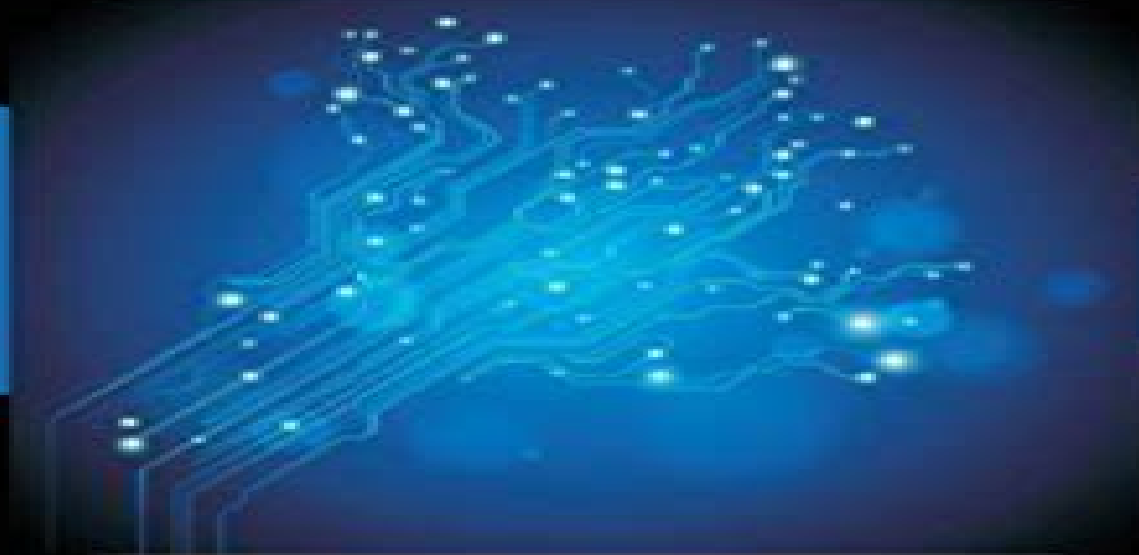


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DIGITAL INTEGRATED CIRCUITS

A DESIGN PERSPECTIVE



SECOND
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Digital Integrated Circuits Jan M. Rabaey, 2003 Contents p pChapter 1 Introductionp pChapter 2 The Manufacturing Processp pChapter 3 The Devicesp pChapter 4 The Wirep pChapter 5 The CMOS Inverterp pChapter 6 Designing Combinational Logic Gates in CMOS *Digital Integrated Circuit Design* Hubert Kaeslin, 2008-04-28 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 **CMOS Integrated Capacitive DC-DC Converters** Tom Van Breussege, Michiel Steyaert, 2012-07-25 This book provides a detailed analysis of all aspects of capacitive DC DC converter design topology selection control loop design and noise mitigation Readers will benefit from the authors systematic overview that starts from the ground up in depth circuit analysis and a thorough review of recently proposed techniques and design methodologies Not only design techniques are discussed but also implementation in CMOS is shown by pinpointing the technological opportunities of CMOS and demonstrating the implementation based on four state of the art prototypes

Real-time Systems Kuodi Jian, 2016-06-08 This book is dedicated to Real time Systems of broad applications such as autonavigation Kalman Filtering real time reconfiguration of distributed networks real time bilateral teleoperation control system over imperfect networks and uniform interfaces for resource sharing components in hierarchically scheduled real time systems In addition to that wireless technology and its usage in implementing intelligent systems open a wide spectrum of real time systems and offer great potential for improving people s life for example wireless sensor networks used in subways reduced energy consumption in public buildings improved security through public surveillance and high efficiency through industrial automation Furthermore electric utilities and multi core CPU architecture the driving force of modern life are part of subjects benefited from the topics covered in this book *Integrated Circuit and System Design. Power and Timing Modeling, Optimization and Simulation* Nadine Azemard, 2007-08-21 This volume features the refereed proceedings of the 17th International Workshop on Power and Timing Modeling Optimization and Simulation Papers cover high level design low power design techniques low power analog circuits statistical static timing analysis power modeling and optimization low power routing optimization security and asynchronous design low power applications modeling and optimization and more

