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Micro and nano-electro-mechanical system (M/NEMS) devices constitute key technological building blocks to enable increased additional functionalities within Integrated Circuits (ICs) in the More-Than-Moore era, as described in the International Technology Roadmap for Semiconductors. The CMOS ICs and M/NEMS dies can be combined in the same package (SiP), or integrated within a single chip (SoC). In the SoC approach the M/NEMS devices are monolithically integrated together with CMOS circuitry allowing the development of compact and low-cost CMOS-M/NEMS devices for multiple applications (physical sensors, chemical sensors, biosensors, actuators, energy actuators, filters, mechanical relays, and others). On-chip CMOS electronics integration can overcome limitations related to the extremely low-level signals in sub-micrometer and nanometer scale electromechanical transducers enabling novel breakthrough applications. This Special Issue aims to gather high quality research contributions dealing with MEMS and NEMS devices monolithically integrated with CMOS, independently of the final application and fabrication approach adopted (MEMS-first, interleaved MEMS, MEMS-last or others).]

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.

This book pulls together all the basic theory and most recent research findings in the new area of switched capacitor filters. KEY TOPICS: Emphasizing the miniaturization and design of filters in silicon chip technology, the book derives and evaluates SC filter configurations and pays particular attention to such important topics as stray-sensitivity, minimal chip area, and capacitor ratio required. This is a valuable reference book for professional engineers, working in the leading edge areas of communications, signal processing, digital filters, switched capacitor filters and VLSI.

This book investigates the possible circuit solutions to overcome the temperature and supply voltage-sensitivity of fully-integrated time references for ultra-low-power communication in wireless sensor networks. The authors provide an elaborate theoretical introduction and literature study to enable full understanding of the design challenges and shortcomings of current oscillator implementations. Furthermore, a closer look to the short-term as well as the long-term frequency stability of integrated oscillators is taken. Next, a design strategy is developed and applied to 5 different oscillator topologies and 1 sensor interface. All 6 implementations are subject to an elaborate study of frequency stability, phase noise and power consumption. In the final chapter all blocks are compared to the state of the art.

Resistor-based Temperature Sensors in CMOS Technology

Communications, Imaging, and Sensing

Development of CMOS-MEMS/NEMS Devices

Hybrid ADCs, Smart Sensors for the IoT, and Sub-1V & Advanced Node Analog Circuit Design

Distributed CMOS Bidirectional Amplifiers

Circuits at the Nanoscale

This second edition of the highly acclaimed RF Power Amplifiers has been thoroughly revised and expanded to reflect the latest challenges associated with power transmitters used in communications systems. With more rigorous treatment of many concepts, the new edition includes a unique combination of class-tested analysis and industry-proven design techniques. Radio frequency (RF) power amplifiers are the fundamental building blocks used in a vast variety of wireless communication circuits, radio and TV broadcasting transmitters, radars, wireless energy transfer, and industrial processes. Through a combination of theory and practice, RF Power Amplifiers, Second Edition provides a solid understanding of the key concepts, the principle of operation, synthesis, analysis, and design of RF power amplifiers. This extensive update boasts: up to date end of chapter summaries; review questions and problems; an expansion on key concepts; new examples related to real-world applications illustrating key concepts and brand new chapters covering 'hot topics' such as RF LC oscillators and dynamic power supplies. Carefully edited for superior readability, this work remains an essential reference for research & development staff and design engineers. Senior level undergraduate and graduate electrical engineering students will also find it an invaluable resource with its practical examples & summaries, review questions and end of chapter problems. Key features:

- A fully revised solutions manual is now hosted on a companion website alongside new simulations.
- Extended treatment of a broad range of topologies of RF power amplifiers.
- In-depth treatment of state-of-the art of modern transmitters and a new chapter on oscillators.
- Includes problem-solving methodology, step-by-step derivations and closed-form design equations with illustrations.

This proceedings volume collects the most up-to-date, comprehensive and state-of-the-art knowledge on wireless communication, sensor network, network technologies, services and application. Written by world renowned researchers, each chapter is original in content, featuring high-impact presentations and late-breaking contributions. Researchers and practitioners will find this edition a useful resource material and an inspirational read. Contents: Wireless Communications Network Technologies Services and Application Readership: Researchers, academics, professionals and graduate students in neural networks/networking, electrical & electronic engineering, and condensed matter physics.

