High Speed Devices And Circuits With Thz Applications

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GaAs High-Speed Devices
High-Speed CMOS Circuits for Optical Receivers
GaAs Devices and Circuits
High-speed Digital Design
High-Frequency Integrated Circuits
Semiconductor Devices for High-Speed Optoelectronics
High Performance Multi-Channel High-Speed I/O Circuits
Pseudomorphic HEMT Technology and Applications
High Speed Semiconductor Devices and Circuits, 1987. Proceedings., IEEE
Design of High-speed Communication Circuits
High-Speed and Power-Efficient Design, Second Edition
High-speed Integrated Circuit Technology Conference : Papers
Integrated Circuit Design for High-speed Frequency Synthesis
High Speed Semiconductor Devices and Circuits, IEEE/Cornell Conference on Advanced Concepts in CMOS Analog Integrated Circuits
IEEE/Cornell Conference on Advanced Concepts in High Speed Semiconductor Devices and Circuits : August 5-7, 1991, Cornell University, Ithaca, New York
High-Speed Devices and Circuits with THz Applications
Design of Terahertz CMOS Integrated Circuits for High-speed Wireless Communication
High-Speed Electronics and Optoelectronics

High Speed Semiconductor Devices and Circuits
High-Speed Devices and Circuits with THz Applications
InP-based Heterojunction Bipolar Transistor Technology for High Speed Devices and Circuits
A Handbook of Black Magic

BRADFORD JONATHAN

Modeling and Optimization of Ultra High-speed Devices and Circuits
World Scientific
A transistor-level, design-intensive overview of high speed and high frequency monolithic integrated circuits for wireless and broadband systems from 2 GHz to 200 GHz, this comprehensive text covers high-speed, RF, mm-wave, and optical fibre circuits using nanoscale CMOS, SiGe BiCMOS, and III-V technologies. Step-by-step design methodologies, end-of chapter problems, and practical simulation and design projects are provided, making this an ideal resource for senior undergraduate and graduate courses in circuit design. With an emphasis on device-circuit topology interaction and optimization, it gives circuit designers and students alike an in-depth understanding of device structures and process limitations affecting

circuit performance. *Devices and Circuits* Springer Science & Business Media Presenting the cutting-edge results of new device developments and circuit implementations, High-Speed Devices and Circuits with THz Applications covers the recent advancements of nano devices for terahertz (THz) applications and the latest high-speed data rate connectivity technologies from system design to integrated circuit (IC) design, providing relevant standard activities and technical specifications. Featuring the contributions of leading experts from industry and academia, this pivotal work: Discusses THz sensing and imaging devices based on nano devices and materials Describes silicon on insulator (SOI) multigate nanowire field-effect transistors (FETs) Explains the theory underpinning nanoscale nanowire metal-oxide-semiconductor field-effect transistors (MOSFETs), simulation methods, and their results Explores the physics of the silicon-germanium (SiGe) heterojunction bipolar transistor (HBT), as well as commercially available SiGe HBT devices and their applications Details aspects of THz

IC design using standard silicon (Si) complementary metal-oxide-semiconductor (CMOS) devices, including experimental setups for measurements, detection methods, and more An essential text for the future of high-frequency engineering, High-Speed Devices and Circuits with THz Applications offers valuable insight into emerging technologies and product possibilities that are attractive in terms of mass production and compatibility with current manufacturing facilities.

