

2019 IEEE International Reliability Physics Symposium (IRPS 2019)

**Monterey, California, USA
31 March – 4 April 2019**

Pages 1-476



IEEE Catalog Number: CFP19RPS-POD
ISBN: 978-1-5386-9505-0

**Copyright © 2019 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:	CFP19RPS-POD
ISBN (Print-On-Demand):	978-1-5386-9505-0
ISBN (Online):	978-1-5386-9504-3
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

EFFICIENT SIMULATION OF ELECTROMIGRATION DAMAGE IN LARGE CHIP POWER GRIDS USING ACCURATE PHYSICAL MODELS (INVITED PAPER)	1
<i>Farid N. Najm ; Valeriy Sukharev</i>	
AN ANALYTICAL TRANSIENT JOULE HEATING MODEL FOR AN INTERCONNECT IN A MODERN IC: MATERIAL SELECTION (CU, CO, RU) AND COOLING STRATEGIES.....	11
<i>Woojin Ahn ; Yen-Pu Chen ; Muhammad Ashreful Alam</i>	
TIME DEPENDENT DIELECTRIC BREAKDOWN OF COBALT AND RUTHENIUM INTERCONNECTS AT 36NM PITCH	17
<i>H. Huang ; P. S. McLaughlin ; J. J. Kelly ; C. -C. Yang ; R. G. Southwick ; M. Wang ; G. Bonilla ; G. Karve</i>	
ROBUST BEOL MIMCAP FOR LONG AND CONTROLLABLE TDDDB LIFETIME	22
<i>Lili Cheng ; Seungman Choi ; Sean Ogden ; Teck Jung Tang ; Robert Fox</i>	
RELIABILITY LIMITING DEFECTS IN MOS GATE OXIDES: MECHANISMS AND MODELING IMPLICATIONS.....	25
<i>Daniel M. Fleetwood</i>	
ACCELERATED CAPTURE AND EMISSION (ACE) MEASUREMENT PATTERN FOR EFFICIENT BTI CHARACTERIZATION AND MODELING	35
<i>Zhicheng Wu ; Jacopo Franco ; Dieter Claes ; Gerhard Rzepa ; Philippe J. Roussel ; Nadine Collaert ; Guido Groeseneken ; Dimitri Linten ; Tibor Grasser ; Ben Kaczer</i>	
A NEW TIME EFFICIENT METHODOLOGY FOR THE MASSIVE CHARACTERIZATION OF RTN IN CMOS DEVICES.....	42
<i>G. Pedreira ; J. Martin-Martinez ; J. Diaz-Fortuny ; P. Saraza-Canflanca ; R. Rodriguez ; R. Castro-Lopez ; E. Roca ; F. V. Fernandez ; M. Nafria</i>	
BIAS TEMPERATURE INSTABILITY RELIABILITY IN STACKED GATE-ALL-AROUND NANOSHEET TRANSISTOR	47
<i>Miaomiao Wang ; Jingyun Zhang ; Huimei Zhou ; Richard G. Southwick ; Robin Hsin Kuo Chao ; Xin Miao ; Veeraraghavan S. Basker ; Tenko Yamashita ; Dechao Guo ; Gauri Karve ; Huiming Bu ; James H. Stathis</i>	
NEW INSIGHTS INTO THE IMPRINT EFFECT IN FE-HFO₂ AND ITS RECOVERY.....	53
<i>Y. Higashi ; K. Florent ; A. Subirats ; B. Kaczer ; L. Di Piazza ; S. Clima ; N. Ronchi ; S. R. C. Mcmitchell ; K. Banerjee ; U. Celano ; M. Suzuki ; D. Linten ; J. Van Houdt</i>	
SUPERIOR ENDURANCE PERFORMANCE OF 22-NM EMBEDDED MRAM TECHNOLOGY	60
<i>V. B. Naik ; J. H. Lim ; K. Yamane ; D. Zeng ; H. Yang ; N. Thiyagarajah ; J. Kwon ; N. L. Chung ; R. Chao ; T. Ling ; K. Lee</i>	
RELIABILITY OF 8MBIT EMBEDDED-STT-MRAM IN 28NM FDSOI TECHNOLOGY	64
<i>Y. Ji ; H. J. Goo ; J. Lim ; S. B. Lee ; S. Lee ; T. Uemura ; J. C. Park ; S. I. Han ; S. C. Shin ; J. H. Lee ; Y. J. Song ; K. M. Lee ; H. M. Shin ; S. H. Hwang ; B. Y. Seo ; Y. K. Lee ; J. C. Kim ; G. H. Koh ; K. C. Park ; S. Pae ; G. T. Jeong ; J. S. Yoon ; E. S. Jung</i>	
GAINING CONFIDENCE - A REVIEW OF SILICON CARBIDE'S RELIABILITY STATUS.....	67
<i>Nando Kaminski ; Sarah Rugen ; Felix Hoffmann</i>	
AVALANCHE AND SHORT-CIRCUIT ROBUSTNESS OF 4600 V SiC DMOSFETS	74
<i>Siddarth Sundaresan ; Vamsi Mulpuri ; Stoyan Jeliazkov ; Ranbir Singh</i>	
HIGH RESOLUTION OBSERVATION OF SUBSURFACE DEFECTS AT SiO₂/4H-SiC INTERFACES BY LOCAL DEEP LEVEL TRANSIENT SPECTROSCOPY BASED ON TIME-RESOLVED SCANNING NONLINEAR DIELECTRIC MICROSCOPY	81
<i>Yuji Yamagishi ; Yasuo Cho</i>	
PERMANENT AND TRANSIENT EFFECTS OF HIGH-TEMPERATURE BIAS STRESS ON ROOM- TEMPERATURE V_T DRIFT MEASUREMENTS IN SiC POWER MOSFETS.....	85
<i>Daniel B. Habersat ; Ronald Green ; Aivars J. Lelis</i>	
GATE-STACK ENGINEERED BTI IMPROVEMENTS IN HIGHVOLTAGE LOGIC-FOR-MEMORY HIGH-K/METAL GATE DEVICES.....	89
<i>B.J. O'sullivan ; R. Ritzenthaler ; G. Rzepa ; Z. Wu ; E. Dentoni Litta ; O. Richard ; T. Conard ; V. Machkaoutsan ; P. Fazan ; C. Kim ; J. Franco ; B. Kaczer ; T. Grasser ; A. Spessot ; D Linten ; N. Horiguchi</i>	
HOT CARRIER RELIABILITY IMPROVEMENT OF THICKER GATE OXIDE NFET DEVICES IN ADVANCED FINFETS	97
<i>M. Iqbal Mahmud ; A. Gupta ; M. Toledano-Luque ; N. Mavilla ; J. Johnson ; P. Srinivasan ; A. Zainuddin ; S. Rao ; S. Cimino ; B. Min ; T. Nigam</i>	

