

2019 14th European Microwave Integrated Circuits Conference (EuMIC 2019)

**Paris, France
30 September – 1 October 2019**



**IEEE Catalog Number: CFP19GAS-POD
ISBN: 978-1-7281-0768-4**

**Copyright © 2019, European Microwave Association (EuMA)
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:	CFP19GAS-POD
ISBN (Print-On-Demand):	978-1-7281-0768-4
ISBN (Online):	978-2-87487-056-9

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
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

EuMIC01 : Integrated mm-Wave Circuits on BiCMOS & CMOS

Chair: Domine Leenaerts, NXP Semiconductors, The Netherlands

Co-Chair: Julien Lintignat, XLIM (UMR 7252), France

08:30–10:10, Monday 30 Sept 2019, N01

- 1 **C** **High Performance 60GHz Bidirectional Phased Array Front End in SiGe BiCMOS**
Roe Ben Yishay, Oded Katz, Benny Sheinman, Danny Elad, ON Semiconductor, Israel
- 5 **C** **Ultralow Power, 3.15mW, 76.7GHz Digitally Controlled Oscillator in 65nm CMOS for High Data-Rate Application**
Yanlu Wang, Muh-Dey Wei, Renato Negra, RWTH Aachen University, Germany
- 9 **C** **Feasibility Demonstration of a Ka-Band Linearized Channel Amplifier in Silicon Technology for Space Applications**
O. Jardel¹, M. Potéreau², V.M. Leal¹, S. Rochette¹, J. Prades¹, Anthony Ghiotto², H. Leblond¹, N. Deltimple², Jean-François Villemazet¹
¹Thales Alenia Space, France; ²IMS (UMR 5218), France
- 13 **C** **A Differential Traveling Wave Active Power Divider in 130nm SiGe:BiCMOS Technology for Application in Receiver Synchronization**
Eswara Rao Bammidi¹, A.R. Javed², Karthik KrishneGowda³, Ingmar Kallfass¹
¹Universität Stuttgart, Germany; ²Universität Paderborn, Germany; ³Brandenburgische Technische Universität, Germany
- 17 **C** **Broadband Linearization Technique for mmWave Circuits**
Alok Sethi, Jere Rusanen, Janne P. Aikio, Aarno Pärssinen, Timo Rahkonen, University of Oulu, Finland
-

EuMIC02 : GaN Characterisation and Modelling

Chair: Alberto Santarelli, Università di Bologna, Italy

Co-Chair: Rocco Giofrè, Università di Roma "Tor Vergata", Italy

08:30–10:10, Monday 30 Sept 2019, E01

- 21 **C** **Time Domain Drain Lag Measurement and TCAD-Based Device Simulations of AlGaN/GaN HEMT: Investigation of Physical Mechanism**
Nandha Kumar Subramani, Mohamed Bouslama, Raphaël Sommet, Jean-Christophe Nallatamby, XLIM (UMR 7252), France
- 25 **C** **Comparison of Harmonic Balance Simulated and Measured Ultra-Short Low Frequency/Microwave Transients in Pulse to Pulse Characterization of GaN Transistors**
Marwen Ben-Sassi, Guillaume Neveux, Denis Barataud, XLIM (UMR 7252), France
- 29 **C** **Characterization of Different Technologies of GaN HEMTs of 0.15 μ m Ultra-Short Gate Length: Identification of Traps Using TCAD Based 2D Physics-Based Simulation**
Mohamed Bouslama, Raphaël Sommet, Jean-Christophe Nallatamby, XLIM (UMR 7252), France
- 33 **C** **Narrow-Pulse-Width Double-Pulsed S-Parameters Measurements of 100-nm GaN-on-Si HEMTs**
Alberto Maria Angelotti, Gian Piero Gibiino, Corrado Florian, Alberto Santarelli, Università di Bologna, Italy
- 37 **C** **GaN HEMT Model with Enhanced Accuracy Under Back-Off Operation**
Valeria Vadalà¹, Antonio Raffo¹, Ken Kikuchi², Hiroshi Yamamoto², Gianni Bosi¹, Kazutaka Inoue², Norihiko Ui², Giorgio Vannini¹
¹Università di Ferrara, Italy; ²Sumitomo Electric Industries, Japan

EuMIC03: GaN Technology and Device Characterization for Improved Circuit Demonstrators