Fully-Integrated Low-Dropout Regulators Xiangyu Mao, Yan Lu, Rui P. Martins, 2025-05-11 This book discusses in detail the key specifications of fully integrated low dropout regulators LDOs It covers the various LDO architectures including the classic analog architectures and the state of the art digital and switching control methods The design insight and comparison are discussed according to the key performance index Readers will be enabled to find a suitable architecture when designing a fully integrated LDO **Design of Power Management Integrated Circuits** Bernhard Wicht, 2024-05-13 Design of Power Management Integrated Circuits Comprehensive resource on power management ICs affording new levels of

functionality and applications with cost reduction in various fields Design of Power Management Integrated Circuits is a comprehensive reference for power management IC design covering the circuit design of main power management circuits like linear and switched mode voltage regulators along with sub circuits such as power switches gate drivers and their supply level shifters the error amplifier current sensing and control loop design Circuits for protection and diagnostics as well as aspects of the physical design like lateral and vertical power delivery pin out floor planning grounding supply guidelines and packaging are also addressed A full chapter is dedicated to the design of integrated passives The text illustrates the application of power management integrated circuits PMIC to growth areas like computing the Internet of Things mobility and renewable energy Includes numerous real world examples case studies and exercises illustrating key design concepts and techniques Offering a unique insight into this rapidly evolving technology through the author s experience developing PMICs in both the industrial and academic environment Design of Power Management Integrated Circuits includes information on Capacitive inductive and hybrid DC DC converters and their essential circuit blocks covering error amplifiers comparators and ramp generators Sensing protection and diagnostics covering thermal protection inductive loads and clamping structures under voltage reference and power on reset generation Integrated MOS MOM and MIM capacitors integrated inductors Control loop design and PWM generation ensuring stability and fast transient response subharmonic oscillations in current mode control analysis and circuit design for slope compensation DC behavior and DC related circuit design covering power efficiency line and load regulation error amplifier dropout and power transistor sizing Commonly used level shifters including sizing rules and cascaded tapered driver sizing and optimization guidelines Optimizing the physical design considering packaging floor planning EMI pinout PCB design and thermal design Design of Power Management Integrated Circuits is an essential resource on the subject for circuit designers IC designers system engineers and application engineers along with advanced undergraduate students and graduate students in related programs of study

Analog Circuit Design Michiel Steyaert, Arthur van Roermund, Andrea Baschirotto, 2011-09-15 Analog Circuit Design contains the contribution of 18 tutorials of the 20th workshop on Advances in Analog Circuit Design Each part discusses a specific to date topic on new and valuable design ideas in the area of analog circuit design Each part is presented by six experts in that field and state of the art information is shared and overviewed This book is number 20 in this successful series of Analog Circuit Design providing valuable information and excellent overviews of Topic 1 Low Voltage Low Power chairman Andrea Baschirotto Topic 2 Short Range Wireless Front Ends chairman Arthur van Roermund Topic 3 Power Management and DC DC chairman Michiel Steyaert Analog Circuit Design is an essential reference source for analog circuit designers and researchers wishing to keep abreast with the latest development in the field The tutorial coverage also makes it suitable for use in an advanced design course Managing Temperature Effects in Nanoscale Adaptive Systems David Wolpert, Paul Ampadu, 2011-08-31 This book discusses new techniques for detecting controlling and exploiting the impacts of temperature

variations on nanoscale circuits and systems A new sensor system is described that can determine the temperature dependence as well as the operating temperature to improve system reliability A new method is presented to control a circuit's temperature dependence by individually tuning pull up and pull down networks to their temperature insensitive operating points This method extends the range of supply voltages that can be made temperature insensitive achieving insensitivity at nominal voltage for the first time

Advanced Circuits for Emerging Technologies Krzysztof Iniewski, 2012-04-17 The book will address the state of the art in integrated circuit design in the context of emerging systems New exciting opportunities in body area networks wireless communications data networking and optical imaging are discussed Emerging materials that can take system performance beyond standard CMOS like Silicon on Insulator SOI Silicon Germanium SiGe and Indium Phosphide InP are explored Three dimensional 3 D CMOS integration and co integration with sensor technology are described as well The book is a must for anyone serious about circuit design for future technologies The book is written by top notch international experts in industry and academia The intended audience is practicing engineers with integrated circuit background The book will be also used as a recommended reading and supplementary material in graduate course curriculum Intended audience is professionals working in the integrated circuit design field Their job titles might be design engineer product manager marketing manager design team leader etc The book will be also used by graduate students Many of the chapter authors are University Professors

Education Management, Education Theory and Education Application Yuanzhi Wang, 2011-10-09 This volume includes extended and revised versions of a set of selected papers from the 2011 2nd International Conference on Education and Educational Technology EET 2011 held in Chengdu China October 1 2 2011 The mission of EET 2011 Volume 2 is to provide a forum for researchers educators engineers and government officials involved in the general areas of education management education theory and education application to disseminate their latest research results and exchange views on the future research directions of these fields 133 related topic papers were selected into this volume All the papers were reviewed by 2 program committee members and selected by the volume editor Prof Yuanzhi Wang from Intelligent Information Technology Application Research Association Hong Kong The conference will bring together leading researchers engineers and scientists in the domain of interest We hope every participant can have a good opportunity to exchange their research ideas and results and to discuss the state of the art in the areas of the education management education theory and education application

CMOS Electronics Jaume Segura, Charles F. Hawkins, 2004-03-26 CMOS manufacturing environments are surrounded with symptoms that can indicate serious test design or reliability problems which in turn can affect the financial as well as the engineering bottom line This book educates readers including non engineers involved in CMOS manufacture to identify and remedy these causes This book instills the electronic knowledge that affects not just design but other important areas of manufacturing such as test reliability failure analysis yield quality issues and problems Designed specifically for the many non electronic engineers employed in the

semiconductor industry who need to reliably manufacture chips at a high rate in large quantities this is a practical guide to how CMOS electronics work how failures occur and how to diagnose and avoid them Key features Builds a grasp of the basic electronics of CMOS integrated circuits and then leads the reader further to understand the mechanisms of failure Unique descriptions of circuit failure mechanisms some found previously only in research papers and others new to this publication Targeted to the CMOS industry or students headed there and not a generic introduction to the broader field of electronics Examples exercises and problems are provided to support the self instruction of the reader *DSP Architecture Design Essentials* Dejan Marković, Robert W. Brodersen, 2012-06-15 In *DSP Architecture Design Essentials* authors Dejan Marković and Robert W Brodersen cover a key subject for the successful realization of DSP algorithms for communications multimedia and healthcare applications The book addresses the need for DSP architecture design that maps advanced DSP algorithms to hardware in the most power and area efficient way The key feature of this text is a design methodology based on a high level design model that leads to hardware implementation with minimum power and area The methodology includes algorithm level considerations such as automated word length reduction and intrinsic data properties that can be leveraged to reduce hardware complexity From a high level data flow graph model an architecture exploration methodology based on linear programming is used to create an array of architectural solutions tailored to the underlying hardware technology The book is supplemented with online material bibliography design examples CAD tutorials and custom software **The Fourth Terminal** Sylvain Clerc, Thierry Di Gilio, Andreia Cathelin, 2020-04-25 This book discusses the advantages and challenges of Body Biasing for integrated circuits and systems together with the deployment of the design infrastructure needed to generate this Body Bias voltage These new design solutions enable state of the art energy efficiency and system flexibility for the latest applications such as Internet of Things and 5G communications Three-Dimensional Integrated Circuit Design Yuan Xie, Jingsheng Jason Cong, Sachin Sapatnekar, 2009-12-02 We live in a time of great change In the electronics world the last several decades have seen unprecedented growth and advancement described by Moore's law This observation stated that transistor density in integrated circuits doubles every 1.5-2 years This came with the simultaneous improvement of individual device performance as well as the reduction of device power such that the total power of the resulting ICs remained under control No trend remains constant forever and this is unfortunately the case with Moore's law The trouble began a number of years ago when CMOS devices were no longer able to proceed along the classical scaling trends Key device parameters such as gate oxide thickness were simply no longer able to scale As a result device leakage currents began to creep up at an alarming rate These continuing problems with classical scaling have led to a leveling off of IC clock speeds to the range of several GHz Of course chips can be clocked higher but the thermal issues become unmanageable This has led to the recent trend toward microprocessors with multiple cores each running at a few GHz at the most The goal is to continue improving performance via parallelism by adding more and more cores instead of increasing speed The challenge here is to

ensure that general purpose codes can be efficiently parallelized There is another potential solution to the problem of how to improve CMOS technology performance three dimensional integrated circuits 3D ICs **Large Area and Flexible**

Electronics Mario Caironi,Yong-Young Noh,2015-01-13 From materials to applications this ready reference covers the entire value chain from fundamentals via processing right up to devices presenting different approaches to large area electronics thus enabling readers to compare materials properties and performance Divided into two parts the first focuses on the materials used for the electronic functionality covering organic and inorganic semiconductors including vacuum and solution processed metal oxide semiconductors nanomembranes and nanocrystals as well as conductors and insulators The second part reviews the devices and applications of large area electronics including flexible and ultra high resolution displays light emitting transistors organic and inorganic photovoltaics large area imagers and sensors non volatile memories and radio frequency identification tags With its academic and industrial viewpoints this volume provides in depth knowledge for experienced researchers while also serving as a first stop resource for those entering the field Model and Design of

Bipolar and MOS Current-Mode Logic Massimo Alioto,Gaetano Palumbo,2006-01-25 Current Mode digital circuits have been extensively analyzed and used since the early days of digital ICs In particular bipolar Current Mode digital circuits emerged as an approach to realize digital circuits with the highest speed Together with its speed performance CMOS Current Mode logic has been rediscovered to allow logic gates implementations which in contrast to classical VLSI CMOS digital circuits have the feature of low noise level generation Thus CMOS Current Mode gates can be efficiently used inside analog and mixed signal ICs which require a low noise silicon environment For these reasons until today many works and results have been published which reinforce the importance of Current Mode digital circuits In the topic of Current Mode digital circuits the authors spent a lot of effort in the last six years and their original results highly enhanced both the modeling and the related design methodologies Since the fundamental Current Mode logic building block is the classical differential amplifier the winning idea that represents the starting point of the authors research was to change the classical point of view typically followed in the investigation and design of Current Mode digital circuits In particular they properly exploited classical paradigms developed and used in the analog circuit domain a topic in which one of the authors matured a great experience

Ageing of Integrated Circuits Basel Halak,2019-09-30 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 **The Sparse Fourier Transform** Haitham

Hassanieh,2018-02-27 The Fourier transform is one of the most fundamental tools for computing the frequency representation of signals It plays a central role in signal processing communications audio and video compression medical imaging genomics astronomy as well as many other areas Because of its widespread use fast algorithms for computing the Fourier transform can benefit a large number of applications The fastest algorithm for computing the Fourier transform is

the Fast Fourier Transform FFT which runs in near linear time making it an indispensable tool for many applications. However, today the runtime of the FFT algorithm is no longer fast enough, especially for big data problems where each dataset can be few terabytes. Hence, faster algorithms that run in sublinear time, i.e., do not even sample all the data points, have become necessary. This book addresses the above problem by developing the Sparse Fourier Transform algorithms and building practical systems that use these algorithms to solve key problems in six different applications: wireless networks, mobile systems, computer graphics, medical imaging, biochemistry, and digital circuits. This is a revised version of the thesis that won the 2016 ACM Doctoral Dissertation Award.

Handbook of Energy-Aware and Green Computing - Two Volume Set Ishfaq Ahmad, Sanjay Ranka, 2016-02-03

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