The ESD Association newsletter, published for everyone with an interest in the understanding and control of electrostatic discharge.

In this issue

www.esda.org

In the next issue of Threshold...

2009 EOS/ESD Symposium featured ten interactive workshops. The topics of the workshops included ESD design, simulation, test, control methods and many others. Symposium participants enjoyed great opportunity for lively discussions and learning from ESD industry experts as well as sharing their own experiences. Detailed report on 2009 EOS/ESD Symposium workshops will be published in November/December issue.

ESD ASSOCIATION

THRESHOLD™

Volume 25, No. 5 September/October 2009

The 31st EOS/ESD Symposium is a Success in Anaheim!

Dr. Steven H. Voldman
ESD Symposium General Chairman

It was a great pleasure to be the General Chairman of the 2009 EOS/ESD Symposium in Anaheim, California held from August 30th - September 4th, 2009.

This year, the EOS/ESD Symposium attendance exceeded 300 people. The conference this year was a lot of fun, with great events, good food, excellent California vintages of wine, and excellent assistance from the Disneyland staff. The weather was beautiful, and there were fantastic fireworks every evening after dusk.

Some of the highlights of the Symposium this year included a Keynote talk in the biomedical field, The Keynote talk given by Dr. Shekar Rao, of Texas Instruments was titled "Emerging Trends of Medical Devices and Opportunities for Semiconductor Chip Technology." The talk discussed biomedical directions for chip development. Faculty were invited from four different universities that provide research and development in the field of ESD. Vice President Ker Ming-Dou of I-Shou University (Kaohsiang, Taiwan), Professor J.J. Liou of University of Central Florida (UCF), Professor Albert Wang of University of California Riverside (UCR), and Professor Kaustav Banerjee of University of California Santa Barbara (UCSB) provided lectures on ESD research in their respective research groups. This was a great success, with many students from these universities attending. In future years, we hope to make this a tradition and have the opportunity to invite more faculty allowing our ESD society to grow.

During the Assocation Luncheon a special talk was given by Dr. Jeremy Smallwood, Chairman of IEC TC101 – Electrostatics. the talk was titled "The Strange World of Static Electricity and International Standards" covering some of the strange and humerous affects that ESD has had on industries.

This year at the EOS/ESD Symposium, there was significant growth in publications in the area of micro electromechanical (MEMs), advanced CMOS devices, and ESD device level testing.

In the Exhibit Hall, the latest advancement in vendor materials and equipment was shown. The exhibit hall was filled with exhibitors from corporations to universities in the ionization, materials, conductive polymers, consulting to device-level test equipment.

To liven up the event, Disney characters even entered the technical sessions and the exhibit hall, shaking hands, and greeting the attendees.

Was this event a good time? Yes! Between the food, the weather, the venue, the staff and a good program to keep us busy, it was a good EOS/ESD event ...a great EOS/ESD event!

See you in Sparks (Reno), NV in 2010, at the 32nd EOS/ESD Symposium.

Symposium

Award Recognition!

Numerous individuals contribute to the success of the industry, organization or events. For those who go above and beyond, the ESD Association annually recognizes individuals who have made a lasting impact on the Association or on the ESD industry. These awards are presented at the annual EOS/ESD Symposium.

Symposium Award
Arnold Steinman

Volunteer Award
Tim Prass

TPC Award
David Tremouilles
(Horst Geiser received the award for David) The ESD Association Technical Program Committee award honors an individual for outstanding contribution to the Symposium Technical Program Committee.

Outstanding Contribution Award
Reinhold Gaertner
The Outstanding Contributions Award is awarded to an individual who has made a major contribution to either the development or the operation of the ESD Association or has had a significant impact in the field of EOS/ESD.

Industry Pioneer Recognition Award
Steve Fowler
The ESD Association Industry Pioneer Award is presented to an individual whose contributions, vision and service helped to form, or significantly change, the industry.

David F. Barber Sr. Memorial Award
Carl Newberg
The David Barber Sr. Memorial Award is presented to an individual who has made a significant contribution to the development, organization, management and growth of the EOS/ESD Symposium.

ESD Symposium General Chairman
Dr. Steven H. Voldman
The Symposium General Chairman is recognized for the time and contributions put forth in the organization and planning of another successful EOS/ESD Symposium event.

President Award
Evan Grund
The President's award is presented in recognition of significant contributions, leadership and management that has enhanced ESDA operations and effectiveness in serving industry and the organization.

Joel P. Weidendorf Memorial Award
Fred Tenzer
The Joel Weidendorf Memorial Award is presented to an individual who has made a significant contribution to the development of ESD Association Standards.

