

IISW25 Technical Program

Session 1: Pixel Design and Process Technology (I)

R01.1 State-of-the-Art CMOS Image Sensors: Looking Under the Hood

Daniel McGrath, TechInsights, Inc., San Jose, CA, USA

R01.2 A 0.5 μ m pixel-pitch 200Mpixel CMOS Image Sensor with Substantial Linearity, Sensitivity, Full-well capacity and Temporal Noise by Front Deep Trench Isolation

Minkyung Kim, DongHyun Kim, Kyoung eun Chang, Kieyoung Woo, Kisang Yoon, Sung-In Kim, Bumsuk, Kim, Kyungho Lee, and Jesuk Lee
System LSI Division, Samsung Electronics Co., Republic of Korea

R01.3 A 0.45 μ m-pitch Photodiode Based 1-layer Dual Pixel for CMOS Image Sensor with High Full-Well Capacity and Low Noise

Seungki Baek, Sungmin An, Dusik Sul, Masato Fujita, Seungki Jung, Yunha Na, Taesub Jung, Haetaek Jeong, Minsoo Lee, Eunkyung Park, Kyungho Lee, and JeSuk Lee
System LSI Division, Samsung Electronics Co., Korea

R01.4 Charge domain type 2.2 μ m BSI Global Shutter pixel with Dual Depth DTI Produced by thick-film epitaxial process

Toshifumi Yokoyama¹, Yoshihiro Noguchi¹, Masafumi Tsutsui¹, Masahiko Takeuchi¹, Masahiro Oda¹ & Fenigstein Amos²

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R01.5 A RGBZ 1.4 μ m Image Sensor for Color and Near-Infrared indirect Time-Of-Flight Depth Sensing on monolithic Silicon

Clémence Jamin-Mornet¹, Hugo Dewitte¹, William Guicquero¹, Gaëlle Palmigiani¹, François Aye¹, Olivier Saxod¹, Lionel Gerard¹, Cyril Bellegarde¹, Laurent Coindoz-Bernard¹, Lilian Masarrotto¹, Samir Guerroudj², Patrice Waltz², Pierre Malinge², Matteo Vignetti², Pascal Fonteneau², Arnaud Tournier²

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Session 2: High Dynamic Range, High Speed, and Global Shutter (I)

R02.1 A 3.24 μ m 400 × 400 117dB Dynamic Range 3-Layer Stacked Digital Pixel Sensor with Triple Quantization and Fixed Pattern Noise Correction

Kwuang-Han Chang¹, Tsung-Hsun Tsai², Yi-Hsuan Lin¹, Sheng-Yeh Lai¹, Hao-Ming Hsu¹, Hirofumi

Abe³, Kazuya Mori³, Hideyuki Fukuhara³, Chih-Hao Lin¹, Toshiyuki Isozaki³, Wei-Chen Li¹, Wei-Fan Chou¹, Chien-Chun Lee¹, Wen-Han Tseng¹, Wun-Young Leo¹, Masayuki Uno³, Rimon Ikeno³, Masato Nagamatsu³, Guang Yang¹, Shou-Gwo Wu¹, Andrew Berkovich², Raffaele Capoccia⁴, Song Chen², Zhao Wang⁵, Chiao Liu², Lyle Bainbridge⁶

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R02.2 2.1 μ m LFM Automotive Pixel with Single Photodiode and 126 dB of Single Exposure Dynamic Range

Manuel Innocent¹, Pei Heng (Benjamin) Hung², Grady Anderson³, Bartosz Banachowicz², Harsh Jog³, Gurvinder Singh⁴, Bharat Balar⁴, Anirudh Oberoi⁴ and Maheedhar Suryadevara⁴

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R02.3 A 12-to-16-bit Column-Parallel CMS-based ADC for High Monotonically Linear Dynamic Range

De Xing Lioe^{1,2}, Tomohiro Okuyama², Keita Yasutomi^{1,2}, Keiichiro Kagawa², Shoji Kawahito^{1,2}

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R02.4 A CMOS Image Sensor with Pixel-Wise Triple-CG Modulation and Gain-Regulating Pre-ISP for Single-Frame Adaptive TCG-HDR Imaging

