and leakage power minimization approaches. The content of this book will prove useful to students, researchers, as well as practicing engineers.

VLSI Circuit Design Methodology Demystified-Liming Xiu 2007-12-04 This book was written to arm engineers qualified and knowledgeable in the area of VLSI circuits with the essential knowledge they need to get into this exciting field and to help those already in it achieve a higher level of proficiency. Few people truly understand how a large chip is developed, but an understanding of the whole process is necessary to appreciate the importance of each part of it and to understand the process from concept to silicon. It will teach readers how to become better engineers through a practical approach of diagnosing and attacking real-world problems.

Digital VLSI Chip Design with Cadence and Synopsys CAD Tools-Erik Brunvand 2010 KEY BENEFIT: This hands-on book leads readers through the complete process of building a ready-to-fabricate CMOS integrated circuit using popular commercial design software. KEY TOPICS: The VLSI CAD flow described in this book uses tools from two vendors: Cadence Design Systems, Inc. and Synopsys Inc. Detailed tutorials include step-by-step instructions and screen shots of tool windows and dialog boxes. MARKET: A useful reference for chip designers.

VLSI Design-A. ALBERT RAJ 2008-10-21 This text is intended for the undergraduate engineering students in Electrical and Electronics Engineering, Electronics and Communication Engineering, and Electronics and Instrumentation Engineering, and those pursuing postgraduate courses in Applied Electronics and VLSI Design. With the electronic devices and chips becoming smaller and smaller, the sizes of circuits and transistors on the microchips are approaching atomic levels. And so, Very Large-Scale Integration (VLSI) Design refers to the process of placing hundreds of thousands of electronic components on a single chip which nearly all modern computer architectures employ, and this technology has assumed a significant role in today's tech savvy world. This well-organized, up-to-date and compact text explains the basic concepts of MOS technology including the fabrication methods, MOS characteristic behaviour, and design processes for layouts, etc. in a crisp and easy-to-learn style. The latest and most advanced techniques for maximising performance, minimising power consumption, and achieving rapid design turnarounds are discussed with great skill by the authors. Key Features □ Gives an in-depth analysis of MOS structure, device characteristics, modelling and MOS device fabrication techniques. □ Provides detailed description of CMOS design of combinatorial, sequential and arithmetic circuits with emphasis on practical applications. □ Offers an insight into the CMOS testing techniques for the design of VLSI circuits. □ Gives a number of solved problems in VHDL and Verilog languages. □ Provides a number of short answer questions to help the students during examinations.

Digital Vlsi Design-Singh Ajay Kumar 2010-11-01

Theory of CMOS Digital Circuits and Circuit Failures-Masakazu Shoji 2014-07-14 CMOS chips are becoming increasingly important in computer circuitry. They have been widely used during the past decade, and they will continue to grow in popularity in those application areas that demand high performance. Challenging the prevailing opinion that circuit simulation can reveal all problems in CMOS circuits, Masakazu Shoji maintains that simulation cannot completely remove the often costly errors that occur in circuit design. To address the failure modes of these circuits more fully, he presents a new approach to CMOS circuit design based on his systematizing of circuit design error and his unique theory of CMOS digital circuit operation. In analyzing CMOS digital circuits, the author focuses not on effects originating from the characteristics of the device (MOSFET) but on those arising from their connection. This emphasis allows him to formulate a powerful but ultimately simple theory explaining the effects of connectivity by using a concept of the states of the circuits, called microstates. Shoji introduces microstate sequence diagrams that describe the state changes (or the circuit connectivity changes), and he uses his microstate theory to analyze many of the conventional CMOS digital circuits. These analyses are practically all in closed-form, and they provide easy physical interpretation of the circuit's working mechanisms, the parametric dependence of performance, and the circuit's failure modes. Originally published in 1992. The Princeton Legacy Library uses the latest print-on-demand technology to again make available previously out-of-print books from the distinguished backlist of Princeton University Press. These editions preserve the original texts of these important books while presenting them in durable paperback and hardcover editions. The goal of the Princeton Legacy Library is to vastly increase access to the rich scholarly heritage found in the thousands of books published by Princeton University Press since its founding in 1905. VLSI Handbook-Norman Einspruch 2012-12-02 VLSI Handbook is a reference guide on very large scale integration (VLSI) microelectronics and its aspects such as circuits, fabrication, and systems applications. This handbook readily answers specific questions and presents a systematic compilation of information regarding the VLSI technology. There are a total of 52 chapters in this book and are grouped according to the fields of design, materials and processes, and examples of specific system applications. Some of the chapters under fields of design are design automation for integrated circuits and computer tools for integrated circuit design. For the materials and processes, there are many chapters that discuss this aspect. Some of them are manufacturing process technology for metal-oxide semiconductor (MOS) VLSI; MOS VLSI circuit technology; and facilities for VLSI circuit fabrication. Other concepts and materials discussed in the book are the use of silicon material in different processes of VLSI, nitrides, silicides, metallization, and plasma. This handbook is very useful to students of engineering and physics. Also, researchers (in physics and chemistry of materials and processes), device designers, and system designers can also benefit from this book.

Design of Analog CMOS Integrated Circuits-Behzad Razavi 2002-10-01

CMOS VLSI Engineering-James B. Kuo 2013-04-17 Silicon-On-Insulator (SOI) CMOS technology has been regarded as another major technology for VLSI in addition to bulk CMOS technology. Owing to the buried oxide structure, SOI technology offers superior CMOS devices with higher speed, high density, and reduced second order effects for deep-submicron low-voltage, low-power VLSI circuits applications. In addition to VLSI applications, and because of its outstanding properties, SOI technology has been used to realize communication circuits, microwave devices, BICMOS devices, and even fiber optics applications. CMOS VLSI Engineering: Silicon-On-Insulator addresses three key factors in engineering SOI CMOS VLSI - processing technology, device modelling, and circuit designs are all covered with their mutual interactions. Starting from the SOI CMOS processing technology and the SOI CMOS digital and analog circuits, behaviors of the SOI CMOS devices are presented, followed by a CAD program, ST-SPICE, which incorporates models for deep-submicron fully-depleted mesa-isolated SOI CMOS devices and special purpose SOI devices including polysilicon TFTs. CMOS VLSI Engineering: Silicon-On-Insulator is written for undergraduate senior students and first-year graduate students interested in CMOS VLSI. It will also be suitable for electrical engineering professionals interested in microelectronics.

Skew-tolerant Circuit Design-David Harris 2001 As advances in technology and circuit design boost operating frequencies of microprocessors, DSPs and other fast chips, new design challenges continue to emerge. One of the major performance limitations in today's chip designs is clock skew, the uncertainty in arrival times between a pair of clocks. Increasing clock frequencies are forcing many engineers to rethink their timing budgets and to use skew-tolerant circuit techniques for both domino and static circuits. While senior designers have long developed their own techniques for reducing the sequencing overhead of domino circuits, this knowledge has routinely been protected as trade secret and has rarely been shared. Skew-Tolerant Circuit Design presents a systematic way of achieving the same goal and puts it in the hands of all designers. This book clearly presents skew-tolerant techniques and shows how they address the challenges of clocking, latching, and clock skew. It provides the practicing circuit designer with a clearly detailed tutorial and an insightful summary of the most recent literature on these critical clock skew issues. * Synthesizes the most recent advances in skew-tolerant design in one cohesive tutorial * Provides incisive instruction and advice punctuated by humorous illustrations * Includes exercises to test understanding of key concepts and solutions to selected exercises

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