

2016 IEEE International Integrated Reliability Workshop (IIRW 2016)

**South Lake Tahoe, California, USA
9-13 October 2016**



**IEEE Catalog Number: CFP16IRW-POD
ISBN: 978-1-5090-4194-7**

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IEEE Catalog Number:	CFP16IRW-POD
ISBN (Print-On-Demand):	978-1-5090-4194-7
ISBN (Online):	978-1-5090-4193-0
ISSN:	1930-8841

Additional Copies of This Publication Are Available From:

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Technical Papers

Session 1	Advanced Characterization 1
Chair	Pat Lenahan , <i>Penn State</i>

Advances in imaging and quantification of electrical properties at the nanoscale using Scanning Microwave Impedance Microscopy (sMIM) [INVITED]

Stuart Friedman

Oxide Defects in Emerging Technologies: Characterization and Mitigation [Tutorial]

Dmitry Veksler

Session 2	Memory and Circuit Reliability
Chair	Luca Larcher , <i>Univ. of Modena and Reggio Emilia</i>

BTI Variability of SRAM Cells Under Periodically Changing Stress Profiles

Kay-Uwe Giering, André Lange, Ben Kaczer and Roland Jancke

AC Stress and Standard Cell Aging Characterization to Enhance Reliability Coverage of Logic Circuits [INVITED]

Y.-C. Huang, L.-C. Hsu, W.-S. Chou, M.-H. Hsieh, K.-W. Shih, N.-H. Tseng, R. B. Pittu, W. Wang and Y.-H. Lee

Novel Characterization Techniques Providing Reliable and Low-power Flash NOR Memory Operations [INVITED]

Jean Coignus, Alexandre Vernhet, Gilles Reimbold, Giulio Torrente and David Roy

The Sources of Erase Voltage Variability in Split-Gate Flash Memory Cell Arrays

Yuri Tkachev and James A. Walls



Session 3	MEMS
Chair	Tom Kopley , ON Semiconductor

MEMS Reliability [Tutorial]
Allyson Hartzell

Session 4	Defects
Chair	Stanislav Tyaginov, TU Vienna

Random Telegraph Noise Analysis as a Tool to link Physical Device features to Electrical Reliability in Nanoscale Devices [INVITED]
Francesco Maria Puglisi

On the Distribution of the FET Threshold Voltage Shifts due to Individual Charged Gate Oxide Defects
B. Kaczer, S. M. Amoroso, R. Hussin, A. Asenov, J. Franco, P. Weckx, Ph. J. Roussel, G. Rzepa, T. Grasser and N. Horiguchi

Atomistic Modeling of Defects in SiO₂ and HfO₂ for Reliability Predictions [Tutorial]
Al-Moatasem El-Sayed

Session 5	Silicon MOSFET Reliability
Chair	Steve Ramey, Intel

Time Dependent Junction Degradation in FinFET
T. Y. Ho, K. Joshi, K. H. Lee, P. J. Liao, J. R. Shih, Y. -H. Lee



Layout Dependent Effect: Impact on Device Performance and Reliability in Recent CMOS Nodes

C. Ndiaye, V. Huard, R. Bertholon, M. Rafik, X. Federspiel and A. Bravaix

Session 6	High Voltage Devices
Chair	Zakariae Chbili , <i>GlobalFoundries</i>

SiC MOSFET Reliability - A Similar Elephant but with Different Spots [Tutorial]

Kevin Matocha

SiC Power Device Reliability [INVITED]

Donald A. Gajewski, Brett Hull, Daniel J. Lichtenwalner, Sei-Hyung Ryu, Eric Bonelli, Habib Mustain, Gangyao Wang, Scott T. Allen and John W. Palmour

Reliability of Power Devices: Bias-Induced Threshold Voltage Instability and Dielectric Breakdown in GaN MIS-HEMTs [INVITED]

Gaudenzio Meneghesso, Davide Bisi, Isabella Rossetto, Maria Ruzzarin, Matteo Meneghini and Enrico Zanoni

The Elegant Complexity of a Simple Capacitor: Revisiting the Reliability Physics of Thick Insulators [INVITED]

Muhammad A. Alam

Reduction of Hot Carrier Degradation in High Voltage N-channel LDMOS BCD (Bipolar-CMOS-DMOS) Technology

