

2025 4th International Conference on Electronics, Integrated Circuits and Communication Technology (EICCT 2025)

**Chengdu, China
11-13 July 2025**



**IEEE Catalog Number: CFP250H3-POD
ISBN: 979-8-3315-3595-7**

**Copyright © 2025 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:	CFP250H3-POD
ISBN (Print-On-Demand):	979-8-3315-3595-7
ISBN (Online):	979-8-3315-3594-0

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

Table of Contents

Bandwidth Tunable Low-Pass Filter based on the Magnetic Coupling Effect	1
Xiaopeng Li, Hujun Jia, Guangbao Shan, Yanwen Zheng, Wentao Liu, Weihua Fan	
Design of Low Power SRAM Memory Cell and Sense Amplifier Based on 20nm Technology	6
Yi Lu, Wangqian Gao, Tao Jiang, Lijun Zhang	
Design Of Radiation-Hardened Schmitt Trigger	11
Chunxiao Ni, Wenxiu Mou, Xiao Su	
A BJT-based temperature sensor with an inaccuracy of ± 0.5 °C by segwise fitting and 2-point calibration	15
Xiaojia Wang, Jinzhong Sun	
A 40V-Output-Range Source Driver IC With 250MHz Mini-LVDS Receivers For Flexible Display Applications (α-Si TFT)	21
Deming Wang, Jie Yang, Jiawei Li, Xu Zhang	
Design and analysis of pulse power ignition system based on voltage controlled devices	25
Jiarui Zhang	
An Ultra-Low ppm/°C Current-Trimmed Bandgap Reference with High-order Curvature Compensation	30
Jiaming Mei, Aiyong Guo, Jianhua Zhang	
An Improved Current-Mode CMOS DC-DC Buck Converter with Rail-to-Rail Current-Sensing Technique	34
Haoyan Wu, Yi Shu	
A Slope Compensated Waveform Generator for Voltage Mode Buck DC-DC Converter	40
Chong Zhou, Dong Huang	
Phase-Locked Loop Design for 32Gbps/s High-Speed Serial Interface	45
Na Wang, Jun Li, Zhiwei Li, Jianguo Hu	
Compact ground-covered differential transmission line with multiple core layers in 65 nm CMOS	49
Ze Zheng Li, Changwei Wang	
A Low-latency Optimization for FPGA-Based Modular Multiplication in Public-Key Algorithm	53
Sizhe Chen, Ding Deng, Yangbo Huang, Shengqiang Lou, Pengyue Sun, Shaojie Ni	
A Current Variation-Based Monitoring Method for Microwave-Induced Damage Effects in Low-Noise Amplifiers	59
Tao Yan, Yibo Zhang, Zhiqiang Yang, Rongwei Zhang	
Low-Power Phase-Locked Loop Design: Co-Optimization of Subthreshold VCO and Adaptive Capacitive Tuning	65
Yi Xu, Yishuang Xu, Wenlu Shu	
Four-Phase Interleaved Bidirectional DC-DC Converter with Magnetic Integration and Voltage Control for High-Efficiency Energy Storage Systems	69
Weibing Li, Xiao Zeng, Jiali Wan, Yiyu Liu	