NOVEL OXIDE TOP-OFF PROCESS ENABLING RELIABLE PC-CA TDDB ON IO DEVICES WITH SELF ALIGNED CONTACT	103
Tian Shen ; Abu Naser Zainuddin ; Purushothaman Srinivasan ; Zakariae Chbili ; Kai Zhao ; Patrick Justison	
PROCESS OPTIMIZATION FOR HCI IMPROVEMENT IN I/O ANALOG DEVICES	108
C. Diouf ; N. Guitard ; M. Rafik ; J. J. Martinez ; X. Federspiel ; A. Bravaix ; D. Muller ; D. Roy	
RELIABILITY CHALLENGES WITH MATERIALS FOR ANALOG COMPUTING	114
Eduard A. Cartier ; Wanki Kim ; Nanbo Gong ; Tayfun Gokmen ; Martin M. Frank ; Douglas M. Bishop ; Youngseok Kim ; Seyoung Kim ; Takashi Ando ; Ernest Y. Wu ; Praneet Adusumilli ; John Rozen ; Paul M. Solomon ; Wilfried Haensch ; Matthew J. Brightsky ; Abu Sebastian ; Geoffrey W. Burr ; Vijay Narayanan	
RELIABILITY PERSPECTIVE ON NEUROMORPHIC COMPUTING BASED ON ANALOG RRAM	124
Huaiqiang Wu ; Meiran Zhao ; Yuyi Liu ; Peng Yao ; Yue Xi ; Xinyi Li ; Wei Wu ; Qingtian Zhang ; Jianshi Tang ; Bin Gao ; He Qian	
FROM EMERGING MEMORY TO NOVEL DEVICES FOR NEUROMORPHIC SYSTEMS: CONSEQUENCES FOR THE RELIABILITY REQUIREMENTS OF MEMRISTIVE DEVICES	128
D.J. Wouters	
RELIABILITY ISSUES IN ANALOG RERAM BASED NEURAL-NETWORK PROCESSOR	132
Ryutaro Yasuhara ; Takashi Ono ; Reiji Mochida ; Shunsaku Muraoka ; Kazuyuki Kouno ; Koji Katayama ; Yuriko Hayata ; Masayoshi Nakayama ; Hitoshi Suwa ; Yukio Hayakawa ; Takumi Mikawa ; Yasushi Gohou ; Shinichi Yoneda	
ALTERNATING TEMPERATURE STRESS AND DEDUCTION OF EFFECTIVE STRESS LEVELS FROM MISSION PROFILES FOR SEMICONDUCTOR RELIABILITY	137
A. Hirler ; A. Alsioufy ; J. Biba ; T. Lehndorff ; D. Lipp ; H. Lochner ; M. Siddabathula ; S. Simon ; T. Sulima ; M. Wiatr ; W. Hansch	
MACHINE LEARNING FOR DETECTION OF COMPETING WEAROUT MECHANISMS	141
Shu-Han Hsu ; Kexin Yang ; Linda Milor	
HCI IMPROVEMENT ON 14NM FINFET IO DEVICE BY OPTIMIZATION OF 3D JUNCTION PROFILE	150
Xinggon Wan ; Baofu Zhu ; Meera Mohan ; Keija Wu ; Dongil Choi ; Arfa Gondal	
ADVANCED CIRCUIT RELIABILITY VERIFICATION FOR ROBUST DESIGN	154
Antony Fan ; Joddy Wang ; Vladimir Aptekar	
APPLYING MACHINE LEARNING TO DESIGN FOR RELIABILITY COVERAGE	162
Norman Chang ; Wentze Chuang ; Ganesh Kumar Tsavatanalli ; Joao Geda ; Hao Zhuang ; Sankar Ramachandran ; Rahul Raian ; Ying-Shiun Li ; Yaowei Jia ; Mathew Kaipanatu ; Suresh Kumar Mantena ; Ming-Chih Shih ; Anita Yang ; Roger Jang	
PHYSICS TO TAPEOUT: THE CHALLENGE OF SCALING RELIABILITY VERIFICATION	169
Sridhar Srinivasan ; Matthew Hogan	
RECENT UPDATES TO TRANSISTOR LEVEL RELIABILITY ANALYSIS	174
Art Schaldenbrand ; Jushan Xie ; Hany Elhak	
WAFER-SCALE TAO_x DEVICE VARIABILITY AND IMPLICATIONS FOR NEUROMORPHIC COMPUTING APPLICATIONS	182
Christopher H. Bennett ; Diana Garland ; Robin B. Jacobs-Gedrim ; Sapan Agarwal ; Matthew J. Marinella	
SWITCHING VARIABILITY FACTORS IN COMPLIANCE-FREE METAL OXIDE RRAM	186
D. Veksler ; G. Bersuiker ; A. W. Bushmaker ; P. R. Shrestha ; K. P. Cheung ; J. P. Campbell	
LOW VOLTAGE TRANSIENT RESET KINETIC MODELING OF OXRRAM FOR NEUROMORPHIC APPLICATIONS	191
J. Doevenspeck ; R. Degraeve ; A. Fantini ; P. Debacker ; D. Verkest ; R. Lauwereins ; W. Dehaene	
FIRST DEMONSTRATION AND PHYSICAL INSIGHTS INTO TIME-DEPENDENT BREAKDOWN OF GRAPHENE CHANNEL AND INTERCONNECTS	197
Abhishek Mishra ; Adil Meersha ; N.K. Kranthi ; Kruti Trivedi ; Harsha B. Variar ; N S Veenadhari Bellamkonda ; Srinivasan Raghavan ; Mayank Shrivastava	
A NEW APPROACH TO VALIDATE GAN FET RELIABILITY TO POWER-LINE SURGES UNDER USE-CONDITIONS	203
Sandeep R. Bahl ; Paul Brohlin	
INFLUENCE OF DONOR-TYPE HOLE TRAPS UNDER P-GAN GATE IN GAN-BASED GATE INJECTION TRANSISTOR (GIT)	207
Kenichiro Tanaka ; Masahiro Hikita ; Tetsuzo Ueda	
ACCELERATED DEVICE DEGRADATION OF HIGH-SPEED GE WAVEGUIDE PHOTODETECTORS	211
A. Lesniewska ; S. A. Srinivasan ; J. Van Campenhout ; B. J. O'sullivan ; K. Croes	
LOW-SIDE GAN POWER DEVICE DYNAMIC R_{ON} CHARACTERISTICS UNDER DIFFERENT SUBSTRATE BIASES	218
Wen Yang ; Jiann-Shiun Yuan ; Balakrishnan Krishnan ; Patrick Shea	

SPATIO-TEMPORAL DEFECT GENERATION PROCESS IN IRRADIATED HFO₂ MOS STACKS: CORRELATED VERSUS UNCORRELATED MECHANISMS	225
<i>Fernando Leonel Aguirre ; Andrea Padovani ; Alok Ranjan ; Nagarajan Raghavan ; Nahuel Vega ; Nahuel Müller ; Sebastián Matías Pazos ; Mario Debray ; Joel Molina ; Kin Leong Pey ; Félix Palumbo</i>	
