

IEEE TRANSACTIONS ON ELECTRON DEVICES

A PUBLICATION OF THE IEEE ELECTRON DEVICES SOCIETY



JULY 2006

VOLUME 53

NUMBER 7

REVIEW ARTICLES

| | | |
|--|---|------|
| Nanoscale Germanium MOS Dielectrics—Part I: Germanium Oxynitrides | <i>C. O. Chui, F. Ito, and K. C. Saraswat</i> | 1501 |
| Nanoscale Germanium MOS Dielectrics—Part II: High- κ Gate Dielectrics | <i>C. O. Chui, H. Kim, D. Chi, P. C. McIntyre, and K. C. Saraswat</i> | 1509 |

REGULAR PAPERS

Compound Semiconductor Devices

| | | |
|--|---|------|
| Origin of Improved RF Performance of AlGaIn/GaN MOSHFETs Compared to HFETs | <i>M. Marso, G. Heidelberger, K. M. Indlekofer, J. Bernát, A. Fox, P. Kordoš, and H. Lüth</i> | 1517 |
| Experimental and Theoretical Examination of Orientation Effect on Piezoelectric Charge at Gate Periphery in AlGaIn/GaN HFETs | <i>H. Ishida, T. Murata, M. Ishii, Y. Hirose, Y. Uemoto, T. Tanaka, and D. Ueda</i> | 1524 |

Nanoelectronics

| | | |
|---|--|------|
| A 6-F ² Bit Cell Design Based on One Transistor and Two Uneven Magnetic Tunnel Junctions Structure and Low Power Design for MRAM | <i>C.-C. Hung, M.-J. Kao, Y.-S. Chen, Y.-H. Wang, Y.-J. Lee, W.-C. Chen, W.-C. Lin, K.-H. Shen, K.-L. Chen, S. Chao, D. D.-L. Tang, and M.-J. Tsai</i> | 1530 |
|---|--|------|

Optoelectronics, Displays, and Imaging

| | | |
|---|---|------|
| Characteristics of an Address Discharge Time Lag in Terms of a Wall Voltage in an AC PDP | <i>B. J. Shin</i> | 1539 |
| Simple Model for Quantum-Dot Semiconductor Optical Amplifiers Using Artificial Neural Networks | <i>J. I. Ababneh and O. Qasaimeh</i> | 1543 |
| Vertically Integrated Amorphous Silicon Color Sensor Arrays | <i>D. Knipp, R. A. Street, H. Stiebig, M. Krause, J.-P. Lu, S. Ready, and J. Ho</i> | 1551 |
| Reducing Power Consumption in Liquid-Crystal Displays | <i>T. N. Ruckmongathan, M. Govind, and G. Deepak</i> | 1559 |
| Degradation Behavior of Avalanche Photodiodes With a Mesa Structure Observed Using a Digital OBIC Monitor | <i>T. Takeshita, Y. Hirota, T. Ishibashi, Y. Muramoto, T. Ito, Y. Tohmori, and H. Ito</i> | 1567 |
| Finite-Element Modeling of Liquid-Crystal Hydrodynamics With a Variable Degree of Order | <i>R. James, E. Willman, F. A. Fernández, and S. E. Day</i> | 1575 |

Reliability

| | | |
|--|--|------|
| On the Generation and Recovery of Interface Traps in MOSFETs Subjected to NBTI, FN, and HCI Stress | <i>S. Mahapatra, D. Saha, D. Varghese, and P. B. Kumar</i> | 1583 |
|--|--|------|