Symposium

Symposium Paper Awards

The Symposium Outstanding Paper Award went to ***HBM ESD Failures Caused by a Parasitic Pre-Discharge Current Spike***

Melanie Etherton, Victor Axelrod, James W. Miller, Haim Marom, Freescale Semiconductor; Tom Meuse, Thermo Fisher Scientific

The Best Paper Award awarded to ***A Study of Cable Discharge Events and Other Short Time Pulses of Cabled MR Sensors***

Icko Eric Timothy Iben, IBM

The Best Student Paper was awarded to ***Design Methodology of FinFET Devices that Meet IC-Level HBM ESD Targets***

S. Thijs, G. Groeseneken, IMEC vzw and Katholieke Universiteit Leuven; C. Russ, H. Gossner, Infineon Technologies AG; D. Trémouilles, LAAS/CNRS; A. Griffoni, University of Padova; D. Linten, M. Scholz, N. Collaert, R. Rooyackers, M. Jurczak, IMEC vzw; M. Sawada, T. Nakaei, T. Hasebe, Hanwa Electronics Ind. Co. Ltd.; C. Duvvury, Texas Instruments

A special recognition cites the best paper from the 2008 RCJ ESD Symposium-Japan. This year's Friendship Award was presented to ***ESD Parameter Extraction by TLP Measurement***

Yasuhiro Fukuda, Tomomi Yamada, Oki Engineering, Co., Ltd.; Masanori Sawada, Hanwa Electronic Industry Co., Ltd.

ESD ASSOCIATION ELECTS BOARD MEMBERS AND OFFICERS FOR 2010

Election results were reported during the annual ESD Association business meeting luncheon at the 2009 EOS/ESD Symposium, in Anaheim, CA.

Elected to the Board of Directors, by the members of the ESD Association, for a three-year term from January 1, 2010, to December 31, 2012, were Nate Peachey, RFMD; Tim Prass, Raytheon; Kathy Muhonen, Penn State Erie, The Behrend College; Terry Welsher, Dangelmayer & Associates.

The Board of Directors also elected its officers for a one-year term of January 1, 2010, to December 31, 2010. The following officers were elected: Donn G. Bellmore, *Advanced ESD Services +*, President; Leo G. Henry, *ESD/TLP Consultants, LLC*, Senior Vice President; and Terry Welsher, *Dangelmayer and Associates*, Vice President.

ORANGEWOOD CHILDREN'S FOUNDATION CONTRIBUTION

At this year's EOS/ESD Symposium, the ESD Association was pleased to sponsor one of Anaheim's local charity organizations. The Orangewood Children's Foundation is a shelter for children who were the victims of abuse, neglect and abandonment. The Orangewood Children's Foundation continues its efforts by meeting the needs of children in the foster care system, developing a wide range of activities, scholarships, support and programs to give every child every chance to succeed.

With the support of members and attendees at the 2009 EOS /ESD Symposium we were able to help this important organization with a donation of ***$2,776***.

Our sincerest thank you to all who contributed.

From the President

ESDA activities....

David E. Swenson

Our 2009 EOS/ESD Symposium will be history by the time you are reading this issue of Threshold. This has been a pretty trying year and the Board of Directors and Executive Committee have had to make some difficult choices regarding the various events and activities that take place at the Symposium. Hopefully, none of the choices had a significant impact on the quality of the Symposium or affected the experience of any of our attendees. If you are among those who were able to attend, please let us know your opinion about this year's event. Hopefully, you will have filled out a Symposium Questionnaire since we really do review every single one of the comments and take them to heart.

One of the things we try to do most years is find a way to support the host city or a charity in the local community where we hold our Symposium. This year we chose Orangewood Children's Foundation. Orangewood deals with child abuse cases and offers some unique services to assist young people that suddenly become "emancipated" from the foster care system when they turn 18 years old. Many of these young folks have a great deal of difficulty getting started in life after foster care and Orangewood provides much needed assistance and guidance. Symposium attendees had the opportunity to contribute to the Foundation while at the Symposium and received a special button to wear with their Name Badge. Special thanks to all who participated in this program; I am sure our modest contribution was well received by the Orangewood Children's Foundation.

On the administrative side of the ESD Association operations, our office in Rome, NY has now taken on much more of our routine printing and publishing responsibility. Just about all of the printed matter is now produced in-house. In the past we have used printing houses for printing our Standards related documents, tutorial notes, flyers, brochures, and the myriad of other paper based items produced by the Association. The vast majority of these items can now be done in the office, giving us the ability to print on demand and reduce printed copy inventory. This helps reduce a tremendous amount of waste since print runs can be much smaller. In the Standards area alone, we do not have to have a stack of published documents on the shelf as they can be printed to order. Since Standards documents change every so often (5- year reviews), having an inventory almost always has led to a large amount of waste in the past. The office can now manage printing deadlines better which also assists the volunteers responsible for content and editorial review.

