

2022 IEEE International Reliability Physics Symposium (IRPS 2022)

**Dallas, Texas, USA
27-31 March 2022**

Pages 1-476



**IEEE Catalog Number: CFP22RPS-POD
ISBN: 978-1-6654-7951-6**

**Copyright © 2022 by the Institute of Electrical and Electronics Engineers, Inc.
All Rights Reserved**

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

****** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP22RPS-POD
ISBN (Print-On-Demand):	978-1-6654-7951-6
ISBN (Online):	978-1-6654-7950-9
ISSN:	1541-7026

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

TABLE OF CONTENTS

2A - GD (GATE/MOL DIELECTRICS)

Finding Suitable Gate Insulators for Reliable 2D FETs	1
<i>Theresia Knobloch, Yury Yu. Illarionov, Tibor Grasser</i>	
A Flexible and Inherently Self-Consistent Methodology for MOL/BEOL/MIMCAP TDDDB Applications with Excessive Variability-Induced Degradation.....	11
<i>Ernest Wu, Ron Bolam, Baozhen Li, Tian Shen, Barry Linder, Griselda Bonilla, Miaomiao Wang, Dechao Guo</i>	
Bias Temperature Instability (BTI) of High-Voltage Devices for Memory Periphery	20
<i>J. P. Bastos, B. J. O'Sullivan, J. Franco, S. Tyaginov, B. Truijen, A. Chasin, R. Degraeve, B. Kaczer, R. Ritzenthaler, E. Capogreco, E. D. Litta, A. Spessot, Y. Higashi, Y. Yoon, V. Machkaoutsan, P. Fazan, N. Horiguchi</i>	
The Relevance of Trapped Charge for Leakage and Random Telegraph Noise Phenomena	26
<i>Sara Vecchi, Paolo Pavan, Francesco Maria Puglisi</i>	

2B - GAN (GAN POWER DEVICE)

Vertical GaN Fin JFET: A Power Device with Short Circuit Robustness at Avalanche Breakdown Voltage	32
<i>R. Zhang, J. Liu, Q. Li, S. Pidaparathi, A. Edwards, C. Drowley, Y. Zhang</i>	
Study of Avalanche Behavior in 3 kV GaN Vertical P-N Diode Under UIS Stress for Edge-Termination Optimization	40
<i>Bhawani Shankar, Zhengliang Bian, Ke Zeng, Chuanzhe Meng, Rafael Perez Martinez, Srabanti Chowdhury, Brendan Gunning, Jack Flicker, Andrew Binder, Jeremy Ray Dickerson, Robert Kaplar</i>	
Incorporation of a Simple ESD Circuit in a 650V E-Mode GaN HEMT for All-Terminal ESD Protection	44
<i>Jian-Hsing Lee, Yeh-Jen Huang, Li-Yang Hong, Li-Fan Chen, Yeh-Ning Jou, Shin-Cheng Lin, Walter Wohlmuth, Chih-Cherng Liao, Ching-Ho Li, Shoa-Chang Huang, Ke-Horng Chen</i>	
Short-Circuit Capability with GaN HEMTs	50
<i>Davide Bisi, Bill Cruse, Philip Zuk, Primit Parikh, Umesh Mishra, Tsutomu Hosoda, Masamichi Kamiyama, Masahito Kanamura</i>	

2C - SR (SYSTEM ELECTRONICS RELIABILITY)

Mission Profile Clustering Using a Universal Quantile Criterion	57
<i>A. Hirler, U. Abelein, M. Büttnner, R. Fischbach, G. Jerke, A. Krinke, S. Simon</i>	
System-Level Simulation of Electromigration in a 3 Nm CMOS Power Delivery Network: The Effect of Grid Redundancy, Metallization Stack and Standard-Cell Currents	66
<i>Houman Zahedmanesh, Ivan Ciofi, Odysseas Zografos, Kristof Croes, Mustafa Badaroglu</i>	
The Price of Secrecy: How Hiding Internal DRAM Topologies Hurts Rowhammer Defenses	73
<i>Stefan Saroiu, Alec Wolman, Lucian Cojocar</i>	

Reliability, Availability, and Serviceability Challenges for Heterogeneous System Design	79
<i>Majed Valad Beigi, Sudhanva Gurumurthi, Vilas Sridharan</i>	

3A - RT (RELIABILITY TESTING)

The Field-Dependence Endurance Model and Its Mutual Effect in Hf-Based Ferroelectrics	87
<i>Y. K. Chang, P. J. Liao, S. H. Yeong, Y.-M. Lin, J. H. Lee, C. T. Lin, Z. Yu, W. Tsai, P. C. McIntyre</i>	

Ultra-Fast CV Methods (< 10 μ s) for Interface Trap Spectroscopy and BTI Reliability Characterization Using MOS Capacitors.....	92
<i>T. Mota Frutuoso, X. Garros, J. Lugo-Alvarez, R. K. Kammeugne, L. D. M. Zouknak, A. Viey, W. Vandendeale, P. Ferrari, F. Gaillard</i>	

GHz C-V Characterization Methodology and Its Application for Understanding Polarization Behaviors in High-K Dielectric Films	98
<i>Yiming Qu, Yang Shen, Mingji Su, Jiwu Lu, Yi Zhao</i>	

Towards the Characterization of Full I_D - V_G Degradation in Transistors for Future Analog Applications.....	104
<i>Pengpeng Ren, Xinfu Zhang, Junhua Liu, Runsheng Wang, Zhigang Ji, Ru Huang</i>	

3B - WB (WIDE-BANDGAP SEMICONDUCTORS (SiC))

Optical Emission Correlated to Bias Temperature Instability in SiC MOSFETs	109
<i>Maximilian W. Feil, Hans Reisinger, André Kabakow, Thomas Aichinger, Wolfgang Gustin, Tibor Grasser</i>	

Investigation of Reliability of NO Nitrided SiC(1100) MOS Devices	118
<i>Takato Nakanuma, Asato Suzuki, Yu Iwakata, Takuma Kobayashi, Mitsuru Sometani, Mitsuo Okamoto, Takuji Hosoi, Takayoshi Shimura, Heiji Watanabe</i>	

SiO ₂ /4H-SiC Interfacial Chemistry as Origin of the Threshold Voltage Instability in Power MOSFETs.....	124
<i>P. Fiorenza, C. Bongiorno, A. Messina, M. Saggio, F. Giannazzo, F. Roccaforte</i>	

