Reliability and Degradation of Semiconductor Lasers and LEDs

Mitsuo Fukuda

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Tien-Pei Lee

Reliability And Degradation Of Semiconductor Lasers And Leds:

Reliability and Degradation of Semiconductor Lasers and LEDs Mitsuo Fukuda,1991-01-01 This comparative tutorial describes the reasons behind device failures and provides practical information on what can be done to minimize failure prone designs and enhance device reliability The text demonstrates how with such advantages as smaller size low cost and simple operation LEDs are well suited for a wide range of applications especially in the field of optical fibre communication This book should prove of interest to engineers and scientists in research design manufacturing and development of semiconductor lasers LEDs and optical transmission systems Reliability Characterisation of Electrical and Electronic Systems ,2014-12-24 This book takes a holistic approach to reliability engineering for electrical and electronic systems by looking at the failure mechanisms testing methods failure analysis characterisation techniques and prediction models that can be used to increase reliability for a range of devices The text describes the reliability behavior of electrical and electronic systems It takes an empirical scientific approach to reliability engineering to facilitate a greater understanding of operating conditions failure mechanisms and the need for testing for a more realistic characterisation After introducing the fundamentals and background to reliability theory the text moves on to describe the methods of reliability analysis and charactersation across a wide range of applications Takes a holistic approach to reliability engineering Looks at the failure mechanisms testing methods failure analysis characterisation techniques and prediction models that can be used to increase reliability Facilitates a greater understanding of operating conditions failure mechanisms and the need for testing for a more realistic characterisation Introduction to Nitride Semiconductor Blue Lasers and Light Emitting Diodes Shuji Nakamura,Shigefusa F. Chichibu,2000-03-09 The blue laser is an exciting new device used in physics The potential is now being recognized for its development into a commercial lighting system using about a tenth of the power and with a thousand times the operating lifetime of a comparable conventional system This comprehensive work introduces the subject at a level suitable for graduate students It covers the basics physics of light emitting diodes LEDs and laser diodes LDs based on gallium nitride and related nitride semiconductors and gives an outline of their structural transport and optical properties and the relevant device physics It begins with the fundamentals and covers both theory and experiment as well as an examination of actual and potential device applications Shuji Nakamura and Nichia Chemicals Industries made the initial breakthroughs in the field and these have revealed that LEDs and LDs are a sophisticated physical phenomenon and a commercial reality **Semiconductor Lasers and Herterojunction LEDs** Henry Kressel,2012-12-02 Semiconductor Lasers and Heterojunction LEDs presents an introduction to the subject of semiconductor lasers and heterojunction LEDs The book reviews relevant basic solid state and electromagnetic principles the relevant concepts in solid state physics and the p n junctions and heterojunctions The text also describes stimulated emission and gain the relevant concepts in electromagnetic field theory and the modes in laser structures The relation between electrical and optical properties of laser

diodes epitaxial technology binary III V compounds and diode fabrication are also considered The book further tackles the heterojunction devices of alloys other than GaAs AlAs the devices for special applications distributed feedback lasers and the transient effects in laser diodes Students taking courses in semiconductor lasers and heterojunction LEDs will find the book useful **Physics of Photonic Devices** Shun Lien Chuang,2012-11-07 The most up to date book available on the physics of photonic devices This new edition of Physics of Photonic Devices incorporates significant advancements in the field of photonics that have occurred since publication of the first edition Physics of Optoelectronic Devices New topics covered include a brief history of the invention of semiconductor lasers the Lorentz dipole method and metal plasmas matrix optics surface plasma waveguides optical ring resonators integrated electroabsorption modulator lasers and solar cells It also introduces exciting new fields of research such as surface plasmonics and micro ring resonators the theory of optical gain and absorption in quantum dots and quantum wires and their applications in semiconductor lasers and novel microcavity and photonic crystal lasers quantum cascade lasers and GaN blue green lasers within the context of advanced semiconductor lasers Physics of Photonic Devices Second Edition presents novel information that is not yet available in book form elsewhere Many problem sets have been updated the answers to which are available in an all new Solutions Manual for instructors Comprehensive timely and practical Physics of Photonic Devices is an invaluable textbook for advanced undergraduate and graduate courses in photonics and an indispensable tool for researchers working in this rapidly growing field **Current Trends in Vertical Cavity Surface Emitting Lasers** Tien-Pei Lee,1995 With significant progress made in recent years vertical cavity surface emitting lasers VCSELs have emerged as potential lightwave sources with a variety of applications including high speed optical interconnects parallel data links optical recording 2 D scanning and optical signal processing This volume which contains a collection of articles by outstanding experts on this topic encompasses a broad discussion of the current trends in the development of VCSELs Discussions include material growths structure designs processing methods performance analysis improvement strategies and future prospects The collection provides a comprehensive overview that may help newcomers to this field as well as engineers and researchers who are engaged in the research and development of this new exciting device family Laser Induced Damage in Optical Materials ,1998 *Compound Semiconductor Integrated Circuits* Tho T. Vu,2003-01-01 This is the book version of a special issue of the International Journal of High Speed Electronics and Systems reviewing recent work in the field of compound semiconductor integrated circuits There are fourteen invited papers covering a wide range of applications frequencies and materials These papers deal with digital analog microwave and millimeter wave technologies devices and integrated circuits for wireline fiber optic lightwave transmissions and wireless radio frequency microwave and millimeter wave communications In each case the market is young and experiencing rapid growth for both commercial and millitary applications Many new semiconductor technologies compete for these new markets leading to an alphabet soup of semiconductor materials described in these papers The book

