

Defect Detection With Transient Current Testing And Its

Covers in detail promising solutions at the device, circuit, and architecture levels of abstraction after first explaining the sensitivity of the various MOS leakage sources to these conditions from the first principles. Also treated are the resulting effects so the reader understands the effectiveness of leakage power reduction solutions under these different conditions. Case studies supply real-world examples that reap the benefits of leakage power reduction solutions as the book highlights different device design choices that exist to mitigate increases in the leakage components as technology scales.

This book is a printed edition of the Special Issue "Advanced Hydroinformatic Techniques for the Simulation and Analysis of Water Supply and Distribution Systems" that was published in Water

This Proceedings contains the papers presented at the 14th International Conference on Condition Monitoring and Diagnostic Engineering Management (COMADEM 2001), held in Manchester, UK, on 4-6 September 2001. COMADEM 2001 builds on the excellent reputation of previous conferences in this series, and is essential for anyone working in the field of condition monitoring and maintenance management. The scope of the conference is truly interdisciplinary. The Proceedings contains papers from six continents, written by experts in industry and academia the world over, bringing together the latest thoughts on topics including: Condition-based maintenance Reliability centred maintenance Asset management Industrial case studies Fault detection and diagnosis Prognostics Non-destructive evaluation Integrated diagnostics Vibration Oil and debris analysis Tribology Thermal techniques Risk assessment Structural health monitoring Sensor technology Advanced signal processing Neural networks Multivariate statistics Data compression and fusion This Proceedings also contains a wealth of industrial case studies, and the latest developments in education, training and certification. For more information on COMADEM's aims and scope, please visit <http://www.comadem.com>

This is the third volume of a series of proceedings including papers presented at the respective International Conferences entitled: "Emerging Technologies in Non-Destructive Testing (NDT)" that have been held in Greece since 1995. This volume contains papers presented at the third Conference on Emerging Technologies in Non-Destructive Testing (NDT) Conference, convened at Thessaloniki, Greece in 2003.

Papers cover a range of subjects including: * interdisciplinary efforts to gain maximum benefit from capabilities from other science and engineering fields * integration of several methods to form multimode systems for improved reliability * increased use of computer simulation to investigate the response of specific methods This work also covers improvements, enhancements and new and innovative ideas in NDT and should be of interest to engineers, researchers, quality control managers, as well as teachers and graduate students in the field.

Este libro contiene las presentaciones de la XVII Conferencia de Diseño de Circuitos y Sistemas Integrados celebrado en el Palacio de la Magdalena, Santander, en noviembre de 2002. Esta Conferencia ha alcanzado un alto nivel de calidad, como consecuencia de su tradición y madurez, que lo convierte en uno de los acontecimientos más importantes para los circuitos de microelectrónica y la comunidad de diseño de sistemas en el sur de Europa. Desde su origen tiene una gran contribución de Universidades españolas, aunque hoy los autores participan desde catorce países

This book addresses two main problems with interconnections at the chip and package level: crosstalk and simultaneous switching noise. Its orientation is towards giving general information rather than a compilation of practical cases. Each chapter contains a list of references for the

topics.

In this book, a number of innovative fault diagnosis algorithms in recently years are introduced. These methods can detect failures of various types of system effectively, and with a relatively high significance.

For newcomers cast into the waters to sink or swim as well as seasoned professionals who want authoritative guidance desk-side, this hefty volume updates the previous (1999) edition. It contains the work of expert contributors who rallied to the job in response to a committee's call for help (the committee was assigned to the update by the Electron

Test functions (fault detection, diagnosis, error correction, repair, etc.) that are applied concurrently while the system continues its intended function are defined as on-line testing. In its expanded scope, on-line testing includes the design of concurrent error checking subsystems that can be themselves self-checking, fail-safe systems that continue to function correctly even after an error occurs, reliability monitoring, and self-test and fault-tolerant designs. On-Line Testing for VLSI contains a selected set of articles that discuss many of the modern aspects of on-line testing as faced today. The contributions are largely derived from recent IEEE International On-Line Testing Workshops. Guest editors Michael Nicolaidis, Yervant Zorian and Dhiraj Pradhan organized the articles into six chapters. In the first chapter the editors introduce a large number of approaches with an expanded bibliography in which some references date back to the sixties. On-Line Testing for VLSI is an edited volume of original research comprising invited contributions by leading researchers.

