

2023 18th European Microwave Integrated Circuits Conference (EuMIC 2023)

**Berlin, Germany
18-19 September 2023**



**IEEE Catalog Number: CFP23GAS-POD
ISBN: 979-8-3503-4833-0**

**Copyright © 2023, 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:	CFP23GAS-POD
ISBN (Print-On-Demand):	979-8-3503-4833-0
ISBN (Online):	978-2-87487-073-6

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 : GaN LNA

Chair: Hermann Schumacher, Universität Ulm, Germany

Co-Chair: Philipp Neining, Fraunhofer IAF, Germany

09:00–10:40, Monday 18th September 2023, Alpha6






- 1  **A 23–32GHz LNA with Near 5W Power Handling Capability Using 180nm GaN HEMT Technology**
Nicholas C. Miller¹, Matthew Hodek², Christopher Barasich³, Edward Gebara³, John D. Albrecht², John Papapolymerou²
¹AFRL, USA; ²Michigan State University, USA; ³Electromagnetic Sensor Technologies, USA
- 5  **A D-Band Low-Noise Amplifier MMIC in a 70-nm GaN HEMT Technology**
Fabian Thome, Peter Brückner, Rüdiger Quay, Fraunhofer IAF, Germany
- 9  **Compact Stacked Rugged GaN Low-Noise Amplifier MMIC Under Input Power Overdrive Condition**
Evelyne Kaule¹, Peng Luo², Serguei A. Chevtchenko³, Matthias Rudolph¹, Cristina Andrei¹
¹BTU, Germany; ²Chengdu DanXi Technology, China; ³FBH, Germany
- 13  **A Self-Reconfigurable Highly Linear and Robust X-Band MMIC GaN LNA**
Bastien Pinault, Jean-Guy Tartarin, Damien Saugnon, Rémy Leblanc, LAAS-CNRS, France
- 17  **On the Survivability of a 28–32GHz GaN Low Noise Amplifier**
Sanaul Haque¹, Cristina Andrei¹, Hossein Yazdani², Matthias Rudolph²
¹BTU, Germany; ²FBH, Germany

EuMIC02 : Novel Modelling Techniques for GaN and Cryogenic Devices

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

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

09:00–10:40, Monday 18th September 2023, Beta5






- 21  **Modeling of 50-nm Metamorphic HEMTs for Cryogenic Ultra-Low-Power Operation**
Felix Heinz, Arnulf Leuther, Fabian Thome, Fraunhofer IAF, Germany
- 25  **Dynamic R_D Modeling by Exploiting Gate Current Dependency of Virtual Gate Effect**
Petros Beleniotis¹, Christos Zervos¹, Frank Schnieder², Matthias Rudolph¹
¹BTU, Germany; ²FBH, Germany
- 29  **Comparison of the Low Noise Performance of GaN HEMTs and MIS-HEMTs at Cryogenic Temperatures**
Mohamed Aniss Mebarki, Ragnar Ferrand-Drake Del Castillo, Erik Sundin, Denis Meledin, Mattias Thorsell, Niklas Rorsman, Victor Belitsky, Vincent Desmaris, Chalmers University of Technology, Sweden
- 33  **TCAD Analysis of GaN HEMT AC Parameters Through Accurate Solution of Trap Rate Equations**
E. Catoggio, S. Donati Guerrieri, F. Bonani, Politecnico di Torino, Italy
- 37  **Capacitance RF Characterization and Modeling of 28FD-SOI CMOS Transistors Down to Cryogenic Temperature**
Q. Berlingard¹, Jose Lugo-Alvarez¹, M. Bawedin², T. Mota-Frutoso¹, C. Durand³, D. Gloria³, P. Galy³, M. Cassé¹
¹CEA-Leti, France; ²IMEP-LaHC (UMR 5130), France; ³STMicroelectronics, France

EuMIC03: III-V mm-Wave Devices and Characterisation

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

Co-Chair: Rüdiger Quay, Fraunhofer IAF, Germany

09:00–10:40, Monday 18th September 2023, Beta6






- (NA)  **C** **Low Barrier Schottky Technology for mmWave and Sub-mmWave Receiver Systems**
(Industrial Keynote)
Matthias Hoefle, Martin Rickes, Veronica Lain Rubio, Javier Martinez Gil, Diego Moro Melgar, Ion Oprea, Oleg Cojocari, ACST, Germany
- 42  **C** **Novel Fmax Enhancement Method for GaN HEMTs by Utilizing the Distributed Behavior of a Gate Finger**
Keiichi Sakuno, Eiji Suematsu, Shinji Hara, Nagoya University, Japan
- 46  **C** **Transition Time of GaN HEMT Switches and its Dependence on Device Geometry**
Andreas Divinyi¹, Niklas Rorsman², Niklas Billström¹, Mattias Thorsell²
¹Saab, Sweden; ²Chalmers University of Technology, Sweden
- 50  **C** **Accurate Modelling of GaN HEMT Capacitances in the Framework of the ASMHEMT Model**
Sayed Ali Albahrani¹, D. Schwantuschke¹, Sourabh Khandelwal²
¹Fraunhofer IAF, Germany; ²Macquarie University, Australia
- 54  **C** **Normally-Off AlN/GaN HEMTs with a DIBL of 1.15mV/V for RF Applications**
Mahmud Dwidar, Afesomah Ofiare, Edward Wasige, Abdullah Al-Khalidi, University of Glasgow, UK