Bias Temperature Instability on SiC n- and p-MOSFETs for High Temperature CMOS Applications.....	129
<i>Emran K. Ashik, Sundar B. Isukapati, Hua Zhang, Tianshi Liu, Utsav Gupta, Adam J. Morgan, Veena Misra, Woongje Sung, Ayman Fayed, Anant K. Agarwal, Bongmook Lee</i>	

3C - NC (NEUROMORPHIC COMPUTING RELIABILITY)

Sparse and Robust RRAM-Based Efficient In-Memory Computing for DNN Inference	137
<i>Jian Meng, Injune Yeo, Wonbo Shim, Li Yang, Deliang Fan, Shimeng Yu, Jae-Sun Seo</i>	

Mitigating Read-Program Variation and IR Drop by Circuit Architecture in RRAM-Based Neural Network Accelerators.....	143
<i>Nicola Lepri, Artem Glukhov, Daniele Ielmini</i>	

Statistical Model of Program/verify Algorithms in Resistive-Switching Memories for In-Memory Neural Network Accelerators	149
<i>Artem Glukhov, Valerio Milo, Andrea Baroni, Nicola Lepri, Cristian Zambelli, Piero Olivo, Eduardo Perez, Christian Wenger, Daniele Ielmini</i>	

Reliability of Non-Volatile Memory Devices for Neuromorphic Applications: A Modeling Perspective (Invited).....	156
<i>Andrea Padovani, Milan Pesic, Federico Nardi, Valerio Milo, Luca Larcher, Mondol Anik Kumar, M. Zunaid Baten</i>	

4A - EM (EMERGING MEMORY)

Electron-Assisted Switching in FeFETs: Memory Window Dynamics – Retention – Trapping Mechanisms and Correlation.....	166
<i>Milan Pesic, Bastien Beltrando, Andrea Padovani, Toshihiko Miyashita, Nam-Sung Kim, Luca Larcher</i>	
MTJ Degradation in SOT-MRAM by Self-Heating-Induced Diffusion.....	174
<i>Simon Van Beek, Kaiming Cai, Siddharth Rao, Ganesh Jayakumar, Sebastien Couet, Nico Jossart, Adrian Chasin, Gouri Sankar Kar</i>	
Investigation of First Fire Effect on V_{TH} Stability and Endurance in GeCTe Selector.....	178
<i>P. C. Chang, P. J. Liao, D. W. Heh, C. Lee, D. H. Hou, E. Ambrosi, C. H. Wu, H. Y. Lee, J. H. Lee, X. Y. Bao</i>	
Modelling Ultra-Fast Threshold Voltage Instabilities in Hf-Based Ferroelectrics.....	183
<i>B. J. O’Sullivan, B. Truijen, V. Putcha, A. Grill, A Chasin, G. Van Den Bosch, B. Kaczer, M. N. K. Alam, J. Van Houdt</i>	

4B - RF (RF/MMW/5G)

Reliability of CMOS-SOI Power Amplifiers for Millimeter-Wave 5G: The Case for pMOS (Invited).....	191
<i>Peter Asbeck, Sravya Alluri, Narek Rostomyan, Jefy A. Jayamon</i>	
Comprehensive Analysis of RF Hot-Carrier Reliability Sensitivity and Design Explorations for 28GHz Power Amplifier Applications.....	200
<i>J. Hai, F. Cacho, A. Divay, E. Lauga-Larroze, J.-D. Arnould, J. Forest, V. Knopik, X. Garros</i>	
RF Reliability of CMOS-Based Power Amplifier Cell for 5G mmWave Applications.....	206
<i>Aarti Rathi, Abhisek Dixit, P. Srinivasan, Oscar H. Gonzalez, Fernando Guarin</i>	
22FDX™ 5G 28GHz 20dBm Power Amplifier Constant Load and VSWR Accelerated Aging Reliability.....	212
<i>G. Bossu, S. Syed, S. Evseev, J. A. S. Jerome, W. Arfaoui, D. Lipp, M. Siddabathula</i>	
Excellent RF Product HTOL Reliability of 5G mmWave Beamformer Chip Fabricated Using GF 45RFSOI Technologies.....	217
<i>P. Srinivasan, F. Guarin, Enkhbayasgalan Gantsog, H. Krishnaswamy, A. Natarajan</i>	

4C - PK (PACKAGING AND 2.5/3D ASSEMBLY)

Thermal Challenges for HPC 3DFabric™ Packages and Systems.....	222
<i>Kathy Wei Yan, Po-Yao Lin, Sheng-Liang Kuo</i>	
Reliability Investigation of W2W Hybrid Bonding Interface: Breakdown Voltage and Leakage Mechanism.....	228
<i>Lin Hou, Emmanuel Chery, Kristof Croes, Davide Tierno, Soon Aik Chew, Yangyin Chen, Peter Rakbin, Eric Beyne</i>	

New Method to Perform TDDB Tests for Hybrid Bonding Interconnects	234
<i>B. Ayoub, S. Moreau, S. Lhostis, P. Lamontagne, H. Combeau, J. G. Mattei, H. Fremont</i>	
A Novel Approach for Assessing Impact of Temperature Hot-Spots on Chip-Package Interaction Reliability	240
<i>R. Aggarwal, L. Jiang, S. Patra, N. Lajo, E. Kabir, R. Kasim</i>	
Impact of TSV on TDDB Performance of Neighboring FinFET with HK/IL Gate Stacking	245
<i>H. Zheng, Y. S. Sun, J. L. Huang</i>	

5A - PI (PROCESS INTEGRATION)

Plasma Processing Induced Charging Damage (PID) Assessment with Appropriate fWLR Stress Methods Ensuring Expected MOS Reliability and Lifetimes for Automotive Products (Invited)	251
<i>Andreas Martin</i>	
Evaluating Forksheet FET Reliability Concerns by Experimental Comparison with Co-Integrated Nanosheets.....	262
<i>E. Bury, A. Chasin, B. Kaczer, M. Vandemaele, S. Tyaginov, J. Franco, R. Ritzenthaler, H. Mertens, P. Weckx, N. Horiguchi, D. Linten</i>	
Parasitic Drain Series Resistance Effects on Non-Conducting Hot Carrier Reliability	269
<i>M. J. Hauser, P. Srinivasan, A. Vallett, R. Krishnasamy, F. Guarin, D. Brochu, V. Pham, B. Min</i>	

5B - WB (WIDE-BANDGAP SEMICONDUCTORS (SiC))

