

# **The Conference Theme**

*Innovative Electronics for Sustainable Society*

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### **Tutorials (in Japanese)**

**9:30-10:30** Fundamentals of Biosensors and its Applications  
Ichiro Yamashita (Nara Institute of Science and Technology)

**Short Break (10:30-10:40)**

**10:40-11:40** Fundamentals of Thermoelectricity and its Application  
Koji Miyazaki (Kyushu Institute of Technology)

### **Opening**

**13:00-13:10** Opening Remarks by Yasuhisa Omura (Kansai University)

### **Keynote Speech**

**13:10-13:50**

**K-1 (p.18)** Micro Systems for Sustainable Society  
Masayoshi Esashi (Tohoku University)

**Short Break (13:50-14:00)**

## Session A (Si Devices)

**14:00-14:40 - Invited -**

**A-1 (p.22)** Understanding Carrier Transport in the Ultimate Physical Scaling Limit of MOSFETs  
Hideaki Tsuchiya (Kobe University)

**14:40-15:00**

**A-2 (p.24)** Body Channel Digital Pulse Transmission for Biometric Measurement by Fully Implantable CMOS Image Sensor  
Hajime Hayami, Yoshiaki Ishii, Kiyotaka Sasagawa, Toshihiko Noda, Takashi Tokuda and Jun Ohta  
(Nara Institute of Science and Technology)

**Short Break (15:00-15:10)**

**15:10-15:30**

**A-3 (p.26)** Development of Solution-Derived Diffusion Barrier Layer for Back-Contact Crystalline Silicon Solar Cell  
Yunjian Jiang, Yasuaki Ishikawa, Seiya Yoshinaga, Tatsuki Honda, and Yukiharu Uraoka (Nara Institute of Science and Technology)

**15:30-15:50**

**A-4 (p.28)** Original amplifier using only emitter and base of a Si bipolar transistor  
Kensho Okamoto, Junichi Fujita, Masaki Ishikawa and Tetsuo Hattori (Kagawa University)

**Short Break (15:50-16:00)**

## Poster Session

### Short Presentation – 2min. each (6/19, 16:00-17:20)

- PA-01 (p.32)** Schottky Barrier Height Reduction of NiGe/Ge Junction by P Ion Implantation for Metal Source/Drain Ge CMOS Devices  
Hiroshi Oka, Yuya Minoura, Takuji Hosoi, Takayoshi Shimura and Heiji Watanabe (Osaka University)
- PA-02 (p.34)** Study of the conduction mechanism of the DNA memory FET  
Shouhei Nakamura, Naoto Matsuo, Kazushige Yamana, Akira Heya, Tadao Takada, Masataka Fukuyama, and Shin Yokoyama (University of Hyogo)
- PA-03 (p.36)** Characteristics of a microbridge type MEMS sensor for the thermal conductivity measurement of gases by a steady state method  
Kenta Fujii, Shigenobu Muraoka, Sigeru Omatu, and Mitsuaki Yano (Osaka Institute of Technology)
- PA-04 (p.38)** Quantum Transport Simulation of Ultra-small V-groove Junctionless Transistors  
Tatsuya Yamana<sup>1</sup> and Nobuya Mori<sup>1,2</sup>  
(<sup>1</sup>Osaka University, <sup>2</sup>CREST)
- PA-05 (p.40)** Gate Voltage Dependence of Channel Length Modulation for Ge p-channel MOSFETs  
Yuta Goto, Akira Hiroki, Akihiro Matsuda and Masaaki Nakamura (Kyoto Institute of Technology)
- PA-06 (p.42)** Study of Thin Film Solar Cell with Metal-Insulator-Semiconductor Diode to Control Carrier Recombination  
Shota Wakamiya, Naoto Matsuo, Takahiro Kobayasi and Akira Heya (University of Hyogo)
- PA-07 (p.44)** Gate Voltage Dependence of Channel Length Modulation for InGaAs n-channel MOSFETs  
Akihiro Matsuda, Akira Hiroki, Yuta Goto and Masaaki Nakamura (Kyoto Institute of Technology)