EuMIC04: Techniques for Measurement and Detection

Chair: Tommaso Cappello, Villanova University, USA / University of Bristol, UK

Co-Chair: Shmuel Auster, IEEE Israel Section, Israel

09:00–10:40, Monday 18th September 2023, Beta7

- (NA)  **C** **Driving Integration in the RF and mmWave Semiconductor Testing Industry**
(Industrial Keynote)
Daniel Kather, Advantest, Germany
- 59  **C** **A 12.2–14.9GHz Amplitude-Sensitive VCO-Based EPR-on-a-Chip Detector Achieving a Spin Sensitivity of 6×10^9 spins/ $\sqrt{\text{Hz}}$**
Khubaib Khan¹, Mohamed Atef Hassan¹, Michal Kern¹, Jens Anders²
¹Universität Stuttgart, Germany; ²IMS CHIPS, Germany
- 63  **C** **K-Band FMCW Radar Transceiver with a Reconfigurable Analog Baseband for Breast Cancer Detection on Large Tissue Spread**
Martin Maier, Finn Stapelfeldt, Fabian Hoevel, Alexander Meyer, Vincent Lammert, Vadim Issakov, Technische Universität Braunschweig, Germany
- 67  **C** **Phase- and Amplitude Noise Suppression Using a Josephson Arbitrary Waveform Synthesizer**
J. Essing¹, M. van Wanum¹, J. Bouwmeester¹, O.F. Kieler², D.J. Michalak¹, J. Kroll¹, F.E. van Vliet¹
¹TNO, The Netherlands; ²PTB, Germany
- 71  **C** **100- μ W Cryogenic HEMT LNAs for Quantum Computing**
Yin Zeng¹, Junjie Li¹, Jörgen Stenarson², Peter Sobis², Jan Grahn²
¹Chalmers University of Technology, Sweden; ²Low Noise Factory, Sweden

EuMIC05 : EuMIC Opening

Chair: Friedel Gerfers, Technische Universität Berlin, Germany

Co-Chairs: Corrado Carta, IHP, Germany and Ulrich Lewark, IMST, Germany

11:20-13:00, Monday 18th September 2023, Alpha6











- (NA)  **Welcome Address: Opening of the European Microwave Integrated Circuits Conference 2023**
Friedel Gerfers, EuMIC 2023 Chair
- (NA)  **RF, Power and Sensor Solutions for Greener ICT Networks**
Ludger Verweyen, Infineon Technologies, Germany
- (NA)  **Transceivers for Automotive Radar Sensor Status and Trends**
Christian Zelger, Robert Bosch, Germany

EuMIC06 : Advanced PAs for Microwave Bands

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

Co-Chair: Patrick Schuh, HENSOLDT, Germany

14:20-16:00, Monday 18th September 2023, Alpha6






- (NA)   **Power Amplifier MMICs for Phased-Array Applications (Industrial Keynote)**
Patrick Schuh, HENSOLDT, Germany
- 76   **A Push-Pull 6-12GHz GaN Dual-Stage MMIC PA with Capacitive Cross-Coupling Neutralization for Increased Gain**
Gregor Lasser, Rob Vissers, Chalmers University of Technology, Sweden
- 80   **A Differential GaN Power Amplifier with $<1^\circ$ AM-PM Distortion for 5G mm-Wave Applications**
Dongyang Yan¹, Sehoon Park², Yang Zhang², Dries Peumans¹, Mark Ingels², Piet Wambacq²
¹Vrije Universiteit Brussel, Belgium; ²imec, Belgium
- 84   **A Ka-Band 15W Output Power and >30% PAE GaN MMIC Power Amplifier with Low IMD3 Over 600MHz Tone Spacing for SATCOM**
Keigo Nakatani, Yutaro Yamaguchi, Koh Kanaya, Shintaro Shinjo, Mitsubishi Electric, Japan
- 88   **A 100W High Efficiency Hybrid Broadband GaN Power Amplifier for Galileo Navigation System**
Stela Furxhi¹, Simone De Marzi¹, Lorena Cabria², Rocco Giofrè¹, Paolo Colantonio¹
¹Università di Roma "Tor Vergata", Italy; ²TTI Norte, Spain

EuMIC07: Novel Techniques for Microwave and mm-Wave Circuits and Systems Design

Chair: Teresa M. Martín-Guerrero, Universidad de Málaga, Spain

Co-Chair: Alessandro Cidronali, Università di Firenze, Italy

14:20–16:00, Monday 18th September 2023, Beta5






- (NA)  **RF Circuit Design in the Era of Artificial Intelligence (Industrial Keynote)**
Ben Gu, Cadence, USA
- 93  **Wideband Automated Tuning of Ka-Band Dual Input Doherty MMIC PA Using Bayesian Optimization**
Mattia Mengozzi¹, Alberto Maria Angelotti¹, Gian Piero Gibiino¹, Christoph Schulze², Corrado Florian¹, Paolo Colantonio³, Olof Bengtsson², Alberto Santarelli¹
¹Università di Bologna, Italy; ²FBH, Germany; ³Università di Roma "Tor Vergata", Italy
- 97  **Load Pull-Driven Behavioral Modelling of Microwave Switches for the Design of Tunable Reflective Terminations**
Seyed U. Ghozati¹, Roberto Quaglia¹, Ehsan Azad¹, Jeff R. Powell², Paul Tasker¹, Steve C. Cripps¹
¹Cardiff University, UK; ²Skyarna, UK
- 101  **InP DHBT On-Wafer RF Characterization and Small-Signal Modelling up to 220GHz**
N. Davy¹, M. Deng², V. Nodjiadjim¹, C. Mukherjee², M. Riet¹, C. Mismar¹, B. Ardouin¹, C. Maneux²
¹III-V Lab, France; ²IMS (UMR 5218), France
- 105  **Varactor Characterization Procedure for Large-Signal High-Frequency Applications**
A. García-Luque, T.M. Martín-Guerrero, F.J. Mata-Contreras, Universidad de Málaga, Spain