Yi Luo¹ and Shahriar Mirabbasi²

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R02.5 On the determination threshold of illumination-adaptive signal selection technology for multi-stage LOFIC CMOS image sensors

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Session 3: Optics, Noise, Modeling, and Characterization

R03.1 Hybrid Optical Structure with 1x1 and 2x2 Micro-lens Mixed Array for Image Resolution Improvement

Gyeong Jin Lee, Hyungeun Yoo, Wooseok Choi, Jina Kim, Sangwoo Lee, Sungho Gil, Seunghyeok June, Hyungchae Kim, Yujeong Baek, MinYoung Jung, Junga Koh, Wonjun Kang, EuiYeol Kim, Jungbin Yun, Bumsuk Kim, and Kyungho Lee
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R03.2 Recovery of Random Telegraph Noises in a Stacked CMOS Image Sensor by High-Temperature Annealing after Hot-Carrier Stress

Calvin Yi-Ping Chao, Thomas Meng-Hsiu Wu, Charles Chih-Min Liu, Shang-Fu Yeh, Chih-Lin Lee, Honyih Tu, Zhong-Da Wu, Joey Chiao-Yi Huang, and Chin-Hao Chang
Taiwan Semiconductor Manufacturing Company, Hsinchu, Taiwan, ROC

R03.3 Dark Signal Quantization and Random Telegraph Signal in a Quanta Image Sensor

Joanna Krynski^{1,2}, Daniel McGrath², Alexandre Le Roch¹, Sarah Holloway², Lucrezia Migliorin², Cédric Virmontois¹, Vincent Goiffon²
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R03.4 A General Method to Predict Full-Well Capacity for Anti-Blooming Pixels

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R03.5 In-Fab Parameter Characterization for Pinned Photodiodes in CMOS Image Sensors

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Session 4: Pixel Design and Process Technology (II)

R04.1 A Twisted Charge Transfer Structure for All-directional Autofocus CMOS Image Sensor

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R04.2 Design consideration of Deep-Trench Isolation for sub-micron dual-photodiode pixel

Jonghyun Go¹, Keunyeong Cho¹, Changkyu Lee¹, Jinyoung Kim¹, Yongsang Park¹, Minkwan Kim¹, Taehoon Kim¹, Jiyoung Song¹, Dami Park¹, Sooyeon Kim¹, Gyunha Park¹, Hyuk Hur¹, Jae Ho Kim²

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R04.3 Airgrid with near-ideal structure for enhanced performance and reliability

Xing Chen, Kun Li, Jeremiah Hebding, Vinayak Rastogi, Zhen Xu, Doug Lee, Yubin Zhang, Charisse Zhao, El Mehdi Bazizi, Michael Chudzik

Applied Materials Inc., Santa Clara, CA, USA

R04.4 Near-infrared sensitivity enhancement of silicon photodiode with plasmonic grating

Koya Okazaki¹, Takahito Yoshinaga¹, Nobukazu Teranishi², and Atsushi Ono^{1,2}

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R04.5 Deep trench isolation via PLAD B2H6 passivation process for pixel scaling in advanced CMOS image sensors

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Session 5: High Dynamic Range, High Speed, and Global Shutter (II)

R05.1 A 2.1 μ m High Dynamic Range CMOS Image Sensor with Sub-pixel and Lateral Overflow Integration Capacitor Architecture

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R05.2 Programmable Dynamic Range Extension up to 110dB Based on Charge Splitting Method with 4-Tap CMOS Image Sensor

Yu Feng¹, Yusuke Tanihata², Kamel Mars^{3,4}, Keita Yasutomi⁴, and Shoji Kawahito⁴, Keiichiro Kagawa⁴

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R05.3 Charge Overflow Control of A 3.96- μm 124dB HDR-DPS for Triple and Single Quantization Dual-Channel Operation