- PA-08 (p.46)** Characterization of Noise Behavior of Ultrathin Inversion-Channel and Buried-Channel SOI MOSFETs in the Subthreshold Bias Range  
Takaki Ito, Shingo Sato, and Yasuhisa Omura (Kansai University)
- PA-09 (p.48)** Macromodeling of Operational Amplifiers for Sound Effect Circuit Design  
Takaya Oyama, Akira Hiroki and Takaaki Sano  
(Kyoto institute of technology)
- PA-10 (p.50)** Germanium Diode Modeling for Sound Effect Circuit Design  
Hirokazu Oda, Akira Hiroki, Takaaki Sano and Takaya Oyama  
(Kyoto Institute of Technology)
- PB-01 (p.52)** Conduction-Type Dependence of Thermal Oxidation Rate on SiC(0001)  
Takuma Kobayashi, Jun Suda and Tsunenobu Kimoto  
(Kyoto University)
- PB-02 (p.54)** Study of current collapse in AlGaIn/GaN HEMTs passivated with sputter-deposited SiO<sub>2</sub> and SiN<sub>x</sub>  
Takuya Kakegami, Shintaro Ohi, Hirokuni Tokuda and Masaaki Kuzuhara (University of Fukui)
- PB-03 (p.56)** Mechanism of off-leakage current in InGaZnO thin-film transistors  
Go Wakimura, Yoshimitsu Yamauchi, Toshimasa Matsuoka and Yoshinari Kamakura (Osaka University)
- PB-04 (p.58)** Interface Properties of n-GaN MIS Diodes with ZrO<sub>2</sub>/Al<sub>2</sub>O<sub>3</sub> Laminated Films as a Gate Insulator  
Shintaro Kodama, Hirokuni Tokuda, and Masaaki Kuzuhara  
(University of Fukui)
- PB-05 (p.60)** Fully transparent ZnO thin-film transistors using conducting AZO films fabricated at room temperature  
Yi Sun, Toshihiko Maemoto and Shigehiko Sasa  
(Osaka Institute of Technology)

- PB-06 (p.62)** Effect of passivation films on DC characteristics of AlGaIn/GaN HEMTs  
Shintaro Ohi, Takuya Kakegami, Hirokuni Tokuda and Masaaki Kuzuhara (University of Fukui)
- PB-07 (p.64)** Electrical Characterization of n<sup>+</sup>-InSb/p-Si Heterojunction Grown by Surface Reconstruction Controlled Epitaxy  
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(<sup>1</sup>Osaka City University, <sup>2</sup>New Japan Radio Co., Ltd.)
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- PC-03 (p.78)** Noise Performance of an Implantable Self-reset CMOS Image Sensor  
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(Nara Institute of Science and Technology)
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- PC-08 (p.88)** Fabrication and Characterization of Si/ ~10- $\mu$ m Mesa-Etched Si Junctions by Surface Activated Bonding  
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Li Chai, Jianbo Liang, Shota Nishida, Masashi Morimoto and Naoteru Shigekawa (Osaka City University)

- PC-10 (p.92)** Characteristics of polymer photodetectors using Ga-doped ZnO electrode modified by self-assembled monolayer treatment  
Yi-Wei Liao, Yusuke Sato, Hirotake Kajii and Yutaka Ohmori  
(Osaka University)
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- PS-02 (p.96)** Design of CMOS Resonating Push-Push Frequency Doubler  
Adachi Hiroshi, Mizuki Motoyoshi, Kyoya Takano, Kosuke Katayama, Shuhei Amakawa, Takeshi Yoshida and Minoru Fujishima (Hiroshima University)
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- PS-04 (p.100)** A 1.8 GHz CMOS Power Amplifier with second harmonic control for LTE applications  
Ming-Yi Chen and Jeng-Rern Yang (Yuan Ze University)
- PS-05 (p.102)** A Capacitance Detection Circuit For On-chip Microparticle Manipulation  
Rie Yamane, Hirosuke Iwasaki, Yoshiaki Dei, Cui Ji and Toshimasa Matsuoka (Osaka University)
- PS-06 (p.104)** Estimation of Threshold Voltage from Frequency of Ring Oscillator  
Takuya Matsumoto<sup>1</sup>, Hiroshi Makino<sup>1</sup>, Tsutomu Yoshimura<sup>1</sup>, Shuhei Iwade<sup>1</sup> and Yoshio Matsuda<sup>2</sup>  
(<sup>1</sup>Osaka Institute of Technology, <sup>2</sup>Kanazawa University)
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Guan-Yu Pan and Jeng-Rern Yang. (Yuan Ze University)

