# Table of Contents

**Session A -- Advanced Packaging**

A-009  **ENEG and ENEPiG Surface Finish for Long Term Solderability**...........1  
* Kelvin Pun, M.N. Islam, Tin Wing Ng

A-032  **Parallel Gap Resistance Thick Wire Bonding for Vertical Interconnection in 3D Assembly**.................................................................6  
* Xuguang Guo, Yanhong Tian, Shang Wang, Chunqing Wang

A-040  **Drop-on-demand jetting of piezoelectric diaphragm-piston for fabricating precision solder bumps** ......................................................10  
* Long He, Xingfang Wei, Honghai Zhang, Peng Chen, Hao Luo, Ming Ma, Sheng Liu, Xiayun Shu

A-055  **Preparation and Performances of Nanoporous Copper for Low Temperature Bonding**.................................................................14  
* Kecheng Li, Xiaogang Liu, Mingxiang Chen, Sheng Liu

A-056  **Research on nano-thermocompression bonding process using nanoporous copper as bonding layer**..................................................19  
* Kecheng Li, Xiaogang Liu, Mingxiang Chen, Sheng Liu

A-073  **Impact of the packaging structural geometry on the Conformal Coating LED performance by Optical Simulation**.................................24  
* Gong Yu-bing, Liao Zhi-ping

A-074  **Impact of the LED chips placement and heat sink design on the multi-chip LED bump performance by the thermal and Optical Simulation**.................................................................28  
* Gong Yu-bing, Zhu Zheng

A-118  **Low Cost Fabrication of TSV-based Silicon Interposer Using Wet Chemical Etching and Its Application in 3D Packaging**......................32  
* Jiaotuo Ye, Xiao Chen, Chunsheng Zhu, Gaowei Xu, Le Luo

A-130  **Fabrication and Measurement of BPF using IPD Technology** ............36  
* Bian Xinhai, Guo Hongyan, Zhang Li, KH Tan, CM Lai

A-182  **Passive Equalizer Design on High Density Interconnects for 25Gbps High Speed IO and Beyond**..........................................................39  
* Boping Wu, Tingting Mo
A-190 Influence of Warpage on the State Estimation of a MEMS-Based Gyro-Free Inertial Measurement Unit .................................................................43
Shuai Yu, Chaojun Liu, Shengzhi Zhang, Xuebing Yuan, Qiang Dan, Sheng Liu

A-225 Effect of melting temperature and amount of the phase change material (PCM) on thermal performance of hybrid heat sinks .........................................48
Jinyan Hu, Tinghui Guo, Yongming Zhu, Run Hu, Xiaobing Luo, Ting Cheng

A-269 Analysis on Electromagnetic Isolation Issues Among Multi-chips in System in Package ..........................................................................................53
Peng Wu, Fengman Liu, Yi He, Huimin He, Jun Li, Liqiang Cao, Dongkai Shangguan, Lixi Wan

A-287 Embedded Band Pass Filter designed using Embedded Capacitor Material ...........................................................................................................58
Wenhu Yang, Xiujiang Zhao, Shuhui Yu, Rong Sun, Wei-Hsin Liao

A-289 Study on the POP ceramic package multilayer board design ..................62
Zhang Jie, Wang Ke

A-292 Multilayer Chip Embedded based on the Organic Substrate ..................66
Xueping Guo, Zhongyao Yu, Liqiang Cao, Yang Song, Yu Sun, Zhidan Fang, Hu Hao, Guowei Ding

A-309 New Process of Copper Pillar Bumps on Substrate ...............................70
Yang Song, Wenlong Liu, Zhongyao Yu, Xueping Guo, Zhide Fang, Guowei Ding

A-310 Foldable Substrates for Wearable Electronics .......................................74
Kelvin Pun, M.N. Islam, Tin Wing Ng

A-342 Characterization of Stencil Printing Parameters for Fine Pitch Wafer Bumping ............................................................80
Xi He, Ziyu Liu, Jian Cai, Yu Chen, Lin Tan, Qian Wang

