

# **2023 China Semiconductor Technology International Conference (CSTIC 2023)**

**Shanghai, China  
26-27 June 2023**



**IEEE Catalog Number: CFP2360Y-POD  
ISBN: 979-8-3503-1101-3**

**Copyright © 2023 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:	CFP2360Y-POD
ISBN (Print-On-Demand):	979-8-3503-1101-3
ISBN (Online):	979-8-3503-1100-6

**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](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

CURRAN ASSOCIATES INC.  
**proceedings**  
.com

## TABLE OF CONTENTS

Research on Vt Window Improvement Process of 2T Sonos Embedded Flash.....	1
<i>Xiaokang Li, Shipu Li, Jun Qian</i>	
An Effective Method to Minimize the Difference Between Spot and Ribbon Beam in S/D Region by Carbon Co-Implantation .....	3
<i>Long Feng, Zhiqiang Xiao, Jiaxing Xiao, Zhirui Li, Haitao Yan</i>	
Study of Breakdown Voltage Improvement of High-Voltage PLDMOS .....	6
<i>Wenting Duan, Donghua Liu, Haiyang Ling, Ying Cai, Feng Jin, Wensheng Qian</i>	
A Compact Sawtooth Wave Generator Based on Novel Z <sup>2</sup> -FET Device.....	9
<i>Hui Xie, Yingxin Chen, J. Wan</i>	
Study of the Formation of Copper Void Defect and Process Optimization for Reduction in Dual Damascene Process .....	12
<i>Hongliang Zhu, Shuhuai Jia, Dejing Ma, Fengjiao Wang</i>	
Study on N-Type MOS Capacitor in 55NM CMOS.....	16
<i>Hongliang Zhu, Xin Zhou, Dejing Ma, Haoqi Zheng, Tianfu Zhang</i>	
The Study on the Optimization and Electrical Behavior of NEDMOS Transistors for High-Voltage Power Applications.....	18
<i>Chongkai Du, Chenchen Qiu, Jun Qian, Chang Sun</i>	
Fabrication and Characterization of a Novel Embedded Mirror Gate Sonos .....	22
<i>Ning Wang, Kegang Zhang</i>	
Investigation of a New Disturb Effect in the Aggressively Scaled Dual-Bit/Cell Split-Gate Floating-Gate Flash Cell .....	25
<i>Yintong Zhang, Zhaozhao Xu, Dylan Zhou, Alan Shen, Fredric Liu, Ziquan Fang, Donghua Liu, Gordon Li, Wensheng Qian</i>	
Important Process Parameter and Its Sensitivity Check by Virtual Fabrication: Channel Hole Profile Impact on Advanced 3D NAND Structure .....	29
<i>Qingpeng Wang, Pengfei Lyu, Lifei Sun, Yu De Chen, Cheng Li, Jacky Huang, Benjamin Vincent, Joseph Ervin</i>	
HF <sub>X</sub> ZR <sub>1-X</sub> O <sub>2</sub> Ferroelectric Thin Film Grain Size Tuning Via Annealing Ramp Rate Achieving Endurance >10 <sup>9</sup> Cycles, 2P <sub>R</sub> of 40.6μC/CM <sup>2</sup> , Write Voltage Down to 1.5 V, and Switching Speed of 30 NS.....	32
<i>Zhixiong Li, Bing Zhou, Jiawei Xu, Shuaihang Xu, Jun Lan, Quanzhou Zhu, Yingjie Zhu, Jie Li, Xuewei Feng, Mei Shen, Feichi Zhou, Longyang Lin, Yida Li</i>	
FinFet Source/Drain Parasitic Resistance Optimization by TCAD Simulation.....	35
<i>Tongtong Luan, Xinqi Liu, Yu Gu, Xufeng Kou</i>	
Simulation Study of Gate-All-Around Nanosheet Devices Based on SOI Structure .....	38
<i>Yangyang Hu, Tianxiang Zhao, Mengmeng Yang, Jianhua Zhang, Kailin Ren</i>	
Leakage Reduction of GAA Stacked SI Nanosheet CMOS Transistors and 6T-SRAM Cell Via Spacer Bottom Footing Optimization.....	41
<i>Jiaxin Yao, Xuexiang Zhang, Lei Cao, Junjie Li, Na Zhou, Qingkun Li, Yanzhao Wei, Yanna Luo, Jun Luo, Qingzhu Zhang, Huaxiang Yin</i>	