Performance Improvement and Reliability Physics in SiC MOSFETs	273
<i>T. Kimoto, K. Tachiki, A. Iijima, M. Kaneko</i>	
Analysis and Modeling of V_{th} Shift in 4H-SiC MOSFETs at Room and Cryogenic-Temperature	280
<i>F. Masin, C. De Santi, A. Stockman, J. Lettens, F. Geenen, G. Meneghesso, E. Zanoni, P. Moens, M. Meneghini</i>	
Identification of Interface States Responsible for V_{TH} Hysteresis in Packaged SiC MOSFETs.....	284
<i>M. Cioni, P. Fiorenza, F. Roccaforte, M. Saggio, S. Cascino, A. Messina, V. Vinciguerra, M. Calabretta, A. Chini</i>	

5C - EL (ESD AND LATCHUP)

ASM-ESD – A Comprehensive Physics-Based Compact Model for ESD Diodes.....	290
<i>S. Khandelwal, D. Bavi</i>	
Single-Event Latchup Vulnerability at the 7-Nm FinFET Node	296
<i>N. J. Pieper, Y. Xiong, A. Feeley, D. R. Ball, B. L. Bhuvu</i>	
A High Voltage Tolerant Supply Clamp for ESD Protection in a 45-Nm SOI Technology	302
<i>Shudong Huang, Srivatsan Parthasarathy, Yuanzhong Paul Zhou, Jean-Jacques Hajjar, Elyse Rosenbaum</i>	

6A - TX (TRANSISTORS)

Transistor Reliability Characterization for Advanced DRAM with HK+MG & EUV Process Technology	308
<i>N.-H. Lee, S. Lee, S.-H. Kim, G.-J. Kim, K. Lee, Y. Lee, Y. Hwang, H. Kim, S. Pae</i>	
Simulation Comparison of Hot-Carrier Degradation in Nanowire, Nanosheet and Forksheet FETs	314
<i>Michiel Vandemaele, Ben Kaczer, Stanislav Tyaginov, Erik Bury, Adrian Chasin, Jacopo Franco, Alexander Makarov, Hans Mertens, Geert Hellings, Guido Groeseneken</i>	
Understanding and Modeling Opposite Impacts of Self-Heating on Hot-Carrier Degradation in n- And p-Channel Transistors	323
<i>Stanislav Tyaginov, Alexander Makarov, Al-Moatasem Bellah El-Sayed, Adrian Chasin, Erik Bury, Markus Jech, Michiel Vandemaele, Alexander Grill, An De Keersgieter, Mikhail Vexler, Geert Eneman, Ben Kaczer</i>	

6B - MR (MEMORY RELIABILITY)

NanoBridgE Technology for Novoaltile FPGA and Memory Applications	331
<i>Munehiro Tada</i>	
New Insight into the Aging Induced Retention Time Degraded of Advanced DRAM Technology	336
<i>Yong Liu, Pengpeng Ren, Da Wang, Longda Zhou, Zhigang Ji, Junhua Liu, Runsheng Wang, Ru Huang</i>	
Extended MTJ TDDDB Model, and Improved STT-MRAM Reliability with Reduced Circuit and Process Variabilities	342
<i>V. B. Naik, J. H. Lim, K. Yamane, J. Kwon, B. Behin-Aein, N. L. Chung, S. K. L. Y. Hau, R. Chao, C. Chiang, Y. Huang, L. Pu, Y. Otani, S. H. Jang, N. Balasankaran, W. P. Neo, T. Ling, J. W. Ting, H. Yoon, J. Mueller, B. Pfefferling, O. Kallensee, T. Merbeth, C. S. Seet, J. Wong, Y. S. You, S. Soss, T. H. Chan, S. Y. Siah</i>	

6C - EL (ESD AND LATCHUP)

Effect of Source & Drain Side Abutting on the Low Current Filamentation in LDMOS-SCR Devices	348
<i>M. Monishmurali, Nagothu Karmel Kranthi, Gianluca Boselli, Mayank Shrivastava</i>	
TCAD Investigation of Power-To-Failure Evaluation for Ultrafast Events in BJT-Based ESD Protection Cells	354
<i>Laura Zunarelli, Susanna Reggiani, Elena Gnani, Raj Sankaralingam, Mariano Dissegna, Gianluca Boselli</i>	

7A - RT (RELIABILITY TESTING)

Universal Hot Carrier Degradation Model Under DC and AC Stresses	360
<i>Chu Yan, Yaru Ding, Yiming Qu, Liang Zhao, Yi Zhao</i>	
Comparison of AC and DC BTI in SiC Power MOSFETs	366
<i>Amartya K. Ghosh, Osama O. Awadelkarim, Jifa Hao, Samia Suliman, Xinyu Wang</i>	

Fast Measurement of BTI on 28nm Fully Depleted Silicon-On-Insulator MOSFETs at Cryogenic Temperature Down to 4K.....	372
<i>Lauriane Contamin, Mikael Casse, Xavier Garros, Fred Gaillard, Maud Vinet, Philippe Galy, Andre Juge, Emmanuel Vincent, Silvano De Franceschi, Tristan Meunier</i>	

7B - MR (MEMORY RELIABILITY)

Characterization and Modelling of Hot Carrier Degradation in pFETs Under $V_d > V_g$ Condition for Sub-20nm DRAM Technologies.....	378
<i>Da Wang, Yong Liu, Pengpeng Ren, Longda Zhou, Zhigang Ji, Junhua Liu, Runsheng Wang, Ru Huang</i>	

First Experimental Study of Floating-Body Cell Transient Reliability Characteristics of Both N- And P-Channel Vertical Gate-All-Around Devices with Split-Gate Structures.....	385
<i>Cheng-Lin Sung, Sheng-Ting Fan, Hang-Ting Lue, Wei-Chen Chen, Pei-Ying Du, Teng-Hao Yeh, Keh-Chung Wang, Chih-Yuan Lu</i>	

7C - SE (SOFT ERRORS)

Recent Advances and Trends on Automotive Safety	391
<i>Riccardo Mariani, Karl Greb</i>	

Thermal-Neutron SER Mitigation by Cobalt-Contact in 7 Nm Bulk-FinFET Technology.....	397
<i>Taiki Uemura, Byungjin Chung, Jegon Kim, Hyewon Shim, Shinyoung Chung, Brandon Lee, Jaehee Choi, Shota Ohnishi, Ken Machida</i>	

Soft Error Characterization of D-FFs at the 5-Nm Bulk FinFET Technology for the Terrestrial Environment	406
<i>Y. Xiong, A. Feeley, N. J. Pieper, D. R. Ball, B. Narasimham, J. Brockman, N. A. Dodds, S. A. Wender, S.-J. Wen, R. Fung, B. L. Bhuvu</i>	

