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Matthias Heimann, Bjoern Boehme, and Klaus-Juergen Wolter – Technical University Dresden; Martin Wirts-Ruetters – Fraunhofer Institute	
<b>Investigation of Enhanced Solder Wetting in 63Sn/37Pb and Sn-Ag-Cu Lead Free Alloy.....</b>	<b>1737</b>
Scott J. Anson and Jacob G. Slezak – Rochester Institute of Technology; Krishnaswami Srihari – State University of New York, Binghamton	

<b>Laser Sintering of Ag Nanopaste Film and Its Application to Bond-Pad Formation.....</b>	<b>1745</b>
Tomotake Niizeki – JST Innovation Satellite Ibaraki; Katsuhiko Maekawa and Kazuhiko Yamasaki – Ibaraki University; Mamoru Mita – Hitachi; Yorishige Matsuba, Nobuto Terada, and Hiroshi Saito – Harima Chemicals Incorporated	
<b>Mechanical Reliability of MEMS Packages .....</b>	<b>1751</b>
W.D. van Driel and G.Q. Zhang – NXP Semiconductors, Delft University of Technology; J.J.M. Zaal – Delft University of Technology; D.G. Yang and M. van Kleef – NXP Semiconductors	
<b>Noise-Induced Jitter in Differential Signaling.....</b>	<b>1755</b>
Janani Chandrasekhar, Ege Engin, and Madhavan Swaminathan – Georgia Institute of Technology; Kazuhide Uriu and Toru Yamada – Matsushita Electric Industrial Company	
<b>Non-Destructive Monitoring of Au Ball Bond Stress During High-Temperature Aging.....</b>	<b>1762</b>
M. Mayer – University of Waterloo	
<b>Optical 8-Channel, 10 Gb/s MT Pluggable Connector Alignment Technology for Precision Coupling of Laser and Photodiode Arrays to Polymer Waveguide Arrays for Optical Board-to-Board Interconnects .....</b>	<b>1769</b>
Ioannis Papanikolaou, David R. Selviah, and Kai Wang – University College London; Richard A. Pitwon, Ken Hopkins, and Dave Milward – Xyratex	
<b>Reliability Issues on the High Speed DRAM Flip-Chip Package Using Gold Stud Bump, Lead Free Solder, and Underfill.....</b>	<b>1776</b>
Woong Sun Lee, Myoung Geun Park, Il Whan Cho, Sung Chul Kim, Ki Young Kim, Qwan Ho Chung, and Kwang Yoo Byun – Hynix Semiconductor, Incorporated	
<b>Reliability of Wafer Level Chip Scale Packages (WL-CSP) under Dynamic Loadings.....</b>	<b>1782</b>
Yeong J. Lee, Paul Crosbie, and Matt Brown – Motorola Incorporated; Adam Zbrzezny – Advanced Micro Devices, Incorporated	
<b>Simultaneous Through-Silicon Via and Large Cavity Formation Using Deep Reactive Ion Etching and Aluminum Etch-Stop Layer.....</b>	<b>1787</b>
J. Tian and M. Bartek – Delft University of Technology	
<b>Stacked Strained Silicon Transistors for Low-Power High-Performance Circuit Applications .....</b>	<b>1793</b>
H. Ramakrishnan, S. Shedabale, G. Russell, and A. Yakovlev – Newcastle University	
<b>Synthesizing SPICE-Compatible Models of Power Delivery Networks with Resonance Effect by Time-Domain Waveforms .....</b>	<b>1799</b>
Chen-Chao Wang, Hung-Hsiang Cheng, C.T. Chiu, and C.P. Hung – Advanced Semiconductor Engineering; Chih-Wen Kuo – National Sun Yat-Sen University	
<b>The Effect of PCB Flexural Modes on Dynamic Reliability of Ball Grid Array Packages.....</b>	<b>1804</b>
Pongpinit Towashiraporn, Paul Crosbie, and Yeong J. Lee – Motorola Incorporated	
<b>Thermal Analyses and Measurements of Low-Cost COP Package for High-Power LED .....</b>	<b>1812</b>
M.Y. Tsai, C.H. Chen, and C.S. Kang – Chang Gung University	
<b>Thin Film Encapsulation of OLED Displays with Organic-Inorganic Composite Film .....</b>	<b>1819</b>
C.Y. Li, B. Wei, Z.K. Hua, H. Zhang, X.F. Li, and J.H. Zhang – Shanghai University	
<b>Time and Frequency Domain Memory Channel Characterization and Correlation Methodology.....</b>	<b>1825</b>
Evelyn Mintarno – Stanford University; Steven Ji – Intel Corporation	
<b>Ultra-Small Compact Transfer Molded Package for Power Modules.....</b>	<b>1832</b>
Ko Sano, Kenichi Hayashi, and Hisashi Kawafuji – Mitsubishi Electric Corporation; Nobuhito Funakoshi – Fukuryo Semiconductor Engineering Corporation	