CORRECT EXTRAPOLATION MODEL FOR TDDDB OF STT-MRAM MGO MAGNETIC TUNNEL JUNCTIONS.....	233
<i>J.H. Lim ; N. Raghavan ; V.B. Naik ; J.H. Kwon ; K. Yamane ; H. Yang ; K.H. Lee ; K.L. Pey</i>	
ROLE OF DEFECTS IN THE RELIABILITY OF HFO₂/SI-BASED SPACER DIELECTRIC STACKS FOR LOCAL INTERCONNECTS	240
<i>C. Wu ; A. Chasin ; A. Padovani ; A. Lesniewska ; S. Demuynick ; K. Croes</i>	
TRANSFORMATION OF RAMPED CURRENT STRESS VBDTO CONSTANT VOLTAGE STRESS TDDDB T_{BD}.....	246
<i>Andrew Kim ; Ernest Wu ; Baozhen Li ; Barry Linder</i>	
DESIGN-FOR-RELIABILITY FLOW IN 7NM PRODUCTS WITH DATA CENTER AND AUTOMOTIVE APPLICATIONS	251
<i>Jae-Gyung Ahn ; I-Ru Chen ; Ping-Chin Yeh ; Jonathan Chang</i>	
ENHANCED FAIL RATE PROJECTIONS USING NEGATIVE DESIGN ASSIST IN AUTOMOTIVE GRADE SRAMs.....	256
<i>Sriram Balasubramanian ; Hari Balan ; Lei Liu ; Kevin Khua ; Wah Peng Neo ; Dianji Sui ; Tze Ho Simon Chan</i>	
EXPERIMENTAL IMPLEMENTATION OF 8.9KGATE STRESS MONITOR IN 28NM MCU ALONG WITH SAFETY SOFTWARE LIBRARY FOR IOT DEVICE MAINTENANCE.....	260
<i>Kan Takeuchi ; Masaki Shimada ; Shinya Konishi ; Daisuke Oshida ; Naoya Ota ; Takashi Yasumatsu ; Koji Shibutani ; Tomohiro Iwashita ; Tetsuya Kokubun ; Fumio Tsuchiya</i>	
HIGH VOLTAGE TOLERANT DESIGN WITH ADVANCED PROCESS FOR TV APPLICATION	267
<i>S. E. Liu ; M. H. Hsieh ; Y. R. Chen ; J. Y. Jao ; M. Z. Lin ; Y. H. Fang ; M. J. Lin</i>	
PRODUCT RELIABILITY METHODS TO ENABLE HIGH PERFORMANCE CPU'S.....	271
<i>Roman Rechter ; Robert Kwasnick ; Almog Reshef ; Oren Zonensain ; Tal Raz ; Anisur Rahman ; Praveen Polasam ; Maxim Levit</i>	
SIC POWER MOSFETS: DESIGNING FOR RELIABILITY IN WIDE-BANDGAP SEMICONDUCTORS.....	276
<i>Kevin Matocha ; In-Hwan Ji ; Xuning Zhang ; Sauvik Chowdhury</i>	
DESIGN STRATEGIES FOR RUGGED SIC POWER DEVICES	284
<i>Diana Xing ; Tianshi Liu ; Susanna Yu ; Minseok Kang ; Arash Salemi ; Marvin White ; Anant Agarwal</i>	
A PHYSICAL-STATISTICAL APPROACH TO ALGAN/GAN HEMT RELIABILITY	289
<i>Peter Moens ; Arno Stockman</i>	
PERIMETER DRIVEN TRANSPORT IN THE P-GAN GATE AS A LIMITING FACTOR FOR GATE RELIABILITY	295
<i>S. Stoffels ; N. Posthuma ; S. Decoutere ; B. Bakeroot ; A.N. Tallarico ; Enrico Sangiorgi ; Claudio Fiegn ; J. Zheng ; X. Ma ; M. Borga ; Elena Fabris ; M. Meneghini ; E. Zanoni ; G. Meneghesso ; J. Priesol ; A. Šatka</i>	
IMPACT OF SIDEWALL ETCHING ON THE DYNAMIC PERFORMANCE OF GAN-ON-SI E-MODE TRANSISTORS.....	305
<i>A. Tajalli ; E. Canato ; A. Nardo ; M. Meneghini ; A. Stockman ; P. Moens ; E. Zanoni ; G. Meneghesso</i>	
DIELECTRIC BREAKDOWN IN 2D LAYERED HEXAGONAL BORON NITRIDE — THE KNOWNS AND THE UNKNOWNs	311
<i>K.L. Pey ; A. Ranjan ; N. Raghavan ; K. Shubhakar ; S.J. O'shea</i>	
COMPREHENSIVE METHODOLOGY FOR MULTIPLE SPOTS COMPETING PROGRESSIVE BREAKDOWN FOR BEOL/FEOL APPLICATIONS	323
<i>Ernest Y. Wu ; Baozhen Li ; James H. Stathis ; Andrew Kim</i>	
IMPACT OF PASSIVE & ACTIVE LOAD GATE IMPEDANCE ON BREAKDOWN HARDNESS IN 28NM FDTSOI TECHNOLOGY	331
<i>A.P. Nguyen ; X. Garros ; M. Rafik ; F. Cacho ; D. Roy ; X. Federspiel ; F. Gaillard</i>	
A STATISTICAL LEARNING MODEL FOR ACCURATE PREDICTION OF TIME-DEPENDENT DIELECTRIC DEGRADATION FOR LOW FAILURE RATES	336
<i>Kaustubh Joshi ; Yung-Huei Lee ; Yu-Cheng Yao ; Shu-Wen Chang ; Siao-Syong Bian ; P. J. Liao ; Jiaw-Ren Shih ; Min-Jan Chen</i>	
TIME-DEPENDENT DIELECTRIC BREAKDOWN UNDER AC STRESS IN GAN MIS-HEMTS	342
<i>Ethan S. Lee ; Luis Hurtado ; Jungwoo Joh ; Srikanth Krishnan ; Sameer Pendharkar ; Jesús A. Del Alamo</i>	
NOVEL CUMULATIVE DEGRADATION APPROACH TO PREDICT COMPONENTS FAILURE RATES	347
<i>George Thiel ; Flavio Griggio</i>	
OPERATIONAL WORKLOAD IMPACT ON ROBUST SOLID-STATE STORAGE ANALYZED WITH INTERPRETABLE MACHINE LEARNING	354
<i>Jay Sarkar ; Cory Peterson</i>	

EVALUATING IMPACT OF INFORMATION UNCERTAINTIES ON COMPONENT RELIABILITY ASSESSMENT	362
<i>Diganta Das ; Edmond Elburn ; Michael Pecht ; Bhanu Sood</i>	
PROCESS VARIATION OF PIXEL DEFINITION AND EFFECTS OF FLEXIBLE OLED LUMINANCE DEGRADATION	371
<i>Jongwon Lee ; Sangkil Kim ; Yoonsuk Choi ; Jongwoo Park</i>	
SOFT ERROR PERFORMANCE OF HIGH-SPEED PULSED-DICE-LATCH DESIGN IN 16 NM AND 7 NM FINFET PROCESSES	377