Design of 90o phase shifter circuit based on DC negative feedback	74
Chunhua Qi, Jiaming Qin, Tieliang Zhang, Mingxue Huo	
Design of a High-Reliability STT-MRAM Read Circuit Based on 40nm Process	79
Wangqian Gao, Tao Jiang, Yi Lu, Aiming Ji, Lijun Zhang	
Integrated Sensorless Control Strategy for PMSM: Improved SMO with PLL and Improved SMC-DPCC	83
Qi Wang, Xiao Zeng, Jiali Wan, Weibing Li	
8T SRAM CIM Based on Interleaved Adder Tree Structure	88
Tao Jiang, Yi Lu, Wangqian Gao, Lijun Zhang	
A 50MHz Digitally Controlled Integrated Voltage Regulator with 92.8% Peak Efficiency	94
Tao Zhang, Lei Liu, Ziyu He, Wanyuan Qu	
Design of Reconfigurable Baseband Receiving Circuit with Variable Gain and Bandwidth	98
Yang Liu, Hongman Liu, Yi Zhang, Jiacheng Zhao, Yi Liu, Di Jiang	
Design of Reconfigurable Broadband Power Amplifier	102
Yuefeng Zhang, Zhangfa Liu	
A gm/Id-Based Rapid Design Method for High-Bandwidth capless LDOs with Fast Transient Response	109
Zhaoyang Diao	
A Low-Power, Slope-Adjustable Logarithmic Amplifier With 0.18μm SiGe Process	115
Shifan Wu, Hongpeng Zhang, Chengying Chen, Chenying Zhang	
Computational Accuracy Enhancement in Large-Scale Capacitorless Gain-Cell Memory Arrays	119
Zhiyuan Wang, Yongzhen Chen, Zhenxin Luo, Shaohao Wang	
A Low-EMI Fast-Transient-Response Buck Converter Using Delta-Sigma Modulation	124
Xiaowei Lv, Haishi Wang	
A Efficient Method for Translating VLIW in C66x Architecture Based on QEMU	129
Lei Li, Zhuoran Su, He Zhou, Haoyu Yang, Taojie Ding, Fangfa Fu, Jinxiang Wang	
High-Precision Bandgap Reference with Piecewise Compensation and No Operational Amplifier	133
Kaiyue Pang, Dawei Liu, Jianlin Fan, Wei Zhuang, Renkuan Tian, Xingfu Wang	
A novel tunable Low-Noise Active Inductor	139
Shangxun Chu, Jinda Song, Xue Wang, Hui Zhang, Jian Cao	
Transmission delay analysis based on memristor gate circuits	144
Xinlan Pan, Xuefang Xiao	
Investigation of Charge Writing Consistency in Large-Scale CAA AOSFET 2T0C Memory Arrays	148
Yongzhen Chen, Zhiyuan Wang, Zhenxin Luo, Shaohao Wang	
Peak Current Mode Control Chip for IoT Applications	152
Wendong Lu	

Design of a Wide-Temperature and Low-Current Mismatch Charge Pump for Phase Locked Loop	156
Weifeng Li, Yu Jin, Ning Fu, Xuesong Chen, Xuedan Wang, Chaoyang He	
Ambient Dependent Metal Interconnection Failure of Flexible Poly-Si TFTs under Dynamic Stretch Stress	160
Qingbing Wu, Yang Hu, Wenjuan Zhou, Mingxiang Wang, Huaisheng Wang, Dongli Zhang	
An Improved Phase Current Reconstruction Algorithm Using Three-Resistor Sampling Technique	164
Wei Jia, Jiayong Cao, Cong Xu, Peidong Yu	
Design of Low-Loss Microstrip Circulator Based on NiCuZn Ferrite Material	169
Wei Zhou, Yu Xiong, Changjiang Chen, Songcheng Su, Yan Yang	
Design of an Enhanced Rail-to-Rail Power Operational Amplifier for Photovoltaic MPPT Application	173
Jiansheng Ran, Wei Zhou, Haishi Wang	
A High-Resolution Two-Stage Coarse-to-Fine Pipelined-SAR ADC	177
Zhihao Fan, Tao Chen, Gong Chen, Ruixiang Tang	
A new AC-DC hybrid microgrid network for critical loads in mountainous areas	182
Ke Deng, Lei Yu, Xuan Jin, Shaorong Wang, Jiaxuan Ren, Xinchun Wang	
Research on Weighted Geometric Dilution of Precision in GNSS Positioning	188
Xiaoying Wang, Qiang Ji, Mengtao Li, Zhanteng Song	
Research on Security of Spatial Information Transmission in Middleware System Based on G/S Mode	193
Yuanhong Zhang, Min Zhang, Chengming Ye	
Research on Multistatic Radar Localization Methods for GEO Targets	198
Shirui Yan, Defeng Chen, Bin Fan, Yueyang Wang	
Research on Communication Anomaly Detection Technology of Internet of Things Devices Based on Data Mining	204
Yungui Luo, Yanmei Ma, Daoqun Chen	
Stacked FAN-Based Radio Frequency Fingerprint Identification	208
Jialong He, Yuelei Xie	
Adaptive feedback magnetic coupling resonant wireless power transmission system	213
Lijun He, Xingpeng Liu	
A Novel Low Loss W-Band Transmit and Receive Module With MEMS Pprocessing	217
Guangfu Li, Xiaolin Li, Yu Zhao	
Multi-Band Pattern Synthesis of Time-Modulated Arrays Based on IPM	221
Zibai Wang, Hongyi Li, Hailin Li	
WiFi CSI Based Passive Human Activity Recognition Using BLSTM-TCN	226
Bolin Zhu, Hua Wei	