EuMIC08: High-Speed Mixed-Signals Circuits and Systems

Chair: Christoph Scheytt, Universität Paderborn, Germany

Co-Chair: Friedel Gerfers, Technische Universität Berlin, Germany

14:20–16:00, Monday 18th September 2023, Beta6






- (NA)  **SiGe BiCMOS Receiver Chain for FMCW Automotive Photonic-Radar Applications**
Christoph Höhn¹, Can Çalışkan¹, Stefan Preußler¹, Nico Bochmann², Gianluca Pellegrichia², Marc-Michael Meinecke³, Thomas Gisder³, Heiko Gustav Kurz³
¹Sicoya, Germany; ²Independent Researcher, Germany; ³Volkswagen, Germany
- 113  **100-GBd Linear Optical Modulator Driver for Short-Reach Links in 130-nm SiGe:C BiCMOS**
Tsung-Ching Tsai, Christian Bohn, Ahmet Çağrı Ulusoy, KIT, Germany
- 117  **A Bulk-Controlled 12GS/s Track and Hold Amplifier with >58dBc SFDR and >53.5dB SNDR in 22nm FD-SOI CMOS**
Enne Wittenhagen, Patrick Artz, Patrick Kurth, Sebastian Linnhoff, Frowin Buballa, Philipp Scholz, Friedel Gerfers, Technische Universität Berlin, Germany
- 121  **The Fastest CMOS Single-Channel 5-Bit Flash ADC Operating at 18.5GS/s in 22nm FD-SOI**
Nima Lotfi, Philipp Scholz, Friedel Gerfers, Technische Universität Berlin, Germany
- 125  **190GBd PAM-4 Signal Generation Using Analog Multiplexer IC with On-Chip Clock Multiplier**
Jonathan Schostak¹, Tobias Tannert², Markus Grözing², Volker Jungnickel¹, Christian Schmidt¹, Holger Rucker³, Manfred Berroth², Ronald Freund¹
¹Fraunhofer HHI, Germany; ²Universität Stuttgart, Germany; ³IHP, Germany

EuMIC09: Sub-THz Circuits and Techniques

Chair: Patrick Reynaert, KU Leuven, Belgium

Co-Chair: Sébastien Chartier, Fraunhofer IAF, Germany






14:20–16:00, Monday 18th September 2023, Beta7

- 129  **C** **GaN-Based Power Amplifier MMIC and Module for D-Band Applications**
D. Schwantuschke, E. Ture, Peter Brückner, Philipp Neininger, Axel Tessmann, M. Zink, M. Kuri, D. Meder, Sandrine Wagner, R. Lozar, Fraunhofer IAF, Germany
- 133  **C** **A Third Harmonic 0.53–0.54THz VCO Radiating Source in 28nm CMOS**
Sumeet Londhe, Eran Socher, Tel Aviv University, Israel
- 137  **C** **A 182GHz Triple-Stacked Distributed Amplifier in InP HBT Process**
Can Cui¹, Phat T. Nguyen¹, Nguyen L.K. Nguyen¹, Natalie Killeen², Tyler Kelley¹, Alexander Stameroff², Anh-Vu Pham¹
¹University of California at Davis, USA; ²Keysight Technologies, USA
- 141  **C** **A 272GHz InP HBT Direct-Conversion Transmitter with 14.1dBm Output Power**
Utku Soylu¹, Amirreza Alizadeh¹, Ahmed S.H. Ahmed¹, Munkyo Seo², Mark J.W. Rodwell¹
¹University of California at Santa Barbara, USA; ²Sungkyunkwan University, Korea
- 145  **C** **A Broadband D-Band Power Detector System in SiGe 130nm BiCMOS Technology**
Christoph Herold¹, Thomas Mausolf¹, Corrado Carta², Andrea Malignaggi¹
¹IHP, Germany; ²Technische Universität Berlin, Germany

EuMIC10: GaN-PAs for mm-Wave Bands

Chair: Patrick Schuh, HENSOLDT, Germany — Co-Chair: Vittorio Camarchia, Politecnico di Torino, Italy

16:40–18:20, Monday 18th September 2023, Alpha6









- 149  **C** **A 63–73GHz GaN Power Amplifier with a Compact Power Combiner**
Mingquan Bao¹, Bharath Cimbili², D. Schwantuschke², Kristoffer Andersson¹, Peter Brückner², Rüdiger Quay², Jonas Hansryd¹
¹Ericsson, Sweden; ²Fraunhofer IAF, Germany
- 153  **C** **E-Band Downlink GaN PA with a Homogeneous Output Power of 2.7W and a Peak PAE of 32.3%**
Bharath Cimbili¹, Christian Friesicke¹, Friedbert van Raay¹, Mingquan Bao², Rüdiger Quay¹
¹Fraunhofer IAF, Germany; ²Ericsson, Sweden
- 157  **C** **GaN/SiC V-Band 33dBm Power Amplifier with 10% PAE for Inter Satellite Communications**
Giuseppe Sivverini¹, Andrea Meazza¹, Antonio Traversa¹, Alberto Colzani¹, Alessandro Fonte¹, Stefano Moscato¹, Christian Friesicke²
¹SIAE MICROELETTRONICA, Italy; ²Fraunhofer IAF, Germany
- 161  **C** **A 2.5W/mm High-Power Density V-Band Power Amplifier Using 150 nm GaN Technology Beyond f_T**
Bharath Cimbili, Christian Friesicke, Sebastian Krause, Friedbert van Raay, Rüdiger Quay, Fraunhofer IAF, Germany
- 165  **C** **V-Band Power Amplifier MMIC on InAlN/GaN/SiC HEMTs Technology**
M. Bouslama¹, S. Piotrowicz¹, N. Michel¹, L. Trinh-Xuan², J. Leroy³, S. Aroulanda¹, S. Driad³, L. Hamidouche¹, J.C. Jacquet¹, Q. Lésvesque¹, M. Oualli¹, C. Chang³, P. Fellon³, S.L. Delage¹
¹III-V Lab, France; ²UMS, Germany; ³UMS, France

