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Proceedings of the ... Midwest Symposium on Circuits and Systems - 2003

CMOS 60-GHz and E-band Power Amplifiers and Transmitters -
Dixian Zhao 2015-06-29

This book focuses on the development of design techniques and methodologies for 60-GHz and E-band power amplifiers and transmitters at device, circuit and layout levels. The authors show the recent development of millimeter-wave design techniques, especially of power amplifiers and transmitters, and presents novel design concepts, such as "power transistor layout" and "4-way parallel-series power combiner", that can enhance the output power and efficiency of power amplifiers in a compact silicon area. Five state-of-the-art 60-GHz and E-band designs with measured results are demonstrated to prove the effectiveness of the design concepts and hands-on methodologies presented. This book serves as a valuable reference for circuit designers to develop millimeter-wave building blocks for future 5G applications.

Integrated Inductors and Transformers - Egidio Ragonese
2010-11-15

With the ability to improve performance, reduce fabrication costs, and increase integration levels of both RX and TX sections of the RF/mm-wave front-end, passive inductive components have experienced extraordinary growth in ICs. Therefore, a fundamental understanding of monolithic inductors and transformers has become essential for all process engineers and circuit designers. Supplying balanced coverage of the technology and applications, *Integrated Inductors and Transformers: Characterization, Design and Modeling for RF and mm-Wave Applications* provides a complete overview of the design, fabrication, and modeling of monolithic inductors and transformers. It considers the underlying physics and theoretical background of inductive components fabricated on a semiconductor substrate. Deals with both inductors and transformers and their application in RF/mm-wave ICs Focuses on silicon-based inductive components and their performance optimization in RF/mm-wave ICs Provides insight into lumped scalable modeling of both inductors and transformers Covers concepts of system calibration, test pattern parasitics, and de-embedding for on-wafer measurements of passive devices Illustrates practical applications of theoretical concepts by means of meaningful circuit design examples Highlighting the pressing requirements of the wireless market and evolving communication standards, the text provides a comprehensive review of recently developed modeling techniques and applications. It also includes helpful rule-of-thumb design guidelines and commonly employed optimization strategies to help kick-start your design, fabrication, and modeling efforts.

Nanoelectronic Materials, Devices and Modeling - Qiliang Li 2019-07-15
As CMOS scaling is approaching the fundamental physical limits, a wide range of new nanoelectronic materials and devices have been proposed and explored to extend and/or replace the current electronic devices and circuits so as to maintain progress with respect to speed and integration density. The major limitations, including low carrier mobility, degraded subthreshold slope, and heat dissipation, have become more challenging to address as the size of silicon-based metal oxide semiconductor field effect transistors (MOSFETs) has decreased to nanometers, while device integration density has increased. This book aims to present technical approaches that address the need for new nanoelectronic materials and devices. The focus is on new concepts and knowledge in nanoscience and nanotechnology for applications in logic, memory, sensors, photonics, and renewable energy. This research on nanoelectronic materials and devices will be instructive in finding solutions to address the challenges of current electronics in switching speed, power consumption, and heat dissipation and will be of great interest to academic society and the industry.

Analog Circuit Design - Johan Huijsing 2007-05-08

This book contains the revised contributions of the 18 tutorial speakers at the tenth AACD 2001 in Noordwijk, the Netherlands, April 24-26. The conference was organized by Marcel Pelgrom, Philips Research Eindhoven, and Ed van Tuijl, Philips Research Eindhoven and Twente University, Enschede, the Netherlands. The program committee consisted of: Johan Huijsing, Delft University of Technology Arthur van Roermund, Eindhoven University of Technology Michiel Steyaert, Catholic University of Leuven The program was concentrated around three main topics in analog circuit design. Each of these topics has been covered by six papers. The three main topics are: Scalable Analog Circuit Design High-Speed D/A Converters RF Power Amplifiers Other topics covered before in this series: 2000 High-Speed Analog-to-Digital Converters Mixed Signal Design PLL's and Synthesizers 1999 XDSL and other Communication Systems RF MOST Models Integrated Filters and Oscillators 1998 1-Volt- Electronics Mixed-Mode Systems Low-Noise and RF Power Amplifiers for Telecommunication vii viii 1997 RF A-D Converters Sensor and Actuator Interfaces Low-Noise Oscillators, PLL's and Synthesizers 1996 RF CMOS Circuit Design Bandpass Sigma Delta and other Converters Translinear Circuits 1995 Low-Noise, Low-Power, Low-Voltage Mixed Mode with CAD Trials Voltage, Current and Time References 1994 Low-Power Low Voltage Integrated Filters Smart power 1993 Mixed-Mode A/D Design Sensor Interfaces Communications Circuits 1992 Op Amps ADC's Analog CAD We hope to serve the analog design community with these series of books and plan to continue this series in the future. Johan H.