Chair: Didier Floriot, United Monolithic Semiconductors, France

Co-Chair: Eric Bergeault, LTCI (UMR 5141), France

08:30–10:10, Monday 30 Sept 2019, E02

- (NA) **C** **GaN for 5G : A Material Perspective on Challenges and Solutions up to mm-Wave Frequencies**
Marianne Germain, Markus Behet, Stefan Degroote, Roland Püsche, Joff Derluyn, EpiGaN, Belgium
- 41 **C** **Drain Current Recovery Time Analyses of InAlGaN/GaN HEMTs Realized with a Back-Barrier Buffer Layer**
S. Piotrowicz¹, C. Potier¹, J.-C. Jacquet¹, Jean-Christophe Nallatamby², M. Prigent², P. Altuntas¹, E. Chartier¹, C. Dua¹, P. Gamarra¹, C. Lacam¹, N. Michel¹, M. Oualli¹, O. Patard¹, S.L. Delage¹
¹III-V Lab, France; ²XLIM (UMR 7252), France
- 45 **C** **Degradation of Ka Band GaN Low-Noise Amplifier Under High Input Power Stress**
Xiaodong Tong¹, Rong Wang¹, Shiyong Zhang¹, Jianxing Xu¹, Penghui Zheng¹, Feng-Xiang Chen²
¹CAEP, China; ²Wuhan University of Technology, China
- 49 **C** **A Segmented Internally-Matched Class J GaN Power Amplifier for High Duty Cycle C-Band Radars**
Gabriele Formicone, James Custer, Integra Technologies, USA
- 53 **C** **A GaN-HEMT with Floating LF Ground for Reverse Operation in Integrated RF Power Circuits**
Olof Bengtsson, Sophie Paul, Wolfgang Heinrich, FBH, Germany
-

EuMIC04: EuMIC Opening Session

Chair: Farid Medjdoub (EuMIC 2019 Chair), IEMN (UMR 8520), France and Jean-Christophe Nallatamby (EuMIC 2019 TPC Chair), XLIM (UMR 7252), France

Co-Chair: Hervé Blanck (EuMIC 2019 Co-Chair), United Monolithic Semiconductors, Germany and Joaquín Portilla (EuMIC 2019 TPC Co-Chair), Universidad del País Vasco, Spain

10:50–12:30, Monday 30 Sept 2019, N01

- (NA) **C** **BiCMOS Integrated Millimeter-Wave Circuits for Short-Range Wireless Communications and Sensing**
Dietmar Kissinger, Universität Ulm, Germany
- (NA) **C** **Trends in Active Antennas and T/R Modules for Radar and Multi-Function Systems**
Yves Mancuso, Thales DMS, France

EuMIC05: New GaN Process Development for Improved Thermal and Efficiency properties

Chair: Farid Medjdoub, IEMN (UMR 8520), France

Co-Chair: Gilles Dambrine, IEMN (UMR 8520), France

13:50–15:30, Monday 30 Sept 2019, N01

- (NA) **C** **Highly Conductive Nitride Based Heterostructures for 5G Communications**
Kai Cheng, Enkris Semiconductor, China
- 57 **C** **High-Speed Linear GaN Technology with a Record Efficiency in Ka-Band**
Jeong-sun Moon, Joel Wong, Bob Grabar, Mike Antcliffe, Peter Chen, Erdem Arkun, Issac Khalaf, Andrea Corrion, HRL Laboratories, USA
- 60 **C** **Thermal Performances of Industrial 0.25- μ m GaN Technology for Space Applications**
S. Driad¹, C. Teyssandier¹, C. Chang¹, L. Brunel¹, A.M. Couturier¹, V. Brunel¹, Didier Floriot¹, H. Stieglauer², H. Blanck²
¹United Monolithic Semiconductors, France; ²United Monolithic Semiconductors, Germany
- 64 **C** **Demonstration of 30GHz OIP3/PDC > 10dB by mm-Wave N-Polar Deep Recess MISHEMTs**
M. Guidry, B. Romanczyk, H. Li, E. Ahmadi, S. Wienecke, X. Zheng, S. Keller, U.K. Mishra, University of California at Santa Barbara, USA
- 68 **C** **Study of Thick Copper Metallization with WNx as Diffusion Barrier for AlGaN/GaN HEMTs**
Y.C. Lin, M.W. Lee, M.Y. Tsai, C. Wang, J.N. Yao, Ting-Jui Huang, Heng-Tung Hsu, J.S. Maa, Edward Y. Chang, National Chiao Tung University, Taiwan
-

