

**2008 IEEE Topical Meeting on
Silicon Monolithic Integrated Circuits
in RF Systems**

DIGEST OF PAPERS

Sponsored by

IEEE Microwave Theory and Techniques Society

Table of Contents

RF Transceivers

Antenna Diversity Zero-Second-IF SiGe BiCMOS Satellite Radio Tuner for Deep Fading Automotive Mobile Reception	1
<i>A. Maxim (Silicon Laboratories, USA), C. Turinici, M. Gheorge (Maxim, USA)</i>	
A Dual Channel DVB-S/S2 Direct-Conversion Satellite TV Tuner with on-chip ADCs and Multiple DC Offset Cancellation Loops.....	5
<i>A. Maxim (Silicon Laboratories, USA), C. Turinici, M. Gheorge (Maxim, USA)</i>	
Full-Duplex Receiver And PA Integration With BAW Devices.....	9
<i>P. Bar (XLIM Research Institute, France/STMicroelectronics, France), A. Giry, P. Triolet (STMicroelectronics, France), G. Parat (CEA-LETI, France), D. Pache, P. Ancey, J.F. Carpentier (STMicroelectronics, France)</i>	
A 10.9 GS/s, 64 Taps Distributed Waveform Generator with DAC-Assisted Current-Steering Pulse Generators in 0.18μm Digital CMOS	13
<i>Yunliang Zhu, Jonathan D. Zuegel, John R. Marcante, Hui Wu (University of Rochester, USA)</i>	
X-Band Receiver Front-End Chip in Silicon Germanium Technology.....	17
<i>T.K. Quach, C.A. Bryant, G.L. Creech, K.S. Groves, T.L. James, A.G. Mattamana, P.L. Orlando, V.J. Patel (Air Force Research Laboratory, USA) , R.G. Drangmeister, L.M. Johnson (Lincoln Laboratory, USA) , B.K. Kormanyos, R.K. Bonebright (The Boeing Company, USA)</i>	
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	21
<i>Huei Wang (National Taiwan University, Taiwan)</i>	
SIMMWICs on Micromachined Silicon on Insulator Substrates beyond 100 GHz.....	22
<i>Andreas Müller (Robert Bosch GmbH, Germany), Erich Kasper (University of Stuttgart, Germany)</i>	

CMOS Circuits

A 27.3 dBm DECT Power Amplifier for 2.5V Supply in 0.13 μm CMOS.....	30
<i>Niklas Zimmermann (RWTH Aachen University, Germany), Ted Johansson (Infineon Technologies Nordic AB, Sweden), Stefan Heinen (RWTH Aachen University, Germany)</i>	
A 9.2 mW, 4-8 GHz Resistive Feedback CMOS LNA with 24.4 dB Gain, 2 dB Noise Figure, and 21.5 dBm Output IP3	34
<i>Bevin G. Perumana (Intel Corporation, USA and Georgia Institute of Technology, USA) Jing-Hong C. Zhan (Intel Corporation, USA and MediaTek, Taiwan) , Stewart S. Taylor, Brent R. Carlton (Intel Corporation, USA) , Joy Laskar (Georgia Institute of Technology, USA)</i>	

