

IONIZATION AND ANSWERS FOR THE PROGRAM MANAGER • CLEANROOM CONSIDERATIONS FOR THE PROGRAM MANAGER • DEVICE DESIGN • PACKAGING PRINCIPLES FOR THE PROGRAM MANAGER • ESD STANDARDS OVERVIEW FOR THE PROGRAM MANAGER

Dates: April 14-15, 2010, Bloomington, MN

Holiday Inn & Suites • Continental breakfast, lunch, and refreshments provided

IONIZATION AND ANSWERS FOR THE PROGRAM MANAGER

April 14, 2010, 8:30 a.m. - 12:00 p.m.

Instructor: Arnold Steinman, Electronics Workshop

The primary method of static charge control is direct connection to ground for conductors, static dissipative materials, and personnel. But a complete static control program must also deal with isolated conductors, insulating materials, and moving personnel that cannot be grounded. Air ionization can neutralize the charge on insulated and isolated objects.

This seminar will

- Examine problems caused by static charge
- Review common methods for generation and control of static charge
- Establish the importance of ionizers in a static control program through demonstrations
- Illustrate charge generation and control through demonstrations
- Explain the major types of ionizers and the varying environments in which they are used
- Discuss electrical and performance test methods
- Demonstrate ionization measurements using the Ionization Standard
- Present installation, safety, maintenance, and contamination issues
- Analyze case histories of the use of ionizers in a variety of work environments

CLEANROOM CONSIDERATIONS FOR THE PROGRAM MANAGER

April 14, 2010, 1:00 p.m. - 4:30 p.m.

Instructor: Chris Long, IBM

Cleanrooms and clean environments are enabling technologies required for the manufacture of many products that have exacting contamination control requirements in order to achieve defined yield and reliability targets. Clean manufacture is required in the semiconductor, hard disk drive, flat panel display, and pharmaceutical industries, to name a few. Requirements of cleanroom/clean environments and tooling therein result in low humidity levels, low surface contamination levels, use of process-required insulators, and a lack of natural ions in the controlled environment. These factors can contribute to development of elevated static charge levels in close proximity to sensitive product, presenting both a contamination and electrostatic discharge exposure. This tutorial will provide a detailed review of the following concepts:

- Cleanroom clean environment function
- Airborne particle classification standards
- Cleanroom compliance monitoring test methodologies
- Electrostatic attraction relation to airborne and surface contamination
- Electrostatic discharge concerns
- Cleanroom static charge generation challenges and control methodologies

In addition, several case studies of static charge control issues in clean environments will be presented.

ABOUT THE INSTRUCTORS

Arnold Steinman is a consultant in electrostatics, static charge control, and ionization, utilizing the knowledge and experience gained in 25+ years as Chief Technology Officer for Ion Systems. He holds four patents covering air ionizer technology. Steinman graduated from the Polytechnic Institute of Brooklyn, receiving both BSEE and MSEE degrees. Steinman has served on the Board of Directors of the ESD Association and is a past chairperson of the Ionization Standards Committee. He has served as leader of the Semiconductor Equipment and Materials (SEMI) ESD Task Force since 1996. Steinman is also a senior member of the Institute of Environmental Sciences and Technology (IEST). Steinman is currently managing West Coast operations for electrostatic instrument supplier, TREK Inc., Medina NY.

Christopher Long is a Senior Engineer with IBM Research, with 27 years experience in semiconductor manufacturing. He currently is involved with research and development of magneto-resistive random access memory (MRAM). Previously he had responsibility for contamination and ESD control program strategy for IBM's semiconductor manufacturing facilities. Mr. Long has published and presented numerous papers on semiconductor manufacturing, defect reduction and yield modeling, and has served as co-chair of the International Technology Roadmap for Semiconductors (ITRS) Yield Enhancement technology working group, responsible for development of the Yield Enhancement chapters of the 2001 and 2003 ITRS. Mr. Long received a BS in physics from Beloit College in Beloit, WI (1980), and an MS in engineering from the Thayer School of Engineering, Dartmouth College (1990), in Hanover, NH.

