

2019 IEEE 4th International Conference on Integrated Circuits and Microsystems (ICICM 2019)

**Beijing, China
25-27 October 2019**



**IEEE Catalog Number: CFP19H23-POD
ISBN: 978-1-7281-5133-5**

**Copyright © 2019 by the Institute of Electrical and Electronics Engineers, Inc.
All Rights Reserved**

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. 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:	CFP19H23-POD
ISBN (Print-On-Demand):	978-1-7281-5133-5
ISBN (Online):	978-1-7281-5132-8

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

2019 The 4th International Conference on Integrated Circuits and Microsystems

ICICM 2019

Table of Contents

Preface	ix
Conference Committees	x

Session 1: Circuit Structure Design

A Synchronous Rectifier Energy Collection Circuit with Two Energy-Transfer Schemes for A 65% Power Efficiency.....	1
<i>Weikuan Li, S. Huang, Quanzhen Duan</i>	
Design of a Power Randomization Circuit for Block Ciphers	6
<i>Zheng Zhen, Yan Ying-Jian</i>	
Design of Automated Voltage Protection Circuit for Digital DC-DC Switching Power Supply	12
<i>Dexuan Huo, Guojun Zhang</i>	
A Novel Low-Noise Bandgap Reference with An Active RC Filter	16
<i>Peiju Liu, Quanzhen Duan, Zhen Meng, Jie Sun, Shengming Huang, Yuemin Ding and Li Han</i>	
A Digitally Controlled CMOS Analog Baseband Circuit with Low Noise for 76-81GHz Automotive Radar	20
<i>Bowen Wu, Zongming Duan, Yan Wang, Dongfang Pan, Bingbing Liao, Yang Zhou</i>	
An Efficient VLSI Design of Residue to Binary Converter Circuit for a New Moduli Set $\{2^{2n}, 2^{2n-1}-1, 2^{2n-1}+1\}$	24
<i>Edem Kwedzo Bankas, Kazeem Alagbe Gbolagade</i>	
An Ultra-low Noise Capacitive Readout Circuit for Gyroscopes	29
<i>Yanfei Lu, Quanzhen Duan, Zhen Meng, Shengming Huang, Yuemin Ding, and Li Han</i>	
A 50 GHz High Sensitivity InP HBT Comparator.....	33
<i>Hao Zhou, Youtao Zhang</i>	

Research on Fault Prediction Method of Analog Circuits Based on DCQGA-SVR	38
<i>Xuelong Yan, Runping Ma</i>	

Session 2: Electronic Components and Applications

A 220GHz GaAs Integration Nonlinear Transmission Line Frequency Doubler Based on Resistive Planar Schottky Diodes	44
---	----

Juan Liu, Lu Tang

Application and Comparison of the Contactless Overvoltage Measurement System Based on Integrated Electro-Optic Sensors	48
--	----

Ning Xu, Lin Zhao, Shaohu Wang, Yong Yang

Steady-State Thermal Simulation of the InP HBT Device Heat Spreading in DAHI Chip	53
---	----

Ming Wang, Youtao Zhang, Xiaopeng Li, Yi Zhang

A 10-bit 320MS/s Time-Interleaved SAR ADC with an Improved Binary-Scaled Recombination Weighting Capacitor Array	57
--	----

Xiaoyuan Zhang, Yi Zhang, Xincun Ji, Zhonghua Liu, Jian Xiao, Yufeng Guo

A High Gain and High CMRR Instrumentation Amplifier for Biomedical Applications.....	61
--	----

Ying-Yu Qian, Zhi-Gong Wang, Yue-Kai Liu, Zhi-Jun Zhou

A 0.4-V 1.9 μ W Amplifier for Low Power Biomedical Applications	65
---	----

Yan Chen, Yousheng Chen, Chunxia Li, Yan Guo

Numerical Study and Parametric Optimization of Pin-Fin in the Microchannel Radiators with Hot Spots	70
---	----

Wang Zhimin, Ye Guigen, Xue Shifeng, Gong Liang

Thermoelastic Damping in Bilayered Microbeam Resonators with Annular-cross Section	75
--	----

Zhijun Luo, Pu Li, Longfei Yang, Yuming Fang

Session 3: Digital Circuits and Systems

Influence of the Interface Charges' Location on the Threshold Voltage of TFT	80
--	----