8A - PR (PRODUCT RELIABILITY)

Reliability Qualification Challenges of SOCs in Advanced CMOS Process Nodes (Invited)	413
<i>Shou-En Liu, Jian Li, Deepak Nayak, Amit Marathe, Kaushik Balamukundhan, Vishal Gosavi, Ajaykumar Prajapati, Baha Kilic, Mengzhi Pang, Arpit Mittal</i>	

Runtime Test Solution for Adaptive Aging Compensation and Fail Operational Safety Mode.....	419
<i>V. Huard, F. Jacquet, S. Mhira, L. Jure, O. Montfort, M. Louvat, L. Zaia, F. Bertrand, E. Acacia, O. Caffin, H. Belhadj, O. Durand, N. Exibard, V. Bonnet, A. Charvier, P. Bernardi, R. Cantoro</i>	

New RC-Imbalance Failure Mechanism of Well Charging Damage and the Implemented Rule	423
<i>Yu-Lin Chu, Hsi-Yu Kuo, Hung-Da Dai, Kuan-Hung Chen, Pei-Jung Lin, Chun-Ting Liao, Ta-Chun Lin, Ming Feng, Swercy Chiu, Victor Liang</i>	

A Method of Developing Qualification Plans for Board Products	427
<i>Jeffrey Zhang, Antai Xu, Daniel Gitlin</i>	

Reduced Relative Humidity (RH) Enhances the Corrosion-Limited Lifetime of Self-Heated IC: Peck's Equation Generalized.....	433
<i>M. Asaduz Zaman Mamun, Muhammad A. Alam</i>	

8B - WB (WIDE-BANDGAP SEMICONDUCTORS (SiC))

Negative Gate Bias TDDB Evaluation of n-Channel SiC Vertical Power MOSFETs	441
<i>Satyaki Ganguly, Daniel J. Lichtenwalner, Caleb Isaacson, Donald A. Gajewski, Philipp Steinmann, Ryan Foarde, Brett Hull, Sei-Hyung Ryu, Scott Allen, John W. Palmour</i>	
Accurate Screening of Defective Oxide on SiC Using Consecutive Multiple Threshold-Voltage Measurements.....	447
<i>H. Miki, M. Sagawa, Y. Mori, T. Murata, K. Kinoshita, K. Asaka, T. Oda</i>	
Investigation of Terrestrial Neutron Induced Failure Rates in Silicon Carbide JFET Based Cascode FETs	454
<i>L. Fursin, P. Losee, A. Akturk</i>	

8C - MB (METALLIZATION/BEOL RELIABILITY)

Novel Methodology for Temperature-Aware Electromigration Assessment in On-Chip Power Grid: Simulations and Experimental Validation (Invited)	460
<i>A. Kteyan, V. Sukharev, Y. Yi, C. Kim</i>	
Assessment of Critical Co Electromigration Parameters.....	470
<i>O. Varela Pedreira, M. Lofrano, H. Zahedmanesh, Ph. J. Roussel, M. Van Der Veen, V. Simons, E. Chery, I. Ciofi, K. Croes</i>	
Redundancy Effect on Electromigration Failure Time in Power Grid Networks	477
<i>M. H. Lin, C. I. Lin, Y. C. Wang, Aaron Wang</i>	
Polarity Dependence and Metal Density Impact on Multi-Layer Inter-Level TDDB for High Voltage Application.....	484
<i>Yinghong Zhao, Ki-Don Lee, Manisha Sharma, Joonah Yoon, Rakesh Ranjan, Iqbal Mahmud, Caleb Dongkwan Kwon, Myung Soo Yeo</i>	

9A - PR (PRODUCT RELIABILITY)

Recent US West Coast Wildfire Disasters: Impact on the Reliability Assessment of Optical Transceivers.....	488
<i>Quan Tran, Ronald Gayhardt, Tin Nguyen, Arif Zaman</i>	
Degradation Mechanisms in Germanium Electro-Absorption Modulators	492
<i>Artemisia Tsiara, Alicja Lesniewska, Philippe Roussel, Srinivasan Ashwyn Srinivasan, Mathias Berciano, Marko Simicic, Marianna Pantouvaki, Joris Van Campenhout, Kristof Croes</i>	
Wafer-Level Aging of InGaAs/GaAs Nano-Ridge p-i-n Diodes Monolithically Integrated on Silicon.....	499
<i>Ping-Yi Hsieh, Artemisia Tsiara, Barry O'Sullivan, Didit Yudistira, Marina Baryshnikova, Guido Groeseneken, Bernardette Kunert, Marianna Pantouvaki, Joris Van Campenhout, Ingrid De Wolf</i>	

9B - RT (RELIABILITY TESTING)

Method to Evaluate Off-State Breakdown in Scaled Tri-Gate Technologies.....	508
<i>D. Nminibapiel, K. Joshi, R. Ramamurthy, L. Pantisano, I. Meric, S. Ramey</i>	

Revealing Stresses for Plasma Induced Damage Detection in Thick Oxides 514
Daniel Beckmeier, Jifa Hao, Jake Choi, Matt Ring

Q&R On-Chip (QROC): A Unified, Oven-Less and Scalable Circuit Reliability Platform..... 520
Ketul B. Sutaria, Minki Cho, Anisur Rahman, Jihan Standfest, Rahul Sharma, Swaroop Namalapuri, Shiv Gupta, Bahar Ajdari, Ricardo Ascazubi, Balkaran Gill

9C - NC (NEUROMORPHIC COMPUTING RELIABILITY)

Monolithic 3D Integration of Oxide Semiconductor FETs and Memory Devices for AI Acceleration (Invited)..... 526
Masaharu Kobayashi

Suppressing Channel Percolation in Ferroelectric FET for Reliable Neuromorphic Applications 532
Kai Ni, Om Prakash, Simon Thomann, Zijian Zhao, Shan Deng, Hussam Amrouch

Ferroelectric FET Threshold Voltage Optimization for Reliable In-Memory Computing 540
Om Prakash, Kai Ni, Hussam Amrouch

10A - TX (TRANSISTORS)

Temperature Dependent Mismatch and Variability in a Cryo-CMOS Array with 30k Transistors 550
A. Grill, V. John, J. Michl, A. Beckers, E. Bury, S. Tyaginov, B. Parvais, A. Vaisman Chasin, T. Grasser, M. Wlatl, B. Kaczer, B. Govoreanu

A Critical Examination of the TCAD Modeling of Hot Carrier Degradation for LDMOS Transistors 556
Bikram Kishore Mahajan, Yen-Pu Chen, Muhammad Ashraf Alam, Dhanoop Varghese, Srikanth Krishnan, Vijay Reddy