Investigation of Electrical Characteristics on Morphotropic Phase Boundary of $\text{Hf}_{1-x}\text{Zr}_x\text{O}_2$ for Dynamic Random Access Memories.....	45
<i>Kun Zhong, Huaxiang Yin, Zhaozuo Zhang, Fan Zhang</i>	
High Endurance Sonos Technology Improved by Design & Process Optimization.....	48
<i>Pingsheng Zhou, Kegang Zhang, Gordon Li, Hualun Chen, Xiang Yao, Weiran Kong</i>	
Investigation of the Doping Profile for Ion Implants and Rapid Annealing in Silicon Via an Improved Method.....	52
<i>Zeqi Zha, Zhenhui Wang, Ya Wang</i>	
Experimental Investigation of Ultra-Low Temperature $\text{LA}_2\text{O}_3/\text{HFO}_2$ Bi-Layer Dipole-First Process Using PVD Method for Advanced IC Technology .....	55
<i>Yanzhao Wei, Jiaxin Yao, Renren Xu, Qingzhu Zhang, Huaxiang Yin</i>	
Large Area CVD $\text{MoS}_2$ Memristor Suitable for Neuromorphic Applications.....	58
<i>Muhammad Zaheer, Tariq Aziz, Jun Lan, Quanzhou Zhu, Wenhui Wang, Mei Shen, Feichi Zhou, Longyang Lin, Xuewei Feng, Yida Li</i>	
Novel Channel-On-Fin (COF) IGZO-TFTS with Ultra-Scaled Back Gate Length of 23 NM .....	61
<i>Shangbo Yang, Gaobo Xu, Gangping Yan, Zhiyu Song, Guoliang Tian, Yanna Luo, Yinan Yan, Lianlian Li, Huaxiang Yin</i>	
Investigation of Vertical Channel IGZO-TFT Based on PVD-IGZO .....	64
<i>Zhiyu Song, Gaobo Xu, Gangping Yan, Shangbo Yang, Yanna Luo, Guoliang Tian, Yinan Yan, Huaxiang Yin</i>	
A Compact Model of Non-Volatile Ferroelectric Tunnel Fet with Ambipolarity for in-Memory- Computing Based Edge AI .....	67
<i>Hanyong Shao, Jin Luo, Zhiyuan Fu, Qianqian Huang, Ru Huang</i>	
Design of Ferroelectric FET-Based Capacitive-Coupling Computing-In-Memory for Binary Neural Networks .....	71
<i>Boyi Fu, Jin Luo, Weikai Xu, Qianqian Huang, Ru Huang</i>	
Investigation of Synergic Hydrogen Mitigation Technique for Top-Gate A-IGZO Thin-Film Transistors .....	75
<i>Gangping Yan, Zhiyu Song, Haoqing Xu, Shangbo Yang, Chuqiao Niu, Guoliang Tian, Yanna Luo, Luoyun Zhang, Yunjiao Bao, Gaobo Xu, Huaxiang Yin</i>	
Characterization of Field Cycling Fatigue in $\text{HfZrOx}$ Ferroelectric Capacitors.....	78
<i>Puyang Cai, Zhiwei Liu, Tianxiang Zhu, Zhigang Ji, Runsheng Wang, Ru Huang</i>	
Promoting Chip Probing Test Yield by Simple ISSG and Global Wet Process .....	81
<i>Jingsong Peng, Kegang Zhang, Ning Wang, Yang Ding, Pingsheng Zhou, Yin Yin</i>	
Reliability Performance of Novel Tunneling Field Effect Transistors Based on Foundry Platform.....	84
<i>Yukun Tang, Qianqian Huang, Kaifeng Wang, Yongqin Wu, Hongyan Han, Ye Ren, Weihai Bu, Junhua Liu, Zhigang Ji, Ru Huang</i>	
Influence of Interfacial Layers and High-K Post Dielectric Annealing on the Characteristics of MOS Devices .....	87
<i>Guanqiao Sang, Qingzhu Zhang, Huaxiang Yin, Junfeng Li, Xulei Qin</i>	
Optimized Wafer Edge Condition in Lithographic Process for Peeling Defect Reduction .....	90
<i>Shanshan Chen, Hunglin Chen, Yin Long, Kai Wang</i>	

Silicide Profile Optimization on Active Area in 4XNM ETOX nor Flash Memory .....	92
<i>Hualun Chen, Yuxin Tong, Xiangyu Qi, Songhan Duan, Botong Liu, Chaoran Zhang, Lin Gu</i>	
Improvement of Standby Current Failure by Device Optimization on 4XNM ETOX NOR-Flash Memory .....	95
<i>Hualun Chen, Zhuangzhuang Wang, Lin Gu, Yihang Du, Chun Yao, Xiaodong Mu, Wan Song</i>	
An On-Chip Superconducting Quantum Transponder.....	99
<i>Rutian Huang, Xinyu Wu, Xiao Geng, Jianshe Liu, Wei Chen</i>	
Effects of Floating Gate Profile on Cell Characteristics of 4XNM FG-First ETOX nor Flash Memory .....	102
<i>Hualun Chen, Yihang Du, Lin Gu, Zhuangzhuang Wang, Chun Yao, Zhaozhao Xu</i>	
Improved Environmental Stability of N-Type Polymer Field-Effect Transistors Using Nickel Contact Electrode .....	105
<i>Yuan Liu, Quanhua Chen, Rujun Zhu, Jinxiu Cao, Yong Xu</i>	
A New Method to Calculate Loading Effect in Embedded Flash.....	109
<i>Fangce Sun</i>	
A New Method to Improve Split Gate Flash Erase and Endurance.....	112
<i>Fangce Sun</i>	
Design and Simulation of a Superconducting Switch Based on Weakly Damped Superconducting Quantum Interference Devices .....	115
<i>Xinyu Wu, Rutian Huang, Jianshe Liu, Wei Chen</i>	
Technologies for Superior Reliability in SiC Power Devices.....	118
<i>Min-Hwa Chi</i>	
The Study on Reducing Bit-Line Parasitic Capacitance in Advanced DRAM.....	122
<i>Yexiao Yu, Hong Ma, Zhongming Liu, Shaoyou Xiong, Dan Wang, Yang Zhang, Yi Yang</i>	
Enhancement of Pattern Depth in Plasmonic Lithography for Practical Application.....	125
<i>Dandan Han, Yayi Wei</i>	
Cyclegan-Based Mask Diffraction Model .....	128
<i>Jiaxiang Zhuo, Dongyong Xu, Yijiang Shen</i>	
Illumination Optimization for the Beol Dtco with 45 Degree Local Interconnection .....	132
<i>Xianhe Liu, Muzi Han, Yanli Li, Qi Wang, Qiang Wu</i>	
Process and Tool Monitor and Diagnosis Based on Overlay Data and Modeling .....	135
<i>Yi Tong, Libin Zhang, Yayi Wei, Tianchun Ye, Yun Wang</i>	
A Multi-Step Sraf to Improve Process Windows in Metal Layer .....	138
<i>Wei Wei, Lu Zhu, Dan Wang, Xiaoyan Sun, Yue Wang, Yueyu Zhang, Jianzhong Liu, Shiri Yu</i>	
Recent Progress of EUV Resist Development for Improving Chemical Stochastic .....	142
<i>Toru Fujimori</i>	
The Reduction of Yield Loss and Contact Overlay Shift by Optimizing the Process Profile of Pre- Layer Process Integration .....	145
<i>Zhejun Liu, Wei Lu</i>	