also includes three papers focused on radiation effects and reliability in III V semiconductor electronics which are useful for reference and future directions Moreover reliability is covered in several papers separately for certain process technologies Contents Present and Future of High Speed Compound Semiconductor IC s T Otsuji The Transforming MMIC E J Martinez Distributed Amplifier for Fiber Optic Communication Systems H Shigematsu et al Microwave GaN Based Power Transistors on Large Scale Silicon Wafers S Manohar et al Radiation Effects in High Speed III V Integrated Circuits T R Weatherford Radiation Effects in III V Semiconductor Electronics B D Weaver et al Reliability and Radiation Hardness of Compound Semiconductors S A Kayali and other papers Readership Engineers scientists and graduate students working on high speed electronics and systems and in the area of compound semiconductor integrated circuits **Defect Recognition and Image Processing in Semiconductors 1997** J. Doneker,2017-11-22 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 Optical Semiconductor Devices Mitsuo Fukuda,1998-12-24 This book is devoted to optical semiconductor devices and their numerous applications in telecommunications optoelectronics and consumer electronics areas where signal processing or the transmission of signals across fiber optic cables is paramount It introduces a new generation of devices that includes optical modulators quantum well QW lasers and photodiodes and explores new applications of more established devices such as semiconductor lasers light emitting diodes and photodiodes Mitsuo Fukuda examines the material properties operation principles fabrication packaging reliability and applications of each device and offers a unique industrial perspective discussing everything engineers and scientists need to know at different phases of research development and production This guide to the state of the art of optical semiconductor devices Helps you choose the right device for a given application Covers important performance data such as temperature and optical feedback noise in lasers Highlights epitaxial growth techniques and fabrication for each device Features one hundred figures and an extensive bibliography Provides a clear and concise treatment unencumbered by excessive theory Optical Semiconductor Devices is an essential resource for engineers and researchers in telecommunications and optoelectronics equipment designers and manufacturers and graduate students and scholars interested in this rapidly evolving field **Plastic Optical Fibers and Applications** IGIC, Inc. Staff,John Bliss,1994 **Heterogeneous Optoelectronics Integration** Elias

Towe,2000 Numerous efforts are directed at investigating the use of optics at short distances for example at the chip to chip and board to board levels of the interconnection hierarchy This book provides an overview of the state of the art in heterogeneous integration of electronics optoelectronics and micro optics for short distance optical interconnections

Microprobe Characterization of Optoelectronic Materials Juan Jimenez,2024-11-01 Each chapter in this book is written by a group of leading experts in one particular type of microprobe technique They emphasize the ability of that technique to provide information about small structures i e quantum dots quantum lines microscopic defects strain layer composition and its usefulness as diagnostic technique for device degradation Different types of probes are considered electrons photons and tips and different microscopies optical electron microscopy and tunneling It is an ideal reference for post graduate and experienced researchers as well as for crystal growers and optoelectronic device makers **International Lighting in Controlled Environments Workshop** T. W. Tibbitts,1994 **Defects in Organic Semiconductors and Devices** Thien-Phap Nguyen,2023-07-27 Defects play a key role in the physical properties of semiconductors and devices and their identification is essential in assessing the reliability of electronic devices Defects in Organic Semiconductors and Devices introduces the fundamental aspects of defects in organic semiconductors and devices in relation to the structure of materials and architecture of electronic components It covers the topics of defect formation and evolution defect measurement techniques and their adaption to organic devices the effects of defects on the physical properties of materials and their effects on the performance and lifetime of organic devices Identifying defects and determining their characteristics in the structure of organic devices such as OLEDs OFETs and OPVs make it possible to better understand degradation processes and develop solutions to improve the reliability of such devices This book is intended for researchers and students in university programs or engineering schools who are specializing in electronics energy and materials **Current Trends in Optical Amplifiers and Their Applications** Tien-Pei Lee,1996 This volume of trends in optical amplifiers and their applications includes such topics as progess in optical fibre amplifiers reliability of high power pump lasers for erbium doped fibre amplifiers and inP based optical switch array using semiconductor optical amplifiers **Wireless Optical Communication Systems** Steve Hranilovic,2006-01-16 This volume addresses the problem of designing efficient signalling and provides a link between the areas of communication theory and modem design for amplitude constrained linear optical intensity channel It provides practical guidelines for the design of signalling sets for wireless optical intensity channels

Fiber Optics Primer IGIC, Inc. Staff,1994 Microelectronics Failure Analysis ,2004-01-01 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 **Optical Fiber Telecommunications IV-A** Ivan Kaminow,Tingye Li,2002-05-22 Volume IVA is devoted to progress in optical component

research and development Topics include design of optical fiber for a variety of applications plus new materials for fiber amplifiers modulators optical switches light wave devices lasers and high bit rate electronics This volume is an excellent companion to Optical Fiber Telecommunications IVB Systems and Impairments March 2002 ISBN 0 12 3951739 Fourth in a respected and comprehensive series Authoritative authors from a range of organizations Suitable for active lightwave R D designers developers purchasers operators students and analysts Lightwave components reviewed in Volume A Lightwave systems and impairments reviewed in Volume B Up to the minute coverage

Reliability And Degradation Of Semiconductor Lasers And Leds Book Review: Unveiling the Magic of Language

In a digital era where connections and knowledge reign supreme, the enchanting power of language has become more apparent than ever. Its ability to stir emotions, provoke thought, and instigate transformation is really remarkable. This extraordinary book, aptly titled "**Reliability And Degradation Of Semiconductor Lasers And Leds**," compiled by a highly acclaimed author, immerses readers in a captivating exploration of the significance of language and its profound affect our existence. Throughout this critique, we shall delve in to the book is central themes, evaluate its unique writing style, and assess its overall influence on its readership.

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