### **38: Thursday Posters**

Chairs: Mark Eblen – Kyocera America, Inc.; and Nam Pham – IBM Corporation

<b>A 10Gbps x 12-Channel Pluggable Optical Transceiver for High-Speed Interconnections.....</b>	<b>1838</b>
Tomoyuki Hino, Ryosuke Kuribayashi, Yoichi Hashimoto, Takara Sugimoto, Jun Ushioda, Junichi Sasaki, Ichiro Ogura, Ichiro Hatakeyama, and Kazuhiko Kurata – NEC Corporation	
<b>A Hermetic Chip-to-Chip Bonding at Low Temperature with Cu/In/Sn/Cu Joint .....</b>	<b>1844</b>
Liling Yan, Daquan Yu, Won Kyoung Choi, Aibin Yu, Seung Uk Yoon, and John H. Lau – Institute of Microelectronics; Chengkuo Lee – Institute of Microelectronics, National University of Singapore	
<b>A Tiny Plastic Package of Piezoresistive Pressure Sensors Constructed by Sacrifice-Replacement Approach.....</b>	<b>1849</b>
Lung-Tai Chen, Chung-Yi Hsu, Jin-Sgeng Chang, and Chun-Hsun Chu – Industrial Technology Research Institute; Wen-Lo Shieh – I-Shou University; Yue-Zhe Xie – Cheng-Kung University	

