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8 Digital PLL for Phase Noise Cancellation in Ring Oscillator-Based I/Q Receivers, Chen, University of California, Los Angeles

9 A Microcontroller with 96% Power-Conversion Efficiency using Stacked Voltage Domains, Blutman, NXP Semiconductors

11 A Bluetooth Low-Energy (BLE) Transceiver with TX/RX Switchable On-Chip Matching Network, 2.75mW High-IF Discrete-Time Receiver, and 3.6mW All-Digital Transmitter, Kuo, TSMC

13 A 8.2-mW 10-b 1.6-GS/s 4x TI SAR ADC with Fast Reference Charge Neutralization and Background Timing-Skew Calibration in 16-nm CMOS, Lin, MediaTek Inc.


17 A 35μW 96.8dB SNDR 1 kHz BW Multi-Step Incremental ADC Using Multi-Slope Extended Counting with a Single Integrator, Zhang, Oregon State University

19 SleepTalker: a 28nm FDSOI ULV 802.15.4a IR-UWB Transmitter SoC achieving 14pJ/bit at 27Mb/s with Adaptive-FBB-based Channel Selection and Programmable Pulse Shape, de Streel, ICTEAM Institute, Université catholique de Louvain, Louvain-la-Neuve, Belgium

27 A 0.3-2.6 TOPS/W Precision-Scalable Processor for Real-Time Large-Scale ConvNets, Moons, KU Leuven

28 A 350mV-900mV 2.1GHz 0.011mm2 Regular Expression Matching Accelerator with Aging-Tolerant Low-VMIN Circuits in 14nm Tri-Gate CMOS, Agarwal, Intel Corporation

31 A 14-bit 2.5GS/s and 5GS/s RF Sampling ADC with Background Calibration and Dither, Ali, Analog Devices

34 A Wireless Power Transfer System with Enhanced Response and Efficiency by Fully-Integrated Fast-Tracking Wireless Constant-Idle-Time Control for Implants, Huang, Keio University

36 A Field-Programmable Mixed-Signal IC with Time-Domain Configurable Analog Blocks, Choi, Seoul National University

39 A 0.58mm2 2.76Gb/s 79.8pJ/b 256-QAM Massive MIMO Message-Passing Detector, Tang, University of Michigan

41 A Transformer-based Digital Isolator With 20kVPK Surge Capability and > 200kV/μS Common Mode Transient Immunity, Yun, Analog Devices Inc

47 A PVT-Robust ~59-dBc Reference Spur and 450-fsRMS Jitter Injection-Locked Clock Multiplier Using a Voltage-Domain Period-Calibrating Loop, Lee, Ulsan National Institute of Science and Technology

49 A 58.6mW Real-Time Programmable Object Detector with Multi-Scale Multi-Object Support Using Deformable Parts Model on 1920x1080 Video at 30fps, Suleiman, MIT

50 A 16-Channel 1.1mm2 Implantable Seizure Control SoC with Sub-μW/Channel Consumption and Closed-Loop Stimulation in 0.18μm CMOS, Shoaran, Caltech

51 250mV-950mV 1.1Tbps/W Double Affine Mapped Sbox based Composite-Field SMS4 Encrypt/Decrypt Accelerator in 14nm Tri-gate CMOS, Satpathy, Intel Corporation
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56 A Microelectrode Array with 8,640 Electrodes Enabling Simultaneous Full-frame Readout at 6.5 kfps and 112-Channel Switch-Matrix Readout at 20 kS/s, Yuan, RIKEN, Japan

60 A 50.6-Gb/s 7.8-mW/Gb/s –7.4-dBm Sensitivity Optical Receiver based on 0.18-um SiGe BiCMOS Technology, Takemoto, Hitachi Ltd.

