2013 IEEE CPMT Symposium Japan (Formerly VLSI Packaging Workshop of Japan)

Kyoto, Japan
11 – 13 November 2013
November 11th, 2013

Room A (Centennial Hall): Chairperson: Shigeru Nakagawa

10:00 – 10:15 Opening Remarks & Welcome Talk:
Shigenori Aoki (General Chair, IEEE CPMT Symposium Japan; Fujitsu Laboratories Ltd.)

10:15 – 11:15 Plenary Speech 1
The end of transceivers as we know
Mehdi Asghari (Kotura, Inc.)

11:15 – 12:15 Plenary Speech 2
Toshiba packaging technology innovations create the new semiconductor products
Shuzo Akejima (Toshiba Corporation)

Room A (Centennial Hall)

13:15 – 15:15 Session 1: Advanced Packaging I
Chairperson: Kenji Takahashi, Shinya Takyu

1-1 Invited: Design, Simulation, and Process Development of 2.5D TSV Interposer for High Density Packaging
Dongkai Shangguan1,2, Xiaoli Ren1, Kai Xue1, Feng Jiang1, Qibing, Wang2, Ye Ping2, Cheng Fang2, Haiyan Liu1, Cheng Xu1,2, and Daquan Yu1,2 / National Center for Advanced Packaging, Institute of Microelectronics, Chinese Academy of Sciences1, Toshiba Corporation2

1-2 Invited: Bridging Between 3D Stacking and 3D IC Technologies
Wael Zohni, and Hiroaki Sato / Invensas Corporation

1-3 A 77 GHz CMOS Power Amplifier Module Using Multi-layered redistribution Layer Technology
Masaru Sato, Yoshikatsu Ishizuki, Shinya Sasaki, Yoichi Kawano, Hiroshi Matsumura, Toshihide Suzuki, and Motoaki Tani / Fujitsu Laboratories Ltd.

1-4 Warpage behavior of 2.5D Si-package using Si-interposer
Koji Hara, Kei Murayama, Mitsuhiro Aizawa, and Mitsutoshi Higashi / Shinko Electric Industries Co., LTD.

15:30 – 17:30 Session 2: Advanced Packaging II
Chairperson: Hiroshi Yamada, Yoichiro Kurita

2-1 Invited: Perspective for Advanced Micro-solder Bump Bonding
Yasumitsu Orii / IBM Research - Tokyo

2-2 Invited: POP package for Mobile Application Processor
Zhang Tonglong / Nantong Fujitsu Microelectronics Co., Ltd

2-3 Fine pitch PoP Introduction
Jinseong Kim1, Gywan Han1, Byoungwoo Cho1, Yesul Ahn1, Dongjoo Park1, Juhoon Yoon1, Glenn Rinne1, Choonheung Lee1, and Akito Yoshida1 / Research and Development Center, Amkor Technology Korea Inc.1, Amkor Technology Japan1

2-4 Airfoil: A New Fine Line Fabrication Technology on Glass-cloth Prepreg without Insulating Films for PKG Substrate
Kumpei Yamada, Daisuke Fujimoto, Tetsurou Iwakura, Hikari Murai, Youichi Kaneko, and Hiroshi Shimizu / Hitachi Chemical Co., Ltd.

Room B (Conference Hall II)

13:15 – 15:15 Session 6: Optical Transceiver Module
Chairperson: Shigeru Nakagawa, Greg Fish

6-1 Invited: High-speed optical engines and optical interconnect challenges and solutions
Mitch Fields / Avago Technologies

6-2 A 25-Gb/s x 4ch, 8 x 8 mm2 small size optical transceiver module for optical interconnection
Naoki Matsushima1, Norio Chuyo1, Toshiaki Takai1, Toru Yazaki1, Daichi Kawamura1, Yasunobu Matsuoka1, Yong Lee2, Hiroki Yamashita1, Takashi Takemoto1, Hideo Arimoto1, Yoshiaki Ishigami1, Kinya Yamazaki1, and Yoshinori Sunagawa1 / Yokohama Research Laboratory, Hitachi, Ltd.1, Central Research Laboratory, Hitachi, Ltd.1, Central Research Laboratory, Hitachi, Ltd.2, Cable Materials Research Laboratory, Hitachi, Ltd.2

6-3 Polymer waveguide-coupled 14-Gb/s x 12-channel parallel-optical modules mounted on optical PCB through Sn–Ag–Cu solder reflow
Aygil Fajar Rizky, Naoya Nishimura, Yoshinobu Nekado, Toshinori Uemura, and Hideyuki Nasu / Furukawa Electric Co., Ltd.
15:30 – 17:30 Session 7: Si Photonics and Single-Mode Optics
Chairperson: Bert Offrein, Mehdi Ashgari