RuiZe Sun, Zhun Zhang, Qi Yu, JianMin Cao

The Core Chip Design of Fast Locked All Digital Phase-locked Loop	85
---	----

Yaqing Zhu, Lu Tang

Study on the Influence of Different Locations of Land and Sea on Geomagnetic Induced Current Based on Finite Element Method.....	90
--	----

Tao Ruixiang, Lin Haofan, Yu Bing, Lin Jiajun, Zhao Lin, Jin Yongtao

A 8-12GHz 4-Element SiGe BiCMOS Multi-Function Chip for Phased Array Systems	95
<i>Zhang Hao, Wan Chuanchuan</i>	
A 10 GHz CMOS Active Phase Shifter with Pole-Splitting All-Pass Quadrature Generator	100
<i>Tongxuan Zhou, Hao Zhang, Keping Wang</i>	
A 12bit 16MS/s Asynchronous SAR ADC with Speed-Enhanced Comparator and TSPC Latch	104
<i>Liang Xie, Xuefeng Han, Haichao Zhang, Xiangliang Jin</i>	
Analysis of Squeeze Film Air Damping with Lattice Boltzmann Method in Transition Regime.....	109
<i>Chengde Zhu, Pu Li, Longfei Yang, Yuming Fang</i>	

Session 4: Electrical Equipment Fault Detection and Performance Testing

Analysis of Partial Discharge Test of Transformer Caused by Excitation Transformer Fault.....	114
<i>Yu Bing, Zhao Lin, Yang Zhi, Yang Yong</i>	
Research on Fault Excitation Technology of Smart Meters	118
<i>Wang Shuang, Duan Xiaomeng, Zhao Ting, Wang Xiaodong</i>	
A Practical Estimation of Periodic Power Supply Induced Jitter for Clock Buffer Chains	122
<i>Warren Anderson, Xiongliang Lai</i>	
A Novel Authorization Methodology to Prevent Counterfeit PCB/Equipment through Supply Chain ...	128
<i>Dongrong Zhang, Yueying Han, Qiang Ren</i>	
Electrical Locating Technology for Failure Point Location Based on an Amplifier Module	133
<i>Zhimin Ding, Chao Duan, Xu Wang, Meng Meng, Zhibin Wang</i>	
A Portable Fault Location Device for High Voltage Equipment Based on Acoustic Wave Method	138
<i>Wang Zezhou</i>	

Session 5: Power Electronics Technology and Application

Progress on Surface Charges of Insulating Materials and Modification Methods	143
<i>Haofan Lin, Luyao Zhou, Bing Yu, Ruixiang Tao</i>	
Detection of Transformer Winding Fault with Oscillation Wave Signal Based on Time-Frequency Transform.....	147
<i>Hongwen Liu, Ke Wang, Xiangyu Zhou</i>	

An Ultra-Low Quiescent Current Output Capacitor-Less Low-Dropout Regulator with Dynamic Bias Circuit.....	153
<i>Weidong Li, S. Huang, Quanzhen Duan</i>	
A Frequency Adaptive Quasi-Synchronous Algorithm Applied to Digital Electric Energy Meters.....	157
<i>Lu Chunguang, Yuan Jian, Xu Tao, Huang Jianzhong</i>	
A Low-Noise, Low-Power, and Chopper-Stabilized, Current-Feedback Instrumentation Amplifier for Current Sensing Application	162
<i>Peng Xie, Quanzhen Duan, Zhen Meng, Shengming Huang, Yuemin Ding, Li Han</i>	
The Influence of Working and Protective Grounding on Submarine Cable in AC Withstand Voltage Test	166
<i>Haofan Lin, Yongtao Jin, Bing Yu, Lin Zhao, Yong Yang, Te Li</i>	