EuMIC06: Nonlinear CAD

Chair: Simona Donati Guerrieri, Politecnico di Torino, Italy

Co-Chair: Raphael Sommet, XLIM (UMR 7252), France

13:50–15:30, Monday 30 Sept 2019, E01

- 72 **C** **Non-Linear Modeling and Harmonic Balance Simulations of Track and Hold Amplifier**
Abhijeet Dasgupta¹, Arij Battikh¹, Guillaume Neveux¹, Denis Barataud¹, Cédric Chambon²
¹XLIM (UMR 7252), France; ²Callisto, France
- 76 **C** **Time-Domain Analysis of RF and Microwave Autonomous Circuits by Vector Fitting-Based Approach**
Leonardo Pantoli¹, Domenico Spina², Daniele Romano¹, Giulio Antonini¹, Giorgio Leuzzi¹, Tom Dhaene²
¹Università dell'Aquila, Italy; ²Ghent University, Belgium
- 80 **C** **GaN FET Load-Pull Data in Circuit Simulators: A Comparative Study**
G. Avolio¹, Antonio Raffo², M. Marchetti¹, Gianni Bosi², Valeria Vadalà², Giorgio Vannini²
¹Anteverta-mw, The Netherlands; ²Università di Ferrara, Italy
- 84 **C** **Physically-Based Statistical Analysis of Nonlinear Circuits Through X-Parameters**
S. Donati Guerrieri, F. Bonani, G. Ghione, Politecnico di Torino, Italy
- 88 **C** **Reduced-Cost Gradient-Based Optimization of Compact Impedance Matching Transformers in Highly-Dimensional Parameters Spaces**
Slawomir Koziel¹, Anna Pietrenko-Dabrowska²
¹Reykjavik University, Iceland; ²Gdansk University of Technology, Poland

EuMIC07: System-Oriented mm-Wave ICs

Chair: Frank E. van Vliet, TNO, The Netherlands

Co-Chair: Ingmar Kallfass, Universität Stuttgart, Germany

13:50–15:30, Monday 30 Sept 2019, E02

- (NA) **C** **100nm GaN on Si Technology for mmW 5G Application and SATCOM**
Fabien Robert, OMMIC, France
- 92 **C** **A 35–39GHz CMOS Linearized Receiver with 2dBm IIP3 and 16.8 dBm OIP3 for the 5G Systems**
Chun-Nien Chen, Ying Chen, Tai-Yu Kuo, Huei Wang, National Taiwan University, Taiwan
- 96 **C** **A High-Speed Millimeter-Wave QPSK Transmitter in 28nm CMOS FD-SOI for Polymer Microwave Fibers Applications**
Florian Voineau¹, Baudouin Martineau², Mathilde Sié¹, Anthony Ghiotto³, Eric Kerhervé³
¹STMicroelectronics, France; ²CEA-Leti, France; ³IMS (UMR 5218), France
- 100 **C** **A D-Band Fully-Integrated 2-RX, 1-TX FMCW Radar Sensor with 13dBm Output Power**
Muhammad Furqan¹, Faisal Ahmed¹, Andreas Stelzer²
¹DICE, Austria; ²Johannes Kepler Universität Linz, Austria
- 104 **C** **A Fully Integrated 30-to-160GHz Coherent Detector with a Broadband Frequency Comb in 65nm CMOS**
Babak Jamali, Aydin Babakhani, University of California at Los Angeles, USA
-

EuMIC08: Advanced Solutions for Integrated Power Amplifiers

Chair: Eric Kerhervé, IMS (UMR 5218), France

Co-Chair: Patrick Schuh, HENSOLDT Sensors, Germany

16:10–17:50, Monday 30 Sept 2019, N01

- (NA) **C** **Ka to W Band GaN/Si CW Power Amplifiers**
Rémy Leblanc, OMMIC, France
- 108 **C** **A Broadband Continuous Class-F GaN MMIC PA Using Multi-Resonance Matching Network**
Gholamreza Nikandish, Robert Bogdan Staszewski, Anding Zhu, University College Dublin, Ireland
- 112 **C** **A 5 to 18GHz, 10W GaN Power Amplifier Using Non-Distributed Approach**
R.S. N'Gongo¹, G. Ujwala², K. Suman², K. Yoganand Varma², Ch. Jyothi², Pramod K. Singh²
¹Aelius Semiconductors, Singapore; ²Astra Microwave Products, India
- 116 **C** **A High Gain Ka-Band Asymmetrical GaAs Doherty Power Amplifier MMIC for 5G Applications**
Ahmet Degirmenci, Ahmet Aktug, Aselsan, Turkey
- 120 **C** **An Area Efficient 48–62GHz Stacked Power Amplifier in 22nm FD-SOI**
Mengqi Cui, Zoltán Tibenszky, David Fritsche, Corrado Carta, Frank Ellinger, Technische Universität Dresden, Germany

