



River Publishers

River Publishers Book Catalogue

Series in Electronic Materials and
Devices

Sensors and Measurement Systems

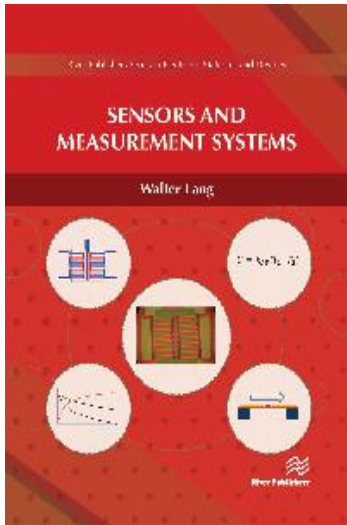
Author: Walter Lang, University of Bremen, Germany

ISBN: 9788770220286

e-ISBN: 9788770220279

Available From: February 2019

Price: € 40.00



Description:

Sensors and measurement systems is an introduction to microsensors for engineering students in the final undergraduate or early graduate level, technicians who wants to know more about the systems they are using, and anybody curious enough to know what microsystems and microsensors can do.

The book discusses five families of sensors:

- Thermal sensors
- Force and pressure sensors
- Inertial sensors
- Magnetic field sensors
- Flow sensors

For each sensor, theoretical, technology and application aspects are examined. The sensor function is modelled to understand sensitivity, resolution and noise. We ask ourselves: What do we want to measure? What are possible applications? How are the sensor chips made in the cleanroom? How are they mounted and integrated in a system?

After reading this book, you should be able to:

- Understand important thermal, mechanical, inertial and magnetic sensors
- Work with characterization parameters for sensors
- Choose sensors for a given application and apply them
- Understand micromachining technologies for sensors

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Rad-hard Semiconductor Memories

Editors:

Cristiano Calligaro, RedCat Devices, Italy

Umberto Gatti, RedCat Devices, Italy

ISBN: 9788770220200

e-ISBN: 9788770220194

Available From: November 2018

Price: € 95.00



Description:

Rad-hard Semiconductor Memories is intended for researchers and professionals interested in understanding how to design and make a preliminary evaluation of rad-hard semiconductor memories, making leverage on standard CMOS manufacturing processes available from different silicon foundries and using different technology nodes.

In the first part of the book, a preliminary overview of the effects of radiation in space, with a specific focus on memories, will be conducted to enable the reader to understand why specific design solutions are adopted to mitigate hard and soft errors. The second part will be devoted to RHBD (Radiation Hardening by Design) techniques for semiconductor components with a specific focus on memories. The approach will follow a top-down scheme starting from RHBD at architectural level (how to build a rad-hard floor-plan), at circuit level (how to mitigate radiation effects by handling transistors in the proper way) and at layout level (how to shape a layout to mitigate radiation effects).

After the description of the mitigation techniques, the book enters in the core of the topic covering SRAMs (synchronous, asynchronous, single port and dual port) and PROMs (based on AntiFuse OTP technologies), describing how to design a rad-hard flash memory and fostering RHBD toward emerging memories like ReRAM. The last part will be a leap into emerging memories at a very early stage, not yet ready for industrial use in silicon but candidates to become an option for the next wave of rad-hard components.

Technical topics discussed in the book include:

- Radiation effects on semiconductor components (TID, SEE)
- Radiation Hardening by Design (RHBD) Techniques
- Rad-hard SRAMs
- Rad-hard PROMs
- Rad-hard Flash NVMs
- Rad-hard ReRAMs
- Rad-hard emerging technologies

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River Publishers Series in Electronic Materials and Devices

Circuit Design Considerations for Implantable Devices

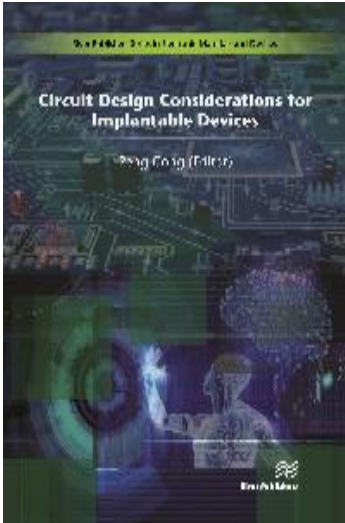
Editor: Peng Cong, Verily Life Science, USA

ISBN: 9788793519862

e-ISBN: 9788793519855

Available From: January 2018

Price: € 85.00



Description:

Implantable devices are a unique area for circuit designers. A comprehensive understanding of design trade-offs at the system level is important to ensure device success. Circuit Design Considerations for Implantable Devices provides knowledge to CMOS circuit designers with limited biomedical background to understand design challenges and trade-offs for implantable devices, especially neural interfacing.

Technical topics discussed in the book include:

- Neural interface
- Neural sensing amplifiers
- Electrical stimulation
- Embedded Signal Analysis
- Wireless Power Transmission to mm-Sized Free-Floating Distributed Implants
- Next Generation Neural Interface Electronics

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Computational Electrodynamics

A Gauge Approach with Applications in Microelectronics

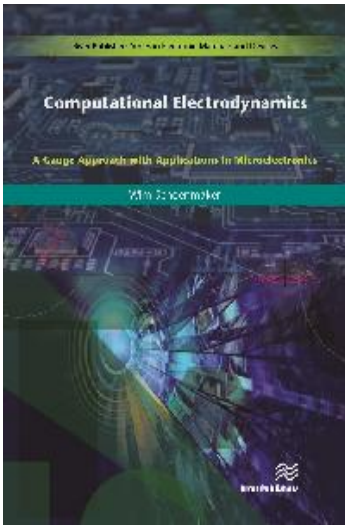
Author: Wim Schoenmaker, MAGWEL, Belgium

ISBN: 9788793519848

e-ISBN: 9788793519831

Available From: May 2017

Price: € 90.00



Description:

Computational Electrodynamics is a vast research field with a wide variety of tools. In physics the principle of gauge invariance plays a pivotal role as a guide towards a sensible formulation of the laws of nature as well as computing the properties of elementary particles using the lattice formulation of gauge theories, yet the gauge principle has played a much less pronounced role in performing computation in classical electrodynamics. In this work the author will demonstrate that starting from the gauge formulation of electrodynamics using the electromagnetic potentials leads to computational tools that can very well compete with the conventional electromagnetic field-based tools. Once accepting the formulation based on gauge fields, the computational code is very transparent due to the mimetic mapping of the electrodynamic variables on the computational grid. Although the illustrations and applications originate from microelectronic engineering, the method has a much larger range of applicability. Therefore this book is of interest to everyone having interest in computational electrodynamics. The volume is organized as follows: In part 1, a detailed introduction and overview is presented of the Maxwell equations as well as the derivation of the current and charge densities in different materials. Semiconductors are responding to electromagnetic fields in a non-linear way and the induced complications are discussed in detail. In part 2, the transition of the theory of electrodynamics, using the gauge potentials, to a formulation that can serve as the gateway to computational code is presented. In part 3, the feasibility and success of the methods of part 2 are demonstrated by a collection of microelectronic device designs. Part 4 focuses on a set of topical themes that brings the reader to the frontier of research in building the simulation tools using the gauge principle in computational electrodynamics.

Technical topics discussed in the book include:

- Electromagnetic Field Equations
- Constitutive Relations
- Discretization and Numerical Analysis
- Finite Element and Finite Volume Methods
- Design of Integrated Passive Components

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