62 A 4fJ/bit Delay-Hardened Physically Unclonable Function Circuit with Selective Bit Destabilization in 14nm Tri-gate CMOS, Mathew, Intel Corporation

63 A 220pJ/Pixel/Frame CMOS Image Sensor with Partial Settling Readout Architecture, Ji, Stanford University

67 A 13.3mW 60MHz Bandwidth, 76dB DR 6GS/s CTDSM with Time Interleaved FIR Feedback, Jain, IIT Madras, India

69 A 128-Channel Spike Sorting Processor Featuring 0.175 μW and 0.0033 mm2 per Channel in 65-nm CMOS, Zeinolabedin, Nanyang Technological University, Singapore

74 A 0.034mm2 , 725fs RMS Jitter, 1.8%/V Frequency-Pushing, 10.8-19.3GHz Transformer-Based Fractional-N All-Digital PLL in 10nm FinFET CMOS, Li, TSMC, Hsinchu, Taiwan

77 A 2.4GHz Ternary Sequence Spread Spectrum OOK Transceiver with Harmonic Spur Suppression and Dual-Mode Detection Architecture for ULP Wearable Devices, Kim, KAIST

81 A Chopping Switched-Capacitor RF Receiver with Integrated Blocker Detection, +31dBm OB-IIP3, and +15dBm OB-B1dB, Xu, Columbia University

88 A 1.40mm2 141mW 898GOPS Sparse Neuromorphic Processor in 40nm CMOS, Knag, University of Michigan

95 An 8.3M-pixel 480fps Global-Shutter CMOS Image Sensor with Gain-Adaptive Column ADCs and 2-on-1 Stacked Device Structure, Oike, Sony

96 3.5mW 1MHz AM Detector and Digitally-Controlled Tuner in a-IGZO TFT for Wireless Communications in a Fully Integrated Flexible System for Audio Bag, Meister, Technische Universität Dresden

97 A 50MHz 5V 3W 90% Efficiency 3-Level Buck Converter with Real-Time Calibration and Wide Output Range for Fast-DVS in 65nm CMOS, Liu, Hong Kong University of Science and Technology

100 80Kb 10ns Read Cycle Logic Embedded High-K Charge Trap Multi-Time-Programmable Memory Scalable to 14nm FIN with no Added Process Complexity, Viraraghavan, GLOBALFOUNDRIES INDIA

102 A 35fJ/Step Differential Successive Approximation Capacitive Sensor Readout Circuit with Quasi-Dynamic Operation, Omran, King Abdullah University of Science and Technology (KAUST)

105 A 65nm CMOS Transceiver with Integrated Active Cancellation Supporting FDD from 1GHz to 1.8GHz at +12.6dBm TX Power Leakage, Ramakrishnan, UC Berkeley

108 A 125 mW 8.5-11.5 Gb/s Serial Link Transceiver with a Dual Path 6-bit ADC/5-tap DFE Receiver and a 4-tap FFE Transmitter in 28 nm CMOS, Raghavan, Broadcom Corp

112 A 12-bit 1.6 GS/s Interleaved SAR ADC with Dual Reference Shifting and Interpolation Achieving 17.8 fJ/conv-step in 65nm CMOS, Nam, University of Southern California

114 A 18.5-fJ/step VCO-Based 0-1 MASH Delta-Sigma ADC with Digital Background Calibration, Sanyal, The University of Texas at Austin
120  A 16Gb/s 14.7mW Tri-Band Cognitive Serial Link Transmitter with Forwarded Clock to Enable PAM-16/256-QAM and Channel Response Detection in 28 nm CMOS, Du, *University of California, Los Angeles*

122  95% Light-load Efficiency Single-Inductor Dual-Output DC-DC Buck Converter with Synthesized Waveform Control Technique for USB Type-C, Yang, *ECE, National Chiao Tung University*

123  A 16nm Dual-Port SRAM with Partial Suppressed Word-line, Dummy Read Recovery and Negative Bit-line Circuitries for Low VMIN Applications, Chen, *TSMC*

124  A Low-EMI Four-Bit Four-Wire Single-Ended DRAM Interface by Using a Three-Level Balanced Coding Scheme, Yi, *POSTECH*

125  A ±36A Integrated Current-Sensing System with 0.3% Gain Error and 400μA Offset from −55°C to +85°C, Heidary Shalmany, *Delft University of Technology*

128  A 14.6mW 12b 800MS/s 4×Time-Interleaved Pipelined SAR ADC achieving 60.8dB SNDR with Nyquist input and sampling timing skew of 60fsrms without calibration, Lien, *MediaTek Inc.*

134  A 190GFLOPS/W DSP for Energy-Efficient Sparse-BLAS in Embedded IoT, Dorrance, *University of California, Los Angeles*

136  A 28nm CMOS Ultra-Compact Thermal Sensor in Current-Mode Technique, Eberlein, *Intel Germany*

138  A 114-pW PMOS-Only, Trim-Free Voltage Reference with 0.26% within-Wafer Inaccuracy for nW Systems, Dong, *University of Michigan, Ann Arbor*