BSA-WSNs: A Blockchain-based Strategy for Device Authentication in Wireless Sensor Networks	230
Cheng Zhang, Zhan Wen, Demao Xiong, Wenzao Li	
Implementation of a Host Protocol Layer Based on USB 3.0 SuperSpeed	234
Bofeng Wang, Peng Ma, Minhua Ren	
A 16~21GHz 5-bit High-Accuracy Attenuator	240
Yishu Liang, Yiping Shangguan, Haiyang Quan	
Recognition of scenarios for civil aviation radiotelephony based on events	244
Fei Tan, Guimin Jia	
A wide-range narrow-linewidth tunable fiber laser	249
Zhang Zhang, Haode Xu, Xuelei Fu, Saifeng Huangfu, Yiming Wang	
Analysis and Optimization of Transmission Characteristics in MCR-WPT Systems Based on an Improved Dung Beetle Algorithm	253
Jiahao Dun, Lipin Li, Hang Chen	
LIGHT-LB: A Lightweight Load Balancing Strategy for Small Flows in Data Center Networks	258
Bocheng Suo, Yu Liu, Minhua Ren	
Underwater Acoustic Source Direction Finding Technology Based on MVDR Beamforming	264
Wenli Ren, Wenhong Lv, Yuecheng Xu, Xiaohan Guo, Yinjing Guo	
Fixed-Length Rotation Invariance Representation For Fingerprint	269
Xiaohua Li, Lu Yin, Shuangbo Yu, Lirui Xiao, You Jia, Shanhai Pan, Shaopeng Yang, Xing Huang	
A Study on Serpentine Maneuvering Target Tracking Based on Improved Square-Root Unscented Kalman Filter	277
Wenzheng Zeng, Wenjun Yang, Shuang Feng	
A Nimble Jamming Strategy for SSB in 5G NR Downlink	284
Xinying Huang, Jiang Zheng	
An IoT-Based Smart Sealing Machine for Mobile Devices: Integration of Embedded Systems and Image Processing	290
Mingjin Li, Hengjun Song, Xin Guo, Jialin Li, Juan Gao	
Status and Development Analysis of Satellite-Direct-to-Phone Technology for Existing Handsets	295
Peng Wang, Qinjuan Zhang, Yujuan Ma, Shan Lu, Yao Deng, Hao Duo	
Performance Analysis of HARQ in Low-Orbit Satellite Networks	300
Kejia Cui, Liang Zhang, Tianle Gao, Wenliang Lin, Yinqiu Cui, Zhizhong Wang, Yishan He, Zhongliang Deng	
Binocular Camera External Reference Calibration Method Based on Multi-sphere Calibration with Bundle Adjustment Optimization	304
Jianuo Liu, Jiayong Cao, Biheng Yan, Zhangyu Chen	
DDoS Attack Prediction Method Based on ITN-DTA	309
Weixia Zhang, Guiqin Yang, Zhiqi Liu	

A Communication Game Confrontation Simulation System for MANET	313
Yue Li, Junyang Zhou, Zhong Chen, Chao Wang, Junjie Chang, Hong Zhang	
An Efficient Automatic Gain Control Mechanism and Design for Wireless Broadband RF Receiver	317
Junjie Chang, Guanwei Guo, Jingyu Kang, Xincheng Xia, Yue Li, Shuangshuang Feng	
Building Data Link Layer of SDR Systems Based on Software Communications Architecture	321
Guorong Yang, Yunxiao Wan, Zhong Chen, Rui Guo, Jiang Zhu, Senke Hou	
Low Mismatch Charge Pump Structure with Triple Feedback and Triple Bias	325
Zhilei Han, Duli Yu, Huan Li, Yu Jin	
Blind carrier frequency offset estimator for cross QAM based on CPS hierarchical search	329
Shilin Ding, Yonggang Chi, Cunhan Zhang, Qiansheng Chen	
Innovative Application of Dynamic Spectrum Allocation in Intelligent Completion	336
Xuan Wen, Mengyan Chi, Huamin Zhang, Ziyu Liao	
Analysis of Information Security in Communication Networks Based on an Improved Bayesian Network	342
Fei Geng	
Design of Multi-functional Fusion Intelligent On-board Terminal for Fire Engine Based on LoRa Communication	346
Yubiao Huang, Yi Guo, Rui Liu, Zhiqi Tang, Jianfeng Hong, Jiaqing Zhang, Huiqun Wu, Zifan Wang	
Improving the Stability of Multi-hop IoT Communication Paths Using Graph Neural Networks	354
Yihan Hu	
Anti-tampering Scheme for Face Images based on Content-aware Selective Encryption and Blockchain	359
Demao Xiong, Zhan Wen, Cheng Zhang, Peng Xiao, Meiqin Wu	
Design and Implementation of an Environment Monitoring System for Agricultural Farms Based on the Internet of Things	363
Yanyan Jia, Qihui Tang, Xingwei Su, Kaida Cai	
A modified design method of PRF for high-speed maneuvering-platform SAR imaging based on range segmentation	369
Lin Yang	
Design and Testing of Coincidence Module for Quantum Optical Research	374
Haoqian Xu, Dingjun Li, Yuxuan Chen, Haoshu Tian, Jiajun Qin, Hao Han, Zhe Cao, Jiaming Li, Kairen Chen, Lei Zhao	
A Comparison of Different Methods for Measuring the Output Impedance of Current Sources Used in Bio-impedance Measurement	379
Yahan Yang, Langyi Tao, Xiao Liu	
Measuring system for weight and center of gravity of pipe gallery module	384
Shaoxuan Luo, Aimin Qiao, Yanchun Wang	
Meta-VSA: No-reference visual security assessment for perceptual encrypted images	388
Qian Bao, Zhenxing Zhao, Baoxing Wang, Cuicui Li	