Radio Design in Nanometer Technologies - Mohammed Ismail
2007-06-16

Radio Design in Nanometer Technologies is the first volume that looks at the integrated radio design problem as a "piece of a big puzzle", namely the entire chipset or single chip that builds an entire wireless system. This is the only way to successfully design radios to meet the stringent demands of today's increasingly complex wireless systems.

Compact Modeling - Gennady Gilenblat 2010-06-22

Most of the recent texts on compact modeling are limited to a particular class of semiconductor devices and do not provide comprehensive coverage of the field. Having a single comprehensive reference for the compact models of most commonly used semiconductor devices (both active and passive) represents a significant advantage for the reader. Indeed, several kinds of semiconductor devices are routinely encountered in a single IC design or in a single modeling support group. *Compact Modeling* includes mostly the material that after several years of IC design applications has been found both theoretically sound and practically significant. Assigning the individual chapters to the groups responsible for the definitive work on the subject assures the highest possible degree of expertise on each of the covered models.

Design of Digital Phase Shifters for Multipurpose Communication Systems - Binboga Siddik Yarman 2022-09-01

This book aims to cover a new emerging need in designing digital phase shifter for modern communication systems. With the advancement of new generation mobile communication systems, directed beams of antenna arrays save a substantial amount of power as well as improve the communication quality. In this regard, beam-forming circuits, such as digital phase shifters (DPS) constitute essential parts of the antenna array systems. Therefore, this book is devoted to the design of digital phase shifters for various communications systems. Nowadays, phase array systems demand compact phase shifters suitable for chip implementation with wide phase-range and broad frequency band. Each chapter of this book is organized as stand-alone in such a way that the reader requires no specific background acquired from the other chapters. For each phase shifter topology introduced in this book, the reader is furnished with explicit design equations to construct the circuit

under consideration. Furthermore, design equations are programmed using MATLAB to assess the electrical performance of the phase shifters with ideal and lossy components. MATLAB design programs are given at the end of each chapter as appendices and provided as soft copy on the web page of the book. In chapters 12 and 14, MMIC layouts for the lattice and T-section based DPS are provided for the readers. It is hoped that an interested reader can immediately identify the "optimum phase shifter topology" for the need under consideration with its estimated electric performance.

Fundamentals of Circuits and Filters - Wai-Kai Chen 2018-10-08

This volume, drawn from the Circuits and Filters Handbook, focuses on mathematics basics; circuit elements, devices, and their models; and linear circuit analysis. It examines Laplace transformation, Fourier methods for signal analysis and processing, z-transform, and wavelet transforms. It also explores network laws and theorems, terminal and port representation, analysis in the frequency domain, and more.

CMOS Analog IC Design for 5G and Beyond - Sangeeta Singh 2021-02-07

This book is focused on addressing the designs of FinFET-based analog ICs for 5G and E-band communication networks. In addition, it also incorporates some of the contemporary developments over different fields. It highlights the latest advances, problems and challenges and presents the latest research results in the field of mm-wave integrated circuits designing based on scientific literature and its practical realization. The traditional approaches are excluded in this book. The authors cover various design guidelines to be taken care of while designing these circuits and detrimental scaling effects on the same. Moreover, Gallium Nitrides (GaN) are also reported to show huge potentials for the power amplifier designing required in 5G communication network. Subsequently, to enhance the readability of this book, the authors also include real-time problems in RFIC designing, case studies from experimental results, and clearly demarcating design guidelines for the 5G communication ICs designing. This book incorporates the most recent FinFET architecture for the analog IC designing and the scaling effects along with the GaN technology as well.