EuMIC09: Modelling and Extraction Techniques

Chair: Roberto Quaglia, Cardiff University, UK

Co-Chair: Justin King, Trinity College Dublin, Ireland

16:10–17:50, Monday 30 Sept 2019, E01

- 124 **C** **Energy-Based Capacitance Modeling for Field-Effect Transistor Stability Analysis**
M. Schmidt-Szalowski, Ampleon, The Netherlands
- 128 **C** **HEMT Small-Signal Modelling for Voltage-Controlled Attenuator Applications**
*Yuan Tao¹, Zhi Fu Hu², Yong Fan¹, Ya Nan Liu², Mei Lin He², Yu Jian Cheng¹,
Bo Zhang¹*
¹UESTC, China; ²CETC 13, China
- 132 **C** **Intrinsic Capacitance Extraction from Pulsed S-Parameters**
Ciaran Wilson¹, Anding Zhu¹, Justin King²
¹University College Dublin, Ireland; ²Trinity College Dublin, Ireland
- 136 **C** **MOM Capacitance Characterization in G-Band Using On-Wafer 3D-TRL Calibration**
*A.A. Saadi¹, M. Margalef¹, S. Le Pilliet², C. Gaquière², D. Gloria³, C. Durand³,
Philippe Ferrari¹*
¹RFIC-Lab (EA 7520), France; ²IEMN (UMR 8520), France; ³STMicroelectronics, France
- 140 **C** **Effective Resistivity Extraction of Low-Loss Silicon Substrate at Millimeter-Wave Frequencies**
*Lucas Nyssens, Martin Rack, Jean-Pierre Raskin, Université catholique de Louvain,
Belgium*
-

EuMIC10: mm-Wave Transceiver Components

Chair: Jonas Hansryd, Ericsson, Germany

Co-Chair: Michael Schlechtweg, Fraunhofer IAF, Germany

16:10–17:50, Monday 30 Sept 2019, E02

- 144 **C** **Compact and Performing Transmission Lines for mm-Wave Circuits Design in Advanced CMOS Technology**
*Giuseppe Aciri¹, Luigi Boccia², N. Corrao³, Florence Podevin¹, Emmanuel Pistono¹,
T. Lim⁴, E.N. Isa⁴, Philippe Ferrari¹*
*¹RFIC-Lab (EA 7520), France; ²Università della Calabria, Italy; ³IMEP-LAHC (UMR 5130),
France; ⁴Fraunhofer EMFT, Germany*
- 148 **C** **Full Waveguide E- and W-Band Fundamental VCOs in SiGe:C Technology for Next Generation FMCW Radars Sensors**
Christian Bredendiek¹, Klaus Aufinger², Nils Pohl³
*¹Fraunhofer FHR, Germany; ²Infineon Technologies, Germany; ³Ruhr-Universität
Bochum, Germany*
- 152 **C** **An Inductorless 60GHz Down-Conversion Mixer in 22nm FD-SOI CMOS Technology**
*P.V. Testa, Vincent Rieß, Corrado Carta, Frank Ellinger, Technische Universität Dresden,
Germany*
- 156 **C** **A 20.7% PAE 3-Stage 60GHz Power Amplifier for Radar Applications in 28nm Bulk CMOS**
Radu Ciocoveanu¹, Robert Weigel², Amelie Hagelauer², Vadim Issakov¹
¹Infineon Technologies, Germany; ²FAU Erlangen-Nürnberg, Germany
- 160 **C** **A 2–38GHz Linear GaAs pHEMT TIA for a Quasi-Coherent Optical Receiver**
Guillermo Silva Valdecasa¹, Jesper Bevenssee Jensen², Morten Didriksen³, T.K. Johansen¹
*¹Technical University of Denmark, Denmark; ²Bifrost Communications, Denmark;
³NIMODI Engineering, Denmark*

EuMIC11 : ICs Beyond 100 GHz

Chair: Christian Fager, Chalmers University of Technology, Sweden

Co-Chair: Vadim Issakov, Infineon Technologies, Germany

08:30–10:10, Tuesday 1 Oct 2019, E02

- 164 **C** **A 18-dBm G-Band Power Amplifier Using 130-nm SiGe BiCMOS Technology**
Abdul Ali¹, Paolo Colantonio¹, Franco Giannini¹, Dietmar Kissinger², Herman Jalli Ng³, Jongwon Yun³
¹Università di Roma “Tor Vergata”, Italy; ²Universität Ulm, Germany; ³IHP, Germany
- 168 **C** **A Broadband Antenna-Coupled Terahertz Direct Detector in a 0.13- μ m SiGe HBT Technology**
Marcel Andree¹, Janusz Grzyb¹, Ritesh Jain¹, Bernd Heinemann², Ullrich R. Pfeiffer¹
¹Bergische Universität Wuppertal, Germany; ²IHP, Germany
- 172 **C** **A 180-GHz Passive Integrated SiGe Down-Conversion Mixer with Low Loss and a Broadband Rat-Race Coupler Design**
Hatem Ghaleb, David Fritsche, Mohammed El-Shennawy, Paul Stärke, Corrado Carta, Frank Ellinger, Technische Universität Dresden, Germany
- 176 **C** **An Integrated mm-Wave Quadrature Up-Conversion Mixer Based on a Six-Port Modulator**
Vincent Rieß, Paul Stärke, Corrado Carta, Frank Ellinger, Technische Universität Dresden, Germany
- 180 **C** **A 300GHz Active Frequency Tripler in Transferred-Substrate InP DHBT Technology**
T.K. Johansen¹, M. Hossain², S. Boppel², Ralf Doerner², Viktor Krozer², Wolfgang Heinrich²
¹Technical University of Denmark, Denmark; ²FBH, Germany

