

2010 Topical Meeting on Silicon Monolithic Integrated Circuits in RF Systems

(SiRF 2010)

**New Orleans, Louisiana, USA
11 - 13 January 2010**



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MO1B: Modeling

Chair: *Julio Costa, RFMD*

Venue *Rhythms 2, Time 08:00 – 09:40, Monday January 11th 2010*

- PAGE 1 **Development Toward Wafer-Scale Graphene RF Electronics**
(J.S. Moon, D. Curtis, M. Hu, D. Wong, P.M. Campbell, G. Jernigan, J. Tedesco, B. VanMil, R. Myers-Ward, C. Eddy Jr., D.K. Gaskill, J. Robinson, M. Fanton, P. Asbeck)
- PAGE 4 **TFMS Microstrip Line Modelling and Characterization up to 110 GHz on 45 nm Node Silicon Technology: Application for CAD**
(T. Quémerais, L. Moquillon, J.-M. Fournier, P. Benech, N. Corrao)
- PAGE 8 **Low Phase Noise 18 kHz Frequency Tuning Step 5 GHz DCO Using Tiny Capacitors Based on Transmission Lines**
(R.K. Pokharel, K. Uchida, A. Tomar, Haruichi Kanaya, Keiji Yoshida)
- PAGE 12 **Scalable Transformer Model Based on Ladder Topological Equivalent Circuit for Si RFICs**
(Nobuhiro Shiramizu, Toru Masuda, Takahiro Nakamura, Katsuyoshi Washio)
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MO2B: Distinguished Lecturer

Chair: *Hermann Schumacher, Ulm University*

Venue *Rhythms 2, Time 10:10 – 11:50, Monday January 11th 2010*

- PAGE 16 **Current Status and Future Trends for Si and Compound MMICs in Millimeter-Wave Regime and Related Issues for System on Chip (SOC) and/or System in Package (SIP) Applications**
(Huei Wang)
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MO3D: Interactive / Poster Session

Chair: *Dietmar Kissinger, University of Erlangen-Nuremberg*

Venue *Waterbury, Time 13:10 – 14:50, Monday January 11th 2010*

- PAGE 17 **A SiGe Frequency Quadrupler for M-QAM Carrier Recovery**
(A. Çağrı Ulusoy, Gang Liu, Andreas Trasser, Hermann Schumacher)
- PAGE 21 **Impulse Generator Targeting the European UWB Mask**
(Bernd Schleicher, Hermann Schumacher)
- PAGE 25 **A 2.4 GHz 0.18- μ m CMOS Class E Single-Ended Power Amplifier Without Spiral Inductors**
(S.A.Z. Murad, R.K. Pokharel, Haruichi Kanaya, Keiji Yoshida)
- PAGE 29 **Rapid Modeling and Efficient Characterization of Shielded Oval-Shaped Spiral Inductors**
(Ioannis Alam, Padelis Papadopoulos, Stefanos Stefanou, Konstantinos Nikellis)
- PAGE 33 **Ultra-Wideband Low Noise Amplifier with Shunt Resistive Feedback in 0.18 μ m CMOS Process**
(A.I.A. Galal, R.K. Pokharel, Haruichi Kanaya, Keiji Yoshida)
- PAGE 37 **A De-Embedding Procedure for One-Port Active mm-Wave Devices**
(Hongya Xu, Erich Kasper)
- PAGE 41 **Silicon Substrate Integration of BST Based Tunable TFBARs Using All-Dielectric SiO₂/AlN Bragg Reflectors**
(A. Vorobiev, J. Berge, M. Norling, S. Gevorgian)
- PAGE 45 **Analog/RF Performance of Sub-100nm SOI MOSFETs with Non-Classical Gate-Source/Drain Underlap Channel Design**
(A. Kranti, Rashmi, S. Burignat, Jean-Pierre Raskin, G.A. Armstrong)
- PAGE 49 **A 60 GHz Wideband High Output P1dB Up-Conversion Image Rejection Mixer in 0.25 μ m SiGe Technology**
(Mohamed Elkhoully, Srdjan Glisic, J.C. Scheytt)

Interactive / Poster Session continued ...