Electromagnetics for High-Speed Analog and Digital Communication Circuits

Springer Science & Business Media

With the exponential growth of the number of Internet nodes, the volume of the data transported on the backbone has increased with the same trend. The load of the global Internet backbone will soon increase to tens of terabits per second. This indicates that the backbone bandwidth requirements will increase by a factor of 50 to 100 every seven years. Transportation of such high volumes of data requires suitable media with low loss and high bandwidth. Among the available transmission media, optical fibers achieve the best performance

in terms of loss and bandwidth. High-speed data can be transported over hundreds of kilometers of single-mode fiber without significant loss in signal integrity. These fibers progressively benefit from reduction of cost and improvement of perf- mance. Meanwhile, the electronic interfaces used in an optical network are not capable of exploiting the ultimate bandwidth of the fiber, limiting the throughput of the network. Different solutions at both the system and the circuit levels have been proposed to increase the data rate of the backbone. System-level solutions are based on the utilization of wave-division multiplexing (WDM), using different colors of light to transmit s- eral sequences simultaneousl y. In parallel with that, a great deal of effort has been put into increasing the operating rate of the electronic transceivers using highly-developed fabrication processes and novel c- cuit techniques. High-Speed Photonics Interconnects CRC Press The book covers the CMOS-based millimeter wave circuits and devices and presents methods and design techniques to use CMOS technology for circuits operating beyond 100 GHz. Coverage

includes a detailed description of both active and passive devices, including modeling techniques and performance optimization. Various mm-wave circuit blocks are discussed, emphasizing their design distinctions from low-frequency design methodologies. This book also covers a device-oriented circuit design technique that is essential for ultra high speed circuits and gives some examples of device/circuit co-design that can be used for mm-wave technology. Power Distribution Networks in High Speed Integrated Circuits Artech House Publishers The book comprises of 5 chapters and covers most of our current knowledge, from the background to the design of a terahertz complementary metal oxide semiconductor (CMOS) transceiver for realizing ultrahigh-speed wireless communication.

High-Speed Devices and Circuits with THz Applications CRC Press Providing an all-inclusive treatment of electronic and optoelectronic devices used in high-speed optical communication systems, this book emphasizes circuit applications, advanced device design solutions, and noise in sources and receivers. Core topics covered

include semiconductors and semiconductor optical properties, high-speed circuits and transistors, detectors, sources, and modulators. It discusses in detail both active devices (heterostructure field-effect and bipolar transistors) and passive components (lumped and distributed) for high-speed electronic integrated circuits. It also describes recent advances in high-speed devices for 40 Gbps systems. Introductory elements are provided, making the book open to readers without a specific background in optoelectronics, whilst end-of-chapter review questions and numerical problems enable readers to test their understanding and experiment with realistic data.

Conference : Papers and Programme

CRC Press

In recent years, III-V devices, integrated circuits, and superconducting integrated circuits have emerged as leading contenders for high-frequency and ultrahigh speed applications. GaAs MESFETs have been applied in microwave systems as low-noise and high-power amplifiers since the early 1970s, replacing silicon devices. The heterojunction high-electron-mobility transistor (HEMT), invented in

1980, has become a key component for satellite broadcasting receiver systems, serving as the ultra-low-noise device at 12 GHz. Furthermore, the heterojunction bipolar transistor (HBT) has been considered as having the highest switching speed and cutoff frequency in the semiconductor device field. Initially most of these devices were used for analog high-frequency applications, but there is also a strong need to develop high-speed III-V digital devices for computer, telecom munication, and instrumentatio n systems, to replace silicon high-speed devices, because of the switching-speed and power-dissipation limitations of silicon. The potential high speed and low power dissipation of digital integrated circuits using GaAs MESFET, HEMT, HBT, and superconducti ng Josephson junction devices has evoked tremendous competition in the race to develop such technology. A technology review shows that Japanese research institutes and companies have taken the lead in the development of these devices, and some integrated circuits have already been applied to supercompute rs in Japan. The activities

of Japanese research institutes and companies in the III-V and superconducting device fields have been superior for three reasons. First, bulk crystal growth, epitaxial growth, process, and design technology were developed at the same time.

Advanced Concepts in High Speed Semiconductor Devices and Circuits

High-Speed Devices and Circuits with THz Applications This book describes design techniques that can be used to mitigate crosstalk in high-speed I/O circuits. The focus of the book is in developing compact and low power integrated circuits for crosstalk cancellation, inter-symbol interference (ISI) mitigation and improved bit error rates (BER) at higher speeds. This book is one of the first to discuss in detail the problem of crosstalk and ISI mitigation encountered as data rates have continued beyond 10Gb/s. Readers will learn to avoid the data performance cliff, with circuits and design techniques described for novel, low power crosstalk cancellation methods that are easily combined with current ISI mitigation architectures.