Design of CMOS RF Integrated Circuits and Systems - Kiat Seng Yeo 2010-03-24

This book provides the most comprehensive and in-depth coverage of the latest circuit design developments in RF CMOS technology. It is a practical and cutting-edge guide, packed with proven circuit techniques and innovative design methodologies for solving challenging problems associated with RF integrated circuits and systems. This invaluable resource features a collection of the finest design practices that may soon drive the system-on-chip revolution. Using this book's state-of-the-art design techniques, one can apply existing technologies in novel ways and to create new circuit designs for the future.

Multi-GHz Frequency Synthesis & Division - Hamid R. Rategh 2007-05-08

In the past 10 years extensive effort has been dedicated to commercial wireless local area network (WLAN) systems. Despite all these efforts, however, none of the existing systems has been successful, mainly due to their low data rates. The increasing demand for WLAN systems that can support data rates in excess of 20 Mb/s enticed the FCC to create an unlicensed national information infrastructure (U-NII) band at 5 GHz. This frequency band provides 300 MHz of spectrum in two segments: a 200 MHz (5.15–5.35 GHz) and a 100 MHz (5.725–5.825 GHz) frequency band. This newly released spectrum, and the fast trend of CMOS scaling, provide an opportunity to design WLAN systems with high data rate and low cost. One of the existing standards at 5 GHz is the European high performance radio LAN (HIPERLAN) standard that supports data rates as high as 20 Mb/s. One of the main building blocks of each wireless system is the frequency synthesizer. Phase-locked loops (PLLs) are universally used to design radio frequency synthesizers. Reducing the power consumption of the frequency dividers of a PLL has always been a challenge. In this book, we introduce an alternative solution for conventional flipflop based multi-GHz frequency synthesizers and DIVISION frequency dividers. An injection-locked frequency divider (ILFD) takes advantage of the narrowband nature of the wireless systems and employs resonators to trade off bandwidth for power.

Circuits at the Nanoscale - Krzysztof Iniewski 2018-10-08

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.

Analog Circuit Design - Herman Casier 2008-03-19

Analog Circuit Design is based on the yearly Advances in Analog Circuit Design workshop. The aim of the workshop is to bring together designers of advanced analogue and RF circuits for the purpose of studying and discussing new possibilities and future developments in this field. Selected topics for AACD 2007 were: (1) Sensors, Actuators and Power Drivers for the Automotive and Industrial Environment; (2) Integrated PA's from Wireline to RF; (3) Very High Frequency Front Ends.

Multi-objective Design Space Exploration of Multiprocessor SoC Architectures - Cristina Silvano 2011-08-23

This book serves as a reference for researchers and designers in Embedded Systems who need to explore design alternatives. It provides a design space exploration methodology for the analysis of system characteristics and the selection of the most appropriate architectural solution to satisfy requirements in terms of performance, power consumption, number of required resources, etc. Coverage focuses on the design of complex multimedia applications, where the choice of the optimal design alternative in terms of application/architecture pair is too complex to be pursued through a full search comparison, especially because of the multi-objective nature of the designer's goal, the simulation time required and the number of parameters of the multi-core architecture to be optimized concurrently.

Design, Simulation and Applications of Inductors and Transformers for Si RF ICs - Ali M. Niknejad 2013-03-14

The modern wireless communication industry has put great demands on circuit designers for smaller, cheaper transceivers in the gigahertz frequency range. One tool which has assisted designers in satisfying these requirements is the use of on-chip inductive elements (inductors and transformers) in silicon (Si) radio-frequency (RF) integrated circuits (ICs). These elements allow greatly improved levels of performance in Si monolithic low-noise amplifiers, power amplifiers, up-conversion and down-conversion mixers and local oscillators. Inductors can be used to improve the intermodulation distortion performance and noise figure of small-signal amplifiers and mixers. In addition, the gain of amplifier stages can be enhanced and the realization of low-cost on-chip local oscillators with good phase noise characteristics is made feasible. In order to reap these benefits, it is essential that the IC designer be able to predict and optimize the characteristics of on-chip inductive elements. Accurate knowledge of inductance values, quality factor (Q) and the influence of adjacent elements (on-chip proximity effects) and substrate losses is essential. In this book the analysis, modeling and application of on-chip inductive elements is considered. Using analyses based on Maxwell's equations, an accurate and efficient technique is developed to model these elements over a wide frequency range. Energy loss to the conductive substrate is modeled through several mechanisms, including electrically induced displacement and conductive currents and by magnetically induced eddy currents. These techniques have been compiled in a user-friendly software tool ASITIC (Analysis and Simulation of Inductors and Transformers for Integrated Circuits).