The Analysis of Optical Critical Dimension (OCD) Signal Strength Between 5 Nm FinFET and 3 Nm Complementary FET (CFET) Vertical Gate Stacks.....	147
<i>Qi Wang, Qiang Wu, Xianhe Liu, Yanli Li</i>	
Study On-Product Overlay Improvement for Immersion Lithography .....	150
<i>Guoping Liu, Yinsheng Yu, Chi Zhang, Yuhui Li, Wei Cao, Qin Yuan, Hongwen Zhaoa</i>	
The Possibility of Using 193 NM Immersion Lithography Process for 5 NM Logic Design Rules .....	153
<i>Qiang Wu, Yanli Li, Xianhe Liu, Qi Wang</i>	
Line-End Roundness and Voids Improvement of BEOL Metal Layer .....	157
<i>Mudan Wang, Tiancheng Tu, Hui Zhao, Shirui Yu</i>	
OPC Correction Method Based on Corner to Corner Structure.....	160
<i>Qiguang Zhou, Dan Wang, Yueyu Zhang, Shirui Yu</i>	
Study on Inter-Layer Overlay of Stitching Lithography Technology .....	162
<i>Hongmin Liu, Changcheng Gao, Qiongtao Wu</i>	
A Negative-Tone Photosensitive Epoxy Material.....	165
<i>Ke Bai, April Tang, Jiangtao Mou, Jinfu Zheng</i>	
Tungsten/Silicon Oxide/Titanium Nitride Stack Etching .....	168
<i>Jie Luo, Haochang Lyu, Linjie Hou, Baodong Han, Hongbo Sun, Chao Zhao</i>	
The Investigation of CF3I for High-Aspect-Ratio Cryogenic Dielectric Etch .....	172
<i>Jianqiu Hou, Vina Xu, Kai Zhang, Ziyang Wu</i>	
SiARC Residue Reduction Methods with Minimizing Profile Change for Mask Patterning .....	176
<i>Xingxing Xu, Hexin Zhou, Quanbao Li, Jian Huang</i>	
Distortion Control When Etching DRAM Metal Contact .....	179
<i>Jianqiu Hou, Yao Sun, Hui Xue, Ya Zhou, Hao Li, Zhiwen Luan, Zijian Chen, Zengwen Hu</i>	
Study on the Effect of Water Spraying Mode on the N Content of Wafer Surface After SC1 Cleaning in Light Doping Process.....	183
<i>Jinlei Wang, Fenglin Guan, Mingguang Hang, Lili Jia, Fang Li, Xinhua Cheng</i>	
A Technical Optimization of Waferless Auto Clean for Aluminum Etcher .....	186
<i>Li Qi, Qiang-Qiang Sang, Xing-Jun Yao, Li-Tian Xu, Jian-Kun Zhang, Li-Song Hu, Yi-Chang Liu, Chen Chen</i>	
Trimming of Silicon Nitride Hard Mask Using Cyclic Deposition and Etch Process .....	188
<i>Li-Tian Xu, Pei Mei, Xing-Jun Yao, Chen Chen, Jia-Yun Zhang, Alan Zhang, Xiao-Peng Wu, Wu-Hao Han, Hong-Bo Lin, Nichole Zhang</i>	
Enabling Plasma Etch Solution for GaN Technology.....	190
<i>Zoe Wang, Chunxiang Guo, Jian Liu, Yingxiong Feng, Lulu Guan, Kangning Xu, Qiao Huang, Lu Chen, Kaidong Xu</i>	
The Research of Special Gate Morphology Adjustment and Its Influence on Electrical Properties.....	193
<i>Junjie Pan, Kai Qian, Lian Lu, Quanbo Li, Jun Huang, Yu Zhang</i>	
Study of Spacer Etching with PR Approach.....	196
<i>Yuhao Yang, Siyuan Che, Xiangguo Meng, Lian Lu, Quanbo Li, Jun Huang, Yu Zhang</i>	