Significant Enhancement of HCD and TDDDB in CMOS FETs by Mechanical Stress..... 563
Kookjin Lee, Ben Kaczer, Anastasiia Kruv, Mario Gonzalez, Geert Eneman, Oguzhan Orkut Okudur, Alexander Grill, Jacopo Franco, Andrea Vici, Robin Degraeve, Ingrid De Wolf

Quantum Mechanical Connection of Schottky Emission Process and Its Implications on Breakdown Methodology and Conduction Modeling for BEOL Low-k Dielectrics..... 569
Ernest Wu, Baozhen Li

10B - GAN (GAN POWER DEVICE)

Modeling Hot-Electron Trapping in GaN-Based HEMTs..... 577
Nicola Modolo, Carlo De Santi, Andrea Minetto, Luca Sayadi, Sebastien Sicre, Gerhard Precht, Gaudenzio Meneghesso, Enrico Zanoni, Matteo Meneghini

Gate Reliability of p-GaN Power HEMTs Under Pulsed Stress Condition..... 582
M. Millesimo, B. Bakeroot, M. Borga, N. Posthuma, S. Decoutere, E. Sangiorgi, C. Fiegna, A. N. Tallarico

Novel High Voltage Bias Temperature Instabilities (HV-BTI) Setup to Monitor R_{ON}/V_{TH} Drift on GaN-On-Si E-Mode MOSc-HEMTs Under Drain Voltage..... 588
C. Leurquin, W. Vandendaele, A. G Viey, R. Gwoziecki, R. Escoffier, R. Salot, G. Despesse, F. Iucolano, R. Modica, A. Constant

GaN MIS-HEMTs in Repetitive Overvoltage Switching: Parametric Shift and Recovery	594
<i>Qihao Song, Joseph P. Kozak, Yunwei Ma, Jingcun Liu, Ruizhe Zhang, Roman Volkov, Daniel Sherman, Kurt V. Smith, Wataru Saito, Yuhao Zhang</i>	

10C - FA (FAILURE ANALYSIS)

Putting AI to Work: A Practical and Simple Application to Improve 3D X-Ray FA.....	601
<i>William Harris, Allen Gu, Masako Terada</i>	
Defect-Controlled Resistance Degradation of Sputtered Lead Zirconate Titanate Thin Films	607
<i>Kuan-Ting Ho, Daniel Monteiro Diniz Reis, Karla Hiller</i>	
Power Cycling Reliability of SiC MOSFETs in Discrete and Module Packages.....	613
<i>I. Kovacevic-Badstuebner, S. Race, T. Ziemann, S. Tiwari, U. Grossner, Elena Mengotti, Enea Bianda, Joni Jormanainen</i>	
Progressive Degradation Without Physical Failure During Mounting Due to Soft Overstress in Compound HBT for RF, Mobile, and Automotive Applications	619
<i>Hyeokjae Lee, Sanggi Ko, Ho-Joon Suh, Gina Jeong, Jung-Han Yeo, Hye-Min Park, Hee-Kyeong Kim, Jong-Kwan Kim, Sung S. Chung, Youngbo Kim, Jisun Park, Hyungsoon Shin</i>	

11A - GD (GATE/MOL DIELECTRICS)

Middle-Of-The-Line Reliability Characterization of Recessed-Diffusion-Contact Adopted Sub-5nm Logic Technology.....	625
<i>Seongkyung Kim, Ukjin Jung, Seungjin Choo, Kihyun Choi, Taejin Chung, Shinyoung Chung, Euncheol Lee, Juhun Park, Deokhan Bae, Myungyoon Um</i>	
On Superior Hot Carrier Robustness of Dynamically-Doped Field-Effect-Transistors	632
<i>Stanislav Tyaginov, Aryan Afzalian, Alexander Makarov, Alexander Grill, Michiel Vandemaele, Maksim Cherenov, Mikhail Vexler, Geert Hellings, Ben Kaczer</i>	
New Modelling Off-State TDDDB for 130nm to 28nm CMOS Nodes	641
<i>Tidjani Garba-Seybou, Xavier Federspiel, Alain Bravaix, Florian Cacho</i>	
AC TDDDB Analysis for HK/IL Gate Stack Breakdown and Frequency-Dependent Oxygen Vacancy Trap Generation in Advanced Nodes FinFET Devices by SILC Spectrum Methodology	648
<i>P. S. Chen, Y. W. Lee, D. S. Huang, S. C. Chen, C. F. Cheng, J. H. Lee, Jun He</i>	
Deep Cryogenic Temperature TDDDB in 45-Nm PDSOI N-Channel FETs for Quantum Computing Applications.....	654
<i>Asifa Amin, Aarti Rathi, Sujit K. Singh, Abhisek Dixit, Oscar H. Gonzalez, P. Srinivasan, Fernando Guarin</i>	

11B - RF (RF/MMW/5G)

6G Roadmap for Semiconductor Technologies: Challenges and Advances.....	660
<i>N. Cahoon, P. Srinivasan, F. Guarin</i>	
Interpretation and Modelling of dynamic- R_{ON} Kinetics in GaN-On-Si HEMTs for Mm-Wave Applications.....	669
<i>V. Putcha, H. Yu, J. Franco, S. Yadav, A. Alian, U. Peralagu, B. Parvais, N. Collaert</i>	

Fe-Traps Influence on Time-Dependent Breakdown Voltage in 0.1- μm GaN HEMTs for 5G Applications.....	677
<i>Marcello Cioni, Nicolo Zagni, Alessandro Chini</i>	
GaN RF HEMT Reliability: Impact of Device Processing on I-V Curve Stability and Current Collapse.....	682
<i>F. Chiocchetta, C. De Santi, F. Rampazzo, K. Mukherjee, Jan Grunenpiütt, Daniel Sommer, Herve Blanck, Benoit Lambert, A. Gerosa, G. Meneghesso, E. Zanoni, M. Meneghini</i>	
DC and RF Reliability Assessment of 5G-MMW Capable GaN HEMT Process (Invited)	688
<i>Satyaki Ganguly, Kyle M. Bothe, Alexandre Niyonzima, Thomas Smith, Yueying Liu, Jeremy Fisher, Fabian Radulescu, Donald A. Gajewski, Scott T. Sheppard, Jim W. Milligan, Basim Noori, John W. Palmour</i>	

11C - CR (CIRCUIT RELIABILITY AND AGING)