EuMIC12: EuMIC Interactive Session 1

Chair: Jean-Christophe Nallatamby, XLIM (UMR 7252), France

Co-Chair: Joaquín Portilla, Universidad del País Vasco, Spain

08:30–10:10, Tuesday 1 Oct 2019, Exhibition Hall

- 184 **C** **10W K Band GaN MMIC Amplifier Embedded in Waveguide-Based Metal Ceramic Package**
L. Marechal¹, M. Dinari¹, T. Huet¹, E. Richard¹, V. Serru¹, Marc Camiade¹, C. Chang¹, L. Brunel¹, Gregory Mouchon², B. Gerfault², Guillaume Le Rhun²
¹United Monolithic Semiconductors, France; ²Thales AVS, France
- 188 **C** **Experimental Analysis of In-Package Harmonic Manipulations with a 160W GaN HEMT Power Bar**
Osman Ceylan, Ali I. Isik, Yi Zhu, Sergio Pires, Ampleon, The Netherlands
- 192 **C** **Comparative Noise Investigation of High-Performance GaAs and GaN Millimeter-Wave Monolithic Technologies**
W. Ciccognani¹, S. Colangeli¹, A. Serino¹, L. Pace¹, S. Fenu¹, P.E. Longhi¹, Ernesto Limiti¹, J. Poulain², Rémy Leblanc²
¹Università di Roma "Tor Vergata", Italy; ²OMMIC, France
- 196 **C** **Increased RF-Losses at the GaN/Si Interface After Eutectic Die Attach**
Korbinian Reiser¹, John Twynam¹, Helmut Brech¹, Shyam Hardikar¹, Robert Weigel²
¹Infineon Technologies, Germany; ²FAU Erlangen-Nürnberg, Germany
- 200 **C** **Systematic Experimental f_T and f_{max} Comparison of 40-nm Bulk CMOS versus 45-nm SOI Technology**
J. Rimmelspacher¹, A. Werthof², Robert Weigel¹, Vadim Issakov²
¹FAU Erlangen-Nürnberg, Germany; ²Infineon Technologies, Germany
- 204 **C** **Study of Enhancement-Mode Tri-Gate InAs HEMTs for Low Noise Application**
C. Wang, Y.C. Lin, C.N. Kuo, M.W. Lee, J.N. Yao, Ting-Jui Huang, Heng-Tung Hsu, Edward Y. Chang, National Chiao Tung University, Taiwan
- 208 **C** **Gigahertz Frequency Graphene Transistor, High Yield Process and Good Stability Under Strain**
W. Wei¹, S. Mhedhbi¹, S.B. Salk¹, T. Levert¹, O. Txoperena², E. Pallecchi¹, H. Happy¹
¹IEMN (UMR 8520), France; ²Graphenea, Spain
- 212 **C** **A 0.41mW Band-Tunable 6th-Order IF Filter with 40ns Settling Time in 45nm CMOS RFSOI**
Rui Ma, Zoltán Tibenszky, Martin Kreißig, Frank Ellinger, Technische Universität Dresden, Germany
- 216 **C** **HCI-Proof Ultra-Broadband Millimeter-Wave Amplifier for Automotive Radar**
Nobumasa Hasegawa, Shuya Kishimoto, Shinji Yamaura, DENSO, Japan
- 220 **C** **A Digital Adjustable Fully Integrated Bistatic Interferometric Radar Transceiver at 60GHz in a 130nm BiCMOS Technology**
M. Voelkel¹, M. Dietz¹, Amelie Hagelauer¹, E.M. Hussein², Dietmar Kissinger², Robert Weigel¹
¹FAU Erlangen-Nürnberg, Germany; ²IHP, Germany
- 224 **C** **A Low Power Wideband V-Band LNA Using Double-Transformer-Coupling Technique and T-Type Matching in 90nm CMOS**
Yu-Teng Chang, Tai-Yi Lin, Hsin-Chia Lu, National Taiwan University, Taiwan
- 228 **C** **A 18–40GHz 10W GaN Power Amplifier MMIC Utilizing Combination of the Distributed and Reactive Matching Topology**
Cheng-Hao Han, Hong-Qi Tao, CETC 55, China

EuMIC Interactive Session 1 continued...