Design of airport bird detection algorithm	392
Qimei Ma, Ju Cai, Qixing Chen	
Research on Road Defect Detection Technology Based on Improved YOLOv11n	396
Wenhao Yi, Chao Chen, Jiaying Deng, Zidong Li	
State of Health Prediction Method for Ship Propulsion Batteries Based on a Parallel TCN-LSTM Architecture	400
Yanyu Huang, Jianwei Huang, Shu Zhang, Tongqiang Chen	
Design and Implementation of an Intelligent Cane Based on Multi-sensor Fusion	405
Luhan Zhang	
Disturbance observer based on matched uncertainty sliding mode control	410
Zhaoye Song, Linyin Zhang	
Optimization Fitting of VCSEL L-I Characteristic Curve Based on Least Squares Method	414
Dongjian Chen	
Multi-Sensor Fusion for Localization: Comparative Study of Kalman Filter and Machine Learning Models	418
Yiliang Zhang	
Deep Learning Based End-to-End Tibetan Speech Recognition Research	423
Chao Tang, Ximing Yuan, Zehua Lv	
A PyMTL-Based Connectivity Verification Platform for Interface Model	427
Taojie Ding, Zhuoran Su, He Zhou, Ting Lei, Lei Li, Fangfa Fu, Jinxiang Wang	
An equivalent model of fluid-solid heat-transfer in power module of motor Inverter	431
Junjie Hu, Xiao Zeng, Xin Li, Jiao Chen	
Efficient joint source channel coding and decoding method for remote sensing image transmission	436
Zhongqiang Zhang, Qi Qiu, Fanyang Meng, Jiayin Xue	
A Hybrid Graphical-Textual Password Scheme with Hash Encoding	441
Dangquan Zeng	
Research on PCB defect detection algorithm based on improved YoloV11	446
Jiankang Yu, Chengyu Hou, Ziming Tang, Chao Chen	
Bearing Fault Diagnosis Method for Marine Vessels Based on Empirical Mode Decomposition and Informer Neural Network	450
Cheng Guo, Jianwei Huang, Shu Zhang, Tongqiang Chen	
Contrastive Clustering for Cross-Modal Alignment and Distribution bias in Visual Question Answering	455
Xingyu Chen, Tongyan Li, Guanhua Qiu, Junkai Wang	
Attention Recognition Based on EEG Using Multi-Model Classification	459
Yizhou Xue, Yuchen Wu, Shenziyang Zhang, Jiayue Feng	
An Improved Droop Control Strategy Based on Adaptive Virtual Impedance Control	464
Jingxuan Gao, Jinghua Zhou	

Research on accurate modeling based on LC Resonant Converter	470
Jian Jiang, Daorong Lu, Xintao Jiang, Xiang Xu, Luncun Cui	
Design of Feedforward PID Control System for DC Motor Based on Simulink and DSP	476
Haoran Wang, Jingyi Tian, Ye Yang	
Research on Multi-Model Fusion Fault Diagnosis Based on Deep Learning	481
Pengfei Xi, Xianwen Zeng	
Cybersecurity: Challenges, Technologies and Future Trends	485
Pan Zhang, Baofeng Zheng, Hongbi Ding, Jun Ruan	
Design of Positioning Accuracy Improvement System for Robot Navigation Based on Dead Reckoning Collaboration	490
Heqing Huang, Wenjing Liu	
A Deeper Study on Antenna Radiation Frequency	494
Jiangmei Tang, Shaomeng Wang, Yubin Gong	
Compressed Sensing Algorithm for Memristor-Based Computing Architectures	500
Ning Sun, Yu Jin	
An improved genetic tabu search algorithm for Rectangular Layout Optimization	506
Dexin Chu, Pengfei Zhang, Sensen Hou, Hang Shi	
A novel image encryption algorithm based on discrete chaotic mapping	510
Linsong Xiao, Wenzao Li, Jiacui Tang, Hanyun Li, Sai Yao, Chengyu Hou, Chengyu Wen	
Research and Optimization of Σ-Δ Modulator at High Temperature	515
Yuying Li, Duli Yu, Huan Li, Yu Jin	
Multipath Exploitation Adaptive Beamforming based on Spatial Smooth and Covariance Matrix Reconstruction	520
Naijun Yang, Zihao Pan, Mengdie Chen, Heng Wang, Pan Zhen, Jie Zhang	
Environment adaptability study of aerospace CSOP devices	525
Zhibo Yang, Wenyan Wang, Bo Wang, Nana Huai, Xuesong Zheng, Li Ji, Zhe Wang	
Design and research of an embedded development board based on STM32F407	530
Xiong Hao, Xiao Hu	
Design of Remote Lithium Battery Power Detection and Power Control System	536
Jingbo Liu	
Femtosecond Laser-Fabricated Liquid Metal Pressure Sensor for Flexible Pressure Detection System	541
Dafa Yan, Yahui Su	
A Physics-Based Hybrid Model for GaN HEMT Devices Utilizing Substrate Bias Modulation	546
Mingzhe Zheng, Yonghe Chen, Ling Li, Wenyan Yu	
High-Efficiency Reverse-Conducting IGBT with Snapback-Free and Low Conduction Loss	551
Yi Xiang Bong, Zhi Lin Sim, David Goh, Ignazio Bertuglia, Marianna Rita Alfano, Fang Hao Foo, Wei Mien Chin	