<b>Analysis of High-Speed Package Substrate without Plating Bars.....</b>	<b>1855</b>
Young-Woo Kim, Jin-Woo Jung, Yu-Seon Kim, and Yeong-Seog Lim – Chonnam University; Gwang Kim and Byung-Hun Ahn – Stats ChipPAC Korea	
<b>Antenna Integration with Laser Diodes and Photodetectors for a Miniaturized Dual-Mode Wireless Transceiver .....</b>	<b>1864</b>
Jun Liao, Shengling Deng, Kenneth A. Connor, and Z. Rena Huang – Rensselaer Polytechnic Institute; Valencia Joyner – Tufts University	
<b>Chip Scale Studies of BCB Based Polymer Bonding for MEMS Packaging .....</b>	<b>1869</b>
C.H. Wang, J. Zeng, K. Zhao, and H.L. Chan – Heriot-Watt University	
<b>Coupling Noise Analysis and High Frequency Design Optimization of Power/Ground Plane Stack-Up in Embedded Chip Substrate Cavities .....</b>	<b>1874</b>
Nithya Sankaran, Baik-Woo Lee, Venky Sundaram, Ege Engin, Madhavan Swaminathan, and Rao Tummala – Georgia Institute of Technology; Venkatesh Chelukka Ramdas – Sameer Centre for Electromagnetics; Mahadevan Iyer – Infineon Technologies Asia Pacific	
<b>Crack Growth-Resistant Interconnects for High-Reliability Microelectronics.....</b>	<b>1880</b>
Ilyas Mohammed, Bahareh Banijamali, and Piyush Savalia – Tessera, Incorporated	
<b>Determination of Solder Bump Stand-Off Height in a Flip-Chip Sub-Mount for Micro-Opto-Electro-Mechanical System (MOEMS) Packaging Applications .....</b>	<b>1887</b>
Jeffery C.C. Lo, S.W. Ricky Lee, Henry H.L. Wu, and Jimmy K.S. Lam – Hong Kong University of Science and Technology	
<b>Development and Evaluation of Lead-Free Reflow Soldering Techniques for the Flip Chip Bonding of Large GaAs Pixel Detectors on Si Readout Chips .....</b>	<b>1893</b>
M. Klein, M. Hutter, H. Oppermann, T. Fritzsck, G. Engelmann, L. Dietrich, J. Wolf, B. Brämer, and R. Dudek – Fraunhofer IZM; H. Reichl – Technical University Berlin	
<b>Development of a 50mm Dual Flip Chip Plastic Land Grid Array Package for Server Applications .....</b>	<b>1900</b>
Sylvain Ouimet and Isabelle Dépatie – IBM Canada Limited; Jon Casey, Kenneth Marston, Jennifer Muncy, Virendra Jadhav, and Thomas Wassick – IBM Semiconductor Research and Development Center; John Corbin – IBM Systems and Technology Group	
<b>Effect of Organic Package Warpage and Assembly Challenges Using Thin Core Substrate .....</b>	<b>1907</b>
Ajit Dubey – NetLogic Microsystems	
<b>Electrically Conductive Adhesive with <math>\pi</math>-Conjugated Self-Assembled Molecular Wire Junctions for Enhanced Electrical and Thermal Properties .....</b>	<b>1913</b>
Rongwei Zhang, Yi Li, Myung Jin Yim, Kyoung Sik Moon, and C.P. Wong – Georgia Institute of Technology; Daoqiang Daniel Lu – Intel Corporation	
<b>Embedded Capacitor Technology: A Real World Example .....</b>	<b>1919</b>
Norm Smith and Jim Knighten – Teradata; Jun Fan – University of Missouri Rolla; John Andresakis – OMT; Yoshi Fukawa – Tech-Dream; Mark Harvey – Sanmina-SCI	
<b>Enhancement of Light Efficiency of LED Using a Novel High Refractive Encapsulant.....</b>	<b>1926</b>
Hsun-Tien Li, Chia-Wen Hsu, and Kai-Chi Chen – Industrial Technology Research Institute	
<b>Evaluation of New Substrate Surface Finish: Electroless Nickel/ Electroless Palladium/ Immersion Gold (ENEPIG).....</b>	<b>1931</b>
Chun-Hsien Fu, Liang-Yi Hung, Don Son Jiang, Chiang-Cheng Chang, Y.P. Wang, and C.S. Hsiao – Siliconware Precision Industries Company, Limited	
<b>Extremely-Compact and High-Performance (160Gbps = 20GB/s) Optical Semiconductor Module Using Lead Frame Embedded Optoelectronic Ferrule .....</b>	<b>1936</b>
Hiroshi Uemura, Hiroshi Hamasaki, Hideto Furuyama, Hideo Numata, Chiaki Takubo, and Hideki Shibata – Toshiba Corporation	
<b>Fabrication and Assembly of High Gain MEMS Antennas for Wireless Communications.....</b>	<b>1941</b>
C.H. Wang and S.K. Pavuluri – Heriot-Watt University	
<b>High RF Performance TSV Silicon Carrier for High Frequency Application.....</b>	<b>1946</b>
Soon Wee Ho, Seung Wook Yoon, Vaidyanathan Kripesh, and John H. Lau – Institute of Microelectronics; Qiaoer Zhou and Krishnamachar Pasad – Nanyang Technological University	
<b>Integration of RF-MEMS, Passives and CMOS-IC on Silicon Substrate by Low Temperature Wafer-to-Wafer Bonding Technique .....</b>	<b>1953</b>
Q.X. Zhang, H.Y. Li, M. Tang, A.B. Yu, E.B. Liao, Rong Yang, G.Q. Lo, N. Balasubramanian, and D.L. Kwong – Institute of Microelectronics	
<b>Low Stress and High Thermal Conductive Underfill for Cu/Low-k Application.....</b>	<b>1958</b>
Qizhen Liang, Kyoung-Sik Moon, Yuelan Zhang, and C.P. Wong – Georgia Institute of Technology	
<b>Mechanical Shock Robustness of Different WLCSP Types .....</b>	<b>1963</b>
Pasi Nummilla, Mikael Johansson, and Sanna Puro – Nokia Corporation	