Electronic delivery of Standards related documents is also a big plus to reducing printing inventory. We are migrating consistently but carefully towards electronic processing of orders. Due to the unique considerations that not-for-profit organizations have to deal with, electronic orders are not so simple. Every transaction has to be coded properly and that is a challenge with paperless systems. Software systems are getting better though, and we should be able to offer electronic order processing for just about everything, including Symposium registration, within a few years.

Continued on page 5

From the President

ESDA activities....continued

On the Technical side of operations, a Task Team made up of people from a cross-section of our membership is working on definitions of terminology related to items or processes that are very sensitive to electrostatic phenomena. As mentioned in previous columns this year, the term "Class 0" is not being used properly since there is no current definition of what that means other than its use with Human Body Model (HBM) sensitivity levels for components. This Task Team, led by Steve Heymann, is currently gathering information from around the industry and the military regarding sensitivity levels and will be developing a recommendation on how to classify processes and parts sensitive to very low levels of electrostatic charge or discharge.

Reports from around the industry are beginning to show signs of recovery from the latest recession (almost depression). As the housing industry and stock market recover from their very depressed state of just months ago, I hope you are seeing an improvement in your business. Here in central Texas we are looking forward to the fall and relief of the oppressing heat this summer has brought. As of today (end of July) we have had 41 days of 100° F or higher this summer and July will go down on record as the hottest month in recorded history. The average for this area is 12 days of 100+ for the entire summer. If any one would like to contribute to my electricity bill, please feel free.

IEW

IEW Call For Presentations

2010 International Electrostatic Discharge Workshop

May 10-13, 2010 in Tutzing, Germany
http://www.esda.org/iew.htm

Tutzing Castle estate is located on the shores of Lake Starnberg, 30 kilometers Southwest of Munich. With its modern conference rooms and facilities, it has been chosen as the venue of our workshop. The spirit of this place encourages thoughtful discussions and intensive interaction.

Abstract Submission Deadline **Friday, Nov. 20, 2009**

We invite you to submit a presentation proposal addressing any of the following topics:

Novel Design Concepts
New protection device and circuit concepts, high sensitivity & high speed circuit challenges, off-the-wall ideas

Special Custom Design Approaches
High voltage application designs, protection design for analog circuits, Bi-CMOS and Bipolar protection, GaAs protection

Technology Integration Issues
ESD sensitivity with technology transfers, qualification challenges for different fabs, unusual problems of process interaction with ESD, process monitor methods

Failure Analysis
New techniques to detect ESD failures, correlation between HBM/CDM/TLP with physical FA, unusual failure modes

Test Structures
Design of standard structures for It2, gate oxide and metal current density monitor; special VFTLP test structure design and analysis

Simulation Tools
TCAD interpretation examples, device behavior under ESD like conditions, standard SPICE simulation techniques to verify ESD designs, ESD checking tool development

ESD Testing Characterization and Tester Issues
Failure debug procedures, correlation of TLP and HBM and correlation of VFTLP and CDM. Tester to tester correlation, ESD tester artifacts, and test standards issues

System Level ESD Issues
On-chip and on-board IEC protection device techniques, cable discharge, transient latch-up effects, system failure cases

Unresolved ESD Issues
Random and unrepeatable ESD failures, issues with ESD standards, ESD data statistics

Submission Instructions

Your abstract (two pages including figures) must clearly present the data and the significance of the results. Submitted abstracts will be considered for both podium and poster presentation. Please email your presentation abstract including title, author affiliation, and email address to iew@esda.org by the November 20, 2009 deadline. The required format is pdf® (Adobe Acrobat®). Notification of acceptance will occur by December 11, 2009. Final presentations for the workshop in PowerPoint® format must be received by April 9, 2010. These PowerPoint® slides will be included in the Presentation Handout along with a CD-ROM that will be distributed during the Workshop. Refereed poster presentations will be included in the CD-ROM. There will be no formal report published. Due to an agreed alignment through the ESD Association, presentation of your work at the IEW will not preclude a subsequent, but more detailed, submission to the EOS/ESD Symposium. For any questions please contact the Technical Program Chair, Gaudenzio Meneghesso (gaudenzio.meneghesso@dei.unipd.it)

Wolfgang Warmbier
Untere Giesswiesen 21, D-78247 Hilzingen, Germany
Tel: 49-7731-86880 Fax: 49-7731-868846
www.warmbier.com • E-mail: wolfgang.warmbier@warmbier.com
ISO 9001:2000 certified for consulting, manufacturing and supply of static control materials and systems, ESD test Instrument calibration

Monroe Electronics
100 Housel Avenue, Lyndonville, NY 14098
Tel: 585-765-2254 Fax: 585-765-9330
E-mail: electrostatics@monroe-electronics.com
www.monroe-electronics.com
Full line manufacturer of static measurement equipment

Symposium

32nd Annual ELECTRICAL OVERSTRESS/ELECTROSTATIC DISCHARGE SYMPOSIUM

2010 SYMPOSIUM CALL FOR PAPERS

OCT 3 - 8, 2010 JOHN ASCUAGA'S NUGGET RESORT SPARKS (RENO), NEVADA, USA

Technical Papers

The Technical Program Committee solicits paper contributions, including data and analysis that advance the state-of-the-art knowledge, enhance or review the general knowledge, or discuss new topics related to EOS/ESD. Paper Presentations at the Symposium will be in electronic Power Point® format.