Design and Analysis of Spiral Inductors - Genemala Haobijam 2013-09-07

The book addresses the critical challenges faced by the ever-expanding wireless communication market and the increasing frequency of operation due to continuous innovation of high performance integrated passive devices. The challenges like low quality factor, design complexity, manufacturability, processing cost, etc., are studied with examples and specifics. Silicon on-chip inductor was first reported in

1990 by Nguyen and Meyer in a 0.8 μm silicon bipolar complementary metal oxide semiconductor technology (BiCMOS). Since then, there has been an enormous progress in the research on the performance trends, design and optimization, modeling, quality factor enhancement techniques, etc., of spiral inductors and significant results are reported in literature for various applications. This book introduces an efficient method of determining the optimized layout of on chip spiral inductor. The important fundamental tradeoffs of the design like quality factor and area, quality factor and inductance, quality factor and operating frequency, maximum quality factor and the peak frequency is also explored. The authors proposed an algorithm for accurate design and optimization of spiral inductors using a 3D electromagnetic simulator with minimum number of inductor structure simulations and thereby reducing its long computation time. A new multilayer pyramidal symmetric inductor structure is also proposed in this book. Being multilevel, the proposed inductor achieves high inductance to area ratio and hence occupies smaller silicon area.

Design, Simulation and Applications of Inductors and Transformers for Si RF ICs - Ali M. Niknejad 2006-04-18

The modern wireless communication industry has put great demands on circuit designers for smaller, cheaper transceivers in the gigahertz frequency range. One tool which has assisted designers in satisfying these requirements is the use of on-chip inductive elements (inductors and transformers) in silicon (Si) radio-frequency (RF) integrated circuits (ICs). These elements allow greatly improved levels of performance in Si monolithic low-noise amplifiers, power amplifiers, up-conversion and down-conversion mixers and local oscillators. Inductors can be used to improve the intermodulation distortion performance and noise figure of small-signal amplifiers and mixers. In addition, the gain of amplifier stages can be enhanced and the realization of low-cost on-chip local oscillators with good phase noise characteristics is made feasible. In order to reap these benefits, it is essential that the IC designer be able to predict and optimize the characteristics of on-chip inductive elements. Accurate knowledge of inductance values, quality factor (Q) and the influence of adjacent elements (on-chip proximity effects) and substrate losses is essential. In this book the analysis, modeling and application of on-chip inductive elements is considered. Using analyses based on Maxwell's equations, an accurate and efficient technique is developed to model these elements over a wide frequency range. Energy loss to the conductive substrate is modeled through several mechanisms, including electrically induced displacement and conductive currents and by magnetically induced eddy currents. These techniques have been compiled in a user-friendly software tool ASITIC (Analysis and Simulation of Inductors and Transformers for Integrated Circuits).

Novel Advances in Microsystems Technologies and Their Applications - Laurent A. Francis 2017-07-28

