



**Electrostatic discharge (ESD)
protection in electronics**

Protecting Electronic Equipment From Electrostatic Discharge

Steven H. Voldman



Protecting Electronic Equipment From Electrostatic Discharge:

Protecting Electronic Equipment from Electrostatic Discharge Edward A. Lacy, 1984 **Electrostatic Discharge Control Handbook for Protection of Electrical and Electronic Parts, Assemblies and Equipment (excluding Electrically Initiated Explosive Devices) (metric)** United States. Department of Defense, 1991 **Electrostatic Discharge Protection** Jun J. Liou, 2017-12-19 Electrostatic discharge ESD is one of the most prevalent threats to electronic components In an ESD event a finite amount of charge is transferred from one object i e human body to another i e microchip This process can result in a very high current passing through the microchip within a very short period of time Thus more than 35 percent of single event chip damages can be attributed to ESD events and designing ESD structures to protect integrated circuits against the ESD stresses is a high priority in the semiconductor industry *Electrostatic Discharge Protection Advances and Applications* delivers timely coverage of component and system level ESD protection for semiconductor devices and integrated circuits Bringing together contributions from internationally respected researchers and engineers with expertise in ESD design optimization modeling simulation and characterization this book bridges the gap between theory and practice to offer valuable insight into the state of the art of ESD protection Amply illustrated with tables figures and case studies the text Instills a deeper understanding of ESD events and ESD protection design principles Examines vital processes including Si CMOS Si BCD Si SOI and GaN technologies Addresses important aspects pertinent to the modeling and simulation of ESD protection solutions *Electrostatic Discharge Protection Advances and Applications* provides a single source for cutting edge information vital to the research and development of effective robust ESD protection solutions for semiconductor devices and integrated circuits *Electrostatic Discharge Protection for Electronics* Neil Sclater, 1990 Neil Sclater offers practical advice on selecting test and control equipment handling and storing semiconductors and other components building static free workstations creating a protective environment for electronics and much more A complete listing of manufacturers and suppliers is included Prior to founding his own electronics marketing research firm Neil Sclater worked as an engineer for several leading corporations and as editor for *Electronic Design* and *Product Engineering* He is the author of *TPR's Gallium Arsenide IC Technology* No 3089 **Safety Design for Space Systems** Tommaso Sgobba, Gary Eugene Musgrave, Gary Johnson, Michael T. Kezirian, 2023-07-25 The lack of widespread education in space safety engineering and management has profound effects on project team effectiveness in integrating safety during design On one side it slows down the professional development of junior safety engineers while on the other side it creates a sectarian attitude that isolates safety engineers from the rest of the project team To speed up professional development bridge the gap within the team and prevent hampered communication and missed feedback the entire project team needs to acquire and develop a shared culture of space safety principles and techniques The second edition of *Safety Design for Space Systems* continues to address these issues with substantial updates to chapters such as battery safety life

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Voldman,2015-01-05 A comprehensive and in depth review of analog circuit layout schematic architecture device power network and ESD design This book will provide a balanced overview of analog circuit design layout analog circuit schematic development architecture of chips and ESD design It will start at an introductory level and will bring the reader right up to the state of the art Two critical design aspects for analog and power integrated circuits are combined The first design aspect covers analog circuit design techniques to achieve the desired circuit performance The second and main aspect presents the additional challenges associated with the design of adequate and effective ESD protection elements and schemes A comprehensive list of practical application examples is used to demonstrate the successful combination of both techniques and any potential design trade offs Chapter One looks at analog design discipline including layout and analog matching and analog layout design practices Chapter Two discusses analog design with circuits examining single transistor amplifiers multi transistor amplifiers active loads and more The third chapter covers analog design layout also MOSFET layout before Chapters Four and Five discuss analog design synthesis The next chapters introduce the reader to analog digital mixed signal design synthesis analog signal pin ESD networks and analog ESD power clamps Chapter Nine the last chapter covers ESD design in analog applications Clearly describes analog design fundamentals circuit fundamentals as well as outlining the various ESD implications Covers a large breadth of subjects and technologies such as CMOS LDMOS BCD SOI and thick body SOI Establishes an ESD analog design discipline that distinguishes itself from the alternative ESD digital design focus Focuses on circuit and circuit design applications Assessible with the artwork and tutorial style of the ESD book series PowerPoint slides are available for university faculty members Even in the world of digital circuits analog and power circuits are two very important but under addressed topics especially from the ESD aspect Dr Voldman s new book will serve as an essential and practical guide to the greater IC community With high practical and academic values this book is a bible for professionals graduate students device and circuit designers for investigating the physics of ESD and for product designs and testing *The ESD Handbook* Steven H. Voldman,2021-03-25 A practical and comprehensive reference that explores Electrostatic Discharge ESD in semiconductor components and electronic systems The ESD Handbook offers a comprehensive reference that explores topics relevant to ESD design in semiconductor components and explores ESD in