EuMIC11: Novel Devices and their Integration

Chair: Marion Matters, Technische Universiteit Eindhoven, The Netherlands



Co-Chair: Lars-Erik Wernersson, Lund University, Sweden

16:40–18:20, Monday 18th September 2023, Beta5

- 169   **Heterointegration of mm-Wave InP-HBT Power Amplifier Chiplets on SiGe-BiCMOS Chip**
Hady Yacoub¹, Marko Rausch¹, Christoph Stölmacker¹, Ralf Dörner¹, M. Hossain¹, Ina Ostermay¹, Taylor Moule¹, Matthias Wietstruck², Steffen Knigge¹, Olaf Krüger¹, Wolfgang Heinrich¹
¹FBH, Germany; ²IHP, Germany
- 173   **Impact of Off-State Stress on SiGe-Channel p-FETs in 22nm FDSOI Under Large-Signal Operation**
Dang Khoa Huynh¹, Quang Huy Le¹, Steffen Lehmann², Zhixing Zhao², Germain Bossu², Wafa Arfaoui², Thomas Kämpfe¹, Matthias Rudolph³
¹Fraunhofer IPMS, Germany; ²GlobalFoundries, Germany; ³BTU, Germany
- 177   **RF Performance of Large Germanium Telluride Switches for Power Application**
Ismaël Charlet¹, Bruno Reig¹, Corentin Mercier², Julien Delprato¹, Vincent Puyal¹, Clémence Héllion¹, Marjolaine Allain¹, Stéphane Monfray², Alain Fleury², Frédéric Giancesello², Philippe Cathelin², Jean-François Robillard³, Emmanuel Dubois³, Jose Lugo-Alvarez¹
¹CEA-Leti, France; ²STMicroelectronics, France; ³IEMN (UMR 8520), France
- 181   **A Novel Reconfigurable RF Switch Based on Ferroelectric Hafnium Oxide FeFET Fabricated in 22nm FDSOI Technology**
Sukhrob Abdulazhanov¹, Dang Khoa Huynh¹, Quang Huy Le¹, Thomas Kämpfe¹, Gerald Gerlach²
¹Fraunhofer IPMS, Germany; ²Technische Universität Dresden, Germany

EuMIC11 continues next page...

EuMIC11 continued...











- 185   **An Integrated Planar Guanella Balun with the Quasi-Coaxial Structure on GaAs Substrate**
Masaomi Tsuru, Tsukasa Hirai, Yusuke Omori, Naoki Sakai, Kenji Itoh, Kanazawa Institute of Technology, Japan

EuMIC12: Frequency Conversion Circuits

Chair: Vadim Issakov, Technische Universität Braunschweig, Germany

Co-Chair: Nils Pohl, Ruhr-Universität Bochum, Germany

16:40–18:20, Monday 18th September 2023, Beta6











- 189   **A 75–140GHz Frequency Quadrupler with Milli-Watt Level Output Power in 22nm FDSOI**
Ahmed Elmenshawi¹, Muhammad Waleed Mansha¹, Sriram Muralidharan², Mona M. Hella¹
¹Rensselaer Polytechnic Institute, USA; ²Analog Devices, USA
- 193   **A $\times 4$ Multiplier MMIC to E-Band Frequencies with High Spectral Purity in 50nm mHEMT Technology**
Rainer Weber, Sandrine Wagner, Arnulf Leuther, Michael Mikull, Fraunhofer IAF, Germany
- 197   **A Wideband W-Band Frequency Tripler with a Novel Mode-Selective Filter for High Harmonic Rejection**
Arjith Chandra-Prabhu¹, Janusz Grzyb¹, Philip Hillger¹, Bernd Heinemann², Holger Rucker², Ullrich Pfeiffer¹
¹Bergische Universität Wuppertal, Germany; ²IHP, Germany
- 201   **A D-Band Frequency Doubler with Gm-Boosting Technique in 28-nm CMOS**
Chung-Chia Chien¹, Yunshan Wang¹, Yuen-Sum Ng¹, Tian-Wei Huang¹, Chau-Ching Chiong², Huei Wang¹
¹National Taiwan University, Taiwan; ²Academia Sinica, Taiwan
- 205   **A 365–410GHz Push-Push Frequency Doubler with Driving Stage in SiGe BiCMOS**
T. Welling¹, J. Romstadt¹, Florian Vogelsang¹, Klaus Aufinger², Nils Pohl¹
¹Ruhr-Universität Bochum, Germany; ²Infineon Technologies, Germany

