

# RADIATION EFFECTS IN SEMICONDUCTORS



Edited by  
**Krzysztof Iniewski**



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# Radiation Effects In Semiconductors

**Krzysztof Iniewski**



## **Radiation Effects In Semiconductors:**

**Radiation Effects in Semiconductors and Semiconductor Devices** V. S. Vavilov, 2012-12-06      *Radiation Effects in Advanced Semiconductor Materials and Devices* C. Claeys, E. Simoen, 2013-11-11 In the modern semiconductor industry there is a growing need to understand and combat potential radiation damage problems Space applications are an obvious case but beyond that today's device and circuit fabrication rely on increasing numbers of processing steps that involve an aggressive environment where inadvertent radiation damage can occur This book is both aimed at post graduate researchers seeking an overview of the field and will also be immensely useful for nuclear and space engineers and even process engineers A background knowledge of semiconductor and device physics is assumed but the basic concepts are all briefly summarized Finally the book outlines the shortcomings of present experimental and modeling techniques and gives an outlook on future developments

**Radiation Effects in Semiconductors** Krzysztof Iniewski, 2018-09-03 Space applications nuclear physics military operations medical imaging and especially electronics modern silicon processing are obvious fields in which radiation damage can have serious consequences i.e. degradation of MOS devices and circuits Zeroing in on vital aspects of this broad and complex topic *Radiation Effects in Semiconductors* addresses the ever growing need for a clear understanding of radiation effects on semiconductor devices and circuits to combat potential damage it can cause Features a chapter authored by renowned radiation authority Lawrence T Clark on Radiation Hardened by Design SRAM Strategies for TID and SEE Mitigation This book analyzes the radiation problem focusing on the most important aspects required for comprehending the degrading effects observed in semiconductor devices circuits and systems when they are irradiated It explores how radiation interacts with solid materials providing a detailed analysis of three ways this occurs Photoelectric effect Compton effect and creation of electron positron pairs The author explains that the probability of these three effects occurring depends on the energy of the incident photon and the atomic number of the target The book also discusses the effects that photons can have on matter in terms of ionization effects and nuclear displacement Written for post graduate researchers semiconductor engineers and nuclear and space engineers with some electronics background this carefully constructed reference explains how ionizing radiation is creating damage in semiconducting devices and circuits and systems and how that damage can be avoided in areas such as military space missions nuclear applications plasma damage and X ray based techniques It features top notch international experts in industry and academia who address emerging detector technologies circuit design techniques new materials and innovative system approaches

*Radiation Effects in Semiconductors*, 1967      *Radiation Effects in Semiconductors and Semiconducting Devices* V. S Vavilov, 1995-12-31

**Radiation Effects on Semiconductor Devices** Los Alamos Scientific Laboratory, 1961      *Radiation effects in semiconductors: proceedings, ed* Santa Fe Conference on Radiation Effects in Semiconductors, 1967,      *Radiation Effects in Semiconductors*, 1977      **Radiation Effects in Semiconductors**, 1968      *Radiation Effects in Semiconductors* Aerospace

Research Laboratories (U.S.), BROWN UNIV PROVIDENCE R I., Brown University. Division of Engineering, N. Koren, M. P. Esposito, United States. Air Force. Systems Command. Research and Technology Division, 1964 The first part of the report contains information of use to persons engaged in irradiation experiments involving electrons or protons with energies between 0 and 400 KeV Range energy curves for these particles based on a critical review of the literature are presented A circuit for stabilizing the output voltage and current of a Van De Graaff machine is described The results of a calibration of the machine based on a p gamma reaction are presented The second section describes radiation damage experiments in GaAs based on studies of changes in recombination radiation induced by electron beam injection The third section is concerned with an experiment designed to demonstrate the existence of a photovoltage between two parts of a semiconductor with different lifetimes the lifetime difference having been produced by irradiation Author **RADIATION EFFECTS IN SEMICONDUCTORS & SEMICONDUCTOR DEVICES** TRANS. F. P. HOUS. V. S. VAVILOV, **Radiation Effects in Semiconductors**, 1976 N. B. Urli, James W. Corbett, 1977 Radiation Effects in Semiconductors and in Semiconductor Instruments V. S. Vavilov, N. A. Ukhin, FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO., 1973 The book presents parameter changes caused by experimental irradiation of transistors a criterion of transistor radiation resistance and effects on transistors of various types and levels of irradiation Changes in parameters and characteristics of semiconductor diodes including V A characteristics and conductivity are examined as is the effect of pulsed irradiation on semiconductor devices Author **Reliability And Radiation Effects In Compound Semiconductors** Allan H Johnston, 2010-04-27 This book focuses on reliability and radiation effects in compound semiconductors which have evolved rapidly during the last 15 years It starts with first principles and shows how advances in device design and manufacturing have suppressed many of the older reliability mechanisms It is the first book that comprehensively covers reliability and radiation effects in optoelectronic as well as microelectronic devices It contrasts reliability mechanisms of compound semiconductors with those of silicon based devices and shows that the reliability of many compound semiconductors has improved to the level where they can be used for ten years or more with low failure rates *Radiation Effects in Semiconductors* University of Michigan. Engineering Summer Conferences, 1967 *The Effect of Nuclear Radiation on Semiconductor Devices* F. J. Reid, 1960 Data are presented on investigations of standard silicon and germanium transistors diodes rectifiers and such devices as unipolar transistors Esaki diodes and SiC GaP and selenium rectifiers The data are intended to be sufficiently inclusive to make it valuable as a guide on effects which can be anticipated from nuclear radiation on electronic components utilizing semiconductor devices Author *Radiation Effects in Semiconductor Devices* Frank Larin, 1968 Radiation Effects in Semiconductors Joseph John Loferski, 1964 The first part of the report contains information of use to persons engaged in irradiation experiments involving electrons or protons with energies between 0 and 400 KeV Range energy curves for these particles based on a critical review of the literature are presented A circuit for