Silicon Surface Roughness Improvement During Plasma Etch.....	198
<i>Guang Yang, Li Zeng, Haiyun Zhu, Jing Wang, Zhongwei Jiang</i>	
Effect of Process Gas on Side Wall Angle in Silicon Trench Etching .....	200
<i>Yiming Ma, Guang Yang, Litian Xu, Zhongwei Jiang, Jing Wang, Qifei Wang, Donghan Wang, Yongjie Zhou</i>	
Investigation of CD Precise Control in Pitch Doubling Flow for Memory Industry .....	202
<i>Zhao Liu, Baodong Han</i>	
The Plasma Etching of the Deep Hole Structure in Silicon with the Mixed Gas of SF <sub>6</sub> , HBr and O <sub>2</sub> .....	206
<i>Qifei Wang, Yiming Ma, Zhongwei Jiang, Jing Wang, Haiyun Zhu</i>	
Investigation of High Aspect Ratio Amorphous Carbon Etching in NAND Flash Memory .....	209
<i>Li Zeng, Guang Yang, Zhongwei Jiang, Jing Wang, Li-Tian Xu</i>	
Study of Photo-Resist (PR) Strip Rate with High Temperature Pedestal for AL Patterning Process .....	212
<i>Cheng Tian, Li-Tian Xu, Li-Song Hu, Xue-Hua Wang</i>	
Self-Limited Etching of Silicon Nitride Using Cyclic Process with CH <sub>2</sub> F <sub>2</sub> Chemistry .....	215
<i>Xue-Hua Wang, Li-Tian Xu, Tian Cheng</i>	
Strategy for Line Width Roughness (LWR) Reduction in Carbon Mandrel Patterning.....	217
<i>Yichang Liu, Li Qi, Litian Xu, Lianfu Zhao, Xingjun Yao, Zihan Zhang</i>	
Redistribution Layer Aluminum Advanced Etching Process Development .....	219
<i>Xing-Jun Yao, Li-Tian Xu, Li Qi, Qiang-Qiang Sang, Li-Song Hu, Chen-Chen, Yi-Chang Liu</i>	
Deep Trench (DT) Etching Process for Power MOS Device .....	221
<i>Chen Chen, Li-Tian Xu, Xing-Jun Yao</i>	
Technical Difficulties and Optimization Methods of Nmos Share CT in Contact Hole Etching.....	223
<i>Peng Zhu, Renhui Xu, Wentao Fu, Lei Sun, Yu Bao</i>	
Investigations of NAND Flash Device Cycling Performance Improvement Via FG Carbon-Doped Polysilicon and Channel Corner Rounding .....	226
<i>Lifeng Liu, Jun Wang, Xinruo Su</i>	
Optimization of SADP Process for Defect Reduction in Planar 2D NAND Flash.....	231
<i>Lifeng Liu, Jun Wang, Yinan Ma, Zhenchao Sui, Yue Li</i>	
Control of Deposition in Cyclic Deposition/Etch Process.....	236
<i>Zhang Zihan, Wang Jing, Xu Litian</i>	
A Novel Method to Eliminate Bond Pad Crystal.....	238
<i>Fanshun Meng, Jiajin Wang, Yunbo Chen, Qiang Rui, Zhongkui Chen, Kuo-Jung Chen, Yi Liu, Fengyang Li, Chao Sun</i>	
Carbon Hard Mask Opening Process Development with Novel Sidewall Passivation in Memory Manufacturing .....	241
<i>Meng-Jiao Zhu, Li-Tian Xu, Jing Wang, Li Zeng, Zi-Han Zhang</i>	
The Optimization of Pin Hole Defect in High Resistance Process.....	243
<i>Lunan Zhu, Shan Huang, Xiaofeng Qu, Lei Sun, Quanbo Li, Tianpeng Guan, Yu Zhang</i>	

Growth and Reduction of Tiny Particle Defects in Selective SiGe Epitaxy S/D Devices .....	246
<i>Zhiqiang Xiao, Cunzhe He, Dongliang Gao, Jiaxing Xiao, Haitao Yan, Zhenchao Sui, Xin Zhang</i>	
Technical Challenges in MRAM Fabrication .....	249
<i>Y. H. Wang, X. L. Yang, Y. Tao, Y. H. Sun, Q. J. Guo, F. T. Meng, G. C. Han</i>	
Some Key Modifications of Theory Required to Understand the Leakage Current Mechanisms for Ferroelectric HfZrO Capacitors Used in Microelectronics.....	253
<i>W. S. Lau</i>	
Pulsed DC Parameters (Reverse Voltage, Duty Cycle, Pulsed Frequency) on Film Quality in Reactive Sputtered Aluminum Nitride Films .....	256
<i>Wei-Yu Zhou, Xue-Li Tseng, Ning-Hsiu Yuan, Hsiao-Han Lo, Peter J. Wang, Ming-Yu Jiang, Yin-Kuen Fuh, Tomi T. Li</i>	
Electroplating Process Improvement on Post-CMP Dishing Profile .....	262
<i>Wenbo Wu, Tong Lei, Zhijun Zhu, Zhenhua Hu, Yushan Chi</i>	
Effect of Sub-Atmospheric Chemical Vapor Deposition SiO <sub>2</sub> Film Deposition Process on Surface Chemistry Sensitivity .....	265
<i>Jianan Wei, Xue Liu, Dapeng Ruan</i>	
Gas Distribution Effect on Thermal ALD AlN Film Thickness Non-Uniformity .....	269
<i>Xiaomeng Liu, Qihui Zhang, Hao Deng</i>	
Substrate Effect on Thermal ALD AlN Film Growth Rate.....	271
<i>Xiaomeng Liu, Tiantian Liu, Wenyi Liu, Xinyu Zhang, Hao Deng</i>	
Lau's Unified Schottky-Poole-Frenkel Theory with Asymmetric Distortion by Electron Charge Trapping Proposed to Explain the Current-Voltage Characteristics of High-K Metal-Insulator-Metal Capacitors.....	274
<i>W. S. Lau</i>	
Cell Structure and Process Integration of a Novel 2T0C Technology for High-Density Dram Application .....	277
<i>Zheng-Yong Zhu, Bok-Moon Kang, Jing Zhang, Xin-Lv Duan, Jin-Juan Xiang, Guan-Hua Yang, Di Geng, Wang Dan, Xie-Shuai Wu, Ming-Xu Liu, Gui-Lei Wang, Chao Zhao</i>	
The Study of Slip Defects in Furnace High Temperature Process.....	281
<i>Sun Yan, Wei Simeng, Xie Yuanxiang</i>	
The Study of Silicon Nitride Films Deposited in Batch ALD System.....	288
<i>Shiyao Cheng, Wei Kuai, Wenxu Duan, Xinyang Wang, Xiaomeng Liu, Shuo Cheng, Yuanxiang Xie, Xiaoping Shi</i>	
Influence of Ion Implantation on Void Defect Formation in Epitaxially Grown Silicon.....	292
<i>Zeqi Zha, Zhenhui Wang, Ya Wang</i>	
The Effect of SiGe Siconi Pre-Clean Time on Planner Logic Device Performance Study .....	295
<i>Xuechun Zhang, Weichi Cheng, Li Ning, Jingang Wang</i>	
Mechanical Properties of Flip-Chip Bonding Structures for Micro-Led Devices: Cu-Cu Bonding with Passivation Layer and Indium Bumps Bonding .....	299
<i>Kefeng Wang, Zehua Chen, Xiaoxiao Ji, Luqiao Yin, Xiuzhen Lu, Jianhua Zhang</i>	