Fundamentals of Laser Photoemission for Testing High Speed

Devices and Circuits Springer Science & Business Media PHEMT devices and their incorporation into advanced monolithic integrated circuits is the enabling technology for modern microwave/millimeter wave system applications. Although still in its infancy, PHEMT MIMIC technology is already finding applications in both military and commercial systems, including radar, communication and automotive technologies. The successful team in a globally competitive market is one in which the solid-state scientist, circuit designer, system engineer and technical manager are cognizant of those considerations and requirements that influence each other's function. This book provides the reader with a comprehensive review of PHEMT technology, including materials, fabrication and processing, device physics, CAD tools and modelling, monolithic integrated circuit technology and applications. Readers with a broad range of specialities in one or more of the areas of materials, processing, device physics, circuit design, system design and marketing will be introduced

quickly to important basic concepts and techniques. The specialist who has specific PHEMT experience will benefit from the broad range of topics covered and the open discussion of practical issues. Finally, the publication offers an additional benefit, in that it presents a broad scope to both the researcher and manager, both of whom must be aware and educated to remain relevant in an ever-expanding technology base.

Ultra High-Speed CMOS Circuits

Prentice Hall

High-speed, power-efficient analog integrated circuits can be used as standalone devices or to interface modern digital signal processors and micro-controllers in various applications, including multimedia, communication, instrumentation, and control systems. New architectures and low device geometry of complementary metaloxidesemiconductor (CMOS) technologies have accelerated the movement toward system on a chip design, which merges analog circuits with digital, and radio-frequency components.

Conference : Papers and Programme

Institute of Electrical & Electronics Engineers(IEEE)

This book covers the fundamentals and significance of 2-D materials and related semiconductor transistor technologies for the next-generation ultra low power applications. It provides comprehensive coverage on advanced low power transistors such as NCFETs, FinFETs, TFETs, and flexible transistors for future ultra low power applications owing to their better subthreshold swing and scalability. In addition, the text examines the use of field-effect transistors for biosensing applications and covers design considerations and compact modeling of advanced low power transistors such as NCFETs, FinFETs, and TFETs. TCAD simulation examples are also provided. FEATURES Discusses the latest updates in the field of ultra low power semiconductor transistors Provides both experimental and analytical solutions for TFETs and NCFETs Presents synthesis and fabrication processes for FinFETs Reviews details on 2-D materials and 2-D transistors Explores the application of FETs for biosensing in the healthcare field This book is aimed at researchers, professionals, and graduate students in electrical engineering, electronics and communicatio

n engineering, electron devices, nanoelectronics and nanotechnology, microelectronics, and solid-state circuits.

Towards 100 GHz Logic

Cambridge University Press

The performance of high-speed semiconductor devices—the genius driving digital computers, advanced electronic systems for digital signal processing, telecommunication systems, and optoelectronics—is inextricably linked to the unique physical and electrical properties of gallium arsenide. Once viewed as a novel alternative to silicon, gallium arsenide has swiftly moved into the forefront of the leading high-tech industries as an irreplaceable material in component fabrication. GaAs High-Speed Devices provides a comprehensive, state-of-the-science look at the phenomenally expansive range of engineering devices gallium arsenide has made possible—as well as the fabrication methods, operating principles, device models, novel device designs, and the material properties and physics of GaAs that are so keenly integral to their success. In a clear five-part format, the book systematically examines each of these