<i>B. Narasimham ; K. Chandrasekharan ; J. K. Wang ; B. L. Bhuvan</i>	
SEIFF: SOFT ERROR IMMUNE FLIP-FLOP FOR MITIGATING SINGLE EVENT UPSET AND SINGLE EVENT TRANSIENT IN 10 NM FINFET	381
<i>Taiki Uemura ; Soonyoung Lee ; Dahye Min ; Ihnhwa Moon ; Seungbae Lee ; Sangwoo Pae</i>	
EVALUATION OF SINGLE EVENT EFFECTS IN SRAM AND RRAM BASED NEUROMORPHIC COMPUTING SYSTEM FOR INFERENCE	387
<i>Zhilu Ye ; Rui Liu ; Hugh Barnaby ; Shimeng Yu</i>	
SINGLE-EVENT UPSET RESPONSES OF DUAL- AND TRIPLE-WELL D FLIP-FLOP DESIGNS IN 7-NM BULK FINFET TECHNOLOGY	391
<i>L. Xu ; J. Cao ; B. L. Bhuvan ; I. Chatterjee ; S. -J. Wen ; R. Wong ; L. W. Massengill</i>	
NEGATIVE AND POSITIVE MUON-INDUCED SEU CROSS SECTIONS IN 28-NM AND 65-NM PLANAR BULK CMOS SRAMS	396
<i>Wang Liao ; Masanori Hashimoto ; Seiya Manabe ; Yukinobu Watanabe ; Shin-Ichiro Abe ; Keita Nakano ; Hayato Takeshita ; Motonobu Tampo ; Soshi Takeshita ; Yasuhiro Miyake</i>	
EXPLORATION OF THE IMPACT OF PHYSICAL INTEGRATION SCHEMES ON SOFT ERRORS IN 3D ICS USING MONTE CARLO SIMULATION	401
<i>M. L. Breeding ; R. A. Reed ; K. M. Warren ; M. L. Alles</i>	
FROM DEVICE AGING PHYSICS TO AUTOMATED CIRCUIT RELIABILITY SIGN OFF	408
<i>Christian Schlünder ; Katja Waschneck ; Peter Rotter ; Susanne Lachenmann ; Hans Reisinger ; Franz Ungar ; Georg Georgakos</i>	
STUDY OF LOCAL BTI VARIATION AND ITS IMPACT ON LOGIC CIRCUIT AND SRAM IN 7 NM FIN-FET PROCESS	420
<i>Mitsuhiko Igarashi ; Yuuki Uchida ; Yoshio Takazawa ; Makoto Yabuuchi ; Yasumasa Tsukamoto ; Koji Shibutani</i>	
AGING-AWARE DESIGN VERIFICATION METHODS UNDER REAL PRODUCT OPERATING CONDITIONS	426
<i>Hyewon Shim ; Jeongmin Jo ; Yoohwan Kim ; Bongyong Jeong ; Minji Shon ; Hai Jiang ; Sangwoo Pae</i>	
UTILIZING A THOROUGH UNDERSTANDING OF CRITICAL AGING AND FAILURE MECHANISMS IN FINFET TECHNOLOGIES TO ENABLE RELIABLE HIGH PERFORMANCE CIRCUITS	430
<i>Bonnie Weir ; Vani Prasad ; Shahriar Moinian ; Sangjune Park ; Joseph Blasko ; Jason Brown ; Jayanthi Pallinti</i>	
INVESTIGATING THE AGING DYNAMICS OF DIODE-CONNECTED MOS DEVICES USING AN ARRAY-BASED CHARACTERIZATION VEHICLE IN A 65NM PROCESS	435
<i>Nakul Pande ; Gyusung Park ; Chris H. Kim ; Srikanth Krishnan ; Vijay Reddy</i>	
INVESTIGATION OF NBTI DYNAMIC BEHAVIOR WITH ULTRA-FAST MEASUREMENT	441
<i>F. Cacho ; X. Federspiel ; D. Nouguier ; C. Diouf</i>	
PHYSICAL INSIGHTS INTO THE LOW CURRENT ESD FAILURE OF LDMOS-SCR AND ITS IMPLICATION ON POWER SCALABILITY	447
<i>Nagothu Karmel Kranthi ; B. Sampath Kumar ; Akram Salman ; Gianluca Boselli ; Mayank Srivastava</i>	
CDM-TIME DOMAIN TURN-ON TRANSIENT OF ESD DIODES IN BULK FINFET AND GAA NW TECHNOLOGIES	452
<i>S.-H. Chen ; D. Linten ; G. Hellings ; M. Simicic ; B. Kaczer ; T. Chiarella ; H. Mertens ; J. Mitard ; A. Mocuta ; N. Horiguchi</i>	
CURRENT FILAMENT DYNAMICS UNDER ESD STRESS IN HIGH VOLTAGE (BIDIRECTIONAL) SCRS AND IT'S IMPLICATIONS ON POWER LAW BEHAVIOR	459
<i>Nagothu Karmel Kranthi ; Akram Salman ; Gianluca Boselli ; Mayank Srivastava</i>	
CONCISE ANALYTICAL EXPRESSION FOR WUNSCH-BELL 1-D PULSED HEATING AND APPLICATIONS IN ESD USING TLP	464
<i>Geert Hellings ; Philippe Roussel ; Nian Wang ; Roman Boschke ; Shih-Hung Chen ; Marko Simicic ; Mirko Scholz ; Soeren Stoedel ; Kris Myny ; Dimitri Linten ; Paul Hellings ; Nowab Reza Md Ashif</i>	
PHYSICAL MODEL FOR ESD HUMAN BODY MODEL TO TRANSMISSION LINE PULSE	470
<i>Jian-Hsing Lee ; Natarajan Mahadeva Iyer ; Timothy J. Maloney</i>	
TUNABLE HOLDING-VOLTAGE HIGH VOLTAGE ESD DEVICES	477
<i>Jian-Hsing Lee ; Natarajan Mahadeva Iyer</i>	

NEW ACCESS TO SOFT BREAKDOWN PARAMETERS OF LOW-K DIELECTRICS THROUGH LOCALISATION-BASED ANALYSIS	485
<i>N. Herfurth ; A. Beyreuther ; E. Amini ; C. Boit ; M. Simon-Najasek ; S. Hübner ; F. Altmann ; R. Herfurth ; C. Wu ; I. De Wolf ; K. Croes</i>	
USE OF HIGH VOLTAGE OBIRCH FAULT ISOLATION TECHNIQUE IN FAILURE ANALYSIS OF HIGH VOLTAGE IC'S	494
<i>Chenran Lei ; Albert Lee ; Qinkan Kang ; Minkwang Lee ; Seiji Yang ; Dan Oliver ; Tu Giao</i>	
SURROGATE MODEL ASSISTED DESIGN OF SILICON ANODE CONSIDERING LITHIATION INDUCED STRESSES	498
<i>Zhuoyuan Zheng ; Bo Chen ; Yashraj Gurumukhi ; John Cook ; Mehmet N. Ates ; Nenad Miljkovic ; Paul V. Braun ; Pingfeng Wang</i>	