PAGE 53	Integrated On-Chip Antennas Using CMOS Circuit Ground Planes <i>(Hristomir Yordanov, Peter Russer)</i>
PAGE 57	A 30 to 44 GHz Divide-by-2, Quadrature, Direct Injection Locked Frequency Divider for Sliding-IF 60 GHz Transceivers <i>(Hammad M. Cheema, Reza Mahmoudi, Arthur van Roermund)</i>
PAGE 61	Accurate Electromagnetic Simulation and Measurement of Millimeter-Wave Inductors in Bulk CMOS Technology <i>(Michael Kraemer, Daniela Dragomirescu, Robert Plana)</i>
PAGE 65	Small-Size Low Losses GSM and DCS Harmonic Filters Integrated in a Low Cost 130 nm High Resistivity SOI CMOS Technology <i>(F. Giancesello, C. Durand, O. Bon, D. Gloria, B. Rauber, C. Raynaud)</i>
PAGE 69	High Gain, High Linearity, L-Band SiGe Low Noise Amplifier with Fully-Integrated Matching Network <i>(John Chung Hang Poh, Peng Cheng, Tushar K. Thrivikraman, John D. Cressler)</i>
PAGE 73	A 53-64-GHz SiGe Up-Conversion Mixer with 4-GHz IF Bandwidth <i>(Minsu Ko, Holger Rucker, Woo-Young Choi)</i>
PAGE 77	A Low Value Normally on RF-MEMS Switched Capacitor for High Q Millimeter Wave Tuning <i>(F. Barriere, A. Crunteanu, A. Pothier, M. Chatras, P. Blondy)</i>
PAGE 80	Mixed-Signal Techniques in mm-Wave Range for 100 Gbit Decision Feedback Equalizer <i>(A. Awny, A. Thiede, Mohamed Elkhoully, J. Borngräber, F. Korndörfer, J.C. Scheytt)</i>
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PAGE 92	Silicon Integrated Defected Ground Structures <i>(Daniel B. Schlieter, Rashaunda M. Henderson)</i>
PAGE 96	New Millimeter Wave Packaged Antenna Array on IPD Technology <i>(C. Calvez, C. Person, J.P. Coupez, F. Gallée, H. Ezzeddine, A. Cathelin, Didier Belot)</i>
PAGE 100	A 11-mW Quadrature Frequency Tripler with Fundamental Cancellation <i>(Chien-Chung Tsai, Derric Chang, Huan-Sheng Chen, Chien-Nan Kuo)</i>
PAGE 104	Design of Ku-Band SIR Interdigital Bandpass Filter Using Silicon-Based Micromachining Technology <i>(Sheng-Chi Hsieh, Chia-Chan Chang, Yi-Ming Chen, Chun-Chi Lin, Sheng-Fuh Chang)</i>
PAGE 108	On the Modeling of Dielectric Charging in RF-MEMS Capacitive Switches <i>(George Papaioannou, Fabio Coccetti, Robert Plana)</i>
PAGE 112	Novel BiST Methods for Parametric Test in Wireless Transceivers <i>(D. Webster, G. Thiagarajan, S. Ramakrishnan, S. Gunturi, A. Sontakke, D.Y.C. Lie)</i>

MO4B: Amplifiers

Chair: Christoph Scheytt, IHP — Co-chair: Guofu Niu, Auburn University

Venue Rhythms 2, Time 15:20 - 17:00, Monday January 11th 2010

- PAGE 116 **Towards the Development of Terahertz Substrate Integrated Circuit Technology**
(Ke Wu)
- PAGE 120 **A CMOS Class-A 65nm Power Amplifier for 60 GHz Applications**
(T. Quémerais, L. Moquillon, S. Pruvost, J.-M. Fournier, P. Benech, N. Corrao)
- PAGE 124 **Fully Balanced 60 GHz LNA with 37% Bandwidth, 3.108 dB NF, 10 dB Gain and Constant Group Delay Over 6 GHz Bandwidth**
(Erwin Janssen, Reza Mahmoudi, Edwin van der Heijden, Pooyan Sakian, Anton de Graauw, Ralf Pijper, Arthur van Roermund)
- PAGE 128 **A Differential 77-GHz Receiver with Current Re-Use Low-Noise Amplifier in SiGe Technology**
(Dietmar Kissinger, Hans Peter Forstner, Herbert Jäger, Linus Maurer, Robert Weigel)
- PAGE 132 **SiGe HBT Amplifiers with High Image Rejection for Quasi-Millimeter-Wave Frequency Range**
(Toru Masuda, Nobuhiro Shiramizu, Takahiro Nakamura, Katsuyoshi Washio)
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TU1B: RF MEMS