This book covers the topic of eddy current nondestructive evaluation, the most commonly practiced method of electromagnetic nondestructive evaluation (NDE). It emphasizes a clear presentation of the concepts, laws and relationships of electricity and magnetism upon which eddy current inspection methods are founded. The chapters include material on signals obtained using many common eddy current probe types in various testing environments. Introductory mathematical and physical concepts in electromagnetism are introduced in sufficient detail and summarized in the Appendices for easy reference. Worked examples and simple calculations that can be done by hand are distributed throughout the text. These and more complex end-of-chapter examples and assignments are designed to impart a working knowledge of the connection between electromagnetic theory and the practical measurements described. The book is intended to equip readers with sufficient knowledge to optimize routine eddy current NDE inspections, or design new ones. It is useful for graduate engineers and scientists seeking a deeper understanding of electromagnetic methods of NDE than can be found in a guide for practitioners.

CMOS manufacturing environments are surrounded with symptoms that can indicate serious test, design, or reliability problems, which, in turn, can affect the financial as well as the engineering bottom line. This book educates readers, including non-engineers involved in CMOS manufacture, to identify and remedy these causes. This book instills the electronic knowledge that affects not just design but other important areas of manufacturing such as test, reliability, failure analysis, yield-quality issues, and problems. Designed specifically for the many non-electronic engineers employed in the semiconductor industry who need to reliably manufacture chips at a high rate in large quantities, this is a practical guide to how CMOS electronics work, how failures occur, and how to diagnose and avoid them. Key features: Builds a grasp of the basic electronics of CMOS integrated circuits and then leads the reader further to understand the mechanisms of failure. Unique descriptions of circuit failure mechanisms, some found previously only in research papers and others new to this publication. Targeted to the CMOS industry (or students headed there) and not a generic introduction to the broader field of electronics. Examples, exercises, and problems are provided to support the self-instruction of the reader.

On-Chip Current Sensors for Reliable, Secure, and Low-Power Integrated Circuits Springer Nature

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Johan H. Huijsing This book contains 18 tutorial papers concentrated on 3 topics, each topic being covered by 6 papers. The topics are: Low-Noise, Low-Power, Low-Voltage Mixed-Mode Design with CAD Tools Voltage, Current, and Time References The papers of this book were written by top experts in the field, currently working at leading European and American universities and companies. These papers are the reviewed versions of the papers presented at the Workshop on Advances in Analog Circuit Design. which was held in Villach, Austria, 26-28 April 1995. The chairman of the Workshop was Dr. Franz Dielacher from Siemens, Austria. The program committee existed of Johan H. Huijsing from the Delft University of Technology, Prof. Willy Sansen from the Catholic University of Leuven, and Dr. Rudy 1. van der Plassche from Philips Eindhoven. This book is the fourth of a series dedicated to the design of analog circuits. The topics which were covered earlier were: Operational Amplifiers Analog to Digital Converters Analog Computer Aided Design Mixed AID Circuit Design Sensor Interface Circuits Communication Circuits Low-Power, Low-Voltage Integrated Filters Smart Power As the Workshop will be continued year by year, a valuable series of topics will be built up from all the important areas of analog circuit design. I hope that this book will help designers of analog circuits to improve their work and to speed it up.

This book describes a wide variety of System-on-Chip (SoC) security threats and vulnerabilities, as well as their sources, in each stage of a design life cycle. The authors discuss a wide variety of state-of-the-art security verification and validation approaches such as formal methods and side-channel analysis, as well as simulation-based security and trust validation approaches. This book provides a comprehensive reference for system on chip designers and verification and validation engineers interested in verifying security and trust of heterogeneous SoCs.