Silicon Devices

| | | |
|---|--|------|
| Comparison Study of Tunneling Models for Schottky Field Effect Transistors and the Effect of Schottky Barrier Lowering | <i>R. A. Vega</i> | 1593 |
| Application of the 1-D Silicon Limit to Varactors | <i>W. D. van Noort, P. Deixler, R. J. Havens, and A. Rodriguez</i> | 1601 |
| Lateral Nonuniformity of Effective Oxide Charges in MOS Capacitors With Al ₂ O ₃ Gate Dielectrics | <i>S.-W. Huang and J.-G. Hwu</i> | 1608 |
| Investigation About the Hot-Carrier Repelling Effect in Semiconductor Devices, Using an Analytical Solution of the Hydrodynamic Model | <i>M. H. El-Saba</i> | 1615 |
| Modeling and Simulation of a Nanoscale Three-Region Tri-Material Gate Stack (TRIMGAS) MOSFET for Improved Carrier Transport Efficiency and Reduced Hot-Electron Effects | <i>K. Goel, M. Saxena, M. Gupta, and R. S. Gupta</i> | 1623 |
| On the Physical Understanding of the kT-Layer Concept in Quasi-Ballistic Regime of Transport in Nanoscale Devices | <i>R. Clerc, P. Palestri, and L. Selmi</i> | 1634 |
| Analysis of the Subthreshold Current of Pocket or Halo-Implanted nMOSFETs | <i>R. J. E. Huetting and A. Heringa</i> | 1641 |
| Scalability of the Si _{1-x} Ge _x Source/Drain Technology for the 45-nm Technology Node and Beyond | <i>G. Eneman, P. Verheyen, R. Rooyackers, F. Nouri, L. Washington, R. Schreutelkamp, V. Moroz, L. Smith, A. De Keersgieter, M. Jurczak, and K. De Meyer</i> | 1647 |
| Electrical Characteristics of 8-Å EOT HfO ₂ /TaN Low Thermal-Budget n-Channel FETs With Solid-Phase Epitaxially Regrown Junctions | <i>L.-Å. Ragnarsson, S. Severi, L. Trojman, K. D. Johnson, D. P. Brunco, M. Aoulaiche, M. Houssa, T. Kauerauf, R. Degraeve, A. Delabie, V. S. Kaushik, S. De Gendt, W. Tsai, G. Groeseneken, K. De Meyer, and M. Heyns</i> | 1657 |
| On the Performance of Single-Gated Ultrathin-Body SOI Schottky-Barrier MOSFETs | <i>J. Knoch, M. Zhang, S. Mantl, and J. Appenzeller</i> | 1669 |

Solid-State Device Phenomena

| | | |
|--|--|------|
| Analysis and Modeling of Liquid-Crystal Tunable Capacitors | <i>C. A. Chang, C.-C. Cheng, and J. A. Yeh</i> | 1675 |
| Theory of Electrothermal Behavior of Bipolar Transistors: Part III—Impact Ionization | <i>N. Rinaldi and V. d' Alessandro</i> | 1683 |

Solid-State Power and High Voltage

| | | |
|--|---|------|
| Electrothermal Model for an SOI-Based LIGBT | <i>S. S. H. U. Gamage, V. Pathirana, and F. Udrea</i> | 1698 |
| Impact of Substrate-Surface Potential on the Performance of RF Power LDMOSFETs on High-Resistivity SOI | <i>J. Scholvin, J. G. Fiorenza, and J. A. del Alamo</i> | 1705 |
| Thermal Behavior of a Superjunction MOSFET in a High-Current Conduction | <i>J. Roig, E. Stefanov, and F. Morancho</i> | 1712 |

Vacuum Electronics

| | | |
|--|---|------|
| Frequency and Phase Modulation Performance of an Injection-Locked CW Magnetron | <i>I. Tahir, A. Dexter, and R. Carter</i> | 1721 |
|--|---|------|

BRIEFS

| | | |
|---|---|------|
| Accurate Boundary Integral Calculation in Semiconductor Device Simulation | <i>R. Gusmeroli and A. S. Spinelli</i> | 1730 |
| High Dynamic-Range CMOS Image Sensor Cell Based on Self-Adaptive Photosensing Operation | <i>S. Lee and K. Yang</i> | 1733 |
| Impact of Strain–Temperature Stress on Ultrathin Oxide | <i>C.-W. Tung, Y.-L. Yang, and J.-G. Hwu</i> | 1736 |
| Measurement of Low-Noise Column Readout Circuits for CMOS Image Sensors | <i>N. Kawai and S. Kawahito</i> | 1737 |
| Analysis of Lateral IGBT With a Variation in Lateral Doping Drift Region in Junction Isolation Technology | <i>R. Tadikonda, S. Hardikar, D. W. Green, M. Sweet, and E. M. S. Narayanan</i> | 1740 |

COMMENTS AND CORRECTIONS

| | | |
|---|--|------|
| Corrections to “An Investigation of Low-Frequency Noise in Complementary SiGe HBTs” | <i>E. Zhao, R. Krithivasan, A. K. Sutton, Z. Jin, J. D. Cressler, B. El-Kareh, S. Balster, and H. Yasuda</i> | 1745 |
|---|--|------|

ANNOUNCEMENTS

| | | |
|--|--|------|
| Call for Papers—Special Issue of the IEEE TRANSACTIONS ON ELECTRON DEVICES on Spintronics | | 1746 |
| Call for Papers—Special Issue of the IEEE TRANSACTIONS ON DEVICE AND MATERIALS RELIABILITY on Automotive Electronic Device Reliability | | 1748 |
| Call for Papers—Special Issue of the IEEE TRANSACTIONS ON ELECTRON DEVICES on Simulation and Modeling of Nanoelectronics Devices | | 1749 |