A-347 Investigation of temporary bonding and release processes for TSV with copper pillar bumps ..........................................................86
Xiangmeng Jing, Feng Jiang, Cheng Xu, Kai Xue, Fengwei Dai, Zhaoqiang Li, Wenqi Zhang

A-381 Bonding 1200 V, 150 A IGBT Chips (13.5 mm × 13.5 mm) with DBC Substrate by Pressureless Sintering Nanosilver Paste for Power Electronic Packaging ..........................................................90
Shancan Fu, Yunhui Mei, Xin Li, Guo-Quan Lu

A-418 **Full-color LED display research based on chip on board (COB) package**

Mingyu Hu, Yiping Wu

A-419 **Effect of annealing after copper plating on the pumping behavior of through silicon vias**

Liang Ji, Xiangmeng Jing, Kai Xue, Cheng Xu, Hongwen He, Wenqi Zhang

A-430 **The Process Development and Reliability Study of Low Cost Area Array QFN Packaging Technology**

Hu Wang, Taotao Li, Xiaobo Ma, Xiaolong Wang, Shiguang Chen, Jianyou Xie, Daquan Yu

A-451 **Study of 3D SiP (System-in-Package) Module for Package-on-Package Application Using Multi-layer PCB Manufacturing Process**

Liulin Hu, Zhu Jin, Xuejie Liao, Yaoguo Ouyang, Jinsheng Dong

A-453 **Development of Advanced AuSn Alloy Plating Technology for Semiconductor Application**

Zhang Ling, Ng Seow Ching, Li Zheng, Fang Shu Nong, Tennyson Nguty, Emiel de Bruin, An Xiao, Henk Thoonen

---

Session B -- System Integration

B-111 **A Test Method of SIP Module**

Tianrui Zhu, Yun Liang, Yimao Cai, Lidong Lan, Xin Li

B-157 **Influence of Cu Orientation on the Growth of Cu-Sn Intermetallics and Interfacial Reaction of Cu/Sn Diffusion Couple**

Shan Yang, Li Peng, Yishi Tao, Anmin Hu, Ming Li

B-251 **The Coupling Effect of Size Effect and Krikendall Voids on the Fracture Features of Ni/Sn3.0Ag0.5Cu/Cu Joint**

Li Xuping, Zhou Bin, Yang Shaohua, En Yunfei

B-252 **Optimization Design and Simulation for a Band-Pass-Filter with IPD Technology for RF Front-end Application**

Huixuan Wang, Jie Pan, Xiaoli Ren, Anmou Liao, Yuan Lu, Daquan Yu, Dongkai Shangguan

B-436 **Fast Time Domain Crosstalk Analysis of Through Silicon Vias Based On**
Equivalent Circuit Model........................................................................................................134
Zhilong ZHANG, Runiu FANG, Guanjiang WANG, Xin SUN, Yufeng JIN, Min MIAO

B-450 A LTCC-BGA multi-chip packaging technology for MMICs up to Ku-band ..................................................................................................................138
Shuwei He, Zhi Huang, Dong Wang, Yijun Chen

Session C -- Packaging Materials & Processes

C-004 Effect of nano-dopant on intermetallic compounds growth in Sn-3.0Ag-0.5Cu-xBi solder joints during aging process..........................141

C-011 Increasing Bonding Strength of Chips and Substrates Assembly by Argon Plasma.................................................................145
Cheng-Li Chuang, Jong-Ning Aoh, Bo-Zhi Yang

C-012 Influence of nano additives on mechanical properties and reliability of interconnects made by electrically conductive adhesives on elastic substrates for printed electronics application ...........................................151
Janusz Sitek, Marek Koscielski, Yan Zhang, Jing-yu Fan, Shiwei Ma

C-015 A novel Method to Fabricate AlN-Al2O3 Multiphase Ceramic Layer on WCu Alloy.................................................................155
Jiandong Zhu, Rong An, Chunqing Wang, Yanhong Tian, Guangwu Wen

C-020 Reactive wetting and dewetting of liquid SnPb solder on the butterfly pattern.................................................................159
W. Liu, P. Jin, S.D. Zhang

C-021 Twin-induