

# IEEE TRANSACTIONS ON DEVICE AND MATERIALS RELIABILITY

A PUBLICATION OF THE IEEE ELECTRON DEVICES SOCIETY AND THE IEEE RELIABILITY SOCIETY  
[www.ieee.org/ieeexplore](http://www.ieee.org/ieeexplore)

SEPTEMBER 2016

VOLUME 16

NUMBER 3

ITDMA2

(ISSN 1530-4388)

---

## REGULAR PAPERS

An Efficiency-Decay Model for Lumen Maintenance . . . . .	<i>G. Bobashev, N. G. Baldasaro, K. C. Mills, and J. L. Davis</i>	277
High-Field Stress, Low-Frequency Noise, and Long-Term Reliability of AlGaN/GaN HEMTs . . . . .	<i>J. Chen, Y. S. Puzyrev, E. X. Zhang, D. M. Fleetwood, R. D. Schrimpf, A. R. Arehart, S. A. Ringel, S. W. Kaun, E. C. H. Kyle, J. S. Speck, P. Saunier, C. Lee, and S. T. Pantelides</i>	282
On the Circuit-Level Reliability Degradation Due to AC NBTI Stress . . . . .	<i>A. Chenouf, B. Djezzar, A. Benabdelloumene, and H. Tahiri</i>	290
Impact of LDD Depth Variations on the Performance Characteristics of SONOS NAND Flash Device . . . . .	<i>D. Gupta and S. K. Vishvakarma</i>	298
Microstructural Indicators for Assessment of Effect of Prolonged and Intermittent Storage on Reliability of Lead-free Electronics . . . . .	<i>P. Lall, K. M. Mirza, M. Harsha, and K. Goebel</i>	304
Effect of Composition and Thermal-Mechanical History on the Creep Behavior of Sn–Ag–Cu Solders—Part I: Experiments . . . . .	<i>B. Talebanpour, U. Sahaym, and I. Dutta</i>	318
Effect of Composition and Thermal-Mechanical History on the Creep Behavior of Sn–Ag–Cu Solders—Part II: Model . . . . .	<i>B. Talebanpour, U. Sahaym, and I. Dutta</i>	326
Reliability Analysis for Power Devices Which Undergo Fast Thermal Cycling . . . . .	<i>D. Simon, C. Boianceanu, G. De Mey, V. Topa, and A. Spitzer</i>	336
Load Sharing Between Discrete Solder Joints in Bending: Effect of Spacing and Joint Properties . . . . .	<i>S. Akbari, A. Nourani, and J. K. Spelt</i>	345
Gate-Material-Engineered Junctionless Nanowire Transistor (JNT) With Vacuum Gate Dielectric for Enhanced Hot-Carrier Reliability . . . . .	<i>Y. Pratap, S. Halder, R. S. Gupta, and M. Gupta</i>	360
Investigation of Set/Reset Operations in CMOS-Logic-Compatible Contact Backfilled RRAMs . . . . .	<i>H.-Y. Chen, H. H. Chen, Y.-C. King, and C. J. Lin</i>	370
Breakdown Analysis of Magnetic Flip-Flop With 28-nm UTBB FDSOI Technology . . . . .	<i>H. Cai, Y. Wang, L. A. B. Naviner, and W. Zhao</i>	376
Investigation on the Breakdown Failure in Stripe Trench-Gate Field-Stop Insulated Bipolar Transistor With Low-Saturation Voltage . . . . .	<i>J. Zhu, Z. Yang, W. Sun, Y. Du, Y. Sun, Y. Zhu, P. Ye, and Z. Li</i>	384
A Highly Reliable Memory Cell Design Combined With Layout-Level Approach to Tolerant Single-Event Upsets . . . . .	<i>C. Qi, L. Xiao, T. Wang, J. Li, and L. Li</i>	388
Dislocation-Induced Punchthrough Causing Drain-to-Source Leakage Current in Power VD MOSFET Structures . . . . .	<i>J. Galle</i>	396
Performance and Reliability Impact of Copper Plasticity in Backside TSV-Last Fabrication Process . . . . .	<i>A. P. Karmarkar, W. Guo, X. Xu, G. Van der Plas, S. Van Huylenbroeck, M. Gonzalez, P. Absil, K. El Sayed, and E. Beyne</i>	402

---

(Contents Continued on Back Cover)

*(Contents Continued from Front Cover)*

---

Implications of the Incremental Pulse and Verify Algorithm on the Forming and Switching Distributions in RERAM Arrays . . . . .	<i>F. Crupi, F. Filice, A. Grossi, C. Zambelli, P. Olivo, E. Perez, and C. Wenger</i>	413
<hr/>		
REVIEW PAPER		
The Current Status and the Future Prospects of Surface Passivation in 4H-SiC Transistors . . . . .	<i>A. Siddiqui, H. Elgabra, and S. Singh</i>	419
<hr/>		
LETTERS		
Toward Graphene-Based Passive UHF RFID Textile Tags: A Reliability Study . . . . .	<i>M. Akbari, J. Virkki, L. Sydänheimo, and L. Ukkonen</i>	429
<hr/>		
ANNOUNCEMENTS		
Call for Papers—Special Issue of IEEE Transactions on Electron Devices on “Power Semiconductor Devices and Smart Power IC Technologies” . . . . .		432
Call for Papers for IEEE TRANSACTIONS ON ELECTRON DEVICES Special Issue on “Flexible Electronics” . . . . .		433
Save the Date PVSC-44 . . . . .		434
Call for Papers—2017 IEEE International Reliability Physics Symposium . . . . .		435
IEEE Collabratec . . . . .		436

---