7-1 Invited : Heterogeneous Integration for Silicon Photonics N/A
Greg Fish / Aurrion

7-2 Invited : Hybrid integration technology of laser source with laser diode arrays on silicon optical waveguide platform by flip-chip bonding for silicon photonics 30
Takanori Shimizu1, Nobuaki Hatori1, Makoto Okano1,1, Masashige Ishizaka2,1, Yutaka Urino2,1, Tsuyoshi Yamamoto2,1, Masahiko Mori2, Takahiro Nakamura2,1, and Yasuhiko Arakawa2,1 / Institute for Photonics-Electronics Convergence System Technology1, Photonics Electronics Technology Research Association2, National Institute of Advanced Industrial Science and Technology3, Institute of Industrial Science, The University of Tokyo4

7-3 Thermal Via Technology for Silica-based Planar Lightwave Circuit 34
Shinichi Anazawa, Yu Karata, Yasuaki Hashizume, MikiTake Itoh, and Hiroyuki Fukayama / NTT Photonics Laboratories, NTT Corporation

7-4 Direct coupling of cavity-resonator-integrated guided-mode resonance filter to a single-mode optical fiber 38
Junichi Iino1, Koji Hatanaka1, Yuki Iwata1, Kenji Kintaka1, Kenzo Nishio1, Yasuhiro Awataguchi, and Shogo Ura1 / Kyoto Institute of Technology1, National Institute of Advanced Industrial Science and Technology2

Room C (Conference Hall III)
Chairperson: Hidenori Osaka, Takashi Harada

13-1 Invited : Noise Suppression by Lossy Filters in Power Distribution Network N/A
Yoshitaka Toyota and Kengo Iokibe / Okayama University

13-2 Ultra-wideband Noise Suppression of Power Supply Noise by Combining Mushroom and Planar Type EBG Structures 42
Keisuke Bomiya, Mayumi Sakai, and Toshio Sudo / Shibaura Institute of Technology

13-3 Power integrity behavior for various packaging environments 46
Masahiro Terasawa, Sho Kiyoshige, Wataru Ichimura, Ryota Kobayashi, Genki Kudo, Hiroki Otsuka, and Toshio Sudo / Shibaura Institute of Technology

15:30 – 17:30 Session 14: Power Integrity / Signal Integrity - Modeling and Jitter
Chairperson: Yoshitaka Toyota, Daisuke Iuchi

14-1 Invited : 2.5D Silicon Interposer PDN model for Power Aware SI analysis N/A
Yuki Masuko / Cadence Design Systems, Inc.

14-2 Power/Ground Wiring for High Speed Driver 50
Kaoru Hashimoto, Yutaka Aikiyama, Chihiro Ueda, and Kanji Otsuka / Collaborative Research Center, Meisei University

14-3 Power distribution network design method based on frequency-dependent target impedance for jitter design of memory interface 54
Yasuhiro Ikeda, Masahiro Toyama, Satoshi Maruoka, Yutaka Uematsu, and Hidenori Osaka / Yokohama Research Laboratory, Hitachi Ltd.

14-4 A study on self turn-on phenomenon in fast switching operation of high voltage power MOSFET 58
Tsuyoshi Funaki / Osaka University

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9:30 – 10:30 Plenary Speech 3
Mobile Device Challenges Leading Packaging Innovation
Steve Bezug (Qualcomm)

Room A (Centennial Hall)
10:30 – 12:30 Session 3: 3D Technology I
Chairperson: Ping Cheng, Shoji Uegaki

3-1 Invited : Cu Pillar – the Next Phase in the Evolution of the Packaging DNA N/A
William T. Chen / ASE Group

3-2 Study of mechanical properties of Cu specimen using through-silicon-vias (TSV) electrodeposition bath 62
Huying Wang1, Ping Cheng2, Su Wang2, Hong Wang2, Yang Yuan2, Ting Gu1 and Guifu Ding3 / Shanghai Jiao Tong3, Shanghai Sanyang Semiconductor Materials Co., Ltd.
3-3 Cu balls and Cu-core balls for 3D packaging 65
Hiroyoshi Kawasaki, Takahiro Hattori, Takahiro Roppongi, Daisuke Soma, Isamu Sato, and Yuji Kawamata / Senju Metal Industry Co., Ltd.