Electrostatic Discharge is a pervasive issue in the semiconductor industry affecting both manufacturers and users of semiconductors. This easy-to-read, practical handbook presents an overview of ESD as it effects electronic circuits and provides a concise introduction for students, engineers, circuit designers and failure analysts.

This book presents best selected research papers presented at the First International Conference on Integrated Intelligence Enable Networks and Computing (IIENC 2020), held from May 25 to May 27, 2020, at the Institute of Technology, Gopeshwar, India (Government Institute of Uttarakhand Government and affiliated to Uttarakhand Technical University). The book includes papers in the field of intelligent computing. The book covers the areas of machine learning and robotics, signal processing and Internet of things, big data and renewable energy sources.

This book provides readers with a comprehensive overview of the state-of-the-art in optical contactless probing approaches, in order to fill a gap in the literature on VLSI Testing. The author highlights the inherent difficulties encountered with the mechanical probe and testability design approaches for functional and internal fault testing and shows how contactless testing might resolve many of the challenges associated with conventional mechanical wafer testing. The techniques described in this book address the increasing demands for internal access of the logic state of a node within a chip under test.

Identifying Emerging Trends in Technological Innovation Doctoral programs in science and engineering are important sources of innovative ideas and techniques that might lead to new products and technological innovation. Certainly most PhD students are not experienced researchers and are in the process of learning how to do research. Nevertheless, a number of empiric studies also show that a high number of technological innovation ideas are produced in the early careers of researchers. The combination of the eagerness to try new approaches and directions of young doctoral students with the experience and broad knowledge of their supervisors is likely to result in an important pool

of innovation potential. The DoCEIS doctoral conference on Computing, Electrical and Industrial Engineering aims at creating a space for sharing and discussing ideas and results from doctoral research in these inter-related areas of engineering. Innovative ideas and hypotheses can be better enhanced when presented and discussed in an encouraging and open environment. DoCEIS aims to provide such an environment, releasing PhD students from the pressure of presenting their propositions in more formal contexts.

AC motors play a major role in modern industrial applications. Squirrel-cage induction motors (SCIMs) are probably the most frequently used when compared to other AC motors because of their low cost, ruggedness, and low maintenance. The material presented in this book is organized into four sections, covering the applications and structural properties of induction motors (IMs), fault detection and diagnostics, control strategies, and the more recently developed topology based on the multiphase (more than three phases) induction motors. This material should be of specific interest to engineers and researchers who are engaged in the modeling, design, and implementation of control algorithms applied to induction motors and, more generally, to readers broadly interested in nonlinear control, health condition monitoring, and fault diagnosis.

The 2nd edition of defect oriented testing has been extensively updated. New chapters on Functional, Parametric Defect Models and Inductive fault Analysis and Yield Engineering have been added to provide a link between defect sources and yield. The chapter on RAM testing has been updated with focus on parametric and SRAM stability testing. Similarly, newer material has been incorporated in digital fault modeling and analog testing chapters. The strength of Defect Oriented Testing for nano-Metric CMOS VLSIs lies in its industrial relevance. The monograph will be dedicated to SRAM (memory) design and test issues in nano-scaled technologies by adapting the cell design and chip design considerations to the growing process variations with associated test issues. Purpose: provide process-aware solutions for SRAM design and test challenges.

Among the variety of wave motions one can single out surface wave propagation since these surface waves often adjust the features of the energy transfer in the continuum (system), its deformation and fracture. Predicted by Rayleigh in 1885, surface waves represent waves localized in the vicinity of extended boundaries (surfaces) of solids or elastic media. In the ideal case of an isotropic elastic half-space while the Rayleigh waves propagate along the surface, the wave amplitude (displacement) in the transverse direction exponentially decays with increasing distance away from the surface. As a result the energy of surface perturbations is localized by the Rayleigh waves within a relatively narrow layer beneath the surface. It is this property of the surface waves that leads to the resonance phenomena that accompany the motion of the perturbation sources (like surface loads) with velocities close to the Rayleigh one; (see e. g. , R. V. Goldstein. Rayleigh waves and resonance phenomena in elastic bodies. Journal of Applied Mathematics and Mechanics (PMM), 1965, v. 29, N 3, pp. 608-619). It is essential to note that resonance phenomena are also inherent to the elastic medium in the case where initially there are no free (unloaded) surfaces. However, they occur as a result of an external action accompanied by the violation of the continuity of certain physical quantities, e. g. , by crack nucleation and dynamic propagation. Note that the aforementioned resonance phenomena are related to the nature of the surface waves as homogeneous solutions (eigenfunctions) of the dynamic elasticity equations for a half-space (i. e. nonzero solutions at vanishing boundary conditions).