Microsystems technologies have found their way into an impressive variety of applications, from mobile phones, computers, and displays to smart grids, electric cars, and space shuttles. This multidisciplinary field of research extends the current capabilities of standard integrated circuits in terms of materials and designs and complements them by creating innovative components and smaller systems that require lower power consumption and display better performance. Novel Advances in Microsystems Technologies and their Applications delves into the state of the art and the applications of microsystems and microelectronics-related technologies. Featuring contributions by academic and industrial researchers from around the world, this book: Examines organic and flexible electronics, from polymer solar cell to flexible interconnects for the co-integration of micro-electromechanical systems (MEMS) with complementary metal oxide semiconductors (CMOS) Discusses imaging and display technologies, including MEMS technology in reflective displays, the fabrication of thin-film transistors on glass substrates, and new techniques to display and quickly transmit high-quality images Explores sensor technologies for sensing electrical currents and temperature, monitoring structural health and critical industrial processes, and more Covers biomedical microsystems, including biosensors, point-of-care devices, neural stimulation and recording, and ultra-low-power biomedical systems Written for researchers, engineers, and graduate students in electrical and biomedical engineering, this book reviews groundbreaking technology, trends, and applications in microelectronics. Its coverage of the latest research serves as a source of inspiration for anyone interested in further developing microsystems technologies and creating new applications.

Transformer-Based Design Techniques for Oscillators and Frequency Dividers - Howard Cam Luong 2015-10-07

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.

Issues in Materials and Manufacturing Research: 2011 Edition - 2012-01-09

Issues in Materials and Manufacturing Research: 2011 Edition is a ScholarlyEditions™ eBook that delivers timely, authoritative, and comprehensive information about Materials and Manufacturing Research. The editors have built Issues in Materials and Manufacturing Research: 2011 Edition on the vast information databases of ScholarlyNews.™ You can expect the information about Materials and Manufacturing Research in this eBook to be deeper than what you can access anywhere else, as well as consistently reliable, authoritative, informed, and relevant. The content of Issues in Materials and Manufacturing Research: 2011 Edition has been produced by the world's leading scientists, engineers, analysts, research institutions, and companies. All of the content is from peer-reviewed sources, and all of it is written, assembled, and edited by the editors at ScholarlyEditions™ and available exclusively from us. You now have a source you can cite with authority, confidence, and credibility. More information is available at <http://www.ScholarlyEditions.com/>.

Acoustic Wave and Electromechanical Resonators - Humberto Campanella 2010

This groundbreaking book provides you with a comprehensive understanding of FBAR (thin-film bulk acoustic wave resonator), MEMS (microelectromechanical system), and NEMS (nanoelectromechanical system) resonators. For the first time anywhere, you find extensive coverage of these devices at both the technology and application levels. This practical reference offers you guidance in design, fabrication, and characterization of FBARs, MEMS and NEMS. It discusses the integration of these devices with standard CMOS (complementary-metal-oxide-semiconductor) technologies, and their application to sensing and RF systems. Moreover, this one-stop resource looks at the main characteristics, differences, and limitations of FBAR, MEMS, and NEMS devices, helping you to choose the right approaches for your projects. Over 280 illustrations and more than 130 equations support key topics throughout the book.

Issues In Josephson Supercomputer Design - Proceedings Of The 6th And 7th Riken Symposia On Josephson Electronics - Goto Eiichi 1991-03-15

Quantum Flux Parametron (QFP) is a Josephson junction device which uses the polarities of a unit of quantum flux to represent a bit of binary information. The low power consumption and the inductive nature of signal transfer of QFP promise the realizability of a highly integrated Josephson Supercomputer. The miniaturization and the inductively connected circuits pose new challenges and problems to the designers of such a computer system. This volume contains five papers which provide detailed illustrations of the essential problems in the design of Josephson Supercomputers. The problems include (i) the three-dimensional packaging problems in the highly integrated system, (ii) the detection of trapped magnetic quanta, (iii) the computation of three-dimensional inductance and (iv) the elimination or alleviation of various internal and external operational problems of QFP arising from the limitation of the current fabrication technology as well as the inherent problems of direct coupling of QFP

Circuits and Systems for Future Generations of Wireless Communications - Aleksandar Tasic 2009-05-16

The idea for this book originated from a Special Session on Circuits and Systems for Future Generations of Wireless Communications that was presented at the 2005 International Symposium on Circuits and Systems, which was then followed by two Special Issues bearing the same title that appeared in the March and April 2008 issues of the IEEE Transactions on Circuits and Systems - Part II: Express Briefs. Out of a large number of great contributions, we have selected those that are the best in the book format based on their quality. We would like to thank all the authors, the reviewers of the Transactions on Circuits and Systems - Part II, and the reviewers of the final book material for their efforts in creating this manuscript. We also thank the Springer Editorial Staff for their support in putting together all the good work. We hope that this book

will provide you, the reader, with new insights into Circuits and Systems for Future Generations of Wireless Communications.