- 232 **C** **A GaN MMIC HPA with 50W Output Power and 50% PAE for S-Band Radar Systems**
Rocco Giofrè¹, Ferdinando Costanzo¹, Manuela Sotgia², Maurizio Cirillo², Ernesto Limiti¹
¹Università di Roma "Tor Vergata", Italy; ²Rheinmetall, Italy
- 236 **C** **100W High Power Amplifier MMIC in 0.45 μ m GaN Technology**
*Pramod K. Singh¹, K. Suman², Santosh K Gedela², Kishore Bantupalli²,
K. Yoganand Varma², R.S. N'Gongo¹*
¹Aelius Semiconductors, Singapore; ²Astra Microwave Products, India
-

EuMIC13: EuMIC Closing Session

Chair: Farid Medjdoub, IEMN (UMR 8520), France

Co-Chair: Hervé Blanck, United Monolithic Semiconductors, Germany

16:10–18:10, Tuesday 1 Oct 2019, N01

- (NA) **C** **Trends in Microwave Technologies for Space Applications**
N. Ayllon, V. Valenta, Petronilo Martin Iglesias, F. Deborgies, P. Angeletti, ESA-ESTEC, The Netherlands
-

EuMC/EuMIC01: Low-Noise amplifiers

Chair: François Deborgies, ESA-ESTEC, The Netherlands

Co-Chair: Amparo Herrera Guardado, Universidad de Cantabria, Spain

08:30–10:10, Tuesday 1 Oct 2019, E01

- (NA) **C** **New Frontier for RF GaN Technologies Applied to SIP Product**
Didier Floriot, United Monolithic Semiconductors, France
- 240 **C** **Limiting the Output Power of Rugged GaN LNAs**
Evelyne Kaule¹, Cristina Andrei¹, Stefan Gerlich¹, Ralf Doerner², Matthias Rudolph¹
¹Brandenburgische Technische Universität, Germany; ²FBH, Germany
- 243 **C** **High Robustness S-Band GaN Based LNA**
*Zineb Ouarch Provost¹, Laurent Caillé¹, Marc Camiade¹, Maxime Olivier²,
David Leclerc², Clement Tolant², Michel Stanislawiak²*
¹United Monolithic Semiconductors, France; ²Thales LAS, France
- 247 **C** **A 23–31GHz Robust Low-Noise Amplifier with 1.1dB Noise Figure and 28dBm Psat**
Penghui Zheng, Shiyong Zhang, Jianxing Xu, Rong Wang, Xiaodong Tong, CAEP, China
- 250 **C** **A 28–60GHz SiGe HBT LNA with 2.4–3.4dB Noise Figure**
Jubaid Abdul Qayyum¹, John Albrecht¹, John Papapolymerou¹, Ahmet Cagri Ulusoy²
¹Michigan State University, USA; ²KIT, Germany

EuMC/EuMIC02 : Photonic-Electronic Devices

Chair: Marion K. Matters-Kammerer, Technische Universiteit Eindhoven, The Netherlands

Co-Chair: Franco Giannini, Università di Roma "Tor Vergata", Italy

08:30-10:10, Tuesday 1 Oct 2019, E03

- (NA) **C** **THz Optoelectronic Systems: Trends and Potential**
Rubén Criado, Luz WaveLabs, Spain
- 254 **C** **Photonics-Based Compact Broadband Transmitter Module for E-Band Wireless Communications**
Muhsin Ali¹, Andrzej Jankowski², Robinson Cruzoe Guzmán¹, Luis Enrique Garcia Muñoz¹, Frédéric van Dijk², Guillermo Carpintero¹
¹Universidad Carlos III de Madrid, Spain; ²III-V Lab, France
- 258 **C** **Broadband Continuously Tuneable Delay Microwave Photonic Beamformer for Phased Array Antennas**
Robert Grootjans¹, Chris Roeloffzen¹, Caterina Taddei¹, Marcel Hoekman¹, Lennart Wevers¹, Ilka Visscher¹, Paul Kapteijn¹, Dimitri Geskus¹, Andrea Alippi², Ronald Dekker¹, Ruud Oldenbeuving¹, Jörn Epping¹, Roelof Bernardus Timens¹, Rick Heuvink¹, Edwin Klein¹, Arne Leinse¹, Paul van Dijk¹, René Heideman¹
¹LioniX International, The Netherlands; ²PHIX, The Netherlands
- 262 **C** **300-GHz-Band Wireless Communication Using a Low Phase Noise Photonic Source**
Li Yi¹, Kenta Iwamoto¹, Takumi Yamamoto¹, Fumiya Ayano¹, Yihan Li², Antoine Rolland², Naoya Kuse², Martin Fermann², Tadao Nagatsuma¹
¹Osaka University, Japan; ²IMRA, USA
- 266 **C** **Pulsed Photoconductive Connected Slot Array Operating at the Sub-mm Wavelength Band**
A. Garufo¹, P. Sberna¹, G. Carluccio¹, J.R. Freeman², D.R. Bacon², L. Li², J. Bueno³, J.J.A. Baselmans³, E.H. Linfield², A.G. Davies², I.E. Lager¹, N. Llombart¹, A. Neto¹
¹Technische Universiteit Delft, The Netherlands; ²University of Leeds, UK; ³SRON, The Netherlands
-