Ken Miyauchi¹, Hsin-Li Chen², Toshiyuki Isozaki¹, Hideki Owada¹, Rimon Ikeno¹, Kazuya Mori¹, Masayuki Uno¹, Hideyuki Fukuhara¹, Hirofumi Abe¹, Masato Nagamatsu¹, Isao Takayanagi¹, Chih-Hao Lin², Wen-Chien Fu², Shou-Gwo Wu², Song Chen³, Ramakrishna Chilukuri³, Wei Gao³, Andrew P. Hammond³, Tsung-Hsun Tsai³, and Chiao Liu³

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R05.4 Automotive 135dB Dynamic Range Image Sensor Enabled by 13-fF In-pixel Capacitor and Novel Pre-discharge Readout Architecture

*Yiliang Song, Yunfei Gao, Bin Lu, Fei Song, Pengfei Yu, Wei Wang, Na Lu, Jianhua Zheng
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R05.5 High Performance CMOS Logarithmic Sensor with Continuous Adaptive FPN Correction
Yang NI

Spectrum in Motion France, France

Session 6: Time of Flight and SPAD Devices (I)

R06.1 Long-Range iToF Sensing with Hybrid Pulsed-CW Operation enabling High Dynamic Range, Ambient Light Rejection, and In-Chip Depth Calculation

*Erez Tadmor, Guy Likver, Yossi Halpern, Itai Israel, Zvika Veig
onsemi, Haifa, Israel*

R06.2 320x240 SPAD direct Time-of-Flight Image Sensor and Camera based on In-Pixel Correlation and Switched-Capacitor Averaging

Maarten Kuijk¹, Ayman Morsy¹, Thomas Lapauw¹, Thomas Van den Dries¹, Mohamed A. Bounouar², Hans Ingelberts¹, Daniel Van Nieuwenhove²

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R06.3 A Multi-Zone Light-Tracing Hybrid Time-of-Flight CMOS Image Sensor for Low Power Long-Range Outdoor Operations

Kamel Mars^{1,2}, Seiya Ageishi², Masashi Hakamata², Tomoaki Sakita³, Daisuke Iguchi³, Junichiro Hayakawa³, Keita Yasutomi², Keiichiro Kagawa², Shoji Kawahito²

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R06.4 Analysis of a coherent 3D imaging sensor for long-range LiDAR

Preethi Padmanabhan, Steven Fortune, Andres Forrer, Fabiana Settembrini, and Remus Nicolaescu

Pointcloud GmbH, Zürich, Switzerland

R06.5 A Short-Pulse Indirect ToF Imager Using 6-Tap Pixel with Backside Illuminated Structure for High-Speed Charge Demodulation

Tomohiro Okuyama¹, Haruya Sugimura¹, Gabriel Alcade¹, Seiya Ageishi¹, Hyeun Woo Kwen¹, De Xing Lioe^{1,2}, Kamel Mars^{1,3}, Keita Yasutomi^{1,2}, Keiichiro Kagawa¹, Shoji Kawahito^{1,2}

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Session 7: Smart and Event-based

R07.1 Asynchronous Depth Sensing through Direct Time-of-Flight Flash LiDAR

Yiyang Liu, Rongxuan Zhang, Filip Taneski, Istvan Gyongy, Robert Henderson

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R07.2 A physically realistic computationally efficient DVS model

Rui Graca and Tobi Delbruck

Sensors Group, Inst. of Neuroinformatics, UZH-ETH Zurich, Zurich, Switzerland

R07.3 Pixel Design of Gain-Boosted Event-Based Vision Sensor to Control Event Noise and Latency at Low Illuminance

M. Tsukamoto, Y. Sato, F. Mochizuki, H. Takahashi, K. Yamashita, A. Niwa, T. Yamaguchi, H.

Wakabayashi, Y. Oike

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R07.4 A DVS sensor with a Photovoltaic Receptor

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Session 8: Beyond Visible and Scientific

R08.1 83.5 dB Dynamic Range Lead-Free SWIR Image Sensors Based on Monolithic Fabrication of

InAs Thin-Film Quantum Dot Photodiodes

Myonglae Chu, Wenya Song, Joo Hyoung Kim, Tristan Weydts, Vladimir Pejovic, Minhyun Jin, Sang Yeon Lee, Yoora Seo, Jonas Bentell, Abu Bakar Siddik, Isabel Pintor Monroy, Marina Vildanova, Arman Uz Zaman, Tae Jin Yoo, Antonia Malainou, Wagdy Hussein, Annachiara Spagnolo, Gauri Karve, Itai Lieberman, and Pawel E. Malinowski
imec, Leuven, Belgium