Chair: Sergio Pacheco, Freescale Semiconductor — Co-chair: Manos Tentzeris, Georgia Inst of Technology

Venue Rhythms 2, Time 08:00 - 09:40, Tuesday January 12th 2010

- PAGE 136 **Filter Technologies for Converged RF-Frontend Architectures: SAW, BAW and Beyond**
(Robert Aigner)
- PAGE 140 **Charging and Discharging Studies in Microwave Capacitive Switches Under High Field Pulse Discharges**
(J. Jinyu Ruan, George Papaioannou, Nicolas Nolhier, David Trémouilles, Fabio Coccetti, Robert Plana)
- PAGE 144 **Characterization of an Embedded RF-MEMS Switch**
(M. Kaynak, K.E. Ehwald, R. Scholz, F. Korndörfer, C. Wipf, Y.M. Sun, B. Tillack, S. Zehir, Y. Gurbuz)
- PAGE 148 **Zero Level Metal Thin Film Package for RF MEMS**
(F. Barriere, A. Crunteanu, A. Bessaudou, A. Pothier, F. Cosset, D. Mardivirin, P. Blondy)

TU3B: SiRF/RWS Joint Session

Chair: Chien-Nan Kuo, National Chiao Tung University

Venue Rhythms 2, Time 13:10 - 14:30, Tuesday January 12th 2010

- PAGE 152 **A Novel 77-GHz Radar Frontend with 19-GHz Signal Distribution on RF-PCB Substrate**
(Florian Starzer, Hans Peter Forstner, Christoph Wagner, Reinhard Feger, Stefan Scheibelhofer, Alexander Fischer, Herbert Jäger, Andreas Stelzer)
- PAGE 156 **On the Large-Signal Robustness of SiGe HBT LNAs for High-Frequency Wireless Applications**
(Tushar K. Thrivikraman, Anuj Madan, John D. Cressler)
- PAGE 160 **A V-Band 90-nm CMOS Low-Noise Amplifier with Modified CPW Transmission Lines for UWB Systems**
(Ibrahim Haroun, Jim Wight, Calvin Plett, Aly E. Fathy, Yaun-Chai Hsu)
- PAGE 164 **A Sub-2dB Noise Figure Wideband LNA in 65nm CMOS for Mobile TV Applications**
(Ahmed Youssef, Aly Ismail, Jim Haslett)
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TU4B: Focused Session on Device Modeling

Chair: Umberto Ravaioli, University of Illinois — Co-chair: Peter Russer, TU Munich

Venue Rhythms 2, Time 15:20 - 17:00, Tuesday January 12th 2010

- PAGE 168 **Advanced Methods for Silicon Device Modeling**
(Umberto Ravaioli)
- PAGE 172 **Modeling of Substrate Noise in Monolithic Integrated Circuits**
(George Manetas, Andreas C. Cangellaris)
- PAGE 176 **Power Waves Formulation of Oscillation Conditions: Avoidance of Bifurcation Modes in Cross-Coupled VCO Architectures**
(Sidina Wane, Damienne Bajon)
- PAGE 180 **Compact Modeling of Collector Base Junction Space Charge Region Transit Time Effect on Noise in SiGe HBTs**
(Ziyan Xu, Guofu Niu, Ramana M. Malladi)
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WE1B: Late News Papers

Chair: Hermann Schumacher, Ulm University — Co-chair: Didier Belot, ST Microelectronics