The VLSI Handbook - Wai-Kai Chen 2019-07-17

Over the years, the fundamentals of VLSI technology have evolved to include a wide range of topics and a broad range of practices. To encompass such a vast amount of knowledge, The VLSI Handbook focuses on the key concepts, models, and equations that enable the electrical engineer to analyze, design, and predict the behavior of very large-scale integrated circuits. It provides the most up-to-date information on IC technology you can find. Using frequent examples, the Handbook stresses the fundamental theory behind professional applications. Focusing not only on the traditional design methods, it contains all relevant sources of information and tools to assist you in performing your job. This includes software, databases, standards, seminars, conferences and more. The VLSI Handbook answers all your needs in one comprehensive volume at a level that will enlighten and refresh the knowledge of experienced engineers and educate the novice. This one-source reference keeps you current on new techniques and procedures and serves as a review for standard practice. It will be your first choice when looking for a solution.

Optimal Design of Switching Power Supply - Zhanyou Sha 2015-09-15

A contemporary evaluation of switching power design methods with real world applications • Written by a leading author renowned in his field • Focuses on switching power supply design, manufacture and debugging • Switching power supplies have relevance for contemporary applications including mobile phone chargers, laptops and PCs • Based on the authors' successful "Switching Power Optimized Design 2nd Edition" (in Chinese) • Highly illustrated with design examples of real world applications

IC Design Insights - from Selected Presentations at CICC 2017 -

Ali Sheikholeslami 2022-09-01

This book contains a selection of tutorial and invited presentations that were given at the IEEE CICC 2017 in Austin, Texas. The selection of the talks was made to provide a comprehensive coverage of key topics, including Circuits Techniques for mm-wave front-ends, RF and mm-wave receivers and frequency synthesis, data and DC-DC converters, and techniques for IoT security. The book is organized into five parts, namely: I: Millimeter-wave Transmitter Circuits II: Millimeter-wave and RF Receiver Circuits III: Data Converters IV: DC-DC Converters and Voltage Regulators V: IoT Security Circuits and Techniques The book is part of an educational initiative of the IEEE Solid-State Circuits Society to offer its members state of the art educational material.

Radio Frequency Integrated Circuits and Technologies - Frank

Ellinger 2008-09-11

The striking feature of this book is its coverage of the upper GHz domain. However, the latest technologies, applications and broad range of circuits are discussed. Design examples are provided including cookbook-like optimization strategies. This state-of-the-art book is valuable for researchers as well as for engineers in industry. Furthermore, the book serves as fruitful basis for lectures in the area of IC design.

Linear CMOS RF Power Amplifiers for Wireless Applications -

Paulo Augusto Dal Fabbro 2010-06-22

Advances in electronics have pushed mankind to create devices, ranging from - credible gadgets to medical equipment to spacecraft instruments. More than that, modern society is getting used to—if not dependent on—the comfort, solutions, and astonishing amount of information brought by these devices. One field that has continuously benefited from those advances is the radio frequency integrated circuit (RFIC) design, which in its turn has promoted countless benefits to the mankind as a payback. Wireless communications is one prominent example of what the advances in electronics have enabled and their consequences to our daily life. How could anyone back in the eighties think of the possibilities opened by the wireless local area networks (WLANs) that can be found today in a host of places, such as public libraries, coffee shops, trains, to name just a few? How can a youngster, who lives this true WLAN experience nowadays, imagine a world without it? This book deals with the design of linear CMOS RF Power Amplifiers (PAs). The RF PA is a very important part of the RF transceiver, the device that enables wireless communications. Two important aspects that are key to keep the advances in RF PA design at an accelerated pace are treated: efficiency enhancement and frequency-tunable capability. For this purpose, the design of two different integrated circuits realized in a 0.11 μm technology is presented, each one addressing a different aspect. With respect to efficiency enhancement, the design of a dynamic supply RF

power amplifier is treated, making up the material of Chaps. 2 to 4.