This book provides a practical guide to terahertz electronics, especially for readers with an electronics background. The author guides readers through the all the key concepts of terahertz electronics, including terahertz sources, detectors, and waveguides, together with reviews on key terahertz applications on spectroscopy, imaging, communication, and radar. This book will serve as a handy reference for graduate students and engineers in the field of terahertz with a viewpoint from electronics. Presents the topic of terahertz from electronics viewpoint; Designed to be particularly helpful for the readers familiar with semiconductor devices and circuits; Enables optics-based terahertz researchers to understand terahertz electronics; Based on the author's extensive experience from both industry and academia.

This comprehensive handbook has become the definitive reference work in the field of nanoscience and nanotechnology, and this 4th edition incorporates a number of recent new developments. It integrates nanofabrication, nanomaterials, nanodevices, nanomechanics, nanotribology, materials science, and reliability engineering knowledge in just one volume. Furthermore, it discusses various nanostructures; micro/nanofabrication; micro/nanodevices and biomicro/nanodevices, as well as scanning probe microscopy; nanotribology and nanomechanics; molecularly thick films; industrial applications and nanodevice reliability; societal, environmental, health and safety issues; and nanotechnology education. In this new edition, written by an international team of over 140 distinguished experts and put together by an experienced editor with a comprehensive understanding of the field, almost all the chapters are either new or substantially revised and expanded, with new topics of interest added. It is an essential resource for anyone working in the rapidly evolving field of key technology, including mechanical and electrical engineers, materials scientists, physicists, and chemists.

Temperature- and Supply Voltage-Independent Time References for Wireless Sensor Networks

Asynchronous Circuit Design

Introduction to Terahertz Electronics

Broadbanding and Linearization Techniques CMOS Circuits for Biological Sensing and Processing

The first book to explain the principals behind mobile 3D hardware implementation, helping readers understand advanced algorithms, produce low-cost, low-power SoCs, or become familiar with embedded systems As mobile broadcasting and entertainment applications evolve, there is increasing interest in 3D graphics within the field of mobile electronics, particularly for handheld devices. In *Mobile 3D Graphics SoC*, Yoo provides a comprehensive understanding of the algorithms of mobile 3D graphics and their real chip implementation methods. 3D graphics SoC (System on a Chip) architecture and its interaction with embedded system software are explained with numerous examples. Yoo divides the book into three sections: general methodology of low power SoC, design of low power 3D graphics SoC, and silicon implementation of 3D graphics SoCs and their application to mobile electronics. Full examples are presented at various levels such as system level design and circuit level optimization along with design technology. Yoo incorporates many real chip examples, including many commercial 3D graphics chips, and provides cross-comparisons of various architectures and their performance. Furthermore, while advanced 3D graphics techniques are well understood and supported by industry standards, this is less true in the emerging mobile applications and games market. This book redresses this imbalance, providing an in-depth look at the new OpenGL ES (The Standard for Embedded Accelerated 3D Graphics), and shows what these new embedded systems graphics libraries can provide for 3D graphics and games developers.

Chip Design and Implementation from a Practical Viewpoint Focusing on chip implementation, Low-Power NoC for High-Performance SoC Design provides practical knowledge and real examples of how to use network on chip (NoC) in the design of system on chip (SoC). It discusses many architectural and theoretical studies on NoCs, including design methodology, topology exploration, quality-of-service guarantee, low-power design, and implementation trials. *The Steps to Implement NoC* The book covers the full spectrum of the subject, from theory to actual chip design using NoC. *Employing the Unified Modeling Language (UML) throughout*, it presents complicated concepts, such as models of computation and communication—computation partitioning, in a manner accessible to laypeople. The authors provide guidelines on how to simplify complex networking theory to design a working chip. In addition, they explore the novel NoC techniques and implementations of the Basic On-Chip Network (BONE) project. Examples of real-time decisions, circuit-level design, systems, and chips give the material a real-world context. *Low-Power NoC and Its Application to SoC Design* Emphasizing the application of NoC to SoC design, this book shows how to build the complicated interconnections on SoC while keeping a low power consumption.

With a focus on designing and verifying CMOS analog integrated circuits, the book reviews design techniques for mixed-signal building blocks, such as Nyquist and oversampling data converters, and circuits for signal generation, synthesis, and recovery. The text details all aspects, from specifications to the final circuit, of the design of digital-to-analog converters, analog-to-digital converters, phase-locked loops, delay-locked loops, high-speed input/output link transceivers, and class D amplifiers. Special emphasis is put on calibration methods that can be used to compensate circuit errors due to device mismatches and semiconductor process variations. Gives an overview of data converters, phase- and delay-locked loop architectures, highlighting basic operation and design trade-offs. Focus on circuit analysis methods useful to meet requirements for a high-speed and power-efficient operation. Outlines design challenges of analog integrated circuits using state-of-the-art CMOS processes. Presents design methodologies to optimize circuit performance on both transistor and architectural levels. Includes open-ended circuit design case studies.

This book presents innovative solutions for the implementation of Sigma-Delta Modulation (SDM) based Analog-to-Digital Conversion (ADC), required for the next generation of wireless hand-held terminals. These devices will be based on the so-called multi-standard transceiver chipsets, integrated in nanometer CMOS technologies. One of the most challenging and critical parts in such transceivers is the analog-digital interface, because of the assorted signal bandwidths and dynamic ranges that can be required to handle the A/D conversion for several operation modes. This book describes new adaptive and reconfigurable SDM ADC topologies, circuit strategies and synthesis methods, specially suited for multi-standard wireless telecom systems and future Software-defined-radios (SDRs) integrated in nanoscale CMOS. It is a practical book, going from basic concepts to the frontiers of SDM architectures and circuit implementations, which are explained in a didactical and systematic way. It gives a comprehensive overview of the state-of-the-art performance, challenges and practical solutions, providing the necessary insight to implement successful design, through an efficient design and synthesis methodology. Readers will learn a number of practical skills – from system-level design to experimental measurements and testing.

High-Speed Circuits for Lightwave Communications

Analog-digital ASICs

Circuits and Principles

Measurement and Modeling of Silicon Heterostructure Devices

Low-Power NoC for High-Performance SoC Design

Interface Circuits for Microsensor Integrated Systems

This book describes methods to design distributed amplifiers useful for performing circuit functions such as duplexing, paraphrase amplification, phase shifting power splitting and power combiner applications. A CMOS bidirectional distributed amplifier is presented that combines for the first time device-level with circuit-level linearization, suppressing the third-order intermodulation distortion. It is implemented in 0.13um RF CMOS technology for use in highly-linear, low-cost UWB Radio-over-Fiber communication systems.

High speed circuits are crucial for increasing the bandwidth of transmission and switching of voice/video/data over optical fiber networks. The ever-increasing demand for bit rates higher than those available due to the explosion of Internet traffic has driven engineers to develop integrated circuits of performance approaching 100 Gb/s. Commercial lightwave products using high speed circuits of 10 Gb/s

and beyond are readily available. High Speed Circuits for Lightwave Communications presents the latest information on circuit design, measured results, applications, and product development. It covers electronic and opto-electronic circuits for transmission, receiving, and cross-point switching. These circuits were implemented with various state-of-the-art IC technologies, including Si BJT, GaAs MESFET, HEMT, HBT, as well as InP HEMT and HBT. The book, written by more than 50 experts, will benefit graduate students, researchers, and engineers who are interested in or work in this exciting and challenging field of optical communications. Contents: High Speed Circuits for Lightwave Communications (K Pedrotti) Si and SiGe Bipolar ICs for 10 to 40 Gb/s Optical-Fiber TDM Links (H-M Rein) Low Transimpedance-Fluctuation Design for 10-GHz Si-Bipolar Preamplifier in 10 Gb/s Optical Transmission Systems (T Masuda et al.) 20-40-Gbit/s-Class GaAs MESFET Digital ICs for Future Optical Fiber Communications Systems (T Otsuji et al.) 20-40 Gbit/s GaAs-HEMT Chip Set for Optical Data Receiver (Z Lao et al.) AlGaAs/GaAs HBT Circuits for Optical TDM Communications (K Runge et al.) High Speed Cross-Point Switches (C E Chang et al.) HBT ICs for OC-192 Equipment (J Sitch & R Surridge) Present Status and Future Prospects of High-Speed Lightwave IC's Based on InP (E Sano et al.) InP HBT ICs for 40 Gb/s Optical Links (M Mokhtari et al.) A Review of Recent Progress in InP-Based Optoelectronic Integrated Circuit Receiver Front-Ends (R H Walden) Ultrahigh f_{max} AlInAs/GaInAs Transferred-Substrate Heterojunction Bipolar Transistors for Integrated Circuits Applications (B Agarwal et al.)

Readership: Researchers in the field of semiconductors and high speed transmission over optic fibres. Keywords: IC; Circuit; Optical-Fiber Communications; Lightwave Communications; 10Gb; 40Gb; OEIC; Transceiver; Crosspoint Switch; GaAs; InP

This book discusses the design and implementation of energy harvesting systems targeting wearable devices. The authors describe in detail the different energy harvesting sources that can be utilized for powering low-power devices in general, focusing on the best candidates for wearable applications. Coverage also includes state-of-the-art interface circuits, which can be used to accept energy from harvesters and deliver it to a device in the most efficient way. Finally, the authors present power management circuits for using multiple energy harvesting sources at the same time to power devices and to enhance efficiency of the system.

Ambient Intelligence is one of the new paradigms in the development of information and communication technology, which has attracted much attention over the past years. The aim is to integrate technology into people environment in such a way that it improves their daily lives in terms of well-being, creativity, and productivity. Ambient Intelligence is a multidisciplinary concept, which heavily builds on a number of fundamental breakthroughs that have been achieved in the development of new hardware concepts over the past years. New insights in nano and micro electronics, packaging and interconnection technology, large-area electronics, energy scavenging devices, wireless sensors, low power electronics and computing platforms enable the realization of the heaven of ambient intelligence by overcoming the hell of physics. Based on contributions from leading technical experts, this book presents a number of key topics on novel hardware developments, thus providing the reader a good insight into the physical basis of ambient intelligence. It also indicates key research challenges that must be addressed in the future.

Improved Techniques for Image Rejection in Wideband Quadrature Receivers

Advances in Analog Circuit Design 2017

Hardware Technology Drivers of Ambient Intelligence

Circuit Techniques, Design Tools and Applications

Nanoelectronics and Information Technology

Data Converters, Phase-Locked Loops, and Their Applications

An introduction to the design of analog VLSI circuits. Neuromorphic engineers work to improve the performance of artificial systems through the development of chips and systems that process information collectively using primarily analog circuits. This book presents the central concepts required for the creative and successful design of analog VLSI circuits. The discussion is weighted toward novel circuits that emulate natural signal processing. Unlike most circuits in commercial or industrial applications, these circuits operate mainly in the subthreshold or weak inversion region. Moreover, their functionality is not limited to linear operations, but also encompasses many interesting nonlinear operations similar to those occurring in natural systems. Topics include device physics, linear and nonlinear circuit forms, translinear circuits, photodetectors, floating-gate devices, noise analysis, and process technology.

This volume comprises select papers from the International Conference on Nano-electronics, Circuits & Communication Systems (NCCS). The conference focused on the frontier issues and their applications in business, academia, industry, and other allied areas. This international conference aimed to bring together scientists, researchers, engineers from academia and industry. The book covers technological developments and current trends in key areas such as VLSI design, IC manufacturing, and applications such as communications, ICT, and hybrid electronics. The contents of this volume will prove useful to researchers, professionals, and students alike.

Circuits for Emerging Technologies Beyond CMOS New exciting opportunities are abounding in the field of body area networks, wireless communications, data networking, and optical imaging. In response to these developments, top-notch international experts in industry and academia present Circuits at the Nanoscale: Communications, Imaging, and Sensing. This volume, unique in both its scope and its focus, addresses the state-of-the-art in integrated circuit design in the context of emerging systems. A must for anyone serious about circuit design for future technologies, this book discusses emerging materials that can take system performance beyond standard CMOS. These include Silicon on Insulator (SOI), Silicon Germanium (SiGe), and Indium Phosphide (InP). Three-dimensional CMOS integration and co-integration with Microelectromechanical (MEMS) technology and radiation sensors are described as well. Topics in the book are divided into comprehensive sections on emerging design techniques, mixed-signal CMOS circuits, circuits for communications, and circuits for imaging and sensing. Dr. Krzysztof Iniewski is a director at CMOS Emerging Technologies, Inc., a consulting company in Vancouver, British Columbia. His current research interests are in VLSI circuits for medical applications. He has published over 100 research papers in international journals and conferences, and he holds 18 international patents granted in the United States, Canada, France, Germany, and Japan. In this volume, he has assembled the contributions of over 60 world-renowned experts who are at the top of their field in the world of circuit design, advancing the bank of knowledge for all who work in this exciting and burgeoning area.

This book is a printed edition of the Special Issue "Interface Circuits for Microsensor Integrated Systems" that was published in *Micromachines*

Analog VLSI

Theory, Analysis and Design

Silicon Based Unified Memory Devices and Technology

Proceedings of the International Conference on Wireless Communication and Sensor Network (WCSN 2015)

Wireless Communication and Sensor Network

Springer Handbook of Nanotechnology

This is the first book focusing on the subject of image rejection in wireless receiver design, which is crucial for the current and next generation mobile terminals. It serves as a very useful reference for wireless design engineers, researchers and students.

This useful monograph presents a total of seven prototypes: two double-sampled S/H circuits, a time-interleaved ADC, an IF-sampling self-calibrated pipelined ADC, a current steering DAC with a deglitcher, and two pipelined ADCs employing the SO techniques.

This volume describes the design of relay-based circuit systems from device fabrication to circuit micro-architectures. This book is ideal for both device engineers as well as circuit system designers, and highlights the importance of co-design across design hierarchies when trying to optimize system performance (in this case, energy-efficiency). The book will also appeal to researchers and engineers focused on semiconductor, integrated circuits, and energy efficient electronics.

High speed circuits are crucial for increasing the bandwidth of transmission and switching of voice/video/data over optical fiber networks. The ever-increasing demand for bit rates higher than those available due to the explosion of Internet traffic has driven engineers to develop integrated circuits of performance approaching 100 Gb/s. Commercial lightwave products using high speed circuits of 10 Gb/s and beyond are readily available. *High Speed Circuits for Lightwave Communications* presents the latest information on circuit design, measured results, applications, and product development. It covers electronic and opto-electronic circuits for transmission, receiving, and cross-point switching. These circuits were implemented with various state-of-the-art IC technologies, including Si BJT, GaAs MESFET, HEMT, HBT, as well as InP HEMT and HBT. The book, written by more than 50 experts, will benefit graduate students, researchers, and engineers who are interested in or work in this exciting and challenging field of optical communications.

Infrared and Terahertz Detectors, Third Edition

Semiconductors and Semimetals

Active RC, OTA-C, and SC

Design, Test and Calibration

Radio-Frequency Microelectronic Circuits for Telecommunication Applications

Circuit Design for Wireless Communications

Radio-Frequency Microelectronic Circuits for Telecommunication Applications covers the design issues of radio-frequency microelectronic circuits for telecommunication applications with emphasis on devices and circuit-level design. It uses a large number of real examples from industrial design as a vehicle both to teach the principles and to ensure relevance starting from device level modeling to basic RF microelectronic circuit cell design. Modeling for high-frequency operation of both active and passive integrated devices is covered starting from the bipolar transistor to the MOS transistor to the modeling of integrated spiral inductors, resistors, capacitors, varactors and package parasitics structures. A chapter is also devoted to the presentation of the basic definitions and terminology used in RF IC design. The book continues with the presentation of the principal building blocks of an integrated RF front-end, namely, the LNA, the mixer, the VCO and integrated filters. Design paradigms are provided classified on the technology used in each case: pure bipolar, CMOS, BiCMOS or SiGe. *Radio-Frequency Microelectronic Circuits for Telecommunication Applications* is essential reading for all researchers, practising engineers and designers working in RF electronics. It is also a reference for use in advanced undergraduate or graduate courses in the same field.

This book covers the complete spectrum of the fundamentals of clocked, regenerative comparators, their state-of-the-art, advanced CMOS technologies, innovative comparators inclusive circuit aspects, their characterization and properties. Starting from the basics of comparators and the transistor characteristics in nanometer CMOS, seven high-performance comparators developed by the authors in 120nm and 65nm CMOS are described extensively. Methods and measurement circuits for the characterization of advanced comparators are introduced. A synthesis of the largely differing aspects of demands on modern comparators and the properties of devices being available in nanometer CMOS, which are posed by the so-called nanometer hell of physics, is accomplished. The book summarizes the state of the art in integrated comparators.

Advanced measurement circuits for characterization will be introduced as well as the method of characterization by bit-error analysis usually being used for characterization of optical receivers. The book is compact, and the graphical quality of the illustrations is outstanding. This book is written for engineers and researchers in industry as well as scientists and Ph.D students at universities. It is also recommendable to graduate students specializing on nanoelectronics and microelectronics or circuit design.

With the fast advancement of CMOS fabrication technology, more and more signal-processing functions are implemented in the digital domain for a lower cost, lower power consumption, higher yield, and higher re-configurability. This has recently generated a great demand for low-power, low-voltage A/D converters that can be realized in a mainstream deep-submicron CMOS technology. However, the discrepancies between lithography wavelengths and circuit feature sizes are increasing. Lower power supply voltages significantly reduce noise margins and increase variations in process, device and design parameters. Consequently, it is steadily more difficult to control the fabrication process precisely enough to maintain uniformity. The inherent randomness of materials used in fabrication at nanoscopic scales means that performance will be increasingly variable, not only from die-to-die but also within each individual die. Parametric variability will be compounded by degradation in nanoscale integrated circuits resulting in instability of parameters over time, eventually leading to the development of faults. Process variation cannot be solved by improving manufacturing tolerances; variability must be reduced by new device technology or managed by design in order for scaling to continue. Similarly, within-die performance variation also imposes new challenges for test methods. In an attempt to address these issues, *Low-Power High-Resolution Analog-to-Digital Converters* specifically focus on: i) improving the power efficiency for the high-speed, and low spurious spectral A/D conversion performance by exploring the potential of low-voltage analog design and calibration techniques, respectively, and ii) development of circuit techniques and algorithms to enhance testing and debugging potential to detect errors dynamically, to isolate and confine faults, and to recover errors continuously. The feasibility of the described methods has been verified by measurements from the silicon prototypes fabricated in standard 180nm, 90nm and 65nm CMOS technology.

This outstanding textbook provides an introduction to electronic materials and device concepts for the major areas of current and future information technology. On about 1,000 pages, it collects the fundamental concepts and key technologies related to advanced electronic

materials and devices. The obvious strength of the book is its encyclopedic character, providing adequate background material instead of just reviewing current trends. It focuses on the underlying principles which are illustrated by contemporary examples. The third edition now holds 47 chapters grouped into eight sections. The first two sections are devoted to principles, materials processing and characterization methods. Following sections hold contributions to relevant materials and various devices, computational concepts, storage systems, data transmission, imaging systems and displays. Each subject area is opened by a tutorial introduction, written by the editor and giving a rich list of references. The following chapters provide a concise yet in-depth description in a given topic. Primarily aimed at graduate students of physics, electrical engineering and information technology as well as material science, this book is equally of interest to professionals looking for a broader overview. Experts might appreciate the book for having quick access to principles as well as a source for getting insight into related fields.

High Efficiency Video Coding (HEVC)

Algorithms and Architectures

From Algorithm to Chip

RF Power Amplifiers

Nanometer CMOS Sigma-Delta Modulators for Software Defined Radio

VLSI Analog Filters

The primary focus of this book is on basic device concepts, memory cell design, and process technology integration. The first part provides in-depth coverage of conventional nonvolatile memory devices, stack structures from device physics, historical perspectives, and identifies limitations of conventional devices. The second part reviews advances made in reducing and/or eliminating existing limitations of NVM device parameters from the standpoint of device scalability, application extendibility, and reliability. The final part proposes multiple options of silicon based unified (nonvolatile) memory cell concepts and stack designs (SUMs). The book provides Industrial R&D personnel with the knowledge to drive the future memory technology with the established silicon FET-based establishments of their own. It explores application potentials of memory in areas such as robotics, avionics, health-industry, space vehicles, space sciences, bio-imaging, genetics etc.

This book provides developers, engineers, researchers and students with detailed knowledge about the High Efficiency Video Coding (HEVC) standard. HEVC is the successor to the widely successful H.264/AVC video compression standard, and it provides around twice as much compression as H.264/AVC for the same level of quality. The applications for HEVC will not only cover the space of the well-known current uses and capabilities of digital video - they will also include the deployment of new services and the delivery of enhanced video quality, such as ultra-high-definition television (UHDTV) and video with higher dynamic range, wider range of representable color, and greater representation precision than what is typically found today. HEVC is the next major generation of video coding design - a flexible, reliable and robust solution that will support the next decade of video applications and ease the burden of video on world-wide network traffic. This book provides a detailed explanation of the various parts of the standard, insight into how it was developed, and in-depth discussion of algorithms and architectures for its implementation.