DO SOLAR PROTON EVENTS REDUCE THE NUMBER OF FAULTS IN SUPERCOMPUTERS?: A COMPARATIVE ANALYSIS OF FAULTS DURING AND WITHOUT SOLAR PROTON EVENTS	504
<i>Claire McKay Bowen ; Nathan Debardeleben ; Sean Blanchard ; Christine Anderson-Cook</i>	
ASSESMENT OF CPI STRESS IMPACT ON IC RELIABILITY AND PERFORMANCE IN 2.5D/3D PACKAGES	509
<i>A. Kteyan ; H. Hovsepyan ; J.-H. Choy ; V. Sukharev</i>	
CPI RELIABILITY CHALLENGES OF LARGE FLIP CHIP PACKAGES AND EFFECTS OF KERF SIZE AND SUBSTRATE	516
<i>Zhuo-Jie Wu ; Manish Nayini ; Charles Carey ; Samantha Donovan ; David Questad ; Edmund Blackshear</i>	
A COMPREHENSIVE WAFER LEVEL RELIABILITY STUDY ON 65NM SILICON INTERPOSER	523
<i>Cs Premachandran ; Thuy Tran-Quinn ; Lloyd Burrell ; Patrick Justison</i>	
ELECTROMIGRATION EARLY FAILURES FOR CU PILLAR INTERCONNECTIONS WITH AN ENEPIG PAD FINISH AND ITS SUPPRESSION	531
<i>Hideaki Tsuchiya ; Naohito Suzumura ; Ryuji Shibata ; Hideki Aono ; Makoto Ogasawara ; Toshihiko Akiba ; Kenji Sakata ; Kazuyuki Nakagawa ; Takuo Funaya</i>	
ARRAY-BASED STATISTICAL CHARACTERIZATION OF CMOS DEGRADATION MODES AND MODELING OF THE TIME-DEPENDENT VARIABILITY INDUCED BY DIFFERENT STRESS PATTERNS IN THE {V_G, V_D} BIAS SPACE	537
<i>E. Bury ; A. Chasin ; M. Vandemaele ; S. Van Beek ; J. Franco ; B. Kaczer ; D. Linten</i>	
MODELING THE EFFECT OF RANDOM DOPANTS ON HOT-CARRIER DEGRADATION IN FINFETS	543
<i>A. Makarov ; B. Kaczer ; Ph. Roussel ; A. Chasin ; A. Grill ; M. Vandemaele ; G. Hellings ; A.-M. El-Sayed ; T. Grasser ; D. Linten ; S. Tyaginov</i>	
FULL {V_G, V_D} BIAS SPACE MODELING OF HOT-CARRIER DEGRADATION IN NANOWIRE FETS	550
<i>Michiel Vandemaele ; Ben Kaczer ; Stanislav Tyaginov ; Zlatan Stanojevic ; Alexander Makarov ; Adrian Chasin ; Erik Bury ; Hans Mertens ; Dimitri Linten ; Guido Groeseneken</i>	
LOCALIZED LAYOUT EFFECT RELATED RELIABILITY APPROACH IN 8NM FINFETS TECHNOLOGY: FROM TRANSISTOR TO CIRCUIT	557
<i>Hai Jiang ; Hyunchul Sagong ; Jinju Kim ; Junekyun Park ; Sangchul Shin ; Sangwoo Pae</i>	
LOW-FREQUENCY NOISE REDUCTION IN 22FDX®: IMPACT OF DEVICE GEOMETRY AND BACK BIAS	562
<i>L. Pirro ; A. Zaka ; O. Zimmerhackl ; T. Herrmann ; M. Otto ; El M. Bazizi ; J. Hoentschel ; X. Li ; R. Taylor</i>	
INFLUENCE OF GATE LENGTH ON PBTI IN GAN-ON-SI E-MODE MOSC-HEMT	567
<i>A.G. Viey ; W. Vandendaele ; Ma Jaud ; R. Gwoziecki ; A. Torres ; M. Plissonnier ; F. Gaillard ; G. Ghibaudo ; R. Modica ; F. Iucolano ; M. Meneghini ; G. Meneghesso</i>	
GATE STABILITY AND ROBUSTNESS OF IN-SITU OXIDE GAN INTERLAYER BASED VERTICAL TRENCH MOSFETS (OG-FETS)	573
<i>Maria Ruzzarin ; Matteo Borga ; Enrico Zanoni ; Matteo Meneghini ; Gaudenzio Meneghesso ; Dong Ji ; Wenwen Li ; Silvia H. Chan ; Anchal Agarwal ; Chirag Gupta ; Stacia Keller ; Umesh K. Mishra ; Srabanti Chowdhury</i>	
HOT-ELECTRON EFFECTS IN GAN GITS AND HD-GITS: A COMPREHENSIVE ANALYSIS	578
<i>E. Fabris ; M. Meneghini ; C. De Santi ; M. Borga ; G. Meneghesso ; E. Zanoni ; Y. Kinoshita ; K. Tanaka ; H. Ishida ; T. Ueda</i>	
μs -RANGE EVALUATION OF THRESHOLD VOLTAGE INSTABILITIES OF GAN-ON-SI HEMTS WITH P-GAN GATE	584
<i>E. Canato ; F. Masin ; M. Borga ; E. Zanoni ; M. Meneghini ; G. Meneghesso ; A. Stockman ; A. Banerjee ; P. Moens</i>	
CHARACTERIZATION OF CRITICAL PEAK CURRENT AND GENERAL MODEL OF INTERCONNECT SYSTEMS UNDER SHORT PULSE-WIDTH CONDITIONS	590
<i>M. H. Lin ; W. S. Chou ; Y. T. Yang ; A. S. Oates</i>	

RELIABILITY OF AN AL₂O₃/SIO₂MIM CAPACITOR FOR 180NM (3.3V) TECHNOLOGY	597
<i>J. Gambino ; D. Allman ; G. Hall ; D. Price ; L. Sheng ; R. Takada ; Y. Kanuma</i>	
LONG TERM NBTI RELAXATION UNDER AC AND DC BIASED STRESS AND RECOVERY.....	602
<i>Elnatan Mataev ; James Stathis ; Giuseppe La Rosa ; Barry P. Linder</i>	
UNDERSTANDING AND VARIABILITY OF LATERAL CHARGE MIGRATION IN 3D CT-NAND FLASH WITH AND WITHOUT BAND-GAP ENGINEERED BARRIERS	607
<i>Andrea Padovani ; Milan Pesic ; Mondol Anik Kumar ; Pieter Blomme ; Alexandre Subirats ; Senthil Vadakupudhupalayam ; Zunaid Baten ; Luca Larcher</i>	
IMPACT OF MECHANICAL STRESS ON THE ELECTRICAL PERFORMANCE OF 3D NAND.....	615
<i>A. Krav ; A. Arreghini ; M. Gonzalez ; D. Verreck ; G. Van Den Bosch ; I. De Wolf ; A. Furnémont</i>	
COMPREHENSIVE ANALYSIS OF DATA-RETENTION AND ENDURANCE TRADE-OFF OF 40NM TAO_x-BASED RERAM	620