EuMIC13: Circuits and Techniques for Phased-Array Systems

Chair: Aleks Dyskin, NVIDIA, Israel

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

16:40–18:20, Monday 18th September 2023, Beta7











- 209   **Wideband Reflection-Type p-i-n Diode Phase Shifters in GaAs MMIC Technology at W-Band**
Artem R. Vilenskiy, Yingqi Zhang, Vessen Vassilev, Viktor Chernikov, Marianna V. Ivashina, Chalmers University of Technology, Sweden
- 213   **A Dual-Band Vector-Sum Phase Shifter Using I-Q Phase Compensation Technique for 5G Applications**
Xin Xu, Jens Wagner, Frank Ellinger, Technische Universität Dresden, Germany
- 217   **SiGe BiCMOS Ka-Band Integrated Transmitter for SatCom Phased-Array Applications**
Matteo Fumagalli, Alberto Colzani, Alessandro Fonte, SIAE MICROELETTRONICA, Italy
- 221   **K-Band Receiver on SiGe BiCMOS Technology for SatCom Phased Array Systems**
Alberto Colzani, Matteo Fumagalli, Alessandro Fonte, SIAE MICROELETTRONICA, Italy
- 225   **Ultra-Wideband mmW Digital Step Attenuator**
Philipp Neininger, Fabian Thome, Laurenz John, Arnulf Leuther, Sébastien Chartier, Rüdiger Quay, Fraunhofer IAF, Germany

EuMIC14: CMOS Circuits Techniques for Communication Applications

Chair: Aleks Dyskin, NVIDIA, Israel

Co-Chair: Herbert Zirath, Chalmers University of Technology, Sweden

09:00–10:40, Tuesday 19th September 2023, Beta5











- 229   **A 433MHz OOK Wake-up Transmitter with Integrated Inverse Class E in 22nm FD-SOI**
Andres Seidel, Bastian Lindner, Jens Wagner, Frank Ellinger, Technische Universität Dresden, Germany
- 233   **A 60GHz Carrier Recovery Circuit in CMOS 28nm FD SOI for BPSK/QPSK PLL-Less High Data Rate Receivers**
Alexandre Siligaris, Cédric Dehos, Jean-Baptiste David, Lea Barrau, José Luis Gonzalez-Jimenez, CEA-Leti, France
- 237   **Transformed-Based mm-Wave Low-Loss Active Isolator in 22nm FD-SOI**
Bharat Kalyan Thota, Patrick Reynaert, KU Leuven, Belgium
- 241   **A Broadband LNA and Sub-Harmonic Mixer Based Multi-Mode RX in 22nm CMOS**
Soumya Gupta, Benjamin Jann, Mostafa Essawy, Kareem Rashed, Arun Natarajan, Oregon State University, USA
- 245   **A D-Band Gain-Switching Phase Shifter with Wideband and Low Temperature-Dependency in 22-nm FD-SOI CMOS**
Toshihide Kuwabara, Naoki Oshima, Koki Tanji, Shinji Hachiyama, Kazuaki Kunihiro, NEC, Japan

EuMIC15: Building Blocks of Beamforming Front-Ends

Chair: Ingmar Kallfass, Universität Stuttgart, Germany

Co-Chair: Ho-Jin Song, POSTECH, Korea

09:00–10:40, Tuesday 19th September 2023, Beta6






- 249   **V- Through W-Band GaN Active Circulator**
Anthony Romano, Timothy Sonnenberg, Laila Marzall, Zoya Popović, University of Colorado Boulder, USA
- 253   **A Ka-Band CMOS Active Phase Shifter Using Active Balun for Phase Optimization**
Jimin Lee, Jaeyong Lee, Seongjin Jang, Changkun Park, Soongsil University, Korea
- 257   **V- and W-Band GaN MMIC Switches**
Timothy Sonnenberg, Tony Romano, Shane Verploegh, Zoya Popović, University of Colorado Boulder, USA
- 261   **Design of a 22–55GHz SPDT Switch MMIC with GaAs PIN Diodes**
Sahand Noorizadeh¹, Stephen Ngamate², Trang D. Nguyen²
¹Northrop Grumman, USA; ²National Instruments, USA
- 265   **60W Stacked-HEMT Based Asymmetric X-Band GaN SPDT Switch for Single Chip T/R Modules**
Volkan Erturk, Armagan Gurdal, Busra Cankaya Akoglu, Ekmel Ozbay, Bilkent University, Türkiye

EuMIC16: Advanced PAs on SiGe & InP Technologies

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

Co-Chair: Gijs van der Bent, TNO, The Netherlands

09:00–10:40, Tuesday 19th September 2023, Beta7

- 269  **C** **A Compact SiGe BiCMOS Distributed Power Amplifier in 5–24GHz**
Kutay Altintas, Abdurrahman Burak, Tahsin Alper Ozkan, Yasar Gurbuz, Sabanci University, Türkiye
- 273  **C** **A 22–42GHz 28nm CMOS SOI 3:1 VSWR Resilient Balanced Power Amplifier for 5G Application**
Gwennaël Diverrez¹, Eric Kerhervé¹, Magali De Matos¹, Andreia Cathelin²
¹IMS (UMR 5218), France; ²STMicroelectronics, France
- 277  **C** **A W-Band Class-F₂₃₄ SiGe-HBT Power Amplifier with 35/19.7% Peak/PBO_{6dB} PAE and 26% 1-dB Large-Signal Power Bandwidth**
Eren Vardarli¹, Mario Krattenmacher¹, Christoph Weimer¹, Austin Ying-Kuang Chen², Michael Schröter¹
¹Technische Universität Dresden, Germany; ²University of California at Santa Cruz, USA
- 281  **C** **A Full G-Band Power Amplifier with 34% Peak PAE in InP-DHBT Technology**
M. Hossain, Ralf Doerner, Wolfgang Heinrich, V. Krozer, FBH, Germany
- 285  **C** **Design and Analysis of a 50GHz InP DHBT Class-E Power Amplifier Providing 2.3mW/μm²**
Venkata Pawan Sriperumbuduri¹, Hady Yacoub², Andreas Wentzel², Tom K. Johansen², Matthias Rudolph¹
¹BTU, Germany; ²FBH, Germany