Abstracts

Authors must submit a 50-word abstract and 4-page (maximum) summary of their work. The summary must clearly state the purpose, results (e.g., data, diagrams, photographs, etc.), and conclusions of the work. Summaries must also include references to prior publications and state how the work enhances existing knowledge. Authors must designate the appropriate technical area related to their work and submission. See reverse for suggested, but not restricted, topic listings. Authors are encouraged to use the abstract submission toolkit available on the ESD Association's website www.esda.org. Presentation of work at the International ESD Workshop (IEW) will not preclude an abstract submission, as long as the submission follows the EOS/ESD Symposium guidelines. If the IEW work is submitted to the EOS/ESD Symposium, it is required that the IEW work is expanded upon in the abstract submission for the EOS/ESD Symposium in order to be considered for acceptance.

Electronic Submissions

Abstract submissions shall be made electronically via an emailed PDF file to info@esda.org. One file for each submission is required.

Paper Acceptance

The Technical Program Committee will accept unpublished papers for peer review with the understanding that the author will not publish the work elsewhere prior to presentation at the Symposium. Accepted papers published in any form prior to presentation at the Symposium may result in the paper being withdrawn from the Symposium Proceedings. Authors must obtain appropriate company and government clearances prior to submitting their abstracts.

Paper Awards and Recognition

Awards are presented annually for the Symposium Outstanding Paper (selected by Symposium attendees), the Best Paper (selected by the Technical Program Committee), and the Best Student Paper. The Best Paper is considered for presentation at the RCJ EOS/ESD Symposium in Japan. Eligible student contributions for the Best Paper Award should be marked as such by the authors at the time of abstract submission.

Deadlines

The submission deadline is Friday, January 29, 2010. Late submissions will not be accepted. Abstracts not meeting guidelines may not be accepted. The final submission deadline for the finished papers will be Friday, July 2, 2010. ESDA reserves the right to withdraw any paper not meeting the guidelines, including deadlines. Your paper MUST be submitted by the deadline. Final papers will be limited to a maximum of 10 pages - guidelines will be provided after acceptance of the paper.

Continued on page 8

Symposium

2010 SYMPOSIUM CALL FOR PAPERS continued

Papers are solicited in the following areas:

I. Component Level EOS/ESD

- On-Chip Protection Devices & Techniques
- IC Design and Layout Issues
- ESD & Latchup, or other Reliability Aspects
- ESD in Advanced Technologies (Multi-gate, SOI, SiGe, Compound Semiconductors, Carbon Nano-tubes, etc.)
- EOS/ESD Failure Analysis
- Transmission Line Pulse and Other Testing Methods
- Processing Issues and Effects
- New ESD Phenomena in MEMS (Microelectromechanical Systems)
- ESD Device and Circuit Simulation
- Modeling and Physics of EOS/ESD
- RF Devices and Circuits
- High Voltage, High Power Technologies (BiCMOS, HV CMOS)

II. System Level EOS/ESD

- Simulators, Calibration and Correlation
- Optical Networks ESD
- ESD Detection and Measurement Techniques
- ESD Electronic Design Automation (EDA)
- Case Studies, Reviews and Analysis
- Test Methods and Procedures
- Modeling and Simulation

III. EOS/ESD Factory Level and Materials Technology

- Packaging and Handling
- Test Methods and Procedures
- Air Ionization and Uses
- Facility Design
- ESD Control Materials
- Use of Antistatic Materials
- Case Studies, Reviews and Analysis
- Transient ESD/EMI Induced Upset
- Troubleshooting Techniques
- Management Issues (cost/benefit analyses, etc.)
- ESD Shunting Packaging Technology
- Chemistry

IV. Electrostatic Considerations

- Biomedical & Chemical Industry Electrostatic Control
- ESD Control in Explosives and Pyrotechnics
- Aircraft, Spacecraft and Avionics ESD
- Graphic Arts Electrostatic Control
- Oil/Petroleum Industry Electrostatic Control
- Other ESD Topics

V. Magnetic Recording Heads and Ultra Sensitive Devices

- Testing and Analysis
- Special Considerations for Extremely Sensitive Devices
- Protection Techniques
- Failure Analysis Techniques and Interpretations

VI. ESD Standards – Components, System, Factory & Materials

- Test Methods and Procedures
- Standards - Comparisons and Analysis
- Round-Robin Testing, Results and Analysis
- Case Studies

Accepted papers covering selected topics may be considered for review for possible publication in a special issue of either the *IEEE Transactions on Components, Packaging and Manufacturing Technology*, the *Journal of Electrostatics*, the *Micro-Electronics Reliability Journal*, or other appropriate publications.