Design of CMOS Millimeter-Wave Cross-Coupled LC Quadrature VCOs with Varactorless Frequency Tuning.....	38
<i>Ibrahim R. Chamas, Sanjay Raman (Virginia Polytechnic Institute and State University, USA)</i>	
Process-Tolerant Ultralow Voltage Digital Subthreshold Design	42
<i>Kaushik Roy, Jaydeep P. Kulkarni, Myeong-Eun Hwang (Purdue University, USA)</i>	
65nm SOI CMOS SoC Technology for Low-Power mmWave and RF Platform.....	46
<i>Daeik D. Kim, Jonghae Kim, Choongyeun Cho, Jean-Olivier Plouchart, Robert Trzcinski (IBM, USA)</i>	
SiGe Devices	
Enhancing the Speed of SiGe HBTs Using fT -Doubler Techniques	50
<i>Jiahui Yuan, John D. Cressler (Georgia Institute of Technology, USA)</i>	
Probing Hot Carrier Phenomena in <i>npn</i> and <i>pnp</i> SiGe HBTs.....	54
<i>Peng Cheng, Aravind Appaswamy, Marco Bellini, John D. Cressler (Georgia Institute of Technology, USA)</i>	
High Voltage Complementary Epi Free LDMOS Module with 70 V PLDMOS for a 0.25 μm SiGe:C BiCMOS Platform.....	58
<i>R. Sorge, A. Fischer, K.-E Ehwald, R. Barth, P. Ostrovsky, R. Pliquett, K. Schulz, D. Bolze, P. Schley, D. Schmidt, H.-E. Wulf (IHP, Germany), H. Grützediek, J. Scheerer (PREMA Semiconductor GmbH, Germany), P. Hartmetz (PREMA Semiconductor GmbH, Germany)</i>	
Influence of Substrate Parasitic Effects on Power Gain Relation between CE and CB SiGe HBTs.....	62
<i>Hai Huang, Zhenqiang Ma (University of Wisconsin-Madison, USA), Pingxi Ma, Marco Ranenelli (Jazz Semiconductor, Inc., USA)</i>	
Impact of Power Cell Design on RF Performance of CE and CB SiGe Power HBTs.....	66
<i>Guoxuan Qin, Zhenqiang Ma (University of Wisconsin-Madison, USA), Jerry Lopez, Donald Y.C. Lie (Texas Tech University, USA)</i>	
Impact of Ballast Resistor Implementations on Linearity and RF Performance of Common-Base SiGe Power HBTs	70
<i>Hui Li, Guoxuan Qin, Zhenqiang Ma (University of Wisconsin-Madison, USA), Pingxi Ma, Marco Racanelli (Jazz Semiconductor, Inc., USA)</i>	
Kirk Effect Induced Bias Dependency of Thermal Resistance in SiGe HBTs	74
<i>Hao Jiang (San Francisco State University, USA), Jie Zheng, Marco Recanelli (Jazz Semiconductor, USA)</i>	

SiGe circuits

Low Noise Amplifier with Integrated Balun for 24GHz Car Radar78

Edwin van der Heijden (NXP Semiconductors Research, The Netherlands),

Hugo Veenstra (Philips Research, The Netherlands),

Dave Hartskeerl (NXP Semiconductors, The Netherlands),

Marc Notten, Dave van Goor (Philips Research, The Netherlands)

A Fully Integrated 48-GHz Low-Noise PLL with a Constant Loop Bandwidth82

Frank Herzl, Srdjan Glišić, Sabbir A. Osmany, J. Christoph Scheytt,

Klaus Schmalz, Wolfgang Winkler (IHP, Germany)

Michael Engels (IMST GmbH, Germany)

A Broadband Millimeter-Wave Low-Noise Amplifier in SiGe BiCMOS Technology.....86

Austin Chen (Alcatel-Lucent/Bell Laboratories, USA and University of Florida, USA) ,

Hsiao-Bin Liang (National Chi Nan University, Taiwan) ,

Yves Baeyens, Young-Kai Chen (Alcatel-Lucent/Bell Laboratories, USA) ,

Yo-Sheng Lin (National Chi Nan University, Taiwan)

RFIC Inductor Technology

Practical Considerations In The Use of CMOS Active Inductors.....90

William Bucossi, James P. Becker (Montana State University, USA)

High Quality Monolithic 8-shaped Inductors for Silicon RF IC Design94

O. Tesson (NXP Semiconductors, France)

On the Design of High Performance RF Integrated Inductors on

High Resistivity thin film 65 nm SOI CMOS Technology98

F. GIANESELLO, D. GLORIA (STMicroelectronics, France),

C. RAYNAUD (STMicroelectronics, France/CEA Leti, France),

S. MONTUSCLAT, S. BORET (STMicroelectronics, France),

P. TOURET (STMicroelectronics, France/CEA Leti, France)

A Methodology for Design and Modeling of Optimum Quality Spiral Inductors.....102

Mauro Ballicchia, Simone Orcioni (Università Politecnica delle Marche)