Exploring Fault Injection Attack Resilience of Secure IC Chips	694
<i>Makoto Nagata</i>	
A Ring-Oscillator-Based Degradation Monitor Concept with Tamper Detection Capability	700
<i>Javier Diaz-Fortuny, Pablo Saraza-Canflanca, Erik Bury, Michiel Vandemaele, Ben Kaczer, Robin Degraeve</i>	
Efficient Evaluation of the Time-Dependent Threshold Voltage Distribution Due to NBTI Stress Using Transistor Arrays	707
<i>Christian Bogner, Tibor Grasser, Michael Waltl, Hans Reisinger, Christian Schlunder</i>	
Layer-To-Layer Endurance Variation of 3D NAND Flash Memory	715
<i>Md Raquibuzzaman, Md Mehedi Hasan, Aleksandar Milenkovic, Biswajit Ray</i>	

POSTER SESSION

Reliability Analysis of Physically Unclonable Function by Using Aging Variability Simulation	720
<i>Jae-Gyung Ahn, Jim Wesselkamper, Ryan Sw Baek, Ping-Chin Yeh, Jonathan Chang, Jennifer Wong, Xin Wu</i>	
A Calibration-Free Synthesizable Odometer Featuring Automatic Frequency Dead Zone Escape and Start-Up Glitch Removal	725
<i>Tahmida Islam, Junkyu Kim, Chris H. Kim, David Tipple, Michael Nelson, Robert Jin, Anis Jarrar</i>	
A Smart SRAM-Cell Array for the Experimental Study of Variability Phenomena in CMOS Technologies	731
<i>P. Saraza-Canflanca, H. Carrasco-Lopez, A. Santana-Andreo, J. Diaz-Fortuny, R. Castro-Lopez, E. Roca, F. V. Fernandez</i>	
An Aging Degradation Suppression Scheme at Constant Performance by Controlling Supply Voltage and Body Bias in a 65 Nm Fully-Depleted Silicon-On-Insulator Process	736
<i>Ikuo Suda, Ryo Kishida, Kazutoshi Kobayashi</i>	
Cleaved-Gate Ferroelectric FET for Reliable Multi-Level Cell Storage.....	741
<i>Navjeet Bagga, Kai Ni, Nitanshu Chauhan, Om Prakash, X. Sharon Hu, Hussam Amrouch</i>	

Combining Experiments and a Novel Small Signal Model to Investigate the Degradation Mechanisms in Ferroelectric Tunnel Junctions	746
<i>Lorenzo Benatti, Paolo Pavan, Francesco Maria Puglisi</i>	
Endurance Evaluation on OTS-PCM Device Using Constant Current Stress Scheme.....	751
<i>W. C. Chien, L. M. Gignac, Y. C. Chou, C. H. Yang, N. Gong, H. Y. Ho, C. W. Yeh, H. Y. Cheng, W. Kim, I. T. Kuo, E. K. Lai, C. W. Cheng, L. Buzi, A. Ray, C. S. Hsu, R. L. Bruce, M. Brightsky, H. L. Lung</i>	
Experimental Demonstration of Single-Level and Multi-Level-Cell RRAM-Based In-Memory Computing with Up to 16 Parallel Operations	755
<i>E. Esmanhotto, T. Hirtzlin, N. Castellani, S. Martin, B. Giraud, F. Andrieu, J. F. Nodin, D. Querlioz, J.-M. Portal, E. Vianello</i>	
Correlation Between Access Polarization and High Endurance (~ 10 ¹² cycling) of Ferroelectric and Anti-Ferroelectric HfZrO ₂	759
<i>K.-Y. Hsiang, C.-Y. Liao, Y.-Y. Lin, Z.-F. Lou, C.-Y. Lin, J.-Y. Lee, F.-S. Chang, Z.-X. Li, H.-C. Tseng, C.-C. Wang, W.-C. Ray, T.-H. Hou, T.-C. Chen, C.-S. Chang, M. H. Lee</i>	
Degradation Mechanism of Amorphous IGZO-Based Bipolar Metal-Semiconductor-Metal Selectors	763
<i>Taras Ravsher, Andrea Fantini, Adrian Vaisman Chasin, Shamin Houshmand Sharifi, Hubert Hody, Harold Dekkers, Thomas Witters, Jan Van Houdt, Valeri Afanas'Ev, Sebastien Couet, Gouri Sankar Kar</i>	
Impact of Temperature on Reliability of MFIS HZO-Based Ferroelectric Tunnel Junctions	768
<i>Ayşe Sunbul, Tarek Ali, Raik Hoffmann, Ricardo Revello, Yannick Raffel, Pardeep Duhan, David Lehninger, Kati Kühnel, Matthias Rudolph, Sebastian Oehler, Philipp Schramm, Malte Czernohorsky, Konrad Seidel, Thomas Kampfe, Lukas M. Eng</i>	
Trap-Polarization Interaction During Low-Field Trap Characterization on Hafnia-Based Ferroelectric Gatestacks	773
<i>B. Truijten, B. O'Sullivan, Md Nur K. Alam, D. Claes, M. Thesberg, P. Roussel, A. Chasin, G. Van Den Bosch, B. Kaczer, J. Van Houdt</i>	
Characterization and Analysis of RF Switches in SOI Technology for ESD Protection.....	777
<i>Jian Liu, Nathaniel Carels, Nathaniel Peachey</i>	
Voltage Surges by Backside ESD Impacts on IC Chip in Flip Chip Packaging.....	782
<i>Takuya Wadatsumi, Kohei Kawai, Rikuu Hasegawa, Takuji Miki, Makoto Nagata, Kikuo Muramatsu, Hiromu Hasegawa, Takuya Sawada, Takahito Fukushima, Hisashi Kondo</i>	
A Novel Latch-Up-Immune DDSCR Used for 12 V Applications	788
<i>Zhihua Zhu, Songyan Wang, Xiaomei Fan</i>	
Numerical Simulation and Characterization of PCB Warpage.....	792
<i>M. Hamid, K. O'Connell, J. Bielick, J. Bennett, E. Campbell, A. Alfoqaha</i>	
Adhesion-Limit in Refractory Transition Metal (Mo) Contact Relay Operation at 300 °C— Avoiding Overestimation for Modern ICs.....	796
<i>Sushil Kumar, Dhairya Singh Arya, Manu Garg, Pushpapraj Singh</i>	
Single Event Induced Crosstalk of Monolithic 3D Circuits Based on a 22 Nm FD-SOI Technology	800
<i>Junjun Zhang, Fanyu Liu, Bo Li, Yang Huang, Siyuan Chen, Yuchong Wang, Jiajun Luo, Jing Wan</i>	