3-4 Effect of leveler on microstructure and stress of electroplated copper for TSV application 68
Xue Feng1, Wei Luo1, Ming Li1, and Su Wang2 / Shanghai Jiao Tong University1, Shanghai Sinyang Semiconductor Materials Co. Ltd.2

13:30 – 15:30 Session 4: 3D Technology II
Chairperson: Ying-Hui Wang, Steve Bezuk

4-1 Invited: Recent progress in through silicon vias (TSVs): Cu filling, microstructure characterization and mechanical properties N/A
Ping Cheng1, Hong Wang1, Guiju Ding1, Huiyin Wang1, Zhaoyu Wang1, Ming Li1, and Jianguan Sun1 / Shanghai Jiao Tong University1, Shanghai Sinyang Semiconductor Materials Co., Ltd.2

4-2 Development of a Chip Prober for Pre-Bond Testing of a 3D-IC 72
Naoya Watanabe1, Motohiro Suzuki2, Michiyuki Eto3, Kenji Kawano1, and Masahiro Aoyagi1 / Nanoelectronics Research Institute, National Institute of Advanced Industrial Science and Technology1, STK TECHNOLOGY CO., LTD. 2

4-3 A numerical model for Bottom-up copper electrodeposition of TSV with additives 76
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4-4 Growth models of copper filling in through silicon via at different current density 80
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15:45 – 17:45 Session 5: High-speed Interconnect
Chairperson: Yutaka Uematsu, Keitaro Yamagishi

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Takahiro Sugiyama1, Hideki Nonen1, Izumi Fukasaku1, Takashi Kamakura1, and Hiroshi Ishikawa1 / Cable Materials Laboratory, Cable Materials Company, Hitachi Metals, Ltd.1, Electric Wire & Cable Division, Cable Materials Company, Hitachi Metals, Ltd.2

5-2 The effect of surface roughness on high frequency transmission line 88
Toshihiko Iwai, Daisuke Mizutani, and Motoaki Tani / Fujitsu Laboratories Ltd.

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Mizuki Shirao, Nobuo Ohata, Kenichi Uto, and Hiroshi Aruga / Information Technology R&D Center, Mitsubishi Electric Corporation

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Chen-Chao Wang, Hung-Hsiang Cheng, Ming-Feng Chung, Po-Chih Pan, Chi-Tsung Chiu, and Chih-Pin Hung / Electrical Laboratory, Advanced Semiconductor Engineering Inc.

Room B (Conference Hall II)

10:30 – 12:30 Session 8: Optics for Computing I
Chairperson: Mitch Fields, Shogo Ura

8-1 Invited: Photonics for computing applications N/A
Bert Offrein / IBM Research - Zurich

8-2 Demonstration of high-bandwidth density and low-power organic optical MCM link 100
Masao Tokunari, Seiji Takeda, Hisao-Ito, and Hiroshi Aruga / IBM Research - Tokyo

8-3 No-Polish Elastic Optical Multifiber Connector for Optical Interconnection 104
Tsuyoshi Aoki1, Hidenobu Murakami1, Shigenori Aoki1, Katsuki Suematsu3, Mitsuhiro Iwaya2, and Masato Shino2 / Fujitsu Laboratories Ltd.1, Furukawa Electric Co., Ltd.2

8-4 Optical Multi-channel Connector for Rigid Waveguide and Fiber Connection 108
Kazumi Nakamura1, Masahito Tsurumizu1, Naoki Takahashi1, Satoshi Asai2, and Takahiro Matsubara2 / KYOCERA Connector Products Corporation2, KYOCERA Corporation3

13:30 – 15:30 Session 9: Optics for Computing II
Chairperson: Shigenori Aoki, Yazo Sasaki

9-1 Invited: Waveguide gratings for in-line wavelength-selective modulators in high-density optical interconnects N/A
Shogo Ura1, and Kenji Kintaka2 / Kyoto Institute of Technology1, National Institute of Advanced Industrial Science and Technology2

9-2 Self-Written Waveguide Technology with Light-curable Resin Enabling Easy Optical Interconnection 112
Yukinobu Soeda, Tadayuki Enomoto, and Osamu Mikami / School of Engineering, Tokai University

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Hiroki Ishikawa1, Ryota Kinoshita1, and Takaaki Ishigure2 / Graduate School of Science and Technology, Koto University1, Faculty of Science and Technology, Koto University2

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10:30 – 12:30 Session 15: Micro Bump Bonding
Chairperson: Kiyokazu Yasuda, Takashi Hisada

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Akito Yoshida / Amkor Technology Japan