Power supply current monitoring to detect CMOS IC defects during production testing quietly laid down its roots in the mid-1970s. Both Sandia Labs and RCA in the United States and Philips Labs in the Netherlands practiced this procedure on their CMOS ICs. At that time, this practice stemmed simply from an intuitive sense that CMOS ICs showing abnormal quiescent power supply current (IDDQ) contained defects. Later, this intuition was supported by data and analysis in the 1980s by Levi (RACD, Malaiya and Su (SUNY-Binghamton), Soden and Hawkins (Sandia Labs and the University of New Mexico), Jacomino and co-workers (Laboratoire d'Automatique de Grenoble), and Maly and co-workers (Carnegie Mellon University). Interest in IDDQ testing has advanced beyond the data reported in the 1980s and is now focused on applications and evaluations involving larger volumes of ICs that improve quality beyond what can be achieved by previous conventional means. In the conventional style of testing one attempts to propagate the logic states of the suspended nodes to primary outputs. This is done for all or most nodes of the circuit. For sequential circuits, in particular, the complexity of finding suitable tests is very high. In comparison, the IDDQ test does not observe the logic states, but measures the integrated current that leaks through all gates. In other words, it is like measuring a patient's temperature to determine the state of health. Despite perceived advantages, during the years that followed its initial announcements, skepticism about the practicality of IDDQ testing prevailed. The idea, however, provided a great opportunity to researchers. New results on test generation, fault simulation, design for testability, built-in self-test, and diagnosis for this style of testing have since been reported. After a decade of research, we are definitely closer to practice.

This book provides readers with insight into an alternative approach for enhancing the reliability, security, and low power features of integrated circuit designs, related to transient faults, hardware Trojans, and power consumption. The authors explain how the addition of integrated sensors enables the detection of ionizing particles and how this information can be processed at a high layer. The discussion also includes a variety of applications, such as the detection of hardware Trojans and fault attacks, and how sensors can operate to provide different body bias levels and reduce power costs. Readers can benefit from these sensors-based approaches through designs with fast response time, non-intrusive integration on gate-level and reasonable design costs.

Traditional at-speed test methods cannot guarantee high quality test results as they face many new challenges. Supply noise effects on chip performance, high test pattern volume, small delay defect test pattern generation, high cost of test implementation and application, and utilizing low-cost testers are among these challenges. This book discusses these challenges in detail and proposes new techniques and methodologies to improve the overall quality of the transition fault test.

This book describes fault tolerance techniques based on software and hardware to create hybrid techniques. They are able to reduce overall performance degradation and increase error detection when associated with applications implemented in embedded processors. Coverage begins with an extensive discussion of the current state-of-the-art in fault tolerance techniques. The authors then discuss the best trade-off between software-based and hardware-based techniques and introduce novel hybrid techniques. Proposed techniques increase existing fault detection rates up to 100%, while maintaining low performance overheads in area and application execution time.

This book gathers select contributions from the 32nd International Congress and Exhibition on Condition Monitoring and Diagnostic Engineering Management (COMADEM 2019), held at the University of Huddersfield, UK in September 2019, and jointly organized by the University of Huddersfield and COMADEM International. The aim of the Congress was to promote awareness of the rapidly emerging interdisciplinary areas of condition monitoring and diagnostic engineering management. The contents discuss the latest tools and techniques in the multidisciplinary field of performance monitoring, root cause failure modes analysis, failure diagnosis, prognosis, and proactive management of industrial systems. There is a special focus on digitally enabled asset management and covers several topics such as condition monitoring, maintenance, structural health monitoring, non-destructive testing and other allied areas. Bringing together expert contributions from academia and industry, this book will be a valuable resource for those interested in latest condition monitoring and asset management techniques.