Failure Analysis of AlGaIn/GaN Power HEMTs Through an Innovative Sample Preparation Approach.....	806
<i>R. L. Torrisi, S. Adamo, S. Alessandrino, C. Bottari, B. Carbone, M. Palmisciano, E. Vitanza</i>	
Influence of Drain and Gate Potential on Gate Failure in Semi-Vertical GaN-On-Si Trench MOSFETs.....	811
<i>D. Favero, C. De Santi, K. Mukherjee, K. Geens, M. Borga, B. Bakeroot, S. You, S. Decoutere, G. Meneghesso, E. Zanoni, M. Meneghini</i>	
Impact of Gate Offset on PBTI of p-GaN Gate HEMTs	815
<i>Ethan S. Lee, Jungwoo Joh, Dong Seup Lee, Jesus A. Del Alamo</i>	
Accelerating the Recovery of p-Gate GaN HEMTs After Overvoltage Stresses	821
<i>Joseph P. Kozak, Qihao Song, Jingcun Liu, Ruizhe Zhang, Qiang Li, Wataru Saito, Yuhao Zhang</i>	
Impact of Random Spatial Fluctuation in Non-Uniform Crystalline Phases on Multidomain MFIM Capacitor and Negative Capacitance FDSOI	826
<i>Nitanshu Chauhan, Chirag Garg, Kai Ni, Amit Kumar Behera, Sarita Yadav, Shashank Banchhor, Navjeet Bagga, Avirup Dasgupta, Arnab Datta, Sudeb Dasgupta, Anand Bulusu</i>	
Effect of Non-Identical Annealing on the Breakdown Characteristics of Sputtered IGZO Films.....	832
<i>Rishabh Kishore, Kavita Vishwakarma, Arnab Datta</i>	
Frequency Dependant Gate Oxide TDDDB Model.....	836
<i>M. Arabi, X. Federspiel, F. Cacho, M. Rafik, S. Blonkowski, X. Garros, G. Guibaudou</i>	
Robust Off-State TDDDB Reliability of n-LDMOS.....	841
<i>Wen Liu, Dimitris P. Ioannou, Johnatan Kantarovsky, Byoung Min, Tanya Nigam</i>	
Combining SILC and BD Statistics for Low-Voltage Lifetime Projection in HK/MG Stacks	845
<i>Andrea Vici, Robin Degraeve, Joao Pedro Bastos, Philippe Roussel, Ingrid De Wolf</i>	
A Realistic Modeling Approach to Explain the Physical Mechanism of TDDDB for Automotive Grade-Zero Applications	850
<i>C. H. Yang, P. S. Chien, Y. S. Cho, W. S. Hung</i>	
Electric Field Impact on Lateral Charge Diffusivity in Charge Trapping 3D NAND Flash Memory.....	855
<i>Juwon Lee, Junho Seo, Jeonghun Nam, Yonglae Kim, Ki-Whan Song, Jai Hyuk Song, Woo Young Choi</i>	
An Abnormal Negative Temperature Dependence of Erasestate Vt Retention Shift in 3-D NAND Flash Memories	859
<i>Y. H. Liu, Y. S. Yang, T. C. Zhan, M. Hu, Z. J. Liu, W. Lin, A. C. Liu, Y. C. Hsu</i>	
Investigation of Retention Characteristics in a Triple-Level Charge Trap 3D NAND Flash Memory	863
<i>Yunjie Fan, Zhiqiang Wang, Shengwei Yang, Kun Han, Yi He</i>	
High-k MIM Dielectric Reliability Study in 65nm Node.....	867
<i>Ravi Achanta, V. McGahay, S. Boffoli, C. Kothandaraman, J. Gambino</i>	
Effect of OTS Selector Reliabilities on NVM Crossbar-Based Neuromorphic Training	871
<i>Wen Ma, Tung Thanh Hoang, Brian Hoskins, Matthew W. Daniels, Jabez McClelland, Yutong Gao, Gina Adam, Martin Lueker-Boden</i>	

Combining Measurements and Modeling/simulations Analysis to Assess Carbon Nanotube Memory Cell Characteristics	877
<i>J. Farmer, D. Veksler, E. Tang, G. Bersuker, D. Z. Gao, A.-M. El-Sayed, T. Durrant, A. Shluger, T. Rueckes, L. Cleveland, H. Luan, R. Sen</i>	
Investigation on Contacts Thermal Stability for 3D Sequential Integration.....	881
<i>S. J. Mao, J. B. Liu, Y. Wang, W. B. Liu, Y. P. Hu, H. W. Cui, R. Zhang, H. C. Liu, Z. X. Wang, N. Zhou, Y. K. Zhang, H. Yang, Z. H. Wu, Y. L. Li, J. F. Gao, A. Y. Du, J. F. Li, J. Luo, W. W. Wang, H. X. Yin</i>	
Applying Universal Chip Telemetry to Detect Latent Defects and Aging in Advanced Electronics	885
<i>A. Evelyn Landman, Alex Burlak, C. Nir Sever, D. Marc Hutner</i>	
Pre-O ₂ Treatment for LNA Gate Oxide Leakage Improvement	889
<i>Zheng Ke, Sachin Goyal, Solomon Arputharaj, Wee Yee Wendy Lau, Tan Tam Lyn, Lim Dau Fatt, Pandurangan Madhavan, Chandrasekar Venkataramani</i>	
Novel Electrical Detection Method for Random Defects on Peripheral Circuits in NAND Flash Memory	893
<i>Bu-Il Nam, Youngha Choi, Sungki Hong, Ki-Young Dong, Wontaeck Jung, Sang-Won Park, Soon-Yong Lee, Dooyeon Jung, Byoung-Hee Kim, Eunkyong Kim, Ki-Whan Song, Jai Hyuk Song, Woo Young Choi</i>	
An Analytical Model of Transient Response of MEMS Under High-G Shock for Reliability Assessment	897
<i>Tianfang Peng, Zheng You</i>	
The Optimal Shape of MEMS Beam Under High-G Shock Based on a Probabilistic Fracture Model.....	902
<i>Tianfang Peng, Zheng You</i>	
NBTI Characterization with <i>in Situ</i> Poly Heater	907
<i>Yu-Hsing Cheng, Michael Cook, Derryl D. J. Allman</i>	
A Deeper Understanding of Well Charging Reliability with Circuit Relevant Test Structures.....	912
<i>T. L. Tan, C. W. Eng, H. Xu, J. M. Soon, E. Ebard, M. Siddabathula, B. F. Phoong, K. H. Poh, M. Prabhu, X.-L. Zhao, J. M. Koo, K. Cho, G.-W. Zhang</i>	
Infant Mortality and Wear-Out Failures in Polymer and MnO ₂ Tantalum Capacitors	916
<i>Alexander Teverovsky</i>	
Reliability of Ferroelectric and Antiferroelectric Si:HfO ₂ Materials in 3D Capacitors by TDDB Studies	925
<i>A. Viegas, K. Falidas, T. Ali, K. Kuhnel, R. Hoffmann, C. Mart, M. Czernohorsky, J. Heitmann</i>	
Nanoscale Analysis of Breakdown Induced Crack Propagation in DTSCR Devices.....	930
<i>Xinqian Chen, Fei Hou, Zuoyuan Dong, Yuxin Zhang, Chaolun Wang, Fang Liang, Feibo Du, Zhiwei Liu, Xing Wu</i>	
Insights on Inter-Metal Reliability Assessment of High Voltage Interconnects.....	935
<i>Kwang Sing Yew, Ran Xing Ong, Hin Kiong Yap, Wanbing Yi, Jacquelyn Phang, R. Chockalingam, Juan Boon Tan</i>	
Degradation Behaviors of 22 Nm FDSOI CMOS Inverter Under Gigahertz AC Stress	939
<i>Yaru Ding, Wei Liu, Yiming Qu, Liang Zhao, Yi Zhao</i>	