aspects of GaAs device technology, forming the first authoritative study to consider so many important aspects at once and in such detail. Beginning with chapter 2 of part one, the book discusses such basic subjects as gallium arsenide materials and crystal properties, electron energy band structures, hole and electron transport, crystal growth of GaAs from the melt and defect density analysis. Part two describes the fabrication process of gallium arsenide devices and integrated circuits, shedding light, in chapter 3, on epitaxial growth processes, molecular beam epitaxy, and metal organic chemical vapor deposition techniques. Chapter 4 provides an introduction to wafer cleaning techniques and environment control, wet etching methods and chemicals, and dry etching systems, including reactive ion etching, focused ion beam, and laser assisted methods. Chapter 5 provides a clear overview of photolithography and nonoptical lithography techniques that include electron beam, x-ray, and ion beam lithography systems. The advances in fabrication techniques

described in previous chapters necessitate an examination of low-dimension device physics, which is carried on in detail in chapter 6 of part three. Part four includes a discussion of innovative device design and operating principles which deepens and elaborates the ideas introduced in chapter 1. Key areas such as metal-semiconductor contact systems, Schottky Barrier and ohmic contact formation and reliability studies are examined in chapter 7. A detailed discussion of metal semiconductor field-effect transistors, the fabrication technology, and models and parameter extraction for device analyses occurs in chapter 8. The fifth part of the book progresses to an up-to-date discussion of heterostructure field-effect (HEMT in chapter 9), potential-effect (HBT in chapter 10), and quantum-effect devices (chapters 11 and 12), all of which are certain to have a major impact on high-speed integrated circuits and optoelectronic integrated circuit (OEIC) applications. Every facet of GaAs device technology is placed firmly in a historical context, allowing readers to see instantly the significant developmental changes that have shaped it. Featuring a

look at devices still under development and device structures not yet found in the literature, GaAs High-Speed Devices also provides a valuable glimpse into the newest innovations at the center of the latest GaAs technology. An essential text for electrical engineers, materials scientists, physicists, and students, GaAs High-Speed Devices offers the first comprehensive and up-to-date look at these formidable 21st century tools. The unique physical and electrical properties of gallium arsenide has revolutionized the hardware essential to digital computers, advanced electronic systems for digital signal processing, telecommunication systems, and optoelectronics. GaAs High-Speed Devices provides the first fully comprehensive look at the enormous range of engineering devices gallium arsenide has made possible as well as the backbone of the technology—ication methods, operating principles, and the materials properties and physics of GaAs—device models and novel device designs. Featuring a clear, six-part format, the book covers: GaAs materials and crystal properties Fabrication processes of GaAs devices

and integrated circuits Electron beam, x-ray, and ion beam lithography systems Metal-semiconductor contact systems Heterostructure field-effect, potential-effect, and quantum-effect devices GaAs Microwave Monolithic Integrated Circuits and Digital Integrated Circuits In addition, this comprehensive volume places every facet of the technology in an historical context and gives readers an unusual glimpse at devices still under development and device structures not yet found in the literature. Advanced Concepts in High Speed Semiconducter Devices and Circuits Springer Science & Business Media Modern communications technology demands smaller, faster and more efficient circuits. This book reviews the fundamentals of electromagnetism in passive and active circuit elements, highlighting various effects and potential problems in designing a new circuit. The author begins with a review of the basics - the origin of resistance, capacitance, and inductance - then progresses to more advanced topics such as passive device design and layout, resonant circuits, impedance

matching, high-speed switching circuits, and parasitic coupling and isolation techniques. Using examples and applications in RF and microwave systems, the author describes transmission lines, transformers, and distributed circuits. State-of-the-art developments in Si based broadband analog, RF, microwave, and mm-wave circuits are reviewed. With up-to-date results, techniques, practical examples, illustrations and worked examples, this book will be valuable to advanced undergraduate and graduate students of electrical engineering, and practitioners in the IC design industry. Further resources for this title are available at www.cambridge.org/9780521853507.

Beyond 100 GHz Springer Science & Business Media Distributing power in high speed, high complexity integrated circuits has become a challenging task as power levels exceeding tens of watts have become commonplace while the power supply is plunging toward one volt. This book is dedicated to this important subject. The primary purpose of this monograph is to provide insight and intuition into the behavior and design of

power distribution systems for high speed, high complexity integrated circuits.

Current Research and Development in Optical Fiber Communications in China Cambridge University Press

High speed data converters represent one of the most challenging, important and exciting analog and mixed-signal systems. They are ubiquitous in our modern and highly connected world. Understanding and designing this class of converters require proficiency in analog circuit design, digital design, and signal processing. This book covers high speed data converters from the perspective of a leading high speed ADC designer and architect, and with a strong emphasis on high speed Nyquist A/D converters. Topics covered include an introduction to high-speed data conversion; performance metrics; data converter architectures; sampling; comparators; amplifiers; pipelined A/D converters; time-interleaved converters; digitally assisted converters; evolution and trends. The book is intended for engineers and students who design, evaluate or use high speed data converters. A basic foundation in circuits,

devices and signal processing is required. The book is meant to bridge the gap between analysis and design, theory and practice, circuits and systems. It covers basic analog circuits and digital signal processing algorithms. There is a healthy dose of theoretical analysis in this book, combined with the practical issues and intuitive perspectives. **Electronics and Photonics** Springer Science & Business Media Presenting the cutting-edge results of new device developments and circuit implementations, High-Speed Devices and Circuits with THz Applications covers the recent advancements of nano devices for terahertz (THz) applications and the latest high-speed data rate connectivity technologies from system design to integrated circuit (IC) design, providing relevant standard activities and technical specifications. Featuring the contributions of leading experts from industry and academia, this pivotal work: Discusses THz sensing and imaging devices based on nano devices and materials Describes silicon on insulator (SOI) multigate nanowire field-effect transistors (FETs) Explains the theory underpinning

nanoscale nanowire metal-oxide-semiconductor field-effect transistors (MOSFETs), simulation methods, and their results Explores the physics of the silicon-germanium (SiGe) heterojunction bipolar transistor (HBT), as well as commercially available SiGe HBT devices and their applications Details aspects of THz IC design using standard silicon (Si) complementary metal-oxide-semiconductor (CMOS) devices, including experimental setups for measurements, detection methods, and more An essential text for the future of high-frequency engineering, High-Speed Devices and Circuits with THz Applications offers valuable insight into emerging technologies and product possibilities that are attractive in terms of mass production and compatibility with current manufacturing facilities.

GaAs High-Speed Devices

CRC Press

This book explores up-to-date research trends and achievements on low-power and high-speed technologies in both electronics and optics. It offers unique insight into low-power and high-speed approaches ranging from devices, ICs, sub-systems and networks that can be exploited for future mobile

devices, 5G networks, Internet of Things (IoT), and data centers. It collects heterogeneous topics in place to catch and predict future research directions of devices, circuits, subsystems, and networks for low-power and higher-speed technologies. Even it handles about artificial intelligence (AI) showing examples how AI technology can be combined with concurrent electronics. Written by top international experts in both industry and academia, the book discusses new devices, such as Si-on-chip laser, interconnections using graphenes, machine learning combined with CMOS technology, progresses of SiGe devices for higher-speed electronices for optic, co-design low-power and high-speed circuits for optical interconnect, low-power network-on-chip (NoC) router, X-ray quantum counting, and a design of low-power power amplifiers. Covers modern high-speed and low-power electronics and photonics. Discusses novel nano-devices, electronics & photonic sub-systems for high-speed and low-power systems, and many other emerging technologies like Si photonic technology, Si-on-chip laser, low-