NOTE

These classes are part of the ESDA Program Manager Certification curriculum. More details on the Professional Certification Programs offered by ESDA are on our website at www.esda.org/certification.html

Co-sponsored by the North Central Chapter ESD Association

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PACKAGING PRINCIPLES FOR THE PROGRAM MANAGER

April 15, 2010, 8:30 a.m. - 12:00 p.m.

Instructor: David E. Swenson, Affinity Static Control Consulting, LLC

Shipping electronic parts within a factory, to another factory, distributor, or to an end-user has always been an area of uncertainty within the manufacturing process. To provide clear-cut information on what type of controlled packaging should be used in any situation, the ESD Association has recently released a comprehensive revision of the obsolete industry standard EIA 541-1988. The new document, ANSI/ESD S541, is the focus of this session. It provides information and guidance, as well as material specifications, to assist in the design and implementation of a packaging plan for use within an ANSI/ESD S20.20 based ESD control program. Current and newly released test method standards suitable for packaging material evaluation will be described. Course credit applies to the ESD Certified Professional-Program Manager certification curriculum.

ESD STANDARDS OVERVIEW FOR THE PROGRAM MANAGER

April 15, 2010, 1:00 p.m. - 4:30 p.m.

Instructor: David E. Swenson, Affinity Static Control Consulting, LLC

The ESD Association's introduction of the Program Manager Curriculum created a need to modify the Standards Tutorial that has been presented for a number of years, mainly to help individuals prepare for the NARTE Engineering and Technician Exams. Many of the ESDA Standards and Standard Test Methods are discussed in depth in the individual tutorials related to the specific subject matter. This Standards Tutorial provides an overview of all the Standards, grouped into common test types, based on measurement probe and test instruments. A common methodology is used in this tutorial to cover the requirements, applications and specifications for each Standard and Standard Test Method.

ABOUT THE INSTRUCTOR

David E. Swenson retired from 3M in 2003 after 35 years of service. The majority of his career involved electrostatic investigation, solutions to static problems and related new product development. After retirement, Swenson and his wife established Affinity Static Control Consulting, L.L.C., to offer electrostatic solutions to industry. He has been a member of the ESD Association since 1984 and is currently President Emeritus of the Board of Directors, has served as Symposium General Chairman, Sr. Vice President. A long term member of the Standards Committee and Working Group Chair, Swenson has authored numerous technical papers on ionization, packaging materials, triboelectrification, test methods for ESD materials, and ESD control program implementation, presented around the world. Dave is a Life Member of the ESD Association.

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Device Design Program

ESD in the Industrial Semiconductor IC Context

What is ESD? Why is it important? What methods are used to control it?
Who is responsible for ESD? What is the role of the design engineer?
Development of library cells and more.

ESD Models and ESD Testing

Description of the three models and model issues from the designer's point of view, for example, tester-device interaction.

ESD Device Operation

Fundamentals of MOS device operation, its behavior under high current mode, latch-up effects and SCR devices, transistor snapback behavior, emission analysis, process effects, diode physics and operation, the role of the PMOS, BiCMOS and the similarity of the techniques for CMOS, bipolar devices, DENMOS and LDMOS devices and protection techniques.

ESD Circuit Operation

Operation of and issues with NMOS circuits, active clamping versus snapback, self-protection versus parallel protection; static (Zener

based) triggering, dynamic gate-coupling, substrate pumping, and multi-finger turn-on; includes discussion of implementation, simulation, and experimental results.

Technology Impact on ESD Design Choices

Review of ESD protection design options as a function of technology and process fluctuations.

Special Circuit Requirements, Including RF, and Their Impact on ESD

Mixed voltage protection, RF and analog protection, BiCMOS, high voltage protection, and new latchup effects.

CDM ESD Protection

Concerns and considerations; fast enough diodes, transistors, and SCRs; the on-chip CDM event; the golden rules; an application example.

Design Examples and Case Studies

Layout methods, ESD rules, new design methods, case studies of protection design problems, class exercises.