R08.2 Optimized BSI CMOS Pixel for both UV and Visible Light

N. Fassi^{1,2}, J.-P. Carrère¹, M. Etribeau², F. Omeis¹, E. Leon Perez¹, K. Jouannic¹, M. Orru¹, C. Augier¹, T. Combier¹, C. Blanc¹, A.S. Sodjo¹, P. Magnan² and V. Goiffon²

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R08.3 A Quantum-dot-based CMOS Image Sensor with Direct X-ray Conversion for Nondestructive Testing

Chun-Min Zhang¹, Riccardo Quaglia¹, Artem Shulga², Vincent Goossens², Paula Blanca Cruz¹, and Pierre-François Ruëdi¹

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R08.4 A 5,000 fps, 4Megapixel, rad-tolerant, wafer-scale CMOS image sensors for the direct detection of electrons and photons

A. Scott, C. Bauzà, A. Bofill-Petit, A. Font, M. Gargallo, R. Gifreu, K. Latif, M. Giulioni, O. Lladós Cos, A. Mollà Garcia, M. Sannino and R. Turchetta

IMASENIC, Barcelona, Spain

Session 9: Time of Flight and SPAD Devices (II)

R09.1 3D-Stacked 1Megapixel Dual-Time-Gated Color SPAD Image Sensor with Simultaneous Dual Image Output Architecture for Efficient Sensor Fusion

K. Chida, K. Morimoto, N. Isoda, H. Sekine, T. Sasago, Y. Maehashi, S. Mikajiri, K. Tojima, M. Shinohara, A. Abdelghafar, H. Tsuchiya, K. Inoue, S. Omodani, A. Ehara, J. Iwata, T. Itano, Y. Matsuno, K. Sakurai, and T. Ichikawa

Canon Inc., Kanagawa, Japan

R09.2 Over 2 Million Frames per Second 128×128 Macropixel 3D-Stacked Burst SPAD-Based Image Sensor

Yuanyuan Hua¹, Maciej Wojtkiewicz¹, Francescopaolo Mattioli Della Rocca^{1,2}, Ahmet T Erdogan¹, Lars Fisher¹, Robert K Henderson¹

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R09.3 Range ambiguity cancellation for continuous-wave indirect ToF image sensors

Bumsik Chung, Il-Pyeong Hwang, Daeyun Kim, Jonghan Ahn, Daeho Kim, Myunghan Bae, Jiheon Park, Inho Song, Hogyun Kim, Minsik Kim, Taemin An, Hyeyeon Lee, Youngkyun Jeong, Min-Sun Keel, Juhyun Ko, Jesuk Lee
Samsung Electronics, Hwaseong, Korea

R09.4 Stress Testing of Spiking Neural Network-based TDC-less dToF

Jack I. MacLean¹, Brian D. Stewart², Istvan Gyongy¹

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R09.5 Reconfigurable, large-format D-ToF/photon-counting SPAD image sensors with embedded FPGA for scene adaptability

Tommaso Milanese, Baris Can Efe, Claudio Bruschini, Edoardo Charbon
AQUA laboratory, École polytechnique fédérale de Lausanne (EPFL)

Session 10: Specialty & New Applications

R10.1 Advanced Active Deep Trench Designs for Enhanced Charge Transfer Performances in CCD-on-CMOS Image Sensor

Antoine Salih Alj¹, Pierre Touron², Jean-Pierre Carrère², Stéphane Demiguel³, Cédric Virmontois⁴, Valérian Lalucua⁴, Julien Michelot⁵, Pierre Magnan⁶, and Vincent Goiffon⁶

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R10.2 An 8.7Mpixel 240fps CMOS Image Sensor with 4 × 4 Pixel-Block Local Adaptation of Resolution, Frame Rate, and Exposure Time for Scene Adaptive Imaging

Kohei Tomioka¹, Kodai Kikuchi¹, Akira Honji¹, Takenobu Usui¹, Kazuya Kitamura¹, Shoji Kawahito²