Contact addresses for questions or further information:

ESD Association
7900 Turin Road, Building 3
Rome, NY 13440
Phone: (+1)315-339-6937
Fax: (+1)315-339-6793
e-mail: info@esda.org

Technical Program Chair
Michael Khazhinsky
Freescale Semiconductor
3501 Ed Bluestein Blvd, MD K10
Austin, TX, 78721
Phone: (+1)512-933-3318
e-mail: michael.khazhinsky@freescale.com

Standards

Standards Activity Update

August 2009 Meeting Series
Disneyland Hotel,
Anaheim, CA

WG2.0 – Garments

•WIP2.1 was approved during STDCOM Vote-by-Mail

•The WG addressed all approval and disapproval comments. The disapproval vote will be changed to an approval with comments. Formal responses will be sent to commenters.

•The document has been submitted to HQ for Industry Review between the August and February meetings.

WG3.0 – Ionization

•The WG discussed TAS input and recommended changes for WIP3.4. Additional changes were made and have been sent to HQ for another TAS review.

•The document will go to STDCOM Vote-By-Mail between the August and February meeting series.

•Donn Pritchard also presented data from testing on numerous "standard 6" CPMs having different size ground planes. Testing confirmed that measurements/results are very different and it appears that the size of the ground plane and many other factors affect the results.

JWG (WG5.1) – (HBM) Device Testing

•The JWG reviewed TAS comments on the HBM standard and made editorial and technical changes. The document has been submitted to HQ for STDCOM Vote-By-Mail and will also be sent to the JEDEC 14.1 Committee for vote.

WG5.2 – (MM) Device Testing

•The WG responded to industry review comments from seven reviewers. No technical changes have been made. Formal responses will be sent to the commenters and the document will be going to publication. The MM WG will be going dormant.

WG5.3.1 – (CDM) Device Testing

•The WG began the comment resolution for the industry review comments.

JWG (WG5.3.1) - (CDM) Device Testing

•Four presentations were given. Tim Maloney gave an update on the 10 ohm resistor model for CDM. This is to prepare for a joint CDM document with JEDEC.

•Reinhold Gaertner and Marti Farris gave separate presentations on three pulse vs. one pulse.

•Marcos Hernandez gave a presentation on a new CDM test methodology.

WG5.4 – (TLU) Device Testing

•The WG had decided to go dormant in February 2009. Attendees showed interest at the 2009 IEW about different methodologies that are currently being used in industry that are not the same as SP5.4. Further discussions will take place to decide if SP5.4 could be redesignated or revised.

WG5.5 – (TLP) Device Testing

•Two presentations were given. Mirko Scholz had completed some VF-TLP modeling using needle probe instead of calibration of VF-TLP transient measurements.

•Alan Righter gave a presentation using VF-TLP to determine transient safe operating areas for devices.

•The round robin is complete and data is being prepared for review by the standards statistician.

WG5.6 – (HMM) Device Testing

•The WG adjudicated industry review comments. No technical changes were made. The document will be submitted for TAS review and publication.

•A discussion was held regarding the round robin testing that is being arranged for the potential elevation of SP5.6 to STM5.6. Semtech brought 50 devices that were distributed to 10 participating labs.

Continued on page 10

Standards

Standards Activity Update

Continued

WG7.0 – Flooring

•The WG reviewed S7.1 for five-year review. They discussed whether to add a section for raised access floors in this document or to add it to the current TR being developed.

WG9.0 – Footwear

•Comparison tests were completed using different industry standards with three pairs of shoes from five manufacturers.

♦A comparison test was done between STM9.1 and the Canadian CSA Z195 test methods. There is a large difference.

♦A comparison test was done between STM97.1 and the ASTM test method. There wasn't a large difference.

WG10.0 – Handlers

•The WG reviewed WIP10.2 and made required edits.

•A technical discussion was held regarding the "target" design and repeatability of waveforms.

WG11.0 – Packaging

•The WG reviewed comments from STDCOM Vote-By-Mail. All changes were editorial. The document has been submitted to HQ for Industry Review.

•The WG discussed new ideas:

♦Voltage retention on packaging – using a contact volt meter to scan packages

♦A TR for using resistance test methods.

♦Voltage decay on packaging.

♦Use EMI detector inside packaging.

WG13.0 – Handtools

•The WG visited the OKI facility and went through round robin data from the second round robin. The second round robin didn't give desired results. There was too much variation to meet the standard definition of accepted variability due to the inherent operating frequency ranges of the equipment and variation in bandwidth of measurement equipment on the market.

•The document will be sent to TAS for review.