various systems Electrostatic discharge is a common problem in the semiconductor environment and this reference fills a gap in the literature by discussing ESD protection Written by a noted expert on the topic the text offers a topic by topic reference that includes illustrative figures discussions and drawings The handbook covers a wide range of topics including ESD in manufacturing garments wrist straps and shoes ESD Testing ESD device physics ESD semiconductor process effects ESD failure mechanisms ESD circuits in different technologies CMOS Bipolar etc ESD circuit types Pin Power Pin to Pin etc and much more In addition the text includes a glossary index tables illustrations and a variety of case studies Contains a well organized reference that provides a quick review on a range of ESD topics Fills the gap in the current literature by providing information from purely scientific and physical aspects to practical applications Offers information in clear and accessible terms Written by the accomplished author of the popular ESD book series Written for technicians operators engineers circuit designers and failure analysis engineers The ESD Handbook contains an accessible reference to ESD design and ESD systems

Electronic Equipment Packaging Technology Gerald L. Ginsberg, 2013-11-27 The last twenty years have seen major advances in the electronics industry Perhaps the most significant aspect of these advances has been the significant role that electronic equipment plays in almost all product markets Even though electronic equipment is used in a broad base of applications many future applications have yet to be conceived This versatility of electronics has been brought about primarily by the significant advances that have been made in integrated circuit technology The electronic product user is rarely aware of the integrated circuits within the equipment However the user is often very aware of the size weight modularity maintainability aesthetics and human interface features of the product In fact these are aspects of the products that often are instrumental in determining its success or failure in the marketplace Optimizing these and other product features is the primary role of Electronic Equipment Packaging Technology As the electronics industry continues to provide products that operate faster than their predecessors in a smaller space with a reduced cost per function the role of electronic packaging technology will assume an even greater role in the development of cost effective products

Handbook of Electrostatic Processes Jen-Shih Chang, Arnold J. Kelly, Joseph M. Crowley, 2018-12-14 Provides detailed comprehensive descriptions of electrostatic processes as well as their applications in areas such as rheology atomization and spraying industrial dust particle precipitation and filtering biomedical engineering gas treatments atmospheric electricity chemical reactors and electronic devices Summarizes electrostatic fundamentals and electrical phenomena in solids and fluids

EMI Protection for Communication Systems Kresimir Malaric, 2010 In recent years the protection of communication services operating in the same of adjacent channels has become more and more challenging Communication systems need to be protected from natural and man made interference This practical reference provides a thorough understanding of how to protect communication systems from intentional and unintentional electromagnetic interference Engineers learn how to overcome critical problems in both digital and analog communications This unique resource shows how to shield equipment

from electrical and magnetic fields design TEM and GTEM Cell build capacitive coupling clamps for susceptibility tests protect electronic equipment with filters and calculate the measurement uncertainty Professionals find numerous well illustrated examples that make challenging electromagnetics issues far easier to comprehend CD ROM Included Contains time saving software that helps engineers perform important calculations including characteristic impedance of TEM Cell cut off frequencies for higher order modes and cut off and resonant frequencies for GTEM cell

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