Session 6: Modern Electronic Information Technology

Laser Study for DICE-based Registers in a Commercial 130nm Process Technology	170
<i>Lei Li, Xianjun Tan, Wanting Zhou, Lei Xie, Yu Song</i>	
A 71.8-87.9 GHz CMOS Injection-Locked Frequency Divider with Coupled Inductance	174
<i>Jingyi Cai, Lu Tang</i>	
A New Single-Port Five-Transistor SRAM Cell Design for Signal Processing Systems.....	178
<i>Chien-Cheng Yu, Chung-Bin Wu, Ming-Chuen Shiau</i>	
Divide-by-2 Transformer-Based Injection-Locked Frequency Dividers with Two Active Cores	182
<i>Sheng-Lyang Jang, Jui Chieh Hou, Wen-Cheng Lai, Miin-Horng Juang</i>	
A Low Noise Operational Amplifier With Cascode Frequency Compensation Technique for Voice Detection and Recognition.....	186
<i>Yang Liu, Zhaohao Wang, Jianlei Yang, Weisheng Zhao</i>	
A Laser Modulation Driver in 130-nm CMOS Technology for Quantum Key Distribution System	190
<i>Bo Feng, Futian Liang, Xinzhe Wang, Yulong Zhu, Chenxi Zhu, Ge Jin</i>	
Implementation of LSTM Accelerator for Speech Keywords Recognition	195
<i>Liping Xiang, Shengli Lu, Xuexiang Wang, Hao Liu, Wei Pang, Huazhen Yu</i>	
A New Generation of Static Timing Analysis Technology Based on N7+ Process—POCV	199
<i>Xiaohong Peng, Hong Wang, Shengxia Wang, Jianing Du</i>	

Session 7: Electronics and Communication Engineering

A Low Computational Complexity Method of PTS	204
<i>Feng Hu, Yuan Lu, Lei Li, Libiao Jin, JianBo Liu, Yunfei Feng</i>	
A 402~614MHz CMOS Transceiver for IEEE 802.15.6 Wireless Body Area Networks	210
<i>Yongkai Wang, Changchun Zhang, Feng Yuan, Ying Zhang, Yi Zhang, Lu Tang</i>	
Divide-By-3 Dual-Resonance Injection-Locked Frequency Divider	215
<i>Wen-Cheng Lai, Sheng-Lyang Jang, Yi-Shan Fang, Chia-Wei Chang</i>	
A Time-Interleaved 14-bit 500MS/s Charge-Domain ADC with Mix-signal Mismatch Calibration.....	220
<i>Zhenhai Chen, Xiaoxiong He, Hongwen Qian, Haijun Wu, Zongguang Yu, Xue Yan</i>	
A 433MHz Transmitter Based on Injection-Locking and Frequency Multiplication	224
<i>Peisheng Zong, Yuhao Zhou, Hao Zhang, Yuxuan Zhou, Keping Wang</i>	
An Optimized Low-Complexity Barzilai-Borwein Algorithm for Signal Detection in Massive MIMO Systems	228
<i>Mingshan Tan, Xiaofeng Qiao</i>	
An Exynos4412-based Embedded Control System Design for Multi-Channel Upper Limb Motor Function Rebuilding and Rehabilitation	233
<i>Hai-Peng Wang, De-Jian Fu, Zheng-Yang Bi, Fei Li, Xiao-Ying Lü, Zhi-Gong Wang</i>	
A New Memory-Based Routing Policy for Mesh Network	237
<i>Ming Ding, Donglin Liang, Anping He, Juxia Xiong, Jinzhao Wu</i>	
A Broad-Band 1:4 Static Frequency Divider MMIC in InPHBT	242
<i>Min Zhang, Qiao Meng, Youtao Zhang, Xiaopeng Li, Yi Zhang, Wei Cheng</i>	

Session 8: Mechanical and Electronic Systems

A New Hardware Trojan Detection System Based on CRON	246
<i>Jia Meng, Qiang Ren</i>	
Design for Test of Radiation-Hardened SOC	252
<i>Shaozhen Zhang, Mo Chen, Jun Mu</i>	
A Real-Time Fast Path Network Processor for EtherCAT and Home Gateway.....	257
<i>Xinbing Zhou, Dake Liu, Pengfei Zhai, Shaohan Liu</i>	
Optimum Design of a New High Voltage Cascaded Amplifier Based on OPA454.....	263
<i>Hao Pan, Fangrong Zhou, Ke Wang, Yutang Ma, Hao Zhang, Chuanhui Zhang</i>	

Study on the Effect of Liquid Cooling on the Temperature Distribution of Diesel Engine ECU	270
<i>Ren Yanping, Shi Jiatao, Cheng Ke, Yuan Shengjie, Zhang Xin</i>	
An Energy Allocation Method of Nodes in Energy Harvesting Distributed Detection System	275
<i>Liu Fei, Liu Xiangyang, Qi Zhengwei</i>	
A Module-Level Pipeline Implementation Based on Inter-Board Heterogeneous.....	280
<i>Haotian Liang, Cuiping Shao, Haonan Qiang, Huiyun Li</i>	
Memory Optimization of CNN Heterogeneous Multi-Core Architecture	287
<i>Muxuan Gao, Dake Liu, Zhidong Miao, Shaohan Liu</i>	