WG14.0 – System Level ESD

•There were two presentations. Fabrice Caignet gave a presentation on modeling and simulating ESD events at the board and IC level.

•Robert Ashton presented CDE waveforms/methods of capturing events over long time periods on multiple wires.

•All STDCOM Vote-by-Mail comments were adjudicated for WIP14.3 (measurment of CDE Current.)

•WIP14.4 (CDE Test Procedures) is due to HQ for TAS review in Oct.

•WIP14.5 (EMC ESD Scanning) was discussed.

WG15.0 – Gloves

•The WG reviewed TAS comments on WIP15.2. The document will be submitted to TAS after a few more changes.

WG53.0 – Compliance Verification

•The WG incorporated and reviewed the last set of TAS comments. After two more figures are added to the document, will be sent back to TAS.

Q&A

ANSI/ESD S20.20 2007, limit of 2000 volts/in

Q. In ANSI/ESD S20.20 2007 there is a limit of 2000 volts/in. What this is stating is that if insulators measure less than 2000 v/in then they are NOT considered a threat and no action needs to be taken. 2000 volts/in is the limit even for contact. The problem is most of our customers are using 100V as the control limit to audit our workstation. If the e-field from the package material, the machine cover or even an ESD smock is higher than 100V, they say it is not ESD S20.20 compliant and we are required to take action to bring it down. But honestly speaking, it is hard to control all to <100V.

My belief is that what most people do not understand is that 100 volts on a person is not the same as 100 volts on an insulator. While a person can discharge their voltage to the part, an insulator can only induce a voltage on a part. I noticed that the E-field control limit in IEC61340-5-1 is also 2000V. In JEDEC625-A the control limit is changed to 1000V. My question is that for ESD sensitive devices which are sensitive to 100 volts or higher HBM, why the e-field control limit is 2000V or 1000V but not 100V. How can I say it is not a threat if e-filed is <2000V or <1000V even for contact. Is there any test or experiment that can show it is not a risk for 100V HBM or higher device? Is there any article that can be shared? Is there any further study conducted by ESDA that <2000V is not a risk even for contact?

As most of our customers have a misunderstanding for 100V HBM, I'd like to get your comments so that I can persuade them.

A. You are correct in your interpretation of the insulator threat level in ANSI/ESD S20.20 - 2007. The threat level is defined as 2000 volts/in for insulators. The number was generated by studies done by North America (Celestica and the US Air force) and by studies done in Europe. The important point to note is that 100 volts on a person is different from 100 volts on an insulator. A person with 100 volts can discharge the entire energy into the device. An insulator does not have a potential but can only generate a field. So the proper term that an insulator can have is 100 volts/in. This level is a field and cannot be discharged into a device. What an insulator does is induce a voltage on an ungrounded device and if the device is grounded within the field, a discharge could occur. However a field of 100 volts/in cannot induce a potential on a device that is damaging. The field must be much higher to be able to set up a damaging event. In fact, the studies show that insulators need to have a large uniform charge across the surface (very unlikely) and must be very close (less than 1/8 of an inch) to become problems. Fields of 2000 v/in did not cause problems unless the insulator was a large uniform material almost in contact with the device. For a typical insulator, the field generated had to be in excess of 10,000 v/in before problems occurred.

ESD on Campus

Silicon Shuttles to Space Shuttles, ESD at the University of Central Florida

In Central Florida, silicon technology is abundant – from the sandy beaches at Satellite Beach to the ESD laboratory of University of Central Florida.

From Satellite Beach, you can see the launch of the Space Shuttles and Delta rockets from Launch Pad 39A at the Kennedy Space Center. On a typical day, surfers and pelicans hang on the coastline riding the waves. On a night launch of the Space Shuttle, the beaches are filled with spectators awaiting the countdown's final minutes. In this region, there is NASA's Kennedy Space Center, Harris Corporation, Intersil, GE, DRS Technology, and thousands of vendors supporting the NASA needs - all concerned with ESD. At NASA, even the bed of stone under the transporter, delivering the Shuttle to the launch-pad, is special stone from Tennessee with low tribo-electric charging to avoid charging as it travels from the Verticle Assembly Building to the launch pad 39A.

Only one hour drive away, at UCF, there are silicon "shuttles" – multi-purpose wafers from TSMC, and other corporations on the tables being tested on the Barth TLP test system for ESD development in the lab of Professor J.J. Liou. The walls of the lab are surrounded with ESD charged students working on applications from RF ESD, analog, smart power devices, to carbon nano-wires. Graduate students include Slavica Malabobic, David Ellis, Blerina Aliaj, Wen Liu, Qiang Cui, You Li, and Zhiwei Liu; Slavica Malobabic works on an ESD Transient Safe Operating Area (SOA); David Ellis is working on gate oxide and software development; You Li's research is on RF ESD; Zhiwei Liu works on high voltage ESD; Xiang Liu focuses on III-V ESD work; and Wen Liu is doing experimental work on nanowire FETs and Carbon nanowires. When I was visiting, the first ESD TLP measurements of Carbon Nanowires were being tested by student Wen Liu, and the first publication was being prepared for release. UCF collaborates with Singapore and Taiwan in ESD research efforts.