FPGA-Based Convolutional Neural Network Implementation	555
Tao Wang, Dejun Yin	
Laser direct writing fabrication of two-dimensional stretchable graphene supercapacitors with island-bridge structures	559
Yuyin Zhang, Zhiman Liu, Yang Zhang	
A sapphire substrate-based frequency reconfigurable microstrip antenna	563
Ying Liu	
The Performance Enhancement of Vertical Organic Transistors with Mesh Electrodes	567
Cheng Zhang, Rong Wu, Shuang Li	
Design of intelligent detection system for flash flood disasters by integrating YOLOv8 and remote sensing images	572
Tongjie Lv, Xiaopeng Leng, Zhen Hu	
Intelligent Optimization Strategies for Hierarchical Cloud-Edge Computing in Heterogeneous Hardware Ecosystems	578
Yumo Yang, Ziyi Ke, Xiao Jia, Lei Yan	
Dynamic tunable optical narrowband filter of multi-nanopore array based on continuum bound states	582
Meijing Jia	
Lifetime Prediction and Stability Analysis of TMR Chips Based on a Modified Arrhenius-Eyring Model	587
Hao Yu, Shuai Yuan, Wenzhi Chang, Yanpeng Gong	
Spectral Reflectometry-Based Film Thickness Measurement Using Particle Swarm Optimization	592
Jingwen Li, Siyao Wang, Jiao Bai, Xiaohao Wang, Xinghui Li	
Research on Communication Network Intrusion Detection Algorithm Based on Deep Learning	597
Xiaoyang Zhao	
Design of an SRAM-Based Computing-in-Memory Multiply-Accumulate Circuit for Image Processing	602
Chenglin Song, Longying Lan, Zilin Teng, Shikai Zuo, Jiangtao Yi, Chengying Chen	
Verification of the consistency of thermal resistance measurement of heat source-temperature measurement separated chips	606
Haibing Li, Hui Zhu, Yuanjie Lv, Shiwei Feng, Xiaozhuang Lu, Shijie Pan, Jiahe Wan	
MGPU-FI: A Fault Injection Framework for Reliability Analysis of Multi-GPU System	610
Leiyu Zhang, Jingweijia Tan, Xiaohui Wei	
Implementation of RAB Driver in Unikraft Environment	615
Lanjie Lu, Xiaoli Zhi, Xujie Zhao	
A Miniaturized Ultra-Wideband Spiral Antenna Loaded with Absorber	623
Changle Ying, Changming Chen, Kaixin Liu, Ruihe Le	
Deepfake Detection based on LSTM Networks with Facial Geometric Features	627
Demao Xiong, Zhan Wen, Cheng Zhang, Peng Xiao, Meiqin Wu	

A Multi-View Point Cloud Registration Method for Human Foot	631
Biheng Yan, Jiayong Cao, Jianuo Liu, Xingyu Deng	
Study on Signal Processing Technology for Slope Instability in Plateau Substations	636
Hongliang Wang, Genyuan Feng, Jiayi Yao, Yilin Wang	
OPMNet: Overlapped Patch Merging Convolution Net for Seismic Image Super-Resolution Reconstruction	641
Zhou Wang, Yajuan Xue, Zhege Liu, Shuna Chen	
Multi-scale Remote Sensing Ship Target Detection in Complex Backgrounds	646
Jiaxing Deng, Lijun Song, Jiandan Zhong, Wenhao Yi	
Author Index	650