139  A 450mV Timing-Margin-Free Waveform Sorter based on Body Swapping Error Correction, Kim, *Columbia University*

141  A 2.4-GHz 6.4-mW Fractional-N Inductorless RF Synthesizer, Kong, *University of California, Los Angeles*

145  A Multiple-String Hybrid LED Driver with 97% Power Efficiency and 0.996 Power Factor, Li, *The Hong Kong University of Science and Technology*

149  A BJT-based Temperature-to-Digital Converter with ±60mK (3σ) Inaccuracy from -70°C to 125°C in 160nm CMOS, Yousefzadeh, *Delft University of Technology*

150  A Sine-Reference Band (SRB)-Controlled Average Current Technique for a Phase-Cut Dimmable AC-DC Buck LED Driver without an Electrolytic Capacitor, Shin, *KAIST, Daejeon, Korea*

157  A 0.44fJ/conversion-step 11b 600KS/s SAR ADC with Semi-Resting DAC, Hsieh, *National Tsing Hua University*

160  An Oscillator Collapse-Based Comparator with Application in a 74.1dB SNDR, 20kS/s 15b SAR ADC, Shim, *Korea University*

165  A 10Gb/s, 342fJ/bit Micro-Ring Modulator Transmitter with Switched-Capacitor Pre-Emphasis and Monolithic Temperature Sensor in 65nm CMOS, Saeedi, *Oracle Labs, Redwood Shores, CA*

167  A 56Gb/s PAM4 Wireline Transceiver using a 32-way Time-Interleaved SAR ADC in 16nm FinFET, Frans, *Xilinx Inc*

168  A Fully Integrated 144 MHz Wireless-Power-Receiver-on-Chip with an Adaptive Buck-Boost Regulating Rectifier and Low-Loss H-Tree Signal Distribution, Kim, *University of California, San Diego*
182 An 18 μW Spur Canceled Clock Generator for Recovering Receiver Sensitivity in Wireless SoCs, Ogasawara, Toshiba Corporation

185 A Wearable Ear-EEG Recording System Based on Dry-Contact Active Electrodes, Zhou, Department of Engineering, Aarhus University

190 A 97.99 dB SNDR, 2 kHz BW, 37.1 uW Noise-Shaping SAR ADC with Dynamic Element Matching and Modulation Dither Effect, Obata, Panasonic Corporation

192 A 7-to-18.3GHz Compact Transformer based VCO in 16nm FinFET, Raj, Xilinx Inc.

196 A Machine-learning Classifier Implemented in a Standard 6T SRAM Array, Zhang, Princeton University

200 A Compact 446 Gbps/W AES accelerator for Mobile SoC and IoT in 40nm, Zhang, University of Michigan

205 A 2.048 Mb/s Full-Duplex Free-Space Optical Transceiver IC for a Real-Time In Vivo Neurofeedback Mouse Experiment Under Social Interaction, Hwang, KAIST

206 A 32 Gb/s Rx Only Equalization Transceiver with 1-tap Speculative FIR and 2-tap Direct IIR DFE, Hwang, Korea University

207 A 0.6mW 31MHz 4th-Order Low-Pass Filter with +29dBm IIP3 Using Self-Coupled Source Follower Based Biquads in 0.18μm CMOS, Xu, Oregon State University

209 A 35 mW 10 Gb/s ADC-DSP less Direct Digital Sequence Detector and Equalizer in 65nm CMOS, Hossain, University of Alberta

215 Embedded Memory and ARM Cortex-M0 Core Using 60 nm C-Axis Aligned Crystalline Indium–Gallium–Zinc Oxide FET Integrated with 65 nm Si CMOS, Onuki, Semiconductor Energy Laboratory Co., Ltd.

216 An 8.865-GHz -244dB-FOM High-Frequency Piezoelectric Resonator-Based Cascaded Fractional-N PLL with Sub-ppb-Order Channel Adjusting Technique, Ikeda, Tokyo Institute of Technology

228 An Inductor-less Fractional-N Injection-Locked PLL with a Spur-and-Phase-Noise Filtering Technique, Li, The Hong Kong University of Science and Technology


233 A 0.23 micro-g Bias Instability and 1.6 micro-g/rt(Hz) Resolution Silicon Oscillating Accelerometer with Build-in Sigma-Delta Frequency-to-Digital Converter, zhao, Nanjing University of Science and Technology

242 A Dead-time Free Global Shutter CMOS Image Sensor with in-pixel LOFC and ADC using Pixel-wise Direct Connections, Sugo, Tohoku Univ.