Dr. Steven H. Voldman provided an ESD talk, co-sponsored by the ESD Association and the IEEE Electron Device Society on "Nano-Defects-ESD in Nano-technology" highlighting the new fields of ESD in nano-technology.

Central Florida is exploring devices as small as Carbon Nanowires, as large as the Space Shuttle and International Space Station; from both electron to planetary orbitals…and of course, some sunshine on the beach and the good surf. Hang ten!

Dr. Steven H. Voldman
ESD on Campus
ESD Association Board of Directors

Local Chapters

"Local Sparks"

The Local Chapter Connection

Quick Links to ESD Local Chapters and affiliated organizations

ASEMEP ESD Council • aec.asemep.com.ph
Asociación ESD de Mexico • www.esdmexico.com
Indian Chapter no website available
North Central Chapter • www.esdnorthcentral.org
Northeast Chapter • www.nechapter-esda.org
Silicon Valley EOS/ESD Society • www.esdiscovery.org
Southwest Chapter • www.southwestesd.com
Texas Chapter • www.Centxesdassoc.homestead.com

The recognition of newly elected AEC Officers last June 5, 2009 during the 5th Philippine ESD Forum at SMX Mall of Asia.

ASEMEP ESD COUNCIL (AEC) OFFICERS 2009 - 2010
Chairman:
Michael Josue J. Pacis Jr. (AMKOR Phils)
Vice Chairman:
Jed Romales (3M Philippines)
Secretary:
Vivian Valleza (PRICON)
Asst Secretary:
Roy Martinez (PROPACK)
Treasurer:
Jerry Rivera (DOUYEE)
Membership Chairman:
Marcelon Cada (ON-SEMI Calamba)
Technical & Education:
Ray Tag-at (HGST)
Events Chairman:
Kerwin Picazo (NXP)

The ASEMEP ESD Council (AEC) is the first Asian local chapter of ESD Association (ESDA) a world-wide organization which has the responsibility of representing the interest of International Electrotechnical Commission (IEC) in the area of electrostatics.

The AEC was formed in January 2002 as technical working group of the Association of Semiconductor and Electronics Manufacturing Engineers of the Philippines (ASEMEP) and the Semiconductor and Electronics Industries in the Philippines Inc (SEIPI).

The theme for the 2009, 5th Philippine ESD Forum (PESDF) was "Innovative Thinking Towards Robust and Cost Effective ESD Control Programs". The event focus was to interact, converse and share topics about ESD Control, best known practices and advance technologies, which could facilitate learning and application of practical ways on how to simplify existing ESD Controls. Several ideas on how to reduce cost, while maintaining a robust control system were presented.

The AEC 5th PESDF is an every other year event and was held at SMX Mall of Asia on June 5, 2009. The event was attended by more than a hundred delegates from Semiconductor and Electronic Industries, ESD Control Supply Chain, Academes, and other ASEMEP members. The technical speakers were from Academe, International Guest Speakers and Experts, and International iNARTE Certified ESD Engineers of the Philippines.

Local Chapters

"Local Sparks"

The Local Chapter Connection

Quick Links to ESD Local Chapters and affiliated organizations

ASEMEP ESD Council • aec.asemep.com.ph
Asociación ESD de Mexico • www.esdmexico.com
Indian Chapter no website available
North Central Chapter • www.esdnorthcentral.org
Northeast Chapter • www.nechapter-esda.org
Silicon Valley EOS/ESD Society • www.esdiscovery.org
Southwest Chapter • www.southwestesd.com
Texas Chapter • www.Centxesdassoc.homestead.com

An ESD Awareness course was conducted by the India Chapter, (IESDA) in Bangalore, India, on July 22nd, 2009. The workshop was well received by the participants and was a very encouraging course. The India Chapter hopes to hold more ESD events in the coming days.

Thank you to A.Vijayendra, Founder, Member, and President of the Indian Chapter of the ESD Association for sharing these photos with us.

ESDA Spotlight

Elaine Olson an "ESD Guru"

Elaine Olson an ESD/Micro Engineer from Intel Corp. is in the ESDA spotlight!

Elaine has worked at Intel for 28 years in both Fab and Assembly Test in manufacturing and process engineering. She has spent the last 11 of those years developing and sustaining an ESD - Micro contamination program in Assembly Test. With Julian Montoya as her mentor, Elaine has benefited immensely from the ESDA and loves to share what she has learned with anyone who will listen. Elaine says she is known at work as the "ESD Guru" because of all of her ESD knowledge.