Defect Recognition and Image Processing in Semiconductors 1997 provides a valuable overview of current techniques used to assess, monitor, and characterize defects from the atomic scale to inhomogeneities in complete silicon wafers. This volume addresses advances in defect analyzing techniques and instrumentation and their application to substrates, epilayers, and devices. The book discusses the merits and limits of characterization techniques; standardization; correlations between defects and device performance, including degradation and failure analysis; and the adaptation and application of standard characterization techniques to new materials. It also examines the impressive advances made possible by the increase in the number of nanoscale scanning techniques now available. The book investigates defects in layers and devices, and examines the problems that have arisen in characterizing gallium nitride and silicon carbide.

GENERAL DESCRIPTION OF THE SERIES Since its inception in 1966, the series of numbered volumes known as Semiconductors and Semimetals has distinguished itself through the careful selection of well-known authors, editors, and contributors. The "Willardson and Beer" Series, as it is widely known, has succeeded in publishing numerous landmark volumes and chapters. Not only did many of these volumes make an impact at the time of their publication, but they continue to be well-cited years after their original release. Recently, Professor Eicke R. Weber of the University of California at Berkeley joined as a co-editor of the series. Professor Weber, a well-known expert in the field of semiconductor materials, will further contribute to continuing the series' tradition of publishing timely, highly relevant, and long-impacting volumes. Some of the recent volumes, such as Hydrogen in Semiconductors, Imperfections in III/V Materials, Epitaxial Microstructures, High-Speed Heterostructure Devices, Oxygen in Silicon, and others promise indeed that this tradition will be maintained and even expanded.

Reflecting the truly interdisciplinary nature of the field that the series covers, the volumes in Semiconductors and Semimetals have been and will continue to be of great interest to physicists, chemists, materials scientists, and device engineers in modern industry.

GENERAL DESCRIPTION OF THE VOLUME This volume has contributions on Advanced Characterization Techniques with a focus on defect identification. The combination of beam techniques with electrical and optical characterization has not been discussed elsewhere.

Model based testing is the most powerful technique for testing hardware and software systems. Models in Hardware Testing describes the use of models at all the levels of hardware testing. The relevant fault models for nanoscaled CMOS technology are introduced, and their implications on fault simulation, automatic test pattern generation, fault diagnosis, memory testing and power aware testing are discussed.

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Models and the corresponding algorithms are considered with respect to the most recent state of the art, and they are put into a historical context by a concluding chapter on the use of physical fault models in fault tolerance.

This book covers the diagnosis and assessment of the various faults which can occur in a three phase induction motor, namely rotor broken-bar faults, rotor-mass unbalance faults, stator winding faults, single phasing faults and crawling. Following a brief introduction, the second chapter describes the construction and operation of an induction motor, then reviews the range of known motor faults, some existing techniques for fault analysis, and some useful signal processing techniques. It includes an extensive literature survey to establish the research trends in induction motor fault analysis. Chapters three to seven describe the assessment of each of the five primary fault types. In the third chapter the rotor broken-bar fault is discussed and then two methods of diagnosis are described; (i) diagnosis of the fault through Radar analysis of stator current Concordia and (ii) diagnosis through envelope analysis of motor startup current using Hilbert and Wavelet Transforms. In chapter four, rotor-mass unbalance faults are assessed, and diagnosis of both transient and steady state stator current has been analyzed using different techniques. If both rotor broken-bar and rotor-mass unbalance faults occur simultaneously then for identification an algorithm is provided in this chapter. Chapter five considers stator winding faults and five different analysis techniques, chapter six covers diagnosis of single phasing faults, and chapter seven describes crawling and its diagnosis. Finally, chapter eight focuses on fault assessment, and presents a summary of the book together with a discussion of prospects for future research on fault diagnosis.

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