<i>Shouhei Fukuyama ; Atsuna Hayakawa ; Ryutaro Yasuhara ; Shinpei Matsuda ; Hiroshi Kinoshita ; Ken Takeuchi</i>	
MODELLING DEGRADATION OF MATCHED-CIRCUITS IN OPERATIONAL CONDITIONS: ACTIVE AND STAND-BY MODES	626
<i>Khai Nguyen ; Geoff Liang</i>	
RELIABILITY ANALYSIS OF A DELAY-LOCKED LOOP UNDER HCI AND BTI DEGRADATION.....	631
<i>Tonmoy Dhar ; Sachin S. Sapatnekar</i>	
ANALYSIS OF RANDOM TELEGRAPH NOISE (RTN) AT NEAR-THRESHOLD OPERATION BY MEASURING 154K RING OSCILLATORS	637
<i>A.K.M. Mahfuzul Islam ; Ryota Shimizu ; Hidetoshi Onodera</i>	
ON THE EFFECT OF NBTI INDUCED AGING OF POWER STAGE ON THE TRANSIENT PERFORMANCE OF ON-CHIP VOLTAGE REGULATORS.....	643
<i>Venkata Chaitanya Krishna Chekuri ; Arvind Singh ; Nihar Dasari ; Saibal Mukhopadhyay</i>	
A NOVEL CONSTANT E-FIELD METHODOLOGY FOR INTRINSIC TDDDB LIFETIME PROJECTION	648
<i>A.S. Teng ; C.W. Lin ; M.N. Chang ; Aaron Wang ; Ryan Lu</i>	
DISTINGUISHING INTERFACIAL HOLE TRAPS IN (110), (100) HIGH-K GATE STACK.....	655
<i>Yueyang Liu ; Xiangwei Jiang ; Liwei Wang ; Yunfei En ; Runsheng Wang</i>	
ON THE FREQUENCY DEPENDENCE OF BULK TRAP GENERATION DURING AC STRESS IN SI AND SIGE RMG P-FINFETS	659
<i>Narendra Parikh ; Uma Sharma ; Richard G. Southwick ; Miaomiao Wang ; James H. Stathis ; Souvik Mahapatra</i>	
COMPARATIVE ANALYSIS OF THE DEGRADATION MECHANISMS IN LOGIC AND I/O FINFET DEVICES INDUCED BY PLASMA DAMAGE	667
<i>Gaspard Hiblot ; Yefan Liu ; Geert Hellings ; Geert Van Der Plas</i>	
TRISTATE RESISTIVE SWITCHING IN HETEROGENOUS VAN DER WAALS DIELECTRIC STRUCTURES	672
<i>Kaichen Zhu ; Xianhu Liang ; Bin Yuan ; Marco A. Villena ; Chao Wen ; Tao Wang ; Shaochuan Chen ; Mario Lanza ; Fei Hui ; Yuanyuan Shi</i>	
A NOVEL HV-NPN ESD PROTECTION DEVICE WITH BURIED FLOATING P-TYPE IMPLANT	678
<i>Jie Jack Zeng ; Ruchil Jain ; Kyong Jin Hwang ; Robert Gauthier</i>	
THIN-FILM FD-SOI BIMOS TOPOLOGIES FOR ESD PROTECTION.....	682
<i>Louise De Conti ; Sorin Cristoloveanu ; Maud Vinet ; Philippe Galy</i>	
CHARACTERIZATION AND MODELING OF THE TRANSIENT SAFE OPERATING AREA IN LDMOS TRANSISTORS	687
<i>Hang Li ; Kalpathy B. Sundaram ; Yuanzhong Zhou ; Javier A. Salcedo ; Jean-Jacques Hajjar</i>	
DESIGN AND OPTIMIZATION OF THE NAND ESD CLAMP IN CMOS TECHNOLOGY	692
<i>Jian Liu ; Nathaniel Peachey</i>	
NOVEL RC-CLAMP DESIGN FOR HIGH SUPPLY VOLTAGE	696
<i>Yuh-Yue Chen ; Tsyr-Shyang Liou ; Shyh-Chyi Wong</i>	
INVESTIGATION ON LATCH-UP PATH BETWEEN I/O PMOS AND CORE PMOS IN A 0.18-μM CMOS PROCESS	702
<i>Chun-Cheng Chen ; Ming-Dou Ker</i>	
LOW-FREQUENCY NOISE MEASUREMENTS TO CHARACTERIZE CU-ELECTROMIGRATION DOWN TO 44NM METAL PITCH.....	706
<i>Sofie Beyne ; Olalla Varela Pedreira ; Ingrid De Wolf ; Zsolt Tokei ; Kristof Croes</i>	
STRESS MIGRATION FOLLOWED BY ELECTROMIGRATION RELIABILITY TESTING	712
<i>J.M. Passage ; N. Azhari ; J.R. Lloyd</i>	

WAFER LEVEL APPROACH FOR THE INVESTIGATION OF THE LONG-TERM STABILITY OF RESISTIVE PLATINUM DEVICES AT ELEVATED TEMPERATURES	717
<i>Timo Schössler ; Florian Schön ; Christian Lemier ; Gerald Urban</i>	
BEOL PROCESS DEVELOPMENT USING FAST POWER CYCLING ON TEST STRUCTURES	722
<i>Matt Ring ; Johan De Greve ; Bill Cowell ; Darren Moore ; Jeff Gambino</i>	
COMPARATIVE STUDY OF TDDB MODELS ON BEOL INTERCONNECTS FOR SUB-20 NM SPACINGS.....	728
<i>Niaz Mahmud ; Nabihah Azhari ; J. R. Lloyd</i>	
VARIATION-AWARE PHYSICS-BASED ELECTROMIGRATION MODELING AND EXPERIMENTAL CALIBRATION FOR VLSI INTERCONNECTS	732
<i>Sarath Mohanachandran Nair ; Raiendra Bishnoi ; Mehdi B. Tahoori ; Houman Zahedmanesh ; Kristof Croes ; Kevin Garello ; Gouri Sankar Kar ; Francky Catthoor</i>	
CURRENT CROWDING IMPACT ON ELECTROMIGRATION IN AL INTERCONNECTS.....	738
<i>Young-Joon Park ; Jungwoo Joh ; Jayhoon Chung ; Srikanth Krishnan</i>	
UNDERSTANDING EM-DEGRADATION MECHANISMS IN METAL HEATERS USED FOR SI PHOTONICS APPLICATIONS	744
<i>K. Croes ; V. Simons ; S. Beyne ; V. Cherman ; H. Oprins ; M. Stucchi ; Ph. Absil ; A. Glabman ; E. Wilcox</i>	
VERIFICATION OF COPPER STRESS MIGRATION UNDER LOW TEMPERATURE LONG TIME STRESS.....	748
<i>Hideya Matsuyama ; Takashi Suzuki ; Motoki Shiozu ; Hideo Ehara ; Takeshi Soeda ; Hirokazu Hosoi ; Masao Oshima ; Kikuo Yamabe</i>	