Venue Rhythms 2, Time 08:00 - 09:20, Wednesday January 13th 2010

- PAGE 184 **Further Generalized Four-Port De-Embedding Method by Dropping Ideality Assumptions on the THROUGH Structure**
(Kejun Xia, Guofu Niu, Xiaoyun Wei)
- PAGE 188 **A Plastic Packaged Ku-Band LNB with Very High Susceptibility to Supply PLL in 0.18 μ m CMOS**
(Kiyoshi Miyashita)
- PAGE 192 **Temperature Calibration of a Differential Pair Based Direct Digital Synthesizer Through Subsampling Spectral Analysis**
(Benjamin Laemmle, Christoph Wagner, Herbert Jäger, Robert Weigel)
- PAGE 196 **Design and Analysis of a W-Band Detector in 0.18- μ m SiGe BiCMOS**
(Le Zheng, Leland Gilreath, Vipul Jain, Payam Heydari)

WE2B: Technology

Chair: Bernd Tillack, IHP — Co-chair: Katsuyoshi Washio, Hitachi

Venue Rhythms 2, Time 10:10–11:50, Wednesday January 13th 2010

- PAGE 200 **Challenges and Opportunities for RF-MEMS in Aeronautics and Space — The EADS Perspective**
(*V. Ziegler, W. Gautier, A. Stehle, B. Schoenlinner, U. Prechtel*)
- PAGE 204 **RF Power Potential of 45 nm CMOS Technology**
(*Usha Gogineni, Jesús A. del Alamo, Christopher Putnam*)
- PAGE 208 **A Deep Silicon Via (DSV) Ground for SiGe Power Amplifiers**
(*V. Blaschke, T. Thibeault, L. Lanzerotti, C. Cureton, R. Zwingman, A. KarRoy, E. Preisler, D. Howard, M. Racanelli*)
- PAGE 212 **Efficient Polysilicon Passivation Layer for Crosstalk Reduction in High-Resistivity SOI Substrates**
(*Khaled Ben Ali, César Roda Neve, Ali Gharsallah, Jean-Pierre Raskin*)
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WE3B: Passives

Chair: Clemens Ruppel, EPCOS — Co-chair: Pierre Blondy, University Limoges

Venue Rhythms 2, Time 13:10–14:50, Wednesday January 13th 2010

- PAGE 216 **Recent Advances in Integrated Ferroelectric and Multiferroic Materials**
(*Mario Maglione*)
- PAGE 220 **Analysis and Measurement of a Novel On-Chip Variable Delay Transmission Line with Fixed Characteristic Impedance**
(*Wayne Woods, Hanyi Ding, Guoan Wang*)
- PAGE 224 **RF MEMS Phase Shifters for 24 and 77 GHz on High Resistivity Silicon**
(*Thomas Buck, Erich Kasper*)
- PAGE 228 **An ESD-Protection-Free Monolithic Harmonic Filter for WLAN Applications**
(*Jingfeng Ding, Andreas Springer, Thomas Bartl, Gernot Hueber, Richard Hagelauer*)
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WE4B: Signal Generation

Chair: Dietmar Kissinger, University of Erlangen-Nuremberg — Co-chair: Robert Aigner, TriQuint Semiconductor

Venue Rhythms 2, Time 15:20–17:00, Wednesday January 13th 2010

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(*Didier Belot*)
- PAGE 239 **64 to 86 GHz VCO Utilizing Push-Push Frequency Doubling in a 80 GHz f_T SiGe HBT Technology**
(*Gang Liu, A. Çağrı Ulusoy, Andreas Trasser, Hermann Schumacher*)
- PAGE 243 **An Integrated Fractional-N Frequency Synthesizer for Software-Defined Radio Applications**
(*Sabbir A. Osmany, Frank Herzel, J.C. Scheytt*)
- PAGE 247 **A 1.9V 25GHz SiGe Static Frequency Dividers with Clock-Sharing Topology**
(*Weiran Cai, Frank Ellinger, Jörg Carls*)
- PAGE 251 **Fast Hopping Carrier Generation for 14-Band Multi-Band OFDM UWB in Digital CMOS**
(*Mohammad Farazian, Prasad S. Gudem, Lawrence. E. Larson*)