stabilizing the output voltage and current of a Van De Graaff machine is described The results of a calibration of the machine based on a p gamma reaction are presented The second section describes radiation damage experiments in GaAs based on studies of changes in recombination radiation induced by electron beam injection The third section is concerned with an experiment designed to demonstrate the existence of a photovoltage between two parts of a semiconductor with different lifetimes the lifetime difference having been produced by irradiation Author Radiation Effects in Semiconductors ,1968  
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## **Table of Contents Radiation Effects In Semiconductors**

1. Understanding the eBook Radiation Effects In Semiconductors
  - The Rise of Digital Reading Radiation Effects In Semiconductors
  - Advantages of eBooks Over Traditional Books
2. Identifying Radiation Effects In Semiconductors
  - Exploring Different Genres
  - Considering Fiction vs. Non-Fiction
  - Determining Your Reading Goals
3. Choosing the Right eBook Platform
  - Popular eBook Platforms
  - Features to Look for in an Radiation Effects In Semiconductors
  - User-Friendly Interface
4. Exploring eBook Recommendations from Radiation Effects In Semiconductors
  - Personalized Recommendations
  - Radiation Effects In Semiconductors User Reviews and Ratings
  - Radiation Effects In Semiconductors and Bestseller Lists

5. Accessing Radiation Effects In Semiconductors Free and Paid eBooks
  - Radiation Effects In Semiconductors Public Domain eBooks
  - Radiation Effects In Semiconductors eBook Subscription Services
  - Radiation Effects In Semiconductors Budget-Friendly Options
6. Navigating Radiation Effects In Semiconductors eBook Formats
  - ePub, PDF, MOBI, and More
  - Radiation Effects In Semiconductors Compatibility with Devices
  - Radiation Effects In Semiconductors Enhanced eBook Features
7. Enhancing Your Reading Experience
  - Adjustable Fonts and Text Sizes of Radiation Effects In Semiconductors
  - Highlighting and Note-Taking Radiation Effects In Semiconductors
  - Interactive Elements Radiation Effects In Semiconductors
8. Staying Engaged with Radiation Effects In Semiconductors
  - Joining Online Reading Communities
  - Participating in Virtual Book Clubs
  - Following Authors and Publishers Radiation Effects In Semiconductors
9. Balancing eBooks and Physical Books Radiation Effects In Semiconductors
  - Benefits of a Digital Library
  - Creating a Diverse Reading Collection Radiation Effects In Semiconductors
10. Overcoming Reading Challenges
  - Dealing with Digital Eye Strain
  - Minimizing Distractions
  - Managing Screen Time
11. Cultivating a Reading Routine Radiation Effects In Semiconductors
  - Setting Reading Goals Radiation Effects In Semiconductors
  - Carving Out Dedicated Reading Time
12. Sourcing Reliable Information of Radiation Effects In Semiconductors
  - Fact-Checking eBook Content of Radiation Effects In Semiconductors
  - Distinguishing Credible Sources
13. Promoting Lifelong Learning

- Utilizing eBooks for Skill Development
- Exploring Educational eBooks

#### 14. Embracing eBook Trends

- Integration of Multimedia Elements
- Interactive and Gamified eBooks

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