EuMIC17: EuMIC Poster

Chair: Ulrich Lewark, IMST, Germany

10:40–13:00, Tuesday 19th September 2023, Exhibition

- 289  **C** **THz Oscillation in Doped-GaN Based Planar Gunn Diode with the T-Shape Channel**
Lili Huo¹, R. Lingaparthi², K. Shabdurasulov², N. Dharmarasu², K. Radhakrishnan¹, S. García-Sánchez³, J. Mateos³
¹CINTRA (UMI 3288), Singapore; ²Temasek Laboratories @ NTU, Singapore; ³Universidad de Salamanca, Spain
- 293  **C** **Thermal Transient Measurements of GaN HEMT Structures by Electrical Measurements**
Tobias Kristensen¹, Andreas Divinyi², Johan Bremer¹, Torbjörn M.J. Nilsson², Mattias Thorsell¹
¹Chalmers University of Technology, Sweden; ²Saab, Sweden
- 297  **C** **The Role of Gate Leakage on Surface-Related Current Collapse in AlGaN/GaN HEMTs**
Christos Zervos¹, Petros Beleniotis¹, Sascha Krause², Dan Ritter³, Matthias Rudolph¹
¹BTU, Germany; ²Kongsberg Defence & Aerospace, Norway; ³Technion, Israel
- 301  **C** **22FDX EDMOS for 5G mmW Power Amplifier Applications**
Mingcheng Chang¹, Zaid Al-Husseini¹, Shafi Syed², Shih Ni Ong³, Lye Hock Kelvin Chan³, Wafa Arfaoui¹, Dieter Lipp¹, Elan Veeramani², Jerome Mazurier¹, Andreas Knorr², Nick Comfoltey², Tianbing Chen²
¹GlobalFoundries, Germany; ²GlobalFoundries, USA; ³GlobalFoundries, Singapore
- 305  **C** **A Ku- and Ka-Band Dual-Band Signal Source SiGe MMIC Realization by Using Wideband SPDT Switches**
Christian Bredendiek¹, Simon Kueppers², Klaus Aufinger³, Nils Pohl⁴
¹Fraunhofer FHR, Germany; ²2π-LABS, Germany; ³Infineon Technologies, Germany; ⁴Ruhr-Universität Bochum, Germany

EuMIC17 continued...






- 309  **Ⓢ** **An 11–15.8GHz Class-D DCO with -117.5dBc/Hz Phase Noise at 1MHz Offset in 22nm FDSOI CMOS Technology**
Qiao Yang¹, Olaf Zimmerhackl², Michael Otto², Zaid Al-Husseini², Xuemei Hui¹, Shafi Syed³, Chi Zhang³
¹GlobalFoundries, China; ²GlobalFoundries, Germany; ³GlobalFoundries, USA
- 313  **Ⓢ** **SPST and SPDT 60GHz Travelling-Wave Switches in 22nm FD-SOI**
Quentin Courte, M. Rack, Dimitri Lederer, Jean-Pierre Raskin, UCLouvain, Belgium
- 317  **Ⓢ** **A 12GS/s RF-Sampler Employing Inductive Peaking in 22nm FD-SOI CMOS**
Enne Wittenhagen, Patrick Kurth, Nima Lotfi, Urs Hecht, Julius Edler, Philipp Scholz, Friedel Gerfers, Technische Universität Berlin, Germany
- 321  **Ⓢ** **A Continuously Adjustable True Time Delay for D-Band Timed Antenna Arrays**
Manuel Koch, Florian Probst, Sascha Breun, Robert Weigel, FAU Erlangen-Nürnberg, Germany
- 325  **Ⓢ** **InP RTD Detector for THz Applications**
Simone Clochiatti¹, Robin Kress¹, Enes Mutlu¹, Florian Vogelsang², Marcel van Delden², Nils Pohl², Werner Probst¹, Nils Weimann¹
¹Universität Duisburg-Essen, Germany; ²Ruhr-Universität Bochum, Germany
- 329  **Ⓢ** **Switchable V-Band Power Amplifier with Ultra-Fast Turn-On for Aggressive Duty-Cycling**
Maximilian Gottfried Becker¹, Marco Gunia¹, Diego Mendez², Frank Ellinger¹
¹Technische Universität Dresden, Germany; ²Pontificia Universidad Javeriana, Colombia

EuMIC18: PAs for Communication Systems

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

Co-Chair: María J. Madero-Ayora, Universidad de Sevilla, Spain

14:20–16:00, Tuesday 19th September 2023, Beta7

- 333  **Ⓢ** **Transmission Line Transformer Based Broadband Differential Class-E PA for Cellular Handset**
Masatoshi Hase, Seiko Netsu, Yuuma Noguchi, Daisuke Araki, Kiichiro Takenaka, Satoshi Arayashiki, Takaya Wada, Murata Manufacturing, Japan
- 337  **Ⓢ** **A 24GHz Harmonic-Injection Doherty Power Amplifier with 42% PAE at 6dB OPBO in 100nm GaN Technology**
Moïse Safari Mugisho¹, Christian Friesicke¹, Mohammed Ayad², Thomas Maier¹, Rüdiger Quay¹
¹Fraunhofer IAF, Germany; ²UMS, France
- 341  **Ⓢ** **A Design Approach for Bandwidth Enhancement of 3-Way Doherty PAs**
Anna Piacibello¹, Rocco Giofrè², Paolo Colantonio², Vittorio Camarchia¹
¹Politecnico di Torino, Italy; ²Università di Roma "Tor Vergata", Italy
- 345  **Ⓢ** **A 20-Watts, GaN MMIC Doherty Power Amplifier for Ku-Band Satellite Communications**
Seifeddine Fakhfakh¹, Thibaut Huet¹, Aymeric Le Brun², Benoit Lefebvre², Jean-Francois Villemazet², Elodie Richard³, Amitabh Chowdhary⁴
¹UMS, France; ²Thales, France; ³ESA-ESTEC, The Netherlands; ⁴ESA-ECSAT, UK
- 349  **Ⓢ** **A 39.5dBm GaN Doherty Amplifier MMIC with Phase Control for Ka-Band Space Applications**
J. Romero Lopera, Michael Gadringer, E. Leitgeb, H. Paulitsch, Wolfgang Bösch, Technische Universität Graz, Austria