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Weixin Fu, Jun Mizuno, Shuichi Shiota, Takashi Kasahara, Akito Okada, and Shugo Ishizuka / Waseda University

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Ying-Hui Wang¹, and Tatatomo Suga² / The Institute of Innovation in International Engineering Education, School of Engineering, The University of Tokyo², Department of Precision Engineering, School of Engineering, The University of Tokyo²

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Takashi Hisada¹, Ikuo Shoji¹, Yasuhiro Yamada¹, Kazushige Toriyama¹, and Mamoru Ueno¹ / IBM Tokyo Laboratory, IBM Japan, Ltd.¹, Faculty of Science and Technology, Gunma University²

13:30 – 15:30 Session 16: Novel Hybrid Bonding
Chairperson: Jun Mizuno, Nobuhiro Imaizumi

16-1 UVV-Assisted Low Temperature Bonding For Organic/Inorganic Hybrid Integration at Atmospheric Pressure  147
Akitsu Shigetou¹, Mano Ajayan ², and Jun Mizuno¹ / National Institute for Materials Science², School of Advanced Science and Engineering Waseda University², Institute for Nanoscience and Nanotechnology Waseda University²

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Takashi Matsumae, Masahita Fujino, and Tatatomo Suga / The Department of Precision Engineering, The School of Engineering, The University of Tokyo

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Masahiro Inoue¹, Yasunori Tada¹, Hiroaki Muta¹, and Shinsuke Yamanaka¹ / Gunma University¹, Osaka University²

15:45 – 17:45 Session 17: Materials for Packaging
Chairperson: Masahiro Inoue, Akitsu Shigetou

17-1 Metal-filled anodized aluminum oxide
A potential substrate material for a high density interconnection in 3D packaging  N/A
Yoshinori Hotta and Kouzuki Yamaishi / Fujifilm Corporation

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Yuichi Sakai¹, Katsuhiko Sasaki², Tomaiko Fukuchis², Ken-ichi Honda², Keichi Hirose², and Akishiro Inoda² / Toyama Industrial Technology Center², Tateyama Kaguga Industry Co., Ltd²

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Room A (Centennial Hall): Chairperson: Daisuke Iguchi

9:30 – 10:00 Special Talk 1 by CPMT President
The Role of IEEE-CPMT in the Evolution of Microelectronics Packaging Technologies
S.W. Ricky Lee (Hong Kong University of Science and Technology)

10:00 – 10:30 Special Talk 2 by Chairman of IEEE-CPMT China Chapter
Activities and Prospect of IEEE-CPMT China Chapter
Jusheng Ma (Tsinghua University)

Room B (Conference Hall II)

10:45 – 12:20 Session 11: Component and Circuits
Chairperson: Hideyuki Ohashi, Yutaka Uematsu

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Fukuro Koshiji1, Kazuya Hiraguri1, and Kohji Koshiji2 / Kokushikan University1, Tokyo University of Science2

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Chairperson: Kishio Yokouchi, Tomoyuki Hatakeyama

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Takashi Fukue1, Koichi Hirose1, Yoshiki Matsuura1, and Hirotoshi Terao2 / Iwate University1, ALPS Electronic Co., Ltd.2

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Room C (Conference Hall III)

10:45 – 12:20 Session 18: Reliability I
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Mitsuru Fujita1, Nobuhiro Anzai1, Kazutoshi Sakamaki1, and Yoshiharu Katayama1 / Asahi Kasei E-materials Corporation1, Graduate school of Shibaura institute of technology2, Materials science and Engineering department, Shibaura institute of technology3

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13:20 – 15:20 Session 19: Reliability II

Chairperson: Masaki Hashizume, Kenji Hirohata

19-1 Failure analysis of electric circuit board by high resolution magnetic field microscopy 214
Yuki Mima¹, Noriaki Oyabu², Takeshi Inao³, Noriaki Kimura⁴, and Kenjiro Kimura¹ / Kobe University¹, Kyoto University², Murata Manufacturing Company, Ltd.³, Integral Geometry Instruments⁴

Hiroyuki Tsuritani¹, Toshihisa Sayama¹, Yoshiyuki Okamoto¹, Takeshi Takayanagi¹, Kentaro Uesugi³, and Takao Morii¹ / Toyama Industrial Technology Center¹, Cosel Co., Ltd.², Japan Synchrotron Radiation Research Institute³, Toyama Prefectural University⁴

19-3 Nondestructive defect analysis case example using combination of Lock-in IR Thermography and high resolution X-ray CT technology N/A
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