MEMS/NEMS

Dynamic Optical Characterization of NEMS Resonators106

L. COUDRON, F. CASSET (STMicroelectronics, France/CEA-LETI, France),

C. DURAND (STMicroelectronics, France/CEA-LETI, France/IEMN, France),

P. RENAUD, E. OLLIER, D. BLOCH (CEA-LETI, France),

P. VAIRAC (FEMTO-ST, France)

CMOS-MEMS Filters110

G.K. FEDDER, T. MUKHERJEE (Carnegie Mellon University, USA)

RF Characterization/Modeling

Body-Biasing Control on Zero-Temperature- Coefficient in Partially Depleted SOI MOSFET	114
<i>M. El Kaamouchi (Universit catholique de Louvain, Belgium), G. Dambrine (Institut d'Electronique de Micro 'electronique et de Nanotechnologies, Belgium) , M. Si Moussa, M. Emam, D. Vanhoenacker-Janvier, J.-P. Raskin (Universit catholique de Louvain, Belgium)</i>	
Measurement and Modeling of Drain Current Thermal Noise to Shot Noise Ratio in 90nm CMOS.....	118
<i>Yan Cui (RFMD Scotts Valley Design Center, USA and Auburn University, USA), Guofu Niu (Auburn University, USA), Ali Rezvani (RFMD Scotts Valley Design Center, USA), Stewart S. Taylor (Intel Corporation, USA)</i>	
Impact of Output Non-Quasi-Static Effect on Consistency between Two Cutoff Frequency Extraction Methods in Bipolar Transistor Simulation	122
<i>Lan Luo, Guofu Niu (Auburn University, USA)</i>	
Complementary TFTs and Inverters on Flexible Plastic Substrates Using Si(100) Nanomembranes	126
<i>Huiqing Pang, Hao-Chih Yuan, Zhenqiang Ma (University of Wisconsin-Madison, USA), G.K. Celler (Soitec USA, USA)</i>	
Surpassing Tradeoffs by Separation: Examples in Frequency Generation Circuits	130
<i>William F. Andress, Kyoungho Woo, Donhee Ham (Harvard University, USA)</i>	
Characterization and Modeling of LDMOS Power FETs for RF Power Amplifier Applications.....	134
<i>John Wood, Peter H. Aaen, Jaime A. Plá (Freescale Semiconductor Inc., USA)</i>	

Passive Circuits

Ultra-Miniaturized Integrated Cavities on High-Resistivity Silicon Thin-Film MCM-D Technology	139
<i>G. Posada (IMEC, Balgium/U.Leuven, Belgium), G. Carchon (IMEC, Belgium), B. Nauwelaers (K.U.Leuven, Belgium), W. De Raedt (IMEC, Belgium)</i>	
An Ultra-wide Stopband Lowpass Filter Using a Cross-Diapason-Shaped Defected Ground Structure	143
<i>Ro-Min Weng, Shih-Ming Cheng, Pai-Yi Hsiao, Yin-Hsin Chang (National Dong Hwa University, Taiwan)</i>	
Substrate Noise Rejection in a New Mixed-Signal Integration Technology	147
<i>H. Sharifi, S. Mohammadi (Purdue University, USA)</i>	

Identification of RF Harmonic Distortion on Si substrates and its Reduction Using a Trap-rich Layer.....	151
<i>Daniel C. Kerr, Joseph M. Gering, Thomas G. McKay, Michael S. Carroll (RFMD, USA), César Roda Neve, Jean-Pierre Raskin (Université Catholique de Louvain, Belgium)</i>	

Characterization and Modeling of Microstrip Transmission Lines with Slow-wave Effect	155
<i>T. Masuda, N. Shiramizu, T. Nakamura, K. Washio (Hitachi, Ltd., Japan)</i>	

Losses Characterization of Tunable Barium Strontium Titanate Materials Integrated on Silicon Substrate	159
<i>Mahmoud Al Ahmad, Robert Plana (LAAS - CNRS, France)</i>	

Posters

SiC Varactor based Tunable Filters with Enhanced Linearity.....	163
<i>Manas Roy, Robert J. Ward (Rockwell Collins, USA), J.A. Higgins (Teledyne Scientific Co., USA)</i>	

High Frequency Characterization of Compact N+Poly/Nwell Varactor using Waffle-Layout	167
<i>Yvan Morandini (STMicroelectronics, France/IEMN, France), Jean-François Larchanche (STMicroelectronics, France), Christophe Gaquière (IEMN, France)</i>	