EuMC/EuMIC03 : Microwave Integrated PA Technologies

Chair: Paolo Colantonio, Università di Roma "Tor Vergata", Italy

Co-Chair: Nathalie Deltimple, IMS (UMR 5218), France

13:50-15:30, Tuesday 1 Oct 2019, E01

- (NA) **C** **Challenges & Solutions of High Frequency and High Output Power GaN-Based SSPAs**
Jose María Agüero, TTI, Spain
- 270 **C** **10W Ka Band MMIC Power Amplifiers Based on InAlGaN/GaN HEMT Technology**
C. Potier¹, S. Piotrowicz¹, C. Chang², O. Patard¹, L. Trinh-Xuan³, J. Gruenenpuett³, P. Gamarra¹, P. Altuntas¹, E. Chartier¹, J.-C. Jacquet¹, C. Lacam¹, N. Michel¹, C. Dua¹, M. Oualli¹, S.L. Delage¹
¹III-V Lab, France; ²United Monolithic Semiconductors, France; ³United Monolithic Semiconductors, Germany
- 274 **C** **3.6GHz Integrated Inverse Class-E Amplifier with Polar Modulation Capability**
Andres Seidel¹, Albrecht Gündel², Martin Kreißig¹, Paul Stärke¹, Jens Wagner¹, Frank Ellinger¹
¹Technische Universität Dresden, Germany; ²Airrays, Germany
- 278 **C** **Quasi Inverse Class-F X-Band Highly Efficient Power Amplifier with 51.8% Peak PAE in SiGe**
S. Redois¹, Eric Kerhervé¹, Anthony Ghiotto¹, B. Louis², V. Petit², Yves Mancuso²
¹IMS (UMR 5218), France; ²Thales DMS, France

EuMC/EuMIC04: Active Circuits

Chair: Domine Leenaerts, NXP Semiconductors, The Netherlands

Co-Chair: Mabel Pontón, Universidad de Cantabria, Spain

13:50–15:30, Tuesday 1 Oct 2019, E02

- 282 **C** **A Compact and Broadband Phase Shifter with Bridged-T Circuit Topology**
Ryota Komaru, Masatake Hangai, Takuo Morimoto, Shintaro Shinjo, Mitsubishi Electric, Japan
- 286 **C** **2–12GHz High-Power GaN MMIC Switch Utilizing Stacked-FET Circuits**
Masatake Hangai, Ryota Komaru, Shinichi Miwa, Yoshitaka Kamo, Shintaro Shinjo, Mitsubishi Electric, Japan
- 290 **C** **A Novel Injection-Locked Frequency Tripler for V-Band Applications**
Yu-Hsin Chang¹, Yen-Chung Chiang²
¹National Formosa University, Taiwan; ²National Chung Hsing University, Taiwan
- 294 **C** **A GaAs Frequency Doubler with 38dB Fundamental Rejection from 22 to 40GHz Using a Transformer Balun**
Sudipta Chakraborty¹, Leigh E. Milner², Simon Mahon¹, Anthony Parker¹, Michael Heimlich¹
¹Macquarie University, Australia; ²DST, Australia
- 298 **C** **Low Phase Noise Digital Division by 2 and by 3 of a 30GHz Coupled Optoelectronic Oscillator**
Arnaud Collet¹, Olivier Llopis¹, Gilles Cibiel², Éric Tournier¹
¹LAAS, France; ²CNES, France
-