System Level Design of Reconfigurable Systems-on-Chip - Nikolaos Voros 2006-02-23

Describes in a consolidated way the results of a three-year research project, during which researchers from leading European industrial companies and research institutes have been working together. Contributors come from academia and industry, such companies as INTRACOM, VTT and Nokia being represented. Proposes brand new approaches based on SystemC and OCAPI-XL that explicitly handle issues related to reconfiguration at the system level. Introduces a design flow for designing reconfigurable systems-on-chip. Provides a comprehensive introduction to reconfigurable hardware and existing reconfigurable technologies. Presents examples on how reconfigurable hardware can be exploited for the development of complex systems. Provides useful feedback from the application of the proposed design flow and system level design methods on different real life design cases.

Transformers and Inductors for Power Electronics - W.G. Hurley

2013-04-29

Based on the fundamentals of electromagnetics, this clear and concise text explains basic and applied principles of transformer and inductor design for power electronic applications. It details both the theory and practice of inductors and transformers employed to filter currents, store electromagnetic energy, provide physical isolation between circuits, and perform stepping up and down of DC and AC voltages. The authors present a broad range of applications from modern power conversion systems. They provide rigorous design guidelines based on a robust methodology for inductor and transformer design. They offer real design examples, informed by proven and working field examples. Key features include: emphasis on high frequency design, including optimisation of the winding layout and treatment of non-sinusoidal waveforms a chapter on planar magnetic with analytical models and descriptions of the processing technologies analysis of the role of variable inductors, and their applications for power factor correction and solar power unique coverage on the measurements of inductance and transformer capacitance, as well as tests for core losses at high frequency worked examples in MATLAB, end-of-chapter problems, and an accompanying website containing solutions, a full set of instructors' presentations, and copies of all the figures. Covering the basics of the magnetic components of power electronic converters, this book is a comprehensive reference for students and professional engineers dealing with specialised inductor and transformer design. It is especially useful for senior undergraduate and graduate students in electrical engineering and electrical energy systems, and engineers working with power supplies and energy conversion systems who want to update their knowledge on a field that has progressed considerably in recent years.

Model Generation in Electronic Design - Jean-Michel Bergé

2012-12-06

Model Generation in Electronic Design covers a wide range of model applications and research. The book begins by describing a model generator to create component models. It goes on to discuss ASIC design and ASIC library generation. This section includes chapters on the requirements for developing an ASIC library, a case study in which VITAL is used to create such a library, and the analysis and description of the accuracy required in modeling interconnections in ASIC design. Other chapters describe the development of thermal models for electronic devices, the development of a set of model packages for VHDL floating point operations, a technique for model validation and verification, and a tool for model encryption. Model Generation in Electronic Design is an essential update for users, vendors, model producers, technical managers, designers and researchers working in electronic design.

Transformers - Xose M. López-Fernández 2017-12-19

Recent catastrophic blackouts have exposed major vulnerabilities in the existing generation, transmission, and distribution systems of transformers widely used for energy transfer, measurement, protection, and signal coupling. As a result, the reliability of the entire power system is now uncertain, and many blame severe underinvestment, aging technology, and a conservative approach to innovation. Composed of contributions from noted industry experts around the world, *Transformers: Analysis, Design, and Measurement* offers invaluable information to help designers and users overcome these and other challenges associated with the design, construction, application, and analysis of transformers. This book is divided into three sections to address contemporary economic, design, diagnostic, and maintenance aspects associated with power, instrument, and high-frequency

transformers. Topics covered include: Design considerations Capability to withstand short circuits Insulation problems Stray losses, screening, and local excessive heating hazard Shell type and superconducting transformers Links between design and maintenance Component-related diagnostics and reliability Economics of life-cycle cost, design review, and risk-management methods Parameter measurement and prediction This book is an essential tool for understanding and implementing solutions that will ensure improvements in the development, maintenance, and life-cycle management of optimized transformers. This will lead to enhanced safety and reliability and lower costs for the electrical supply. Illustrating the need for close cooperation between users and manufacturers of transformers, this book outlines ways to achieve man