Temperature Stability and Reliability Aspects of 77 GHz Voltage Controlled Oscillators in a SiGe:C BiCMOS Technology	171
<i>Gerhard G. Fischer, Srdjan Glišić (IHP, Germany)</i>	

A 1.2V, 0.1-6.0 GHz, Two-Stage Differential LNA Using Gain Compensation Scheme	175
<i>Junji Wadatsumi, Shouhei Kousai, Daisuke Miyashita, Mototsugu Hamada (Toshiba Corporation, Japan)</i>	

Transient Switching Behavior in Silicon MOSFET RF Switches	179
<i>Robert H. Caverly, Jeffrey J. Manosca (Villanova University, USA)</i>	

Finite Element Simulations of Parasitic Capacitances Related to Multiple-Gate Field-Effect Transistors Architectures	183
<i>O. Moldovan (Universitat Rovira i Virgili, Spain), D. Lederer (Tyndall National Institute, Ireland), B. Iñiguez (Universitat Rovira i Virgili, Spain), J.-P. Raskin (Université Catholique de Louvain, Belgium)</i>	

Thick-Gate-Oxide MOS Structures with Sub-Design-Rule (SDR) Polysilicon Lengths for RF Circuit Applications	187
<i>Haifeng Xu, Kenneth K. O (University of Florida, USA)</i>	

A Miniaturized Dual-Band Bandpass Filter Using Open-Loop and SIR-DGS Resonators.....	191
<i>Pai-Yi Hsiao, Ro-Min Weng, Yin-Hsin Chang (National Dong Hwa University, Taiwan)</i>	
A Compact Low-Power SiGe:C BiCMOS Amplifier for 77-81 GHz Automotive Radar	195
<i>Bernd Schleicher, Sébastien Chartier (University of Ulm, Germany), Gerhard Fischer, Falk Korndörfer, Johannes Borngräber (IHP, Germany), Till Feger, Hermann Schumacher (University of Ulm, Germany)</i>	
50 GHz Integrated Distributed Phase Shifter based on Novel Silicon-on-Glass Varactor Diodes	199
<i>G. Gentile, K. Buisman, A. Akhoukh, L.C.N. de Vreede, B. Rejaei, L.K. Nanver (TU Delft, The Netherlands)</i>	
Improved Compact Model for High Speed SiGe HBT Breakdown.....	203
<i>Hongya Xu, Erich Kasper (Universität Stuttgart, Germany)</i>	
Suppression of Digital Noise Coupling on LNA in 0.13-μm RFCMOS Technology by Global Guard Rings	206
<i>Seungyong Lee, Kihan Kim (Korea University, Korea), Tae Hyun Oh, Ickhyun Song, Hyungcheol Shin, Moonil Kim, Jae-Sung Rieh (Korea University, Korea)</i>	
High-Voltage HBTs Compatible with High-Speed SiGe BiCMOS Technology	210
<i>B. Geynet (STMicroelectronics, France/IEMN-DHS, France), P. Chevalier, S. Chouteau, G. Avenier, T. Schwartzmann, D. Gloria (STMicroelectronics, France) , G. Dambrine (IEMN-DHS, France) , F. Danneville (IEMN-DHS, France) , A. Chantre (STMicroelectronics, France)</i>	
Coupled Resonator Filters for W-CDMA Duplexer Application.....	214
<i>L. Mourot (IXLIM Research Institute, France), P. Bar, C. Arnaud (STMicroelectronics, France), G. Parat (CEA-LETI, France), J-F. Carpentier (STMicroelectronics, France)</i>	
An Ultra-Wideband Resistive-Feedback Low-Noise Amplifier with Noise Cancellation in 0.18μm Digital CMOS.....	218
<i>Jianyun Hu, Yunliang Zhu, Hui Wu (University of Rochester, USA)</i>	
Monolithic Integrated Coplanar W-band Impatt Oscillator.....	222
<i>Erich Kasper, Hongya Xu, Emanuel Dörner, Jens Werner (Universität Stuttgart, Germany)</i>	
Author Index.....	follows page 226