<b>Nano-Micro Filled Conductive Adhesive-Based 3D Micro Arrays for Z-Axis Interconnections .....</b>	<b>1970</b>
Rabindra N. Das, John M. Lauffer, Mark D. Poliks, Frank D. Egitto, and Voya R. Markovich – Endicott Interconnect Technologies, Incorporated	
<b>Novel Flip-Chip Interconnection Technology for Millimeter Wave Applications .....</b>	<b>1978</b>
F. Felbier, F. Draheim, U. Goebel, and H. Karstensen – Huber+Suhner AG	
<b>Optimizing Au and In Micro-Bumping for 3D Chip Stacking .....</b>	<b>1984</b>
W. Zhang, A. Matin, E. Beyne, and W. Ruythooren – IMEC	
<b>Passive UHF RFID with Ferrite Electromagnetic Band Gap (EBG) Material for Metal Objects Tracking .....</b>	<b>1990</b>
Bo Gao and Matthew M.F. Yuen – Hong Kong University of Science and Technology	
<b>Photo-Imageable Solder Resist for Semiconductor Packages .....</b>	<b>1995</b>
Toshizumi Yoshino, Hideyuki Katagi, and Kuniaki Sato – Hitachi Chemical Company, Limited	
<b>Prediction of Drift in Foil Resistors .....</b>	<b>2000</b>
Joseph Szwarc, Roy Golombick, and Yuval Hernik – Vishay Intertechnology	
<b>Process Development and Reliability Evaluation for Inline Package-on-Package (PoP) Assembly .....</b>	<b>2005</b>
Jonas Sjoberg, David A. Geiger, and Dongkai Shangguan – Flextronics International	
<b>Reliability of Flip Chip Packages with High Thermal Conductivity Heat Spreader Attach .....</b>	<b>2011</b>
Yuquan Li and R. Wayne Johnson – Auburn University; Patrick Thompson, Tejpal Hooghan, and Jeremias Libres – Texas Instruments	
<b>Reliability of Pb-Free Solder Alloys in Demanding BGA and CSP Applications .....</b>	<b>2018</b>
Ranjit Pandher and Robert Healey – Cookson Electronics	
<b>Silver Pick-Up During Tail Formation and Its Effect on Free Air Ball in Thermosonic Copper Ball Bonding .....</b>	<b>2024</b>
J. Lee, M. Mayer, and Y. Zhou – University of Waterloo; S.J. Hong and J.T. Moon – MK Electron Company Limited	
<b>Size Effect on Electromigration Reliability of Pb-Free, Flip-Chip Solder Bump .....</b>	<b>2030</b>
Jang-Hee Lee, Gi-Tae Lim, and Young-Bae Park – Andong National University; Seung-Taek Yang, Min-Suk Suh, Qwan-Ho Chung, and Kwang-Yoo Byun – Hynix Semiconductor Incorporated	
<b>Studies on the Thermal Cycling Reliability of Fine-Pitch, Cu/SnAg Double-Bump Flip Chip Assemblies on Organic Substrates: Experimental Results and Numerical Analysis .....</b>	<b>2035</b>
Ho-Young Son, Ilho Kim, Jin-Hyoung Park, Soon-Bok Lee, and Kyung-Wook Paik – KAIST; Gi-Jo Jung and Byung-Jin Park – Nepes Corporation	
<b>System-in-Package for Extreme Environments .....</b>	<b>2044</b>
Senthil Sivaswamy, Charles Ellis, Michael Palmer, and R. Wayne Johnson – Auburn University; Rui Wu and Patrick McCluskey – University of Maryland, College Park; Kevin Petrarca – IBM Corporation	
<b>The Development of Anisotropic Conductive Paste (ACP) to Make Solder Metal Connection .....</b>	<b>2051</b>
Satomi Kawamoto, Kaori Matsumura, and Yukinari Abe – NAMICS Corporation	
<b>The Hybrid Curing Adhesive for Image Sensor Module .....</b>	<b>2056</b>
Yukinari Abe and Kazuki Iwaya – NAMICS Corporation	
<b>Thin-Film MCM-D Technology with Through-Substrate Vias for the Integration of 3D SiP Modules .....</b>	<b>2060</b>
G. Posada – IMEC, KU Leuven; G. Carchon and W. de Raedt – IMEC; B. Nauwelaers – KU Leuven	
<b>Transmission Characteristics in GHz Region at the Conductive Adhesive Joints .....</b>	<b>2067</b>
Kaoru Hashimoto, Yutaka Akiyama, and Kanji Otsuka – Meisei University	
<b>Ultra High Q Embedded Inductors in Highly Miniaturized Family of Low Loss Organic Substrates .....</b>	<b>2073</b>
Dhanya Athreya, Venky Sundaram, and Rao Tummala – Georgia Institute of Technology; Mahadevan Iyer – Infineon Technologies Asia Pacific	

### **39: Friday Posters**

Chairs: Mark Eblen – Kyocera America, Inc.; and Swapan Bhattacharya – Georgia Institute of Technology