EuMIC19: Circuits for Broadband mm-Wave Transceivers

Chair: Hua Wang, ETH Zürich, Switzerland

Co-Chair: Ulrich Lewark, IMST, Germany

14:20–16:00, Tuesday 19th September 2023, Beta8

- 353  **C** **Design of an E-TSPC Flip-Flop for a 43Gb/s PRBS Generator in 22nm FDSOI**
Florian Probst¹, Jonas Weninger¹, Andre Engelmann¹, Vadim Issakov², Robert Weigel¹
¹FAU Erlangen-Nürnberg, Germany; ²Technische Universität Braunschweig, Germany
- 357  **C** **A Silicon-Based Optical Signal Transmitter for Sub-THz Wireless Communication Systems**
Kalliopi Spanidou¹, Luis Orbe², Robinson Guzmán¹, Luis González-Guerrero¹, Guillermo Carpintero¹
¹Universidad Carlos III de Madrid, Spain; ²Synopsys Photonics Solutions, Canada
- 361  **C** **A 32GHz, 12.8GSps Direct Sampler and Converter for Direct Microwave Sampling for Terrestrial and Space Applications**
F. Boré, J. Duvermay, A. Landri, O. Legendre, J. Palmigiani, K. Salmi, A. Dezzani, S. Renane, Teledyne e2v, France
- 365  **C** **A Fully-Differential Travelling-Wave Amplifier up to 110GHz in a 22nm FD-SOI CMOS Technology**
Athanasios Gatzastras¹, Christian Volmer², Ingmar Kallfass¹
¹Universität Stuttgart, Germany; ²Advantest, Germany
- 369  **C** **A D-Band Low-Noise Amplifier in 28-nm CMOS Technology for Radio Astronomy Applications**
Li-Jung Huang¹, Chau-Ching Chiong², Yunshan Wang¹, Huei Wang¹, Tian-Wei Huang¹, Chung-Chia Chien¹
¹National Taiwan University, Taiwan; ²Academia Sinica, Taiwan

EuMIC20: EuMIC Closing

Chair: Friedel Gerfers, Technische Universität Berlin, Germany

Co-Chair: Corrado Carta, IHP, Germany and Ulrich Lewark, IMST, Germany

16:40–18:20, Tuesday 19th September 2023, Alpha5/6






- (NA) **C** **Session Welcome**
Friedel Gerfers, EuMIC 2023 Chair
- (NA) **C** **Leaving the Marconi Era and Entering the Directive Communications and Sensors Era for 5G/6G and SATCOM**
Gabriel M. Rebeiz, University of California at San Diego, USA
- (NA) **C** **RFSOI Technology for the RF Front-End: Then, Now and Tomorrow**
Julio C. Costa, GlobalFoundries, USA
- (NA) **C** **Awards Ceremony**
Michael Gadringer¹, Friedel Gerfers²
¹EuMW 2023 Awards Chair; ²EuMIC 2023 Chair
- (NA) **C** **Closing Remarks**
Friedel Gerfers, EuMIC 2023 Chair
- (NA) **C** **Invitation to EuMIC 2024**
Nathalie Deltimple, EuMIC 2024 Chair

EuMIC/EuMC01 : Focused Session Low Noise mm-Wave Integrated Technologies for Sub-THz Wireless Communication

Chair: Alessandro Fonte, SIAE MICROELETTRONICA, Italy

Co-Chair: Luca Aluigi, Huawei Technologies, Italy

09:00–10:40, Tuesday 19th September 2023, Beta3/4

- (NA)  **C** **Design Methodologies for mm-Wave Transceivers in Bi(CMOS) for Next-Generation Wireless and Optical Applications (Industrial Keynote)**
Domenico Pepe, Renesas Design Zurich, Switzerland
- 374  **C** **Fully Integrated Built-In Self Test of Millimeter-Wave LNA Based on Avalanche Noise Diodes in 130nm SiGe BiCMOS Technology**
Guendalina Simoncini, Valentina Palazzi, Giulia Orecchini, Federico Alimenti, Università di Perugia, Italy
- 378  **C** **Modelling, Design, and Characterization Challenges of a Gallium Arsenide High-Linearity Low-Noise Amplifier with Gain Control at W-Band**
Patrick E. Longhi, Antonio Serino, Walter Ciccognani, Sergio Colangeli, Shikha Swaroop Sharma, Swati Sharma, Ernesto Limiti, Università di Roma "Tor Vergata", Italy
- 382  **C** **A D-Band Low-Noise-Amplifier in SiGe BiCMOS with Broadband Multi-Resonance Matching Networks**
Guglielmo De Filippi, Lorenzo Piotto, Andrea Bilato, Andrea Mazzanti, Università di Pavia, Italy
- 386  **C** **A Compact 120GHz LNA in 22nm FD-SOI with Back-Gate Controllable Variable-Gain**
M. Rack¹, Lucas Nyssens¹, Quang Huy Le², Dang Khoa Huynh², Thomas Kämpfe², Jean-Pierre Raskin¹, Dimitri Lederer¹
¹UCLouvain, Belgium; ²Fraunhofer IPMS, Germany