A Novel Method to Optimize Sige Profile Using Co-Implantation.....	303
<i>Zhiqiang Xiao, Long Feng, Cunzhe He, Jiaxing Xiao, Dongliang Gao, Mingying Liu</i>	
A Study of Parasitic Capacitance Using Different Bit Line Spacer Integration Schemes in Advanced DRAM.....	306
<i>Dempsey Deng, Qingpeng Wang, Yujia Zhong, Yu De Chen, Jacky Huang</i>	
Improvement of Sige Relaxation by a New Clamping Film Deposition Process Method.....	309
<i>Zhiqiang Xiao, Cunzhe He, Dongliang Gao, Haitao Yan, Zhenchao Sui, Xin Zhang</i>	
Some Methods to Reduce Micro Scratch Defect for Via Contact Tungsten Chemical Mechanical Planarization Process.....	312
<i>Zhijie Zhang, Le Ning, Hongdi Wang, Zhiyang Liang</i>	
Study on the Mechanism of CMP Induced W Seam at Advanced Technology Node.....	317
<i>Shaojia Zhu, Yurong Que, Feng Shi, Mingfei Yu, Jian Zhang, Jingxun Fang, Yu Zhang</i>	
Study on the Mechanism of SIN Residue for ILD0CMP .....	319
<i>Yurong Que, Xing Ma, Jian Zhang, Hu Li, Jingxu Fang, Yu Zhang</i>	
Slurry System Establishment and Optimization for Advanced Cobalt Interconnect Metallization.....	322
<i>Lifei Zhang, Tongqing Wang, Xinchun Lu</i>	
Pattern Loading Improvement for CU CMP Process.....	325
<i>Lei Zhang, Yu Yang, Jian Zhang, Jingxun Fang, Yu Zhang</i>	
A Fem Model of Micro-Galvanic Corrosion Evolution at RU/CU Interface in H <sub>2</sub> O <sub>2</sub> CMP Solution .....	328
<i>Shuo Gao, Qinhua Miao, Boyu Wen, Jie Cheng</i>	
Effects of Process to Material Removal in CMP: Modelling and Experiments.....	333
<i>Yanming Ren, Yiran Liu, Zijun Guan, Lei Zhu, Yuanda Gao, Wenjie Yu, Weimin Li</i>	
Improving 300mm Si Wafer Planarization Process with a Wholistic Approach.....	337
<i>Zijun Guan, Yiran Liu, Jiaming Fan, Yuanda Gao, Lei Zhu, Wenjie Yu, Weimin Li</i>	
Research Progress and Challenges of Chemical Mechanical Polishing for Silicon Carbide Wafer .....	340
<i>Lijuan Zhang</i>	
Research on the Dispersion Stability and Polishing Performance of Ceria Slurry .....	343
<i>Min Liu, Baoguo Zhang, Shitong Liu, Dexing Cui, Wenhao Xian, Pengfei Wu, Ye Wang</i>	
Study on the Slurry for Chemical Mechanical Polishing of Sapphire Wafer.....	346
<i>Wenhao Xian, Baoguo Zhang, Liu Min, Dexing Cui, Pengfei Wu, Ye Wang</i>	
Pad Surface Variation and Its Effect on SiO <sub>2</sub> Removal Rate in Ceria-Based CMP Slurry .....	349
<i>Chenchen Yang, Yu Yao, Enghoe Tan</i>	
Impact of Slurry for Dishing Reduction During CU CMP .....	352
<i>Yu Yao, Chenchen Yang, Enghoe Tan</i>	
Effect of Abrasive on the CMP Performance of C-Plane (0001) GAN Flim.....	354
<i>Jianghao Liu, Xinhuan Niu, Ni Zhan, Yida Zou, Yebo Zhu</i>	
Analysis of the Adsorption and Passivation Mechanism of JFCE on Copper Surface in Alkaline CMP Slurry.....	357
<i>Ni Zhan, Xinhuan Niu, Yinchan Zhang, Fu Luo, Han Yan</i>	