## Session B (Compound Semiconductor Devices)

### 9:30-10:10 – Invited –

- B-1** (p.110) Power Electronics Innovation by Silicon Carbide Power Semiconductor Devices  
Hajime Okumura (National Institute of Advanced Industrial Science and Technology)

### 10:10-10:30

- B-2** (p.112) The Mechanism of Parasitic Oscillation in a Half Bridge Circuit Including Wide Band-gap Semiconductor Devices  
Tatsuya Yanagi, Hirotaka Otake and Ken Nakahara (ROHM Co., Ltd)

<b>Short Break (10:30-10:40)</b>
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### 10:40-11:00

- B-3** (p.114) Reliability of Bottom Gate Amorphous InGaZnO Thin-Film Transistors with Siloxane Passivation Layer  
Chaiyanan Kulchaisit, Mami Fujii, Yoshihiro Ueoka, Juan Paolo Bermundo, Masahiro Horita, Yasuaki Ishikawa, and Yukiharu Uraoka (Nara Institute of Science and Technology)

### 11:00-11:20

- B-4** (p.116) Analysis of heating phenomenon in oxide thin-film transistor under pulse voltage stress  
Kahori Kise<sup>1</sup>, Mami Fujii<sup>1</sup>, Shigekazu Tomai<sup>2</sup>, Yoshihiro Ueoka<sup>1</sup>, Haruka Yamazaki<sup>1</sup>, Satoshi Urakawa<sup>1</sup>, Koki Yano<sup>1</sup>, Dapeng Wang<sup>3</sup>, Mamoru Furuta<sup>3</sup>, Masahiro Horita<sup>1</sup>, Yasuaki Ishikawa<sup>1</sup> and Yukiharu Uraoka<sup>1</sup>  
(<sup>1</sup>Nara Institute of Science and Technology, <sup>2</sup>Idemitsu Kosan Co., Ltd., <sup>3</sup>Kochi University of Technology)

<b>Lunch (11:20-12:30)</b>
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## Session C (Emerging Devices)

**12:30-13:10 – Invited –**

**C-1** (p.120) In-situ TEM Observation of ReRAM Switching  
Yasuo Takahashi (Hokkaido University)

**13:10-13:30**

**C-2** (p.122) Soft Actuator using Ionic Polymer-Metal Composite driven with Ionic Liquid  
Hiroshi Okazaki, Shigeki Sawada, Tokiyoshi Matsuda and Mutsumi Kimura  
(Ryukoku University)

**13:30-13:50**

**C-3** (p.124) Orientation-controlled Dielectrophoretic Alignment of Silicon Microrod on a Substrate with High Positional Accuracy  
Akihide Shibata<sup>1</sup>, Keiji Watanabe<sup>1</sup>, Takuya Sato<sup>1</sup>, Hiroshi Kotaki<sup>1</sup>, Paul Schuele<sup>2</sup>, Mark Crowder<sup>2</sup>, Changqing Zhan<sup>2</sup>, John Hartzell<sup>2</sup> and Ryoichi Nakatani<sup>3</sup>  
(<sup>1</sup>Sharp Corporation, <sup>2</sup>Sharp Laboratories of America, <sup>3</sup>Osaka University)

**Short Break (13:50-14:00)**

## Session D (Solid-State Circuits)

**14:00-14:20**

**D-1** (p.128) Correlation between BTI-Induced Degradations and Process Variations by Measuring Frequency of Ros  
Michitarou Yabuuchi, Ryo Kishida and Kazutoshi Kobayashi  
(Kyoto Institute of Technology)

**14:20-14:40**

**D-2** (p.130) Output Voltage Stability of SPMC Type AC-AC Converter for Power Management in IT System  
Hiroaki Ohtsuka, Masakazu Muraguchi, Yitao Ma and Tetsuo Endoh (Tohoku University)

**14:40-15:00**

**D-3** (p.134) A dual channel switched RF beamformer for LTE small cell base-station receiver

Ying-Lou Chiang and Jeng-Rern Yang (Yuan Ze University)

**Short Break (15:00-15:10)**

## **Poster Viewing Session**

**15:10-17:10** at Lobby

**Short Break (17:10-17:20)**

## **Closing**

**17:20-17:40** Award and Closing: Akira Takahashi (Sharp Corporation)