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² Research Institute of Electronics, Shizuoka University, Hamamatsu, Japan

R10.3 A 640x480 Resolution 326,000fps Continuous-Mode Ultra-High Speed Global-Shutter CMOS BSI Imager with Exceptional Light Sensitivity

Jean-Luc Bacq¹, Mandar Thite¹, Roeland Vandebriel¹, Swaraj Bandhu Mahato¹, Philippe Coppejans¹,

Jonathan Borremans^{1,4}, Linkun Wu^{1,5}, Kuba Rączkowski^{1,4}, Ismail Cevik¹, Vasyl Motsnyi¹, Luc Haspeslagh¹, Andreas Suess^{1,3}, Brandon Flon², Dan Jantzen², Phil Jantzen², Celso Cavaco¹, Annachiara Spagnolo¹

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R10.4 High-Frame Rate Low-Noise Global Shutter CMOS Image Sensor for High-Speed Machine Vision

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R10.5 Linkable Self-Coded CMOS Image Sensor with Serial Communication Interface for Compact Omnidirectional Lensless Cameras

Yuya Miyagi¹, Fuki Hosokawa¹, Tomoki Nakamura¹, Ryoma Okada², Kiyotaka Sasagawa², Jun Ohta², and Tomoya Nakamura³, Keiichiro Kagawa¹

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Posters and Flash Presentations

P01 10 μ m Radiation Tolerant Global Shutter Pixel for Operation under High Ionizing Dose Rates of Gamma or X-ray Radiation

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P02 Mid-infrared Detection using Black Phosphorus on Silicon Heterostructure with Avalanche Multiplication

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P03 Fully Depleted CIS Pixel Using Reverse Substrate Bias without Undesirable Leakage Currents

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P04 Improvement of Conversion Gain and Pixel Linearity through Source Follower Drain Design in CMOS image sensors

Gyunha Park, Jiyoung Song, Keunyeong Cho, Sooyeon Kim, Yongsang Park, Yoonseok Kim, Joonhyuk Hwang, Changkyu Lee, Myunghae Seo, Hoocheol Lee, Jihun Lim and Jonghyun Go

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P05 Digital Pixel Sensor using Frame Averaging Unit for Fixed-Pattern Noise Correction and Pixel Size Reduction

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P06 Efficient Methods for Analyzing the Floating Diffusion, Photodiode, and Transfer Gate of a 4T Pixel and Calibrating TCAD

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P07 Improvement of Fixed Pattern Noise and Electrical Cross-Talk in Small-Sized Pixel-Parallel ADCs

Yongsuk Choi, Min-Woong Seo, Sanggwon Lee, Bumjun Kim, Yeongseok Shim, Hiroyuki Sugihara, You-Na Lee, Masamichi Ito, Jaehun Jeong, Su-Hyun Han, Gihwan Cho, Hyukbin Kwon, Sung-Jae Byun, Daehee Bae, Sigyoung Koo, Heesung Shim, Jae-Kyu Lee, Jonghyun Go and Jaihyuk Song

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P08 A Digital Pixel Sensor with 0.17%/-0.32% Non-Linearity and 75.3 μ W Power Consumption Using Wide-Swing PWM and Embedded 10-bit 3T-GC-eDRAM

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P09 Random Noise Improvement for Pixel-Parallel Single-Slope ADC

Masayuki Uno¹, Kwang-Han Chang², Tsung-Hsun Tsai³, Toshiyuki Isozaki¹, Rimon Ikeno¹, Kazuya Mori¹, Ken Miyauchi¹, Yi-Hsuan Lin², Sheng-Yeh Lai², Chih-Hao Lin², Wei-Fan Chou², Junichi

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P10 Noise Performance of a Photovoltaic Receptor for Dynamic Vision Sensors

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P11 Parameter Estimation for Column Level Single Slope ADCs

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OmniVision Technologies, Santa Clara, CA

P12 Noise Analysis of Pixel-Parallel ADC

Masaki Sakakibara, Shin Sakai, Koji Ogawa, Koya Tsuchimoto, Kazuki Nomoto, Tsukasa Miura, Hirotsugu Takahashi, Yusuke Oike