Effect of Surfactants on CMP Properties of M-Plane Sapphire.....	360
<i>Yida Zou, Xinhuan Niu, Ziyang Hou, Minghui Qu, Ni Zhan, Jianghao Liu</i>	
Methods for Fin Etching Profile Maintaining and Measurement .....	363
<i>Yun Xu, Tong Wu, Fairy Chen</i>	
Investigation of Different Gate Bias on PMOS HCI Performance .....	367
<i>Lei Li, Canny Chen, Atman Zhao</i>	
An Efficient Tool for Generating Test Program to Save Marginal Fail Chips .....	370
<i>Hanyan Chen</i>	
Research on TDDB Physical Mechanism of 28HKMG Mosfet .....	374
<i>Ting Wan, Hao Jiang, Yueqin Zhu, Ke Zhou</i>	
Reservoir Effect Study on Electro-Migration Behavior of ALCU Interconnects .....	377
<i>Jizhou Li, Kitty Wang, Weihai Fan</i>	
A Universal Auto Test Program Generation on Advantest V93000 ATE Platform.....	380
<i>Xin Song, Yefang Wang, Hanyan Chen</i>	
Innovation Test Technology for Ultra-High-Speed ADC on ATE .....	385
<i>Yanyan Chang, Tianyu Chen, Jiaying Xiang, Yichen Xiao</i>	
Computer Vision Technology Supported Rapid DRAM Capacitor Analyzing System Based on TEM Image.....	388
<i>Zhi-Yuan Gui, Chang Xu, Han Yan, Zhi-Yu Li</i>	
A Novel Model-Matching Based Scratch Tool Tracing System .....	391
<i>Shi-Qiang He, Yan-Qiu Zhang, Xiao-Lei Zhang, Chic-Kuo Fang</i>	
Faster AU-AL IMC Growth Under Chlorine Environment .....	394
<i>Liao Jinzhi Lois, Wang Bisheng, Zhang Xi, Hua Younan, Li Xiaomin</i>	
The Verification of TDDB Acceleration Model in Ultrathin Gate Dielectric .....	398
<i>Wen Ying, Canny Chen, Atman Zhao</i>	
The Design-Based Inspection Strategy for CU Void Defects Reduction.....	401
<i>Xingdi Zhang, Hunglin Chen, Yin Long, Kai Wang</i>	
Anomaly Detection of Non-Normal Distribution Wafer Acceptance Test Data Via GMM-Based Method .....	404
<i>Junjun Zhuang, Yong Wang, Guiyun Mao, Xu Chen, Yansheng Wang, Zhengying Wei</i>	
Impact of Interface Trap Density on the Endurance of HFO <sub>2</sub> /SI FEFETS .....	408
<i>Jiaqi Zheng, Yue Peng, Yanbin Yang, Dawei Gao, Rui Zhang, Genquan Han</i>	
Reliability Research on Micro Bump and C4bump in Large-Size 2.5D FCBGA .....	411
<i>Xiang Li, Zhuqiu Wang, Xiao He, Dan Yang, Na Mei</i>	
Design and Optimization of RC Triggered MV-NMOS for 28NM CMOS Technology ESD Protection .....	415
<i>Jia Zhu, Lanying Wei, Yang Li, Jun Wu, Kun Wang, Wei Chen</i>	
Reliability Analysis of Metal Thermal Interface Materials for Ultra-Large Size FCLGA Package .....	418
<i>Keqing Ouyang, Zhuolun Wu, Zhuqiu Wang, Weilun Wang, Dan Yang, Na Mei</i>	

Impact of Interface Traps Generation on Flicker Noise Degradation in SI pMOSFETs .....	421
<i>Yi Jiang, Luping Wang, Yanbin Yang, Dawei Gao, Rui Zhang</i>	
Research on Hot Carrier Injection Optimization of 28HKMG Technology .....	425
<i>Weili Ma, Yang Li, Ran Huang, Yamin Cao, Wei Zhou</i>	
Application of Picosecond Ultrasonic Technology for CMOS Image Sensors .....	428
<i>Johnny Mu, Kaixing Song, Johnny Jin, Cheolkyu Kim, Yaodong Huang, Hong Hong</i>	
Neutron Irradiation Induced Carrier Removal and Deep-Level Traps in N-Gan Schottky Barrier Diodes.....	432
<i>Jin Sui, Jiaxiang Chen, Haolan Qu, Ruohan Zhang, Min Zhu, Xing Lu, Xinbo Zou</i>	
Metavit-Trans: A Framework for Mixed-Type Defect Detection of Wafers with Vision Transformer Combined with Meta-Learning and Transfer Learning .....	435
<i>Junfeng Zhao, Lixin Tang</i>	
Lithography Hotspot Detection Based on Transfer Learning with High Resolution Networks .....	438
<i>Hongzhe Wang, Lixin Tang</i>	
A Methodology for Testing Scan Chain with Diagnostic Enhanced Structure .....	441
<i>Keqing Ouyang, Minqiang Peng, Shuai Wang, Guohua Zhou, Kai Wang</i>	
An End-To-End Detection Approach for Micropipe Defect of SIC Wafers Via Fusing Multiple Hierarchical Features.....	444
<i>W. X. Shi, T. G. Zhao, J. W. Zhang</i>	
A Novel Method to Achieve High Efficient Iteration of MBIST Pattern .....	447
<i>Minqiang Peng, Keqing Ouyang, Feilong Pan, Guohua Zhou, Lei Chen</i>	
Calibration of Pitch Standards of SEM for Semiconductor Dimension Metrology Application .....	450
<i>Wei Li, Yang Qu, Yushu Shi</i>	
Ultra-Wideband (UWB) Test Solution on V93000.....	453
<i>Kevin Yan, Daniel Sun</i>	
Applications of Picosecond Laser Acoustics to Power Semiconductor Device: IGBT and MOSFET .....	458
<i>Johnny Dai, Cheolkyu Kim, Priya Mukundhan</i>	
RC-Triggered Silicon Controlled Rectifier-based ESD Clamp with Fast Transient Reaction.....	461
<i>Lingran Pan, Wenwen Zhang, Da-Wei Lai, Yidan Liang, Feijun Zheng</i>	
Virtual Metrology Modeling for CVD Film Thickness with Lasso-Gaussian Process Regression .....	464
<i>Shijia Yan, Cong Luo, Sen Wang, Shenglan Ding, Lei Li, Juan Ai, Qiang Sheng, Qing Xia, Zhi Li, Qilin Chen, Shilin Li, Hongwei Dai, Yuting Zhong</i>	
A Real-Time Detection Method for Wafer Probe Reference Die Shift.....	468
<i>Deguang Zheng, Kuan Lu, Bo Zhong, Shuxin Liu, Xiaofeng Liang</i>	
Novel Localization Approaches in Metal-Insulator-Metal Structure Failure Analysis.....	472
<i>Lyye Fang, Hongtao Qian, Qinjin Yu</i>	
The Improvement Study of UTS CIS Bevel Peeling Defect Based on the Application of SEM API.....	475
<i>Xianghua Hu, Guangzhi He, Jingfeng Wang, Qiliang Ni</i>	
General Chip Digital Data Obtaining Solution on Ate .....	478
<i>Steve Xie</i>	