Deep Level Effects and Degradation of 0.15 μm RF AlGaIn/GaN HEMTs with Mono-Layer and Bi-Layer AlGaIn Backbarrier	944
<i>Z. Gao, F. Chiochetta, C. De Santi, N. Modolo, F. Rampazzo, M. Meneghini, G. Meneghesso, E. Zanoni, H. Blanck, H. Stieglauer, D. Sommer, L. Benoit, J. Grunenputt, O. Kordina, J.-T. Chen, J.-C. Jacquet, C. Lacam, S. Piotrowicz</i>	
Correlated Effects of Radiation and Hot Carrier Degradation on the Performance of LDMOS Transistors	950
<i>Bikram Kishore Mahajan, Yen-Pu Chen, Ulisses Alberto Heredia Rivera, Rahim Rahimi, Muhammad Ashraful Alam</i>	
Accelerator-Based Thermal-Neutron Beam by Compact and Low-Cost Moderator for Soft-Error Evaluation in Semiconductor Devices.....	955
<i>Taiki Uemura, Byungjin Chung, Jegon Kim, Hyewon Shim, Shinyoung Chung, Brandon Lee, Jaehee Choi, Shota Ohnishi, Ken Machida</i>	
Design and Heavy-Ion Testing of MTJ/CMOS Hybrid LSIs for Space-Grade Soft-Error Reliability	961
<i>K. Watanabe, T. Shimada, K. Hirose, H. Shindo, D. Kobayashi, T. Tanigawa, S. Ikeda, T. Shinada, H. Koike, T. Endoh, T. Makino, T. Ohshima</i>	
Modeling Time and Bias Dependence of Classical HCD Mechanism (Peak I_{SUB} Stress) in n-MOSFETs.....	966
<i>Himanshu Diwakar, Karansingh Thakor, Souvik Mahapatra</i>	
Decoupling of NBTI and Pure HCD Contributions in p-GAA SNS FETs Under Mixed VG/VD Stress	972
<i>Nilotpal Choudhury, Ayush Ranjan, Souvik Mahapatra</i>	
Optimized LDMOS Offering for Power Management and RF Applications	978
<i>S. Cimino, J. Singh, J. B. Johnson, W. Zheng, Y. Chen, W. Liu, P. Srinivasan, O. Gonzales, M. Hauser, M. Koskinen, K. Nagahiro, Y. Liu, B. Min, T. Nigam, N. Squib</i>	
Reverse Body Bias Dependence of HCI Reliability in Advanced FinFET	983
<i>Md Iqbal Mahmud, Rakesh Ranjan, Ki-Don Lee, Pavitra Ramadevi Perepa, Caleb Dongkyun Kwon, Seungjin Choo, Kihyun Choi</i>	
Impact of Electrical Defects Located at Transistor Periphery on Analog and RTN Device Performance.....	987
<i>L. Pirro, P. Liebscher, C. Brantz, M. Kessler, H. Herzog, O. Zimmerhackl, R. Jain, E. Ebrand, K. Gebauer, M. Otto, A. Zaka, J. Hoentschel</i>	
SiGe Gate-All-Around Nanosheet Reliability	992
<i>Huimei Zhou, Miaomiao Wang, Ruqiang Bao, Curtis Durfee, Liqiao Qin, Jingyun Zhang</i>	
Failure Analysis Addressing Method of Optically Undetected Defectivity on 4H-SiC PowerMOSFET Epitaxial Layer	996
<i>S. Alessandrino, B. Carbone, F. Cordiano, B. Mazza, A. Russo, W. Coco, M. Boscaglia, A. Di Salvo, A. Lombardo, D. Scarcella, E. Vitanza, P. Fiorenza</i>	
Static Performance and Reliability of 4H-SiC Diodes with P+ Regions Formed by Various Profiles and Temperatures	1000
<i>Stephen A. Mancini, Seung Yup Jang, Zeyu Chen, Dongyoung Kim, Justin Lynch, Yafei Liu, Balaji Raghothamachar, Minseok Kang, Anant Agarwal, Nadeemullah Mahadik, Robert Stahlbush, Michael Dudley, Woongje Sung</i>	

Influence of SiC Epitaxial Wafer Quality on Yield of 1.2kV SiC-DMOSFETs	1006
<i>Junji Senzaki, Ryoji Kosugi, Keiko Masumoto, Takeshi Mitani, Takeharu Kuroiwa, Hiroshi Yamaguchi</i>	
Characteristic Degradation of Power MOSFETs by X-Ray Irradiation and Their Recovery.....	1010
<i>Masato Shiozaki, Takashi Sato</i>	
Defects in 4H-SiC Epilayers Affecting Device Yield and Reliability	1014
<i>Robert Stahlbush, Nadeemullah Mahadik, Peter Bonanno, Jake Soto, Bruce Odekirk, Woongje Sung, Anant Agarwal</i>	
Characterization of Electron Traps in Gate Oxide of <i>m</i> -Plane SiC MOS Capacitors.....	1020
<i>Yutaka Terao, Takuji Hosoi, Takuma Kobayashi, Takayoshi Shimura, Heiji Watanabe</i>	

Author Index