<b>3D Strip Meander Delay Line Structure for Multilayer LTCC-Based SiP Applications .....</b>	<b>2081</b>
Gawon Kim and Joungho Kim – Korea Advanced Institute of Science and Technology (KAIST); Albert Chee W. Lu, Fan Wei, and Lai L. Wai – Singapore Institute of Manufacturing Technology (SIM Tech)	
<b>A Non-Destructive Characterization and Real-Time Monitor Technique for Low-Loss, Polymeric Waveguide Circuits .....</b>	<b>2086</b>
Fengtao Wang, Fuhuan Liu, Gee-Kung Chang, Ali Adibi, and Rao Tummala – Georgia Institute of Technology; Matthew Q. Yao – Rockwell Collins	

<b>Effects of Mechanical Deformation on Outer Surface Reactivity of Carbon Nanotubes .....</b>	<b>2091</b>
Xiaohui Song – Shanghai Jiao Tong University; Sheng Liu – Shanghai Jiao Tong University, Huazhong University of Science & Technology; Han Yan and Zhiyin Gan – Huazhong University of Science & Technology	
<b>Electrodeposition of Indium for Bump Bonding .....</b>	<b>2096</b>
Yingtao Tian, Changqing Liu, and David Hutt – Loughborough University; Bob Stevens – Rutherford Appleton Laboratory	
<b>High Performance Organic Dielectrics and High Density Substrates for Next Generation System on a Package (SOP) Technology .....</b>	<b>2101</b>
Ganesh Krishnan, Fuhan Liu, Venky Sundaram, Raghuram Pucha, and Rao Tummala – Georgia Institute of Technology; Scott Kennedy, Dirk Baars, John Dobrick, David Guo, Jack Neill, and Sankar Paul – Rogers Corporation	
<b>Improving Copper Electrodeposition in the Microelectronics Industry .....</b>	<b>2105</b>
Y. Liu, J. Wang, S. Bliznakov, E.J. Cotts, and N. Dimitrov – State University of New York, Binghamton; L. Yin, P. Kondos, and P. Borgesen – Unovis Solutions; C. Parks and D.W. Henderson – IBM Corporation	
<b>Low-Loss 4 x 2 Channels Polymer Optical Waveguide with Circular Graded-Index Cores for High-Density Integration on Printed Circuit Boards .....</b>	<b>2111</b>
Yusuke Takeyoshi, Kotaro Matsumoto, and Takaaki Ishigure – Keio University	
<b>Preparation of Multi-Functional Silicon Surface Structures for Solar Cell Applications .....</b>	<b>2117</b>
Yonghao Xiu, Dennis W. Hess, and C.P. Wong – Georgia Institute of Technology	
<b>Reduction of Underpad Stress in Thermosonic Copper Ball Bonding .....</b>	<b>2123</b>
A. Shah, M. Mayer, and Y. Zhou – University of Waterloo; S.J. Hong and J.T. Moon – MK Electron Company Limited	
<b>Reliability Assessment of High Temperature Lead-Free Device Attach Technologies .....</b>	<b>2131</b>
Pedro Quintero, Timothy Oberc, and Patrick McCluskey – University of Maryland, College Park	
<b>Stress Relaxation in a Commercial Stamped Metal Land Grid Array Socket .....</b>	<b>2139</b>
Vidyu Challa, Myra Torres, Michael Osterman, and Michael Pecht – University of Maryland, College Park; Leoncio Lopez – Sun Microsystems	
<b>Temperature Nonuniformity and Bias-Dependent Thermal Resistance in Multi-Finger MOS Transistors .....</b>	<b>2145</b>
Xi Wang, Ali Shakouri, Jacob Wysocki, Mike Winch, and Ken Pedrotti – University of California, Santa Cruz	
<b>Verification of Drop Impact Simulations Using High-Speed Camera Measurements .....</b>	<b>2149</b>
J.J.M. Zaal – Delft University of Technology; W.D. van Driel and G.Q. Zhang – NXP Semiconductors, Delft University of Technology; F.J.H.G. Kessels – NXP Semiconductors	
<b>Wearable RFID-Enabled Sensor Nodes for Biomedical Applications .....</b>	<b>2156</b>
Li Yang, Rushi Vyas, Amin Rida, Jonathan Pan, and Manos M. Tentzeris – Georgia Institute of Technology	