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P13 Dark-Current Random Telegraph Signal in InGaAs Image Sensor for SWIR domain

M. Benfante, C. Durnez, V. Laluca, A. Rouvie, A. Le Roch, C. Virmontois

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P14 0.3e- Read Noise @30fps 9.5Mpixel CMOS Image Sensor for Scientific Applications Requiring Photon Counting

Steve Mims, Kwang Bo Cho, Shabnam Ansari, Hung Do, Khai Nguyen, William Tian, Angel Lopez, Son Vo

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P15 ORION sensor 10um 66Mpixel high dynamic range and sub-electron dark noise image sensor

Jose Segovia¹, Alberto Villegas¹, Rafael Dominguez¹, Loli Pardo¹, Alex Charlet¹, Luis Alba¹, Sony Cherivan², Jason Nottingham³, Len Colavito², Ana Gonzalez¹, Ángel Rodríguez-Vázquez⁴

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P16 Dual-Channel RAW and YUV Image Output CIS with 130dB DR and LFM for Automotive

Applications

Jae-Sung An¹, Naoki Kawazu², Tatsuya Kaneko², Sumeet Shrestha¹, Trung Thanh Nguyen¹, Manuel Moreno Garcia¹, Erwin H. T. Shad¹, Tore Martinussen¹, Trygve Willassen¹, Yorito Sakano³ and Satoko Iida³

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P17 Charge-domain signal clamping and extended dark signal cancellation for automotive CMOS image sensors

Shinyeol Choi, Haneol Seo, Kyung-min Kim, Minwoo Lee, Mira-Lee, Jihun Shin, Jinkyong Heo, Youngtae Jang, Min-Sun Keel, Juhyun Ko and Jesuk Lee
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P18 High Dynamic Range Imaging with High Speed MSB Subframe Readout of In-Pixel Counters in SPAD Image Sensors

Kosuke Mikawa, Hiroki Koda, Toshinori Otaka, Shunichi Sato, Yusuke Kameda, Yoshihiro Maeda, Takayuki Hamamoto
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P19 Variable Dynamic Range CMOS Image Sensor with Area-Efficient LOFIC Pixel and Readout Circuit

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P20 A dual mode PWM based 4T pixel CMOS image sensor for higher dynamic range and low power imaging applications

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P21 Dislocation-free Ge/Si coupling at LCM of their lattice constants replacing InGaAs/InP

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P22 Small Diameter SAG-based InGaAs/InP SPAD for 1550nm photon counting

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P23 Pixelated On-chip Polarizers for Near-Infrared Imaging Realized in Amorphous Silicon
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P24 Delta-doped CMOS Image Sensors for NASA's Habitable Worlds Observatory
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P25 Avalanche detectors in 110nm CMOS for high-energy radiation imaging and sub-nanosecond timing

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P26 Voltage domain TDI with diffusion enhanced pixels

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- P27** Design of 5µm Pixel, Global Shutter, 120fps, 2-Megapixel ROICs for Colloidal Quantum Dots Image Sensors
*A. Font, M. Sannino, R. Gifreu, C. Bauzá, O. Lladós, R. Turchetta and A. Bofill-Petit**
IMASENIC, Barcelona, Spain
- P28** SCD 12 µm pitch microbolometer for high end commercial and defense applications
C. G. Jakobson, U. Mizrahi, N. Ben Ari, L. Pallah, Y. Shinde, N. Shiloah, E. Avnon, D. Seref, G. Zohar, R. Raichman, T. Markovitz
SCD, Haifa, Israel
- P29** Single-layer color router for solid state image sensors: To propagate or not?
Peter B. Catrysse and Shanhui Fan
E. L. Ginzton Laboratory and Dept. of Electrical Eng., Stanford University, CA, USA
- P30** Curved CMOS Image Sensors Using SOI Layer Transfer Technology
Masahide Goto, Shigeyuki Imura, and Hiroto Sato
NHK Science & Technology Research Laboratories, Tokyo, Japan
- P31** Quantum C100, a Wafer Scale CMOS Detector Optimised for 100 keV Cryo Electron Microscopy
Nicola Guerrini¹, Mohamed El Sharkawy², Ben Marsh¹, Jonathan Barnard³, Matthew Hart¹, Craig Macwaters¹, Roger Goldsbrough², Angus Kirkland³, Liam O’Ryan², Herman Larsen¹, Iain Sedgwick¹, Sam W. Hutchings¹
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- P32** Convex Curved Single-Chip Thin-Film Image Sensors for Distortion-Free Multilens Panoramic Imaging
Koki Imamura, Kazunori Miyakawa, Masahide Goto, and Hiroto Sato
NHK Science & Technology Research Laboratories, Tokyo, Japan
- P33** Design Mitigations on Pixel and Column ADC for 1 MGy TID and SEE Tolerant CIS
I. Hafizh¹, P. Santos¹, P. Leroux¹, G. Meynants¹, J. Van Rethy², Y. Cao²
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- P34** Evaluation of X-ray Induced Degradation of Light Response and Dark Current in BSI CMOS image sensors with Backside Deep Trench Isolation

*Toshiyuki Isozaki, Ken Miyauchi, Rimon Ikeno and Junichi Nakamura
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P35 A 400×96 14,467-fps Scan Rate Low Rolling Shutter Distortion CMOS Image Sensor using 12-bit Error-Averaging Column Parallel Pipelined ADC

*Yohei Teranishi, Toshinori Otaka, Shunichi Sato and Takayuki Hamamoto
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P36 PlatonSPAD: A novel SPAD sensor for high resolution neutrino detection

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P37 Low-Light High Dynamic Range Single Frame Image Denoising for Quanta Image Sensors

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P38 A 250 um x 12.5 um rectangular pixel with resistive poly gate for line scan CMOS image sensor

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P39 Investigating Diverse Parameters for Characterizing Spatial Contrast Transfer in CMOS Event-based Cameras

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P40 Transporter: A 128×4 SPAD Imager with On-chip Encoder for Spiking Neural Network-based Processing

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P41 A Study on a Feature Extractable CMOS Image Sensor for On-Chip Image Classification

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- P42** Bandwidth efficient frame-based CMOS image sensor for edge and contour detection applications
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- P43** Real-time Crosstalk Mitigation Method using On-Chip ISP in iToF System
Daeho Kim, Hogyun Kim, Minsik Kim, Seong Won Jo, Sangil Lee, Taemin An, Jaewon Choi, Jaeil An, Yundong Chang, Sunhwa Lee, Il-Pyeong Hwang, Youngkyun Jeong, Juhyun Ko, and Jesuk Lee
Samsung Electronics, Hwaseong, Korea
- P44** A 256x256 Flash-LiDAR SPAD Imager with Distributed Background Suppression and Adaptive Event Detection for Space Applications in 110nm CIS Technology
Enrico Manuzzato^{1,2}, Luca Parmesan¹, Roberto Passerone², Leonardo Gasparini¹, Christophe Meier³, Nguyen David³, Holzer Jannis Serge³, Christophe Pache³
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- P45** 3D-Stacked SPAD Sensor with In-Pixel Multi-Frame Storage for Photon Counting and Time Resolved Applications
Tarek Alabbas¹, Yiyang Liu², Neil Calder¹, Robert Henderson²
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- P46** A Multi-Mode Pixel with Photodiode and Clock-Recharged SPAD Operation for Continuous Recording Applications
Xin Sun^{1,2}, Maciej Wojtkiewicz^{1,2}, Istvan Gyongy¹, Srinjoy Mitra¹, Filip Kaklin², Neale A.W. Dutton²
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- P47** 10 μm Backside Illuminated SPAD cell with Novel Dielectric-Filled DTI Scheme for optical Isolation
Becky Lavi¹, Adi Birman¹, Dmitry Veinger¹, Nobuyoshi Takahashi², Shirly Regev³, Amos Fenigstein¹
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P48 A 300x150 Single Photon Active Event Sensor

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P49 Design and characterization of single-photon avalanche diodes in deep-cryogenic temperatures for quantum applications

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P50 NIR Sensitivity Enhanced 55nm BCDLite[®] FSI SPAD

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