An Efficient Protocol Framework Solution on V93000 .....	482
<i>Jun Chen, Xin Song, Yanfen Fang</i>	
Ultra-High-throughput Inline Probe Metrology and Inspection on EUV Resist .....	485
<i>Andrew Humphries, John Cossins, Lei Feng</i>	
Study on E-Beam Induced Deposition with Gas Injection System .....	490
<i>Fan Zhang, Yun Xu, Hongtao Qian</i>	
A Simulation Study on the Thermal Effectiveness of Graphene-Based Films in Intelligent Power Modules.....	494
<i>Jie Bao, Juan Hu, Yunyan Zhou, Yuan Xu</i>	
Effects of Different Catalysts on Epoxy Molding Compound.....	497
<i>Yangyang Duan, Wei Tan, Xingming Cheng, Lanxia Li, Hongjie Liu, Dandan Fan, Lingling Liu, Xiaojuan Jiang, Liang Cui, Xingzhi Cui</i>	
Rough Nickel PPF for Mold Adhesion Improvment .....	499
<i>Wei-Gang Wu, Tsz-Chun Lo, Ka-Kiu So, Fai-Lung Ting, Maria Rzeznik</i>	
Rough Silver for Improved Lead-Frame Reliability.....	503
<i>Fai-Lung Ting, Ka-Kiu So, Tsz-Chun Lo, Wei-Gang Wu, Maria Rzeznik</i>	
Printable Copper Sintering Paste for High-Power Die-Attach Application.....	507
<i>Li Ma, Hongyun Li, Min Yao, Fen Chen, Xuelian Han, Yan Liu</i>	
Integrating High Frequency Radar Chip Using Laminated Substrate Transitions for System-In-Package Design .....	511
<i>Zhiqiang Fang, Boping Wu</i>	
Electromagnetic Interference Shielding Solution for System-In-Package.....	514
<i>Lihong Liu, Jiongjiong Gu, Boping Wu</i>	
A Composite Photodector with Wide Dynamic Range and Small Area for Dynamic Vision Sensor Application .....	518
<i>Yaping Chen, Xiaona Zhu, Shaofeng Yu</i>	
Improve the Breakdown Voltage of Silicon Pixel Sensor with Optimized Multi-Guard Rings.....	521
<i>Peng Sun, Gaobo Xu, Jianyu Fu, Mingzheng Ding, Yinan Yan, Luoyun Zhang, Huaxiang Yin</i>	
Study on Improvement of Dark Count Rate for Silicon Photomultiplier .....	524
<i>Xing Chen, Zhigao Wang</i>	
Process Optimization and Performance Improvement of CMOS Microbolometer with a Salicided Polysilicon Thermistor .....	527
<i>Jiang Lan, Haolan Ma, Yaozu Guo, Ke Wang, Feng Yan, Yiming Liao, Xiaoli Ji</i>	
Investigation of Vertically Stacked Horizontal Gate-All-Around SI Nanosheet Ion Sensitive Field Effect Transistor for Detection of C-Reactive Protein.....	530
<i>Yang Liu, Qingzhu Zhang, Junjie Li, Cinan Wu, Lei Cao, Yanna Luo, Zhaohao Zhang, Shuhua Wei, Qianhui Wei, Jiaxin Yao, Jiawei Hu, Meiyang Qin, Enxu Liu, Yanchu Han, Lianlian Li, Yinglu Li, Tao Yang, Na Zhou, Jianfeng Gao, Junfeng Li</i>	
Monolithic 3D Integration of Dendritic Neural Network with Memristive Synapse, Dendrite and Soma on Si CMOS .....	533
<i>Tingyu Li, Jianshi Tang, Junhao Chen, Xinyi Li, Han Zhao, Yue Xi, Wen Sun, Yijun Li, Qingtian Zhang, Bin Gao, He Qian, Huaqiang Wu</i>	

Simulation Investigation on the Characteristics of Gan-Based Multi-Quantum Wells Micro-Leds .....	536
<i>Pengfei Ye, Youshan Gui, Yue Li, Ding Chen, Jinghao Yu, Yi Tong, Haixia Da</i>	
Near-Infrared Sensitivity Enhancement of CMOS Image Sensor with Germanium on Silicon Structure .....	539
<i>Hui Chen, Chenchen Qiu, Zhengying Wei, Chang Sun, Jun Qian, Yufei Peng</i>	
Differential Evolution with Multivariate Gaussian Sampling for Sensor Arrangement .....	542
<i>Kuiling Du, Gang Tang</i>	
A 2A 4MHz Dual-Phase ZDS Hysteretic DC-DC Buck Converter with Peak Efficiency Above 90% .....	545
<i>Yanye Chen, Quan Sun, Changyou Men, Lenian He</i>	
Improve Sparse Implicit Projection Via Incomplete Cholesky Factorization.....	548
<i>Yang Yang, Fan Yang, Xuan Zeng</i>	
High Efficient Automatic Power/Ground Layout Routing Algorithm for Analog ICS.....	551
<i>Jiaxin Zuo, Fei Li, Jing Wan</i>	
Implementing Boolean Function by Ternary Content Addressable Memory with Approximate Match.....	554
<i>Jian Shi, Weikang Qian</i>	
Verification of 100Gb/s Data-Rate Transceiving Through Silicon-Photonic Module in an FPGA Platform.....	557
<i>Xuhui Liu, Chun-Zhang Chen, Xiaoli Fang, Liang Wang, Quan Pan, Hanming Wu</i>	
Artificial Neural Network Compact Modeling Methodology for Complementary Field Effect Transistor.....	560
<i>Ouwen Tao, Xiaona Zhu, Yage Zhao, Rongzheng Ding, Shaofeng Yu, Ye Lu</i>	
A 14.7mW 4Gb/s/lane Wireless Through Silicon Interface for Memory Cube Exploiting 16-QAM and Magnetic Resonance .....	563
<i>Chonghui Sun, Rushuo Tao, Kun Yang, Xuhui Liu, C.-Z. Chen, Xiaolei. Zhu</i>	
A Hardware Accelerator for Standard Convolution and Depthwise Convolution .....	566
<i>Fubang An, Wei Cao, Xuegong Zhou, Lingli Wang</i>	
A Multi-Layer Stacked 3-D SRAM System Based on Wireless Transceiver Using Inductively Coupled Interface in 22-NM CMOS .....	569
<i>Kun Yang, Chonghui Sun, Rushuo Tao, Jiannan Guo, Cheng Yang, D. Ma, Xiaolei Zhu</i>	
An Adaptive Controlled Chip-Level Wireless Power Transfer System with DPID Controller for Wireless 3-D Stacked Chips .....	572
<i>Rushuo Tao, Chonghui Sun, Kun Yang, Cheng Yang, Jiannan Guo, Xiaolei Zhu</i>	
An Improved Noise Canceling Sturdy 2-1 MASH Sigma-Delta Modulator with Multi-Bit SAR Quantizer .....	575
<i>Tengteng Mu, Lianxi Liu</i>	
Post-Training Quantization Or Quantization-aware Training? that is the Question .....	578
<i>Xiaotian Zhao, Ruge Xu, Xinfei Guo</i>	
A Front-End for 1.5GSPS 12Bit Pipelined ADC .....	581
<i>Xiuheng Wu, Xuan Guo, Fangyuan Xu, Zeyu Li, Hanbo Jia, Xinyu Liu</i>	