EuMC/EuMIC05: Sub THz Components and Systems

Chair: Christophe Gaquiere, IEMN (UMR 8520), France

Co-Chair: Alexandru Takacs, LAAS, France

13:50–15:30, Tuesday 1 Oct 2019, E03

- 302 **C** **A 0.5THz Signal Source with -11dBm Peak Output Power Based on InP DHBT**
M. Hossain¹, N. Weimann¹, M. Brahem¹, O. Ostinelli², C.R. Bolognesi², Wolfgang Heinrich¹, Viktor Krozer¹
¹FBH, Germany; ²ETH Zürich, Switzerland
- 306 **C** **A 115–185GHz 75–115mW High-Gain PA MMIC in 250-nm InP HBT**
Zach Griffith, Miguel Urteaga, Petra Rowell, Teledyne Scientific & Imaging, USA
- 310 **C** **High Data Rate W-Band Balanced Schottky Diode Envelope Detector for Broadband Communications**
Angel Blanco Granja¹, Dimitrios Konstantinou², Simon Rommel², Bruno Cimoli³, Sebastian Rodriguez³, Roland Reese¹, Ulf Johannsen², Rolf Jakoby¹, T.K. Johansen³, Idelfonso Tafur Monroy², Andreas Penirschke⁴
¹Technische Universität Darmstadt, Germany; ²Technische Universiteit Eindhoven, The Netherlands; ³Technical University of Denmark, Denmark; ⁴Technische Hochschule Mittelhessen, Germany
- 314 **C** **A D-Band 4-Ways Power Splitter/Combiner Implemented on a 28nm Bulk CMOS Process**
Fernando Barrera, Alexandre Siligaris, Benjamin Blampey, José Luis Gonzalez-Jimenez, CEA-Leti, France
- 318 **C** **A Novel Wide-Band Finger-Shaped Phase Shifter on Silicon-On-Glass (SOG) Technology for Sub-Millimeter Wave and Terahertz Applications**
Aidin Taeb, Suren Gigoyan, Mohammed Basha, Sujeet Chaudhuri, Safieddin Safavi-Naeini, University of Waterloo, Canada

EuMC/EuMIC06 : EuMC/EuMIC Interactive Session 2

Chair: *Tan-Phu Vuong, IMEP-LAHC (UMR 5130), France*

Co-Chair: *Anthony Ghiotto, IMS (UMR 5218), France*

14:30–16:10, Tuesday 1 Oct 2019, Exhibition Hall

- 322 **C** **Tune-All Substrate-Integrated-Waveguide (SIW) Bandpass Filters**
Martin Deng, Dimitra Psychogiou, University of Colorado Boulder, USA
- 326 **C** **A Reconfigurable Array for Media Based Spatial Modulation**
Aritra Roy, K.J. Vinoy, Indian Institute of Science, India
- 330 **C** **20–44GHz Mismatch Tolerant Programmable Dynamic Range with Inherent CMRR Square Law Detector for AGC Applications**
Ahmed E. Amer¹, Mohamed A.Y. Abdalla², Islam A. Eshrah²
¹Analog Devices, Egypt; ²Cairo University, Egypt
- 334 **C** **A Miniatured 28-GHz FEM Using a 0.15- μ m InGaAs/GaAs E-Mode pHEMT Process**
Hui Dong Lee, Sunwoo Kong, Seunghyun Jang, Kwang-Seon Kim, Kwang-Chun Lee, Bonghyuk Park, ETRI, Korea
- 338 **C** **A Planar Single-Ended Kilowatt-Level VHF Class E Power Amplifier**
Renbin Tong, Stefan Book, Long Hoang Duc, Dragos Dancila, Uppsala University, Sweden
- 342 **C** **4096-QAM Microwave Transmitter Providing Efficiency Exceeding 50% and EVM Below 1%**
E. McCune, Q. Diduck, Eridan Communications, USA
- 346 **C** **High-Reliability Active Integrated Power Limiter with Sharp Compression Profile in Ka-Band in 130nm SiGe Technology**
M. Potéreau¹, N. Deltimple¹, Anthony Ghiotto¹, O. Jardel², S. Rochette², H. Leblond², Jean-François Villemazet²
¹IMS (UMR 5218), France; ²Thales Alenia Space, France
- 350 **C** **Unified Feedback Beamforming Digital Predistorter**
Suguru Habu, Yasushi Yamao, Hiroshi Suzuki, University of Electro-Communications, Japan
- 354 **C** **Screening of Integrated GaAs Stacked-FET Power Amplifiers**
G. van der Bent, A.P. de Hek, F.E. van Vliet, TNO, The Netherlands
- 358 **C** **Sub-THz On-Chip Dielectric Resonator Antenna with Wideband Performance**
Abdul Ali¹, Jongwon Yun², Herman Jalli Ng², Dietmar Kissinger³, Franco Giannini¹, Paolo Colantonio¹
¹Università di Roma “Tor Vergata”, Italy; ²IHP, Germany; ³Universität Ulm, Germany
- 362 **C** **Simple Microwave Measurement System Using Bi-Directional Configuration of VCSEL and PD-TIA from 6 to 16GHz**
Satoru Kurokawa¹, Masanobu Hirose¹, Shinichi Murata², Tsutomu Mitui²
¹AIST, Japan; ²Koden Electronics, Japan