Schedule

April 14

8:30 AM Registration
9:00 AM **Session 1**
ESD in the Semiconductor IC Context
ESD Models and ESD Testing
ESD Device Operation
1:00 PM **Session 2**
ESD Device Operation (cont'd)
ESD Circuit Operation
5:00 PM Adjourn

April 15

9:00 AM **Session 3**
Technology Impact on ESD Design Choices
Special Circuit Requirements, Including RF,
and Their Impact on ESD
1:00 PM **Session 4**
Special Circuit Requirements, Including RF,
and Their Impact on ESD (cont'd)
CDM ESD Protection
Design Examples and Case Studies
5:00 PM Seminar Concludes

Instructors This Design Seminar is given by two experts and the information is much more than can be obtained by any other tutorial on this subject in just two days

Charvaka Duvvury, Texas Instruments

Charvaka Duvvury is a Texas Instruments Fellow working in the Technology Design and Integration Group at Dallas. Dr. Duvvury received his Ph.D. in Engineering Science from the University of Toledo. His current work is on development and companywide support on ESD for the nanometer submicron CMOS technologies. He is internationally known and has presented many invited seminars on ESD design for semiconductor ICs. He has published over 120 papers in ESD and other IC reliability topics, co-authored four books, and holds 65 patents. He has been involved with the EOS/ESD Symposium since 1984, having served as the Technical Program Chair in 1992 and twice as the General Chair in 1994 and 2005. He has received the Outstanding Contributions Award and numerous Best Paper Awards from the EOS/ESD Symposium. Dr. Duvvury is a member of the ESDA Board of Directors since 1997, promoting university research and education in ESD. He is also an IEEE Fellow.

James W. Miller, Freescale

James W. Miller is a Distinguished Member of the Technical Staff at Freescale Semiconductor in Austin, Texas. He manages an ESD team responsible for developing and deploying to products ESD solutions in advanced CMOS technologies. Mr. Miller received the B.S. and M.S. degrees in Physics from Stephen F. Austin State University. He has served several years on the Technical Program Committees of the IRPS and the EOS/ESD Symposium. Jim is also a past General Chair and Technical Program Chair of the Integrated Reliability Workshop and was a co-organizer of the International ESD Workshop. He has co-authored over 40 external papers, presentations and tutorials on ESD network design, transistor reliability, failure analysis and I/O physical architecture. He was a co-recipient of several EOS/ESD Symposium Best Paper and Best Presentation awards. Jim currently holds twenty one patents, with several pending.

NOTE This class is part of the ESDA Device Design Certification curriculum. More details on the Professional Certification Programs offered by ESDA are on our website at www.esda.org/certification.html

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Registration Form

First Name: _____ Last Name: _____

Company Name: _____

Street: _____ City: _____

State/Province: _____ Country _____ Zip/Postal Code: _____

Is Address (please circle the one that applies) Home or Company

Phone: _____ Fax: _____ Email: _____

Course Selection

April 14, 2010

- Ionization Issues and Answers for the Program Manager (8:30 a.m. - Noon)
- Cleanroom Considerations for the Program Manager (1:00 p.m. - 4:30 p.m.)

April 15, 2010

- Packaging Principles for the Program Manager (8:30 a.m. - Noon)
- ESD Standards Overview for the Program Manager (1:00 p.m. - 4:30 p.m.)

April 14-15, 2010

- Device Design Seminar

	Cost on or before 3/17/2010		Cost after 3/17/2010	
	Members	Non-Members	Members	Non-Members
1/2 day - each (AM or PM session)	\$295	\$395	\$495	\$495
Full Day (1 day or two half days)	\$495	\$595	\$695	\$695
Both Full Days	\$990	\$1,190	\$1,390	\$1,390
Device Design Seminar	\$1,495	\$1,595	\$1,695	\$1,695

Payment Information

Payment is required at time of registration. Only checks drawn in U.S. currency on a U.S. bank that is a member of the Federal Reserve will be accepted; make checks payable to ESD Association. Visa®, Mastercard®, and American Express® and Discover® are accepted.

Amount enclosed \$ _____ Check Credit Card

Credit card type: Visa® Mastercard® American Express® Discover®

Credit card number: _____ Expiration date: _____

Name on card: _____ Security code: _____

Cardholder's signature: _____

Accommodations

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 Three Appletree Square / I-494 & 34th Avenue (Exit 1)
 Bloomington, Minnesota 55425 • Phone: (952) 854-9000 • Fax: (952) 876-8700
<http://www.himspairport.com/index.php>

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