EuMIC/EuMC02 : Panel Session on European Chips Act

Chair: Wolfgang Heinrich, FBH, Germany

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

14:20–16:00, Tuesday 19th September 2023, Alpha5/6





- (NA) **C** **Introduction: What is the EU Chips Act**
Gerhard Kahmen, IHP, Germany
- (NA) **C** **The Research View: 3 Pitches by European RTOs (FMD, imec & CEA-Leti)**
Gerhard Kahmen¹, Nadine Collaert², Martin Gallezot³
¹IHP, Germany; ²imec, Belgium; ³CEA-Leti, France
- (NA) **C** **The Industrial View: Impulse Presentations by European Industries**
Volker Ziegler¹, Massimo C. Comparini²
¹Nokia, Germany; ²Thales, Italy
- (NA) **C** **The Foundry View: Panel with Foundry Representatives**
- (NA) **C** **Open Discussion**

EuMIC/EuMC03 : EuMIC/EuMC Poster

Chair: Ulrich Lewark, IMST, Germany

Co-Chair: Amelie Hagelauer, Fraunhofer EMFT, Germany

16:00–18:20, Tuesday 19th September 2023, Exhibition

- 390  **C** **Comparative Life Cycle Assessment of Hybrid Bonding and Copper Pillar Die-to-Wafer 3D Integrations for Sub-THz Applications**
Léa Roulleau, Laura Vauche, Olivier Valorge, Christophe Dubarry, Léa Di Cioccio, CEA-Leti, France
- 394  **C** **An Unconventional Measurement Technique for the Nonlinear Characterization of mm-Wave GaN HEMT**
Valeria Vadalà¹, Antonio Raffo², Gianni Bosi², Rocco Giofrè³, Paolo Colantonio³, Giorgio Vannini²
¹Università di Milano-Bicocca, Italy; ²Università di Ferrara, Italy; ³Università di Roma “Tor Vergata”, Italy
- (NA)  **C** **A Hybrid Radiating Element for 1-D Scanning Clustered Phased Array**
Raffaele De Marco, Emilio Arnieri, Giandomenico Amendola, Luigi Boccia, Università della Calabria, Italy
- 402  **C** **Experimental Validation of Class F Waveform Engineering in Class C Biasing Condition**
Francesco Manni¹, Rocco Giofrè¹, Franco Giannini¹, Valeria Vadalà², Gianni Bosi³, Antonio Raffo³, Giorgio Vannini³, Paolo Colantonio¹
¹Università di Roma “Tor Vergata”, Italy; ²Università di Milano-Bicocca, Italy; ³Università di Ferrara, Italy
- (NA)  **C** **New Approach to Absolute Power Measurements in the WR-3 Band**
Benjamin Röben¹, Karsten Lange², Priyanka Mondal³, Pierre Gellie³, Andreas Steiger¹
¹PTB, Germany; ²SLT Sensor- und Lasertechnik, Germany; ³Lytid, France

EuMIC/EuMC03 continues next page...

EuMIC/EuMC03 continued...

- (NA)  **C** **Phase Distortion Reduction of Flat Gain Envelope Tracked GaN RF PAs**
Morten Olavsbråten, Anders Ivar Hagen, Hans-Robert Løhren, NTNU, Norway
- (NA)  **C** **Analysis of the Dispersion Characteristics in Substrate Integrated Waveguides with Periodic Walls**
Raúl García¹, Ángela Coves¹, Ángel A. San Blas¹, Maurizio Bozzi²
¹Universidad Miguel Hernández de Elche, Spain; ²Università di Pavia, Italy
- (NA)  **C** **GaN-on-Porous Silicon for RF Applications**
Gilles Scheen¹, Romain Tuyvaerts¹, Pieter Cardinael², Enriquè Ekoga¹, Khaled Aouadi¹, Christophe Pavageau¹, Amin Rassekh¹, Massinissa Nabet², Sachin Yadav³, Jean-Pierre Raskin², Bertrand Parvais³, Mostafa Emam¹
¹Incize, Belgium; ²UCLouvain, Belgium; ³imec, Belgium
- (NA)  **C** **Bondwire Integration Challenges in E-Band Systems: From PCB to Die Level**
Sherif R. Zahran¹, Antonio Alati¹, Raffaele De Marco¹, Stefano Moscato², Alessandro Fonte², Giandomenico Amendola¹, Philippe Ferrari³, Luigi Boccia¹
¹Università della Calabria, Italy; ²SIAE MICROELETTRONICA, Italy; ³TIMA (UMR 5159), France
- (NA)  **C** **Air-Filled and Slow-Wave CNT-Based Substrate Integrated Waveguide**
Phi-Long Doan¹, Jordan Corsi¹, Tay Beng Kang², Rongtao Jiang³, Joseph de Saxce⁴, Philippe Coquet³, Jianxiong Wang³, Dominique Baillargeat⁴, Emmanuel Pistono¹, Florence Podevin¹
¹TIMA (UMR 5159), France; ²NTU, Singapore; ³CINTRA (UMI 3288), Singapore; ⁴XLIM (UMR 7252), France
- (NA)  **C** **Dual-Band Substrate Integrated Waveguide Filters with Independently Controllable Passband Based on Cambered Cavity and Circular Cavity**
Xian-Long Yang¹, Xiao-Wei Zhu¹, Xiang Wang², Rui-Jia Liu³
¹Southeast University, China; ²NJUST, China; ³University College Dublin, Ireland