Analog Circuits and Devices - Wai-Kai Chen 2003-03-26

The Principles and Application in Engineering Series is a new series of convenient, economical references sharply focused on particular engineering topics and subspecialties. Each volume in this series comprises chapters carefully selected from CRC's bestselling handbooks, logically organized for optimum convenience, and thoughtfully priced to fit

Microwave Circuit Design Using Linear and Nonlinear Techniques

- George D. Vendelin 2005-10-03

The ultimate handbook on microwave circuit design with CAD. Full of tips and insights from seasoned industry veterans, Microwave Circuit Design offers practical, proven advice on improving the design quality of microwave passive and active circuits-while cutting costs and time. Covering all levels of microwave circuit design from the elementary to the very advanced, the book systematically presents computer-aided methods for linear and nonlinear designs used in the design and manufacture of microwave amplifiers, oscillators, and mixers. Using the newest CAD tools, the book shows how to design transistor and diode circuits, and also details CAD's usefulness in microwave integrated circuit (MIC) and monolithic microwave integrated circuit (MMIC) technology. Applications of nonlinear SPICE programs, now available for microwave CAD, are described. State-of-the-art coverage includes microwave transistors (HEMTs, MODFETs, MESFETs, HBTs, and more), high-power amplifier design, oscillator design including feedback topologies, phase noise and examples, and more. The techniques presented are illustrated with several MMIC designs, including a wideband amplifier, a low-noise amplifier, and an MMIC mixer. This unique, one-stop handbook also features a major case study of an actual anticollision radar transceiver, which is compared in detail against CAD predictions; examples of actual circuit designs with photographs of completed circuits; and tables of design formulae.

The Circuits and Filters Handbook - Wai-Kai Chen 2002-12-23

A bestseller in its first edition, The Circuits and Filters Handbook has been thoroughly updated to provide the most current, most

comprehensive information available in both the classical and emerging fields of circuits and filters, both analog and digital. This edition contains 29 new chapters, with significant additions in the areas of computer-*Radio Frequency Integrated Circuit Design* - John W. M. Rogers 2014-05-14

This newly revised and expanded edition of the 2003 Artech House classic, Radio Frequency Integrated Circuit Design, serves as an up-to-date, practical reference for complete RFIC know-how. The second edition includes numerous updates, including greater coverage of CMOS PA design, RFIC design with on-chip components, and more worked examples with simulation results. By emphasizing working designs, this book practically transports you into the authors' own RFIC lab so you can fully understand the function of each design detailed in this book. Among the RFIC designs examined are RF integrated LC-based filters, VCO automatic amplitude control loops, and fully integrated transformer-based circuits, as well as image reject mixers and power amplifiers. If you are new to RFIC design, you can benefit from the introduction to basic theory so you can quickly come up to speed on how RFICs perform and work together in a communications device. A thorough examination of RFIC technology guides you in knowing when RFICs are the right choice for designing a communication device. This leading-edge resource is packed with over 1,000 equations and more than 435 illustrations that support key topics."

mm-Wave Silicon Power Amplifiers and Transmitters - Hossein Hashemi 2016-04-04

Build high-performance, energy-efficient circuits with this cutting-edge guide to designing, modeling, analysing, implementing and testing new mm-wave systems.

Fast Techniques for Integrated Circuit Design - Mikael Sahrling 2019-08-15

Learn how to use estimation techniques to solve real-world IC design problems and accelerate design processes with this practical guide.

RF Circuit Design - Richard C. Li 2008-10-22

A Must-Read for all RF/RFIC Circuit Designers This book targets the four most difficult skills facing RF/RFIC designers today: impedance matching, RF/AC grounding, Six Sigma design, and RFIC technology. Unlike most books on the market, it presents readers with practical engineering design examples to explore how they're used to solve ever more complex problems. The content is divided into three key parts: Individual RF block circuit design Basic RF circuit design skills RF system engineering The author assumes a fundamental background in RF circuit design theory, and the goal of the book is to enable readers to master the correct methodology. The book includes treatment of special circuit topologies and introduces some useful schemes for simulation and layout. This is a must-read for RF/RFIC circuit design engineers, system designers working with communication systems, and graduates and researchers in related fields.