247 A Reconfigurable SIMO System with 10-Output Dual-Bus DC-DC Converter using the Load Balancing Function in Group Allocator for Diversified Load Condition, Shin, KAIST

261 1.74-μW/ch, 95.3%-Accurate Spike-Sorting Hardware based on Bayesian Decision, Jiang, Columbia University

262 A 2x Logic Density Programmable Logic Array using Atom Switch Fully Implemented with Logic Transistors at 40nm-node and beyond, Tsuji, NEC Corporation
A 9.84–73.2 nJ, 0.048 mm2 Time-Domain Impedance Sensor that Provides Values of Resistance and Capacitance, Hong, Nanyang Technological University, Singapore, 2Institute of Microelectronics, A*STAR, Singapore.

A 14-bit 8.9GS/s RF DAC in 40nm CMOS achieving >71dBc LTE ACPR at 2.9GHz, Ravinuthula, Texas Instruments Inc

A 180 mW Multistandard TV Tuner in 28 nm CMOS, Xiao, Broadcom

A Fully-Adaptive Wideband 0.5-32.75Gb/s FPGA Transceiver in 16nm FinFET CMOS Technology, Upadhyaya, Xilinx


A 260µW Infrared Gesture Recognition System-on-Chip for Smart Devices, Oh, University of Michigan

-197dBc/Hz FOM 4.3-GHz VCO Using an Addressable Array of Minimum-Sized NMOS Cross-Coupled Transistor Pairs in 65-nm CMOS, Jha, The University of Texas, Dallas

An High-Density CMOS Multi-Modality Joint Sensor/Stimulator Array with 1024 Pixels for Holistic Real-Time Cellular Characterization, Park, Georgia Institute of Technology

A 0.9um2 1T1R Bit Cell in 14nm SoC Process for Metal-Fuse OTP Array with Hierarchical Bitline, Bit Level Redundancy, and Power Gating, Chen, Intel Corporation

Multi-modal Smart Bio-sensing SoC Platform with >80dB SNR 35µA PPG RX Chain, Sharma, Texas Instruments Inc.

A 16-channel Noise-Shaping Machine Learning Analog-Digital Interface, Buhler, University of Michigan, Ann Arbor, MI

A 380pW Dual Mode Optical Wake-up Receiver with Ambient Noise Cancellation, Lim, University of Michigan


A 0.003 mm² 5.2 mW/tap 20 GDbd Inductor-less 5-Tap Analog RX-FFE, Boesch, Stanford University

A 23mW 24GS/s 6b Time-Interleaved Hybrid Two-Step ADC in 28nm CMOS, Xu, University of Texas at Dallas

200-280GHz CMOS RF Front-End of Transmitter for Rotational Spectroscopy, Sharma, University of Texas at Dallas

A Front-end ASIC with Receive Sub-Array Beamforming Integrated with a 32 × 32 PZT Matrix Transducer for 3-D Transesophageal Echocardiography, Chen, Electronic Instrumentation Lab., Delft University of Technology, Delft, The Netherlands

A 6.05-Mb/mm2 16-nm FinFET Double Pumping 1W1R 2-port SRAM with 313 ps Read Access Time, Yabuuchi, Renesas Electronics Corp.

A 400mV Active VMIN, 200mV Retention VMIN, 2.8 GHz 64Kb SRAM with a 0.09 um2 6T bitcell in a 16nm FinFET CMOS Process, Bhavnagarwala, ARM Research
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342  A Fast, Flexible, Positive and Negative Adaptive Body-Bias Generator in 28nm FDSOI, Blagojević, STMicroelectronics, Crolles; Dept. of EECS, University of California, Berkeley; Institut Supérieur d'Électronique de Paris

350  A 5.8 pJ/Op 115 Billion Ops/sec, to 1.78 Trillion Ops/sec 32nm 1000-Processor Array, Bohnenstiehl, University of California, Davis

388  Broadband THz Spectroscopic Imaging based on a Fully Integrated 4×2 Digital-to-Impulse Radiating Array with a Full-Spectrum of 0.03-1.03THz in Silicon, Assefzadeh, Rice University