Having attended the Garments, Gloves and Packaging standards committees for about 5 years as a guest Elaine is now a member of two years running. Elaine says "The ESDA tutorials and standards meetings have been my education and support in the ESD world." She went on to say "The resources and the generous support of the people in the organization have greatly contributed to my success."

"This has been a great opportunity to broaden my ESD knowledge and insight into the various industries that depend on the ESDA for guidance", says Elaine about her membership experience.

Elaine is married with 3 children and 3 grandchildren. Her youngest child is still at home, he will be a sophomore in high school this coming August. The family spends as much time as possible traveling in their RV. The longest and furthest trip to date was 6 weeks in Canada and Alaska. Elaine enjoys scrapbooking, reading and spending time with her son on the golf course (she is his caddy). Watching the Food Network channel gives Elaine an opportunity to find new recipes to try out on her unsuspecting family.

Education

Online Training

Air Ionization: Theory and Practice
October 8, 2009 • 2:00 p.m. Eastern Time

Offered by the ESD Association

Air Ionization: Theory and Practice
October 8, 2009 • 2:00 p.m. Eastern Time • Course length - one hour.
Instructor: Arnold Steinman, Electronics Workshop

Solve Problems Caused By Static Charge With Air Ionization

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.

Grounding in an Electrostatic Protected Area
October 27, 2009 • 2:00 p.m. Eastern Time

Offered by the ESD Association

Grounding in an Electrostatic Protected Area
October 27, 2009 • 2:00 p.m. Eastern Time • Course length - one hour.
Instructor: David E. Swenson, Affinity Static Control Consulting, L.L.C

Learn the basics of grounding—without leaving your desk!

Grounding is perhaps the single most important technical aspect in establishing an electrostatic protected area. The ESD Association standard for grounding, ANSI/ESD S6.1 - Grounding, originally issued in 1991, went through significant revisions in 1999. The document was reaffirmed in 2005 and has recently been reviewed and recommended for reaffirmation with minor editorial changes for release later in 2009.

Charged Board Events: A Growing Industry Concern
November 10, 2009 • 2:00 p.m. Eastern Time

Offered by the ESD Association

Charged Board Events: A Growing Industry Concern
November 10, 2009 • 2:00 p.m. Eastern Time • Course length - one hour.
Instructor: Terry Welsher, Dangelmayer Associates, L.L.C.
Instructor: Leo G. Henry, Ph.D. ESD/TLP Consultants LLC

In this seminar, the board-level ESD event will be compared with the component level CDM ESD event. The waveforms from both ESD events will be compared and it will be shown that for the same voltage, the current in the board-level ESD event will be much higher than that from the chip-level ESD event. A summary of literature and industry data will be given. It is suggested that failure analysts give stronger consideration to these types of board level events before assigning an EOS diagnosis to the failure. This will support more effective root cause analysis and prevention of these failures.

Calendar

October 8, 2009
Air Ionization: Theory and Practice
Online Course
http://www.esda.org/documents/AirIonizationTheoryandPractice.pdf

October 13 - 14, 2009
S20.20 Seminar
ESDA Headquarters, Rome, NY
http://www.esda.org/documents/RomePMSeminar10-09.pdf

October 27, 2009
Grounding in an Electrostatic Protected Area
Online Course
http://www.esda.org/documents/GroundingOnline10-27-09.pdf

November 10, 2009
Charged Board Events: A Growing Industry Concern
Online Course
http://www.esda.org/documents/ChargeBoardEventsAGrowingIndustryConcern.pdf

February 25-March 2, 2010
February Meeting Series
JA Nugget, Reno, NV

May 10 - 13, 2010
IEW International Electrostatic Workshop
Tutzing, Germany

June 10-15, 2010
June Meeting Series
Doubletree, Chicago (North Shore), IL

September 30 – October 8, 2010
EOS/ESD Symposium
JA Nugget, Sparks (Reno), NV

Threshold

Threshold™ is published six times a year by the ESD Association, a not-for-profit corporation. It strives for the advancement of theory and practice of electrical overstress avoidance and of allied arts and sciences and the maintenance of a high professional standing among its members and others.

Threshold™ Publication Schedule

Issue	Deadlines
January/February	Nov. 19
March/April	Feb. 1
May/June	April 1
July/August	June 1
September/October	Aug. 1
November/December	Oct. 1

Threshold Institutional Listings
Space in the Threshold Institutional Listings, which appear at the bottom of newsletter pages, can be purchased for $600.00 for six consecutive issues. Listings will also appear in the online calendar. Larger contributions are welcome. No agency fee is granted for soliciting such contributions. Inquiries, or contributions made payable to the ESD Association, should be sent to:
ESD Association, 7900 Turin Rd., Bldg. 3, Rome, NY 13440-2069 Tel: (315) 339-6937, Fax: (315) 339-6793, e-mail: info@esda.org.