A SIMPLE PREDICTION METHOD FOR CHIP-LEVEL ELECTROMIGRATION LIFETIME USING GENERALIZED GAMMA DISTRIBUTION.....	753
<i>Shinji Yokogawa ; Kyosuke Kunii</i>	
PROBING WRITE ERROR RATE AND RANDOM TELEGRAPH NOISE OF MGO BASED MAGNETIC TUNNEL JUNCTION USING A HIGH THROUGHPUT CHARACTERIZATION SYSTEM.....	759
<i>Shifan Gao ; Bing Chen ; Nuo Xu ; Yiming Qu ; Yi Zhao</i>	
AN EVALUATION OF X-RAY IRRADIATION INDUCED DYNAMIC REFRESH CHARACTERIZATION IN DRAM.....	763
<i>Kyungwoo Lee ; Chae-Hyuk Yun ; Hyungah Seo ; Taehun Kang ; Yunsung Lee ; Kangyong Cho</i>	
CHARACTERIZATION AND ANALYSIS OF BIT ERRORS IN 3D TLC NAND FLASH MEMORY	766
<i>Nikolaos Papandreou ; Haralampos Pozidis ; Thomas Parnell ; Nikolas Ioannou ; Roman Pletka ; Sasa Tomic ; Patrick Breen ; Gary Tressler ; Aaron Fry ; Timothy Fisher</i>	
MODELING OF APPARENT ACTIVATION ENERGY AND LIFETIME ESTIMATION FOR RETENTION OF 3D SGVC MEMORY	772
<i>Wei-Hao Hsiao ; Nian-Jia Wang ; Ming-Yi Lee ; Li-Kuang Kuo ; Ding-Jhang Lin ; Yen-Hai Chao ; Chih-Yuan Lu</i>	
CYCLING INDUCED TRAP GENERATION AND RECOVERY NEAR THE TOP SELECT GATE TRANSISTOR IN 3D NAND.....	777
<i>Xingqi Zou ; Liang Yan ; Lei Jin ; Da Li ; Feng Xu ; Di Ai ; An Zhang ; Hongtao Liu ; Ming Wang ; Wei Li ; Yali Song ; Huazheng Wei ; Yi Chen ; Chunlong Li ; Zongliang Huo</i>	
ENVM MRAM RETENTION RELIABILITY MODELING IN 22FFL FINFET TECHNOLOGY	782
<i>James A. O'donnell ; Chris Connor ; Tanmoy Pramanik ; Jeff Hicks ; Juan G. Alzate ; Fatih Hamzaoglu ; Justin Brockman ; Oleg Golonzka ; Kevin Fischer</i>	
PERFORMANCE IMPROVEMENT ON HFO₂-BASED 1T FERROELECTRIC NVM BY ELECTRICAL PRECONDITIONING	785
<i>C. Cagli ; L. Perniola ; F. Gaillard ; S. Duenkel ; T. Melde ; B. Mueller ; M. Trentzsch ; S. Wittek ; S. Beyer</i>	
AUTOMATIC DATA REPAIR OVERWRITE PULSE FOR 3D-TLC NAND FLASH MEMORIES WITH 38X DATA-RETENTION LIFETIME EXTENSION.....	789
<i>Kyoji Mizoguchi ; Kyosuke Maeda ; Ken Takeuchi</i>	
PROGRAM/ERASE CYCLING ENHANCED LATERAL CHARGE DIFFUSION IN TRIPLE-LEVEL CELL CHARGE-TRAPPING 3D NAND FLASH MEMORY	794
<i>Rui Cao ; Jixuan Wu ; Wenjing Yang ; Jiezhi Chen ; Xiangwei Jiang</i>	
REINFORCEMENT LEARNING SYSTEM COMPRISING RESISTIVE ANALOG NEUROMORPHIC DEVICES.....	798
<i>Song-Ju Kim ; Kaori Ohkoda ; Masashi Aono ; Hisashi Shima ; Makoto Takahashi ; Yasuhisa Naitoh ; Hiroyuki Akinaga</i>	
RELIABILITY OF CMOS INTEGRATED MEMRISTIVE HFO2 ARRAYS WITH RESPECT TO NEUROMORPHIC COMPUTING	804
<i>M.K. Mahadevaiah ; E. Perez ; Ch. Wenger ; A. Grossi ; C. Zambelli ; P. Olivo ; F. Zahari ; H. Kohlstedt ; M. Ziegler</i>	

PROCESS-INDUCED ANOMALOUS CURRENT TRANSPORT IN GRAPHENE/INALN/GAN HETEROSTRUCTURED DIODES	808
<i>Peter F. Satterthwaite ; Ananth Saran Yalamarthy ; Sam Vaziri ; Miguel Muñoz Rojo ; Eric Pop ; Debbie G. Senesky</i>	
TOLERANCE OF DEEP NEURAL NETWORK AGAINST THE BIT ERROR RATE OF NAND FLASH MEMORY	814
<i>Mehedi Hasan ; Biswajit Ray</i>	
PLASMA ANTENNA CHARGING IN CMOS IMAGE SENSORS	818
<i>Y. Sacchettini ; J. -P. Carrère ; V. Goiffon ; P. Magnan</i>	
STUDY OF THE MECHANICAL STRESS IMPACT ON SILICIDE CONTACT RESISTANCE BY 4-POINT BENDING	823
<i>Yefan Liu ; Hao Yu ; Gaspard Hiblot ; Anastasiia Kruv ; Marc Schaekers ; Naoto Horiguchi ; Dimitrios Velenis ; Ingrid De Wolf</i>	
A COMPARISON OF ENVIRONMENTAL STRESSING DATA AND SIMULATION AT THE CORNER OF A TEST CHIP IN A FC-BGA PACKAGE	828
<i>Sandeep Mallampati ; Zaeem Baig ; Scott Pozder ; Eng Chye Chua</i>	
DEGRADATION MONITORING — FROM A VISION TO REALITY	832
<i>Evelyn Landman ; Shai Cohen ; Noam Broussard ; Raanan Gewirtzman ; Inbar Weintraub ; Eyal Fayne ; Yahel David ; Yuval Bonen ; Omer Niv ; Shai Tzroia ; Alex Burlak ; J. W. Mcpherson</i>	
RELIABILITY EVALUATION OF SILICON INTERCONNECT FABRIC TECHNOLOGY	836
<i>Kannan K. Thankappan ; Adeel Bajwa ; Boris Vaisband ; Sivachandra Jangam ; Subramanian S. Iyer</i>	
BILAYER PASSIVATION FILM FOR Cu INTERCONNECTS ON Si INTERCONNECT FABRIC	841
<i>Niloofar Shakoorzadeh ; Amir Hanna ; Subramanian Iyer</i>	
STABILITY OF 4H-SiC JBS DIODES UNDER REPETITIVE AVALANCHE STRESS	846
<i>Ajit Kanale ; Kijeong Han ; B. Jayant Baliga ; Subhashish Bhattacharya</i>	
ALPHA PARTICLE SOFT-ERROR RATES FOR D-FF DESIGNS IN 16-NM AND 7-NM BULK FINFET TECHNOLOGIES	852