Jifa Hao and Daniel Hahn

Plasma Induced Damage (PID): Challenges and Overview [Tutorial]

Andreas Martin



Session 7	Advanced Characterization 2
Chair	Ricki Southwick, IBM

Reliability of Electronic Devices: Nanoscale Studies Based on the Conductive Atomic Force Microscope [Invited]
Mario Lanza

Scalpel SPM toward the three-dimensional characterization of confined volumes [Tutorial]
Umberto Celano

Session 8	Self-Heating
Chair	Gavin Hall, ON Semiconductor

Self-Heating Confounds, Correlates, and Redefines Front and Backend Reliability of Modern Surround Gate Transistors
Ashraf Alam

Self-heating Impact on TDDB in Bulk FinFET Devices: Uniform vs Non-uniform Stress
Z. Chbili and A. Kerber

Session 9	TDDB
Chair	Andreas Aal, Volkswagen

A Physical Manifestation of Interfacial Roughness Pitfalls in Assessing Dielectric TDDB Lifetimes
Lieyi Sheng

Fast TDDB for Early Reliability Monitoring
C. LaRow, Y. Liu, Z. Chbili and A. Gondal



Session 10	Harsh Environments
Chair	Jean Yang-Scharlotta, <i>JPL</i>

Automotive system level reliability dependence on semiconductor capabilities and market dynamics [INVITED]

Andreas Aal

Reliability-performance evaluation for scaled multi-materials device stacks [Invited]

Gennadi Bersuker

Session 11	Back End of Line
Chair	Jean Yang-Scharlotta, <i>JPL</i>

Scaling and Variability Challenges to Advance Node BEOL Reliability [Tutorial]

Patrick Justison

Effect of Texture and Elastic Anisotropy of Copper Microstructure on Reliability

Adarsh Basavalingappa, Ming Y. Shen and James R. Lloyd

Session	Poster Presentations
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Vth Is Dead — Long Live The Threshold Voltage

Theodor Hillebrand, Maik Taddiken, Konstantin Tscherkaschin, Steffen Paul, Dagmar Peters-Drolshagen

Humidity and Polarity Influence on MIM PZT Capacitor Degradation and Breakdown

Jiahui Wang, Cora Salm, Evert Houwman, Minh Nguyen and Jurriaan Schmitz



Reliability of Integrated Resistors and the Influence of WLCSP Bake

S. Jose, J. Bisschop, V. Girault, L. V. Marwijk, J. Zhang and S. Nath

AC TDDB Analysis for Circuit-Level Gate Oxide Wearout Reliability Assessment

T. E. Kopley, K. O'Brien and W.-C. Chang

1/f Noise Analysis of Hafnium Oxide Based ReRAM Devices Using ac + dc Measurement Technique

Niaz Mahmud, Avyaya J. Narasimham and J. R. Lloyd

Intrinsic Reliability Characterization for Stand-Alone MEMS Switch Technology

Edoardo Maria Ceccarelli, Colm Heffernan, John Browne and Padraig Fitzgerald

Improved Analysis of NBTI Relaxation Behavior Based on Fast I-V Measurement

D. Nouguier, C. Ndiaye, G. Ghibaudo, X. Federspiel, M. Rafik and D. Roy

Increasing Velocity of Wafer Level Reliability Characterization: Novel Approaches and Limitations

B. Bittel, S. Vadlamani, S. Ramey and S. Padiyar

Study on Off-State Hot Carrier Degradation and Recovery of NMOSFET in SWD Circuits of DRAM

Kangil Kim, Ilsub Chung, Kangil Kim, Duan Sun, Sangjae Rhe, Ilgweon Kim, Hongsun Hwang, Kangyong Cho and Gyoyoung Jin

On the Effect of Interface Traps on the Carrier Distribution Function During Hot-Carrier Degradation

S. E. Tyaginov, A. Makarov, M. Jech, J. Franco, P. Sharma, B. Kaczer and T. Grassner

Radiation Induced Leakage Currents in Dense and Porous Low- k Dielectrics

Ryan J. Waskiewicz, Michael J. Mutch, Patrick M. Lenahan and Sean W. King

Bias Temperature Instability and its Correlation to Flicker (1/f) Noise in FinFETs

Y. M. Ding, D. Misra and P. Srinivasan