power driver for optic device, and network-on-chip router. Includes practical applications and recent results with respect to emerging low-power systems. Addresses the future perspective of silicon photonics as a low-power interconnections and communication applications. High-Speed CMOS Circuits for Optical Receivers John Wiley & Sons This book reviews the state of the art of very high speed digital integrated circuits. Commercial applications are in fiber optic transmission systems operating at 10, 40, and 100 Gb/s, while the military application is ADCs and DACs for microwave radar. The book contains detailed descriptions of the design, fabrication, and performance of wideband Si/SiGe-, GaAs-, and InP-based bipolar transistors. The analysis, design, and performance of high speed CMOS, silicon bipolar, and III-V digital ICs are presented in detail, with emphasis on application in optical fiber transmission and mixed signal ICs. The underlying physics and circuit design of rapid single flux quantum (RSFQ) superconducting logic circuits are reviewed, and there is extensive coverage of recent integrated

circuit results in this technology. Contents: Preface (M J W Rodwell); High-Speed and High-Data-Bandwidth Transmitter and Receiver for Multi-Channel Serial Data Communicatio n with CMOS Technology (M Fukaishi et al.); High-Performance Si and SiGe Bipolar Technologies and Circuits (M Wurzer et al.); Self-Aligned Si BJT/SiGe HBT Technology and Its Application to High-Speed Circuits (K Washio); Small-Scale InGaP/GaAs Heterojunction Bipolar Transistors for High-Speed and Low-Power Integrated-Circuit Applications (T Oka et al.); Prospects of InP-Based IC Technologies for 100-Gbit/S-Class Lightwave Communicatio ns Systems (T Enoki et al.); Scaling of InGaAs/InAlAs HBTs for High Speed Mixed-Signal and mm-Wave ICs (M J W Rodwell); Progress Toward 100 GHz Logic in InP HBT IC Technology (C H Fields et al.); Cantilevered Base InP DHBT for High Speed Digital Applications (A L Gutierrez-Aitken et al.); RSFQ Technology: Physics and Devices (P Bunyk et al.); RSFQ Technology: Circuits and Systems (D K Brock). Readership: Researchers, industrialists and academics in electrical and electronic engineering.

GaAs Devices and Circuits CRC Press Presenting the cutting-edge results of new device developments and circuit implementations, High-Speed Devices and Circuits with THz Applications covers the recent advancements of nano devices for terahertz (THz) applications and the latest high-speed data rate connectivity technologies from system design to integrated circuit (IC) design, providing relevant standard activities and technical specifications. Featuring the contributions of leading experts from industry and academia, this pivotal work: Discusses THz sensing and imaging devices based on nano devices and materials Describes silicon on insulator (SOI) multigate nanowire field-effect transistors (FETs) Explains the theory underpinning nanoscale nanowire metal-oxide-semiconductor field-effect transistors (MOSFETs), simulation methods, and their results Explores the physics of the silicon-germanium (SiGe) heterojunction bipolar transistor (HBT), as well as commercially available SiGe HBT devices and their applications Details aspects of THz IC design using standard silicon (Si)

complementary metal-oxide-semiconductor (CMOS) devices, including experimental setups for measurements, detection methods, and more An essential text for the future of high-frequency engineering, High-Speed Devices and Circuits with THz Applications offers valuable insight into emerging technologies and product possibilities that are attractive in terms of mass production and compatibility with current manufacturing facilities. *High-speed Digital Design* IET Focused on the field of knowledge lying between digital and analog circuit theory, this new text will help engineers working with digital systems shorten their product development cycles and help fix their latest design problems. The scope of the material covered includes signal reflection, crosstalk, and noise problems which occur in high speed digital machines (above 10 megahertz). This volume will be of practical use to digital logic designers, staff and senior communications scientists, and all those interested in digital design.

• The Psychology Of Money: Timeless Lessons On Wealth, Greed, And Happiness
• Reminders Of Him: A Novel
• Things We Hide From The Light (knockemout Series, 2)
• How To Catch A Leprechaun
• Hunting Adeline (cat And Mouse Duet) By H. D. Carlton
• Outlive: The Science And Art Of Longevity By Peter Attia Md
• Things We Never Got Over (knockemout)
• The Complete Summer I Turned Pretty Trilogy (boxed Set): The Summer I Turned Pretty; It's Not Summer Without You; We'll Alway
• Haunting Adeline (cat And Mouse Duet)