<i>J. Cao ; L. Xu ; B. L. Bhuva ; S. -J. Wen ; R. Wong ; B. Narasimham ; L. W. Massengill</i>	
NEUTRON BEAM ATTENUATION THROUGH SEMICONDUCTOR DEVICES DURING SEU TESTING	857
<i>S. A. Wender ; J. M. O'donnell ; L. Zavorka ; B. L. Bhuva</i>	
IMPACT OF COMBINATIONAL LOGIC DELAY FOR SINGLE EVENT UPSET ON FLIP FLOPS IN A 65 NM FD-SOI PROCESS	861
<i>Jun Furuta ; Yuto Tsukita ; Kodai Yamada ; Mitsunori Ebara ; Kentaro Kojima ; Kazutoshi Kobayashi</i>	
AN ACCURATE DEVICE-LEVEL SIMULATION METHOD TO ESTIMATE CROSS SECTIONS OF SINGLE EVENT UPSETS BY SILICON THICKNESS IN RAISED LAYER	865
<i>Kentaro Kojima ; Kodai Yamada ; Jun Furuta ; Kazutoshi Kobayashi</i>	
IMPACT OF NBTI ON INCREASING THE SUSCEPTIBILITY OF FINFET TO RADIATION	870
<i>Frank Stil Torres ; Hussam Amrouch ; Jörg Henke ; Rolf Drechsler</i>	
NONLINEAR MIXED MODEL AND RELIABILITY PREDICTION FOR OLED LUMINANCE DEGRADATION	876
<i>Kanghyun Choi ; Jongwon Lee ; Jongwoo Park</i>	
FLIGHT SAFETY CERTIFICATION IMPLICATIONS FOR COMPLEX MULTI-CORE PROCESSOR BASED AVIONICS SYSTEMS	880
<i>Jyotika Athavale ; Riccardo Mariani ; Michael Paulitsch</i>	
RESPONSE OF SWITCHING HOLE TRAPS IN THE SMALL-AREA P-MOSFET UNDER CHANNEL HOT-HOLE EFFECT	886
<i>X. Ju ; D. S. Ang</i>	
POSITIVE BIAS INSTABILITY IN ZNO TFTS WITH AL₂O₃ GATE DIELECTRIC	890
<i>Pavel Bolshakov ; Rodolfo A. Rodriguez-Davila ; Manuel Quevedo-Lopez ; Chadwin D. Young</i>	
COMPREHENSIVE STUDY FOR OFF-STATE HOT CARRIER DEGRADATION OF SCALED NMOSFETS IN DRAM	895
<i>Nam-Hyun Lee ; Jongkyun Kim ; Donghee Son ; Kangjun Kim ; Jung Eun Seok</i>	
TCAD SIMULATION ON FINFET N-TYPE POWER DEVICE HCI RELIABILITY IMPROVEMENT	899
<i>B. Zhu ; E. M. Bazizi ; J.H.M. Tng ; Z. Li ; E. K. Banghart ; M. K. Hassan ; Y. Hu ; D. Zhou ; D. Choi ; L. Qin ; X. Wan</i>	
FUNDAMENTAL UNDERSTANDING OF OXIDE DEFECTS IN HFO₂ AND Y₂O₃ ON GAAS(001) WITH HIGH THERMAL STABILITY	903
<i>H. W. Wan ; Y. J. Hong ; L. B. Young ; M. Hong ; J. Kwo</i>	
EXPERIMENTAL STUDY ON EFFECTS OF BORON TRANSIENT ENHANCED DIFFUSION ON CHANNEL SIZE DEPENDENCES OF LOW FREQUENCY NOISE IN NMOSFETS	907
<i>Shuntaro Fujii ; Isao Maru ; Soichi Morita ; Tsutomu Miyazaki</i>	

SCALING BEHAVIOUR OF STATE-TO-STATE COUPLING DURING HOLE TRAPPING AT SI/SIO₂.....	912
<i>Xiaolei Ma ; Xiangwei Jiang ; Jiezhi Chen ; Liwei Wang ; Yunfei En</i>	
BTI CHARACTERIZATION OF MBE SI-CAPPED GE GATE STACK AND DEFECT REDUCTION VIA FORMING GAS ANNEALING	916
<i>H. W. Wan ; Y. J. Hong ; Y. T. Cheng ; M. Hong</i>	
GIDL INCREASE DUE TO HCI STRESS: CORRELATION STUDY OF MOSFET DEGRADATION PARAMETERS AND MODELLING FOR RELIABILITY SIMULATION	920
<i>Edoardo Ceccarelli ; Kevin Manning ; Seamus Maxwell ; Colm Heffernan</i>	
CHARACTERIZATION AND MODELLING OF HIGH SPEED GE PHOTODETECTORS RELIABILITY.....	925
<i>F. Sy ; Q. Rafhay ; J. Poette ; G. Grosa ; C. Basset ; G. Beylier ; P. Grosse ; D. Roy ; J.-E. Broquin</i>	
STABILITY IN FLUORINE-TREATED AL-RICH HIGH ELECTRON MOBILITY TRANSISTORS WITH 85% AL-BARRIER COMPOSITION	930
<i>Albert G. Baca ; B. A. Klein ; A. M. Armstrong ; A. A. Allerman ; E. A. Douglas ; T. R. Fortune ; R. J. Kaplar</i>	
RELIABILITY AND PERFORMANCE ISSUES IN SIC MOSFETS: INSIGHT PROVIDED BY SPIN DEPENDENT RECOMBINATION	934
<i>James P. Ashton ; Patrick M. Lenahan ; Daniel J. Lichtenwalner ; Aivars J. Lelis ; Mark. A. Anders</i>	
UV-ASSISTED PROBING OF DEEP-LEVEL INTERFACE TRAPS IN GAN MISHEMITS AND THEIR ROLE IN THRESHOLD VOLTAGE & GATE LEAKAGE INSTABILITIES	939
<i>Sayak Dutta Gupta ; Vipin Joshi ; Bhawani Shankar ; Swati Shikha ; Srinivasan Raghavan ; Mayank Srivastava</i>	
V_{TH}-HYSTERESIS AND INTERFACE STATES CHARACTERISATION IN SIC POWER MOSFETS WITH PLANAR AND TRENCH GATE.....	944
<i>Besar Asllani ; Alberto Castellazzi ; Oriol Aviño Salvado ; Asad Fayyaz ; Hervé Morel ; Dominique Planson</i>	
NOVEL GYROTRON BEAM ANNEALING METHOD FOR MG-IMPLANTED BULK GAN	950
<i>K. Hogan ; S. Tozier ; E. Rocco ; I. Mahabooob ; V. Meyers ; B. Mcewen ; F. Shahedipour-Sandvik ; R. Tompkins ; M. Derenge ; Kenneth Jones ; M. Shevelev ; V. Sklyar ; A. Lang ; J. Hart ; M. Taheri ; M. Reshchikov</i>	
RELIABILITY TESTING OF SIC MOS DEVICES AT 500°C	956
<i>A. C. Ahyi ; S. Dhar ; Z. Dilli ; A. Akturk ; N. Goldsman ; A. Ghanbari</i>	
Author Index	