Logic Circuit Simulation Based on Semi-Tensor Product .....	584
<i>Ruibing Zhang, Hongyang Pan, Zhufei Chu</i>	
CirSAT: An Efficient Circuit-Based SAT Solver Via Fanout-driven Decision Heuristic .....	587
<i>Kunmei Hu, Zhufei Chu</i>	
Fast NoC Router Latency Estimation Using Machine Learning .....	590
<i>Yang Li, Pingqiang Zhou</i>	
Lutplace: An Improved Lookup Table-Based Placement for Routability.....	593
<i>Yihang Qiu, Yan Xing, Shuteng Cai, Xingquan Li, Xiaoming Xiong</i>	
AcArm: A Novel Semiconductor Wafer Handling Robot.....	596
<i>Donglin Chen, Lixin Tang, Dehong Cong, Jingchao Qiao</i>	
Efficient Partitioning and Communication Scheme-Based Distributed Edge Computing to Accelerate Deep Neural Network.....	599
<i>Xudong Lu, Cheng Zhuo</i>	
A Hybrid Training Framework for Speeding Up the Inference Process of Spiking Neural Networks .....	602
<i>Ziwen Li, Yu Ma, Pingqiang Zhou</i>	
Attention-Based Mechanism for Technology Mapping Optimization.....	605
<i>Zhaohui Yang, Yinshui Xia, Mengke Wang, Chenghao Yang, Xiaojing Zha</i>	
An Efficient ATPG Technology Based on Time Division Multiplexing Method .....	608
<i>Minqiang Peng, Keqing Ouyang, Lunmao Zhou, Guohua Zhou</i>	
Learning-Based Performance and Power Model for Processor Microsecond DVFS .....	611
<i>Yingtao Shen, An Zou</i>	
A High-Sensitivity and Large-Dynamic Range Readout Circuit for Polysilicon-Based Microbolometer .....	614
<i>Wei Zhu, Ke Wang, Yaozu Guo, Sheng Xu, Feng Yan, Yiming Liao, Xiaoli Ji</i>	
A Scalable and Configurable Low-Power Mixed Signal Neuromorphic Accelerators for Spiking Neural Network .....	617
<i>Yekuan Chen, Yiqi Meng, Yiling Chen, Xiaolei Zhu</i>	
RLCkt: An Analog Circuit Automatic Sizing Sage Based on Reinforcement Learning.....	620
<i>Wangge Zuo, Lingge Liu, Fei Li, Yifei Huang, Liqian Zhang, Jing Wan</i>	
Convolutional Neural Networks on the Edge: A Comparison Between FPGA and GPU.....	624
<i>Yichen Wei, Siyi Gong, Hongfei Mei, Longxing Shi, Xinfei Guo</i>	
Logic Optimization Sequence Tuning Based on Policy Search Deep Reinforcement Learning .....	627
<i>Yu Jin, Haijiao Huang, Wenzhe Ye, Xuebing Zhang</i>	
Agile Full-Chip Sign-Off in the Post-Moore Era .....	630
<i>Xiao Dong, Songyu Sun, Zhengrui Chen, Jianyi Yang, Cheng Zhuo</i>	
A 2-D Multi-Dielectric Capacitance Solver Based on Floating Random Walk Method.....	635
<i>Jiahao Xu, Yibin Zhang, Shenghan Gao, Jiecheng Huang, Ming Yang, Wenjian Yu</i>	
Correlation Analysis Between Defect Scanning and Machine Components .....	638
<i>Ming Guo</i>	

Essential Steps to Enable Analyzing Effective Resistance of ESD Paths-PG Routing Network	
Pruning and Resistance Contribution by Layer .....	640
<i>Frank Feng, Abner Huang, Joe Huang, Dawson Chiou, Jeff Byrd, Nicholas Palmer, Charles McFalls, Akhil A. Gore</i>	
An 18-Bit 2MSPS SAR ADC with Double Passive Noise-Shaping Calibration.....	644
<i>Xiao-Wei Zhang, Jian-Xiong Xi, Tao Wang, Le-Nian He</i>	
Design and Simulation of a PFM-PWM Hybrid Controller for DCDC Converter with CLLC Topology.....	647
<i>Hai Liu, Lenian He, Quan Sun, Changyou Men</i>	
Design of an 8-Channel 12Bits 1MSPS SAR ADC.....	650
<i>Zhengxue Shi, Quan Sun, Changyou Men, Lenian He</i>	

#### **Author Index**