This book is based on the 18 tutorials presented during the 26th workshop on Advances in Analog Circuit Design. Expert designers present readers with information about a variety of topics at the frontier of analog circuit design, with specific contributions focusing on hybrid ADCs, smart sensors for the IoT, sub-1V and advanced-node analog circuit design. This book serves as a valuable reference to the state-of-the-art, for anyone involved in analog circuit research and development.

This book provides the most comprehensive and consistent survey of the field of IC design for Biological Sensing and Processing. The authors describe a multitude of applications that require custom CMOS IC design and highlight the techniques in analog and mixed-signal circuit design that potentially can cross boundaries and benefit the very wide community of bio-medical engineers.

Comparators in Nanometer CMOS Technology

Micro-Relay Technology for Energy-Efficient Integrated Circuits

Festkörperprobleme

Amlware

Circuit Techniques for Low-Voltage and High-Speed A/D Converters

Mobile 3D Graphics SoC

This new edition of Infrared and Terahertz Detectors provides a comprehensive overview of infrared and terahertz detector technology, from fundamental science to materials and fabrication techniques. It contains a complete overhaul of the contents including several new chapters and a new section on terahertz detectors and systems. It includes a new tutorial introduction to technical aspects that are fundamental for basic understanding. The other dedicated sections focus on thermal detectors, photon detectors, and focal plane arrays.

Semiconductors and Semimetals

Great strides have been made in the development of analog filters over the past few decades. The first book to treat these recent advances in depth, "VLSI Analog Filters"

provides a comprehensive guide for researchers and upper-level graduate students, which fully prepares readers for professional work. In particular, the work covers active R filters, OTA-C filters, and switched-capacitor filters, including topics such as differential output opamps, sensitivity analysis for passive components, multiple-feedback techniques, double-sampling, and N-path filters. Throughout the book, exercises are included to reinforce understanding of concepts, and simulations are used to enhance connections to practical applications. This advanced textbook is suitable for engineering graduate students studying analog filter design, offering a full course that can feed seamlessly to employment industry. At the same time, it serves as an extremely valuable reference for researchers and engineers looking to gain a deeper understanding of the field.

When you see a nicely presented set of data, the natural response is: "How did they do that; what tricks did they use; and how can I do that for myself?" Alas, usually, you must simply keep wondering, since such tricks-of-the-trade are usually held close to the vest and rarely divulged. Shamefully ignored in the technical literature, measurement and modeling of high-speed semiconductor devices is a fine art. Robust measuring and modeling at the levels of performance found in modern SiGe devices requires extreme dexterity in the laboratory to obtain reliable data, and then a valid model to fit that data. Drawn from the comprehensive and well-reviewed Silicon Heterostructure Handbook, this volume focuses on measurement and modeling of high-speed silicon heterostructure devices. The chapter authors provide experience-based tricks-of-the-trade and the subtle nuances of measuring and modeling advanced devices, making this an important reference for the semiconductor industry. It includes easy-to-reference appendices covering topics such as the properties of silicon and germanium, the generalized Moll-Ross relations, the integral charge-control model, and sample SiGe HBT compact model parameters.

High-speed Circuits for Lightwave Communications

Energy Harvesting for Self-Powered Wearable Devices

Switched Capacitor Filters

Proceedings of the International Conference on Nano-electronics, Circuits & Communication Systems

Low-Power High-Resolution Analog to Digital Converters

Transformer-Based Design Techniques for Oscillators and Frequency Dividers

Circuits at the Nanoscale Communications, Imaging, and Sensing CRC Press

This book provides in-depth coverage of transformer-based design techniques that enable CMOS oscillators and frequency dividers to achieve state-of-the-art performance. Design, optimization, and measured performance of oscillators and frequency dividers for different applications are discussed in detail, focusing on not only ultra-low supply voltage but also ultra-wide frequency tuning range and locking range. This book will be an invaluable reference for anyone working or interested in CMOS radio-frequency or mm-Wave integrated circuits and systems.

For many applications, circuits that combine analog and digital signals can provide superior solutions to those produced with digital signals alone. Eighteen contributions in four sections--processing technology, circuit techniques and building blocks, design and applications, and CAD and supporting tools--detail and support this new approach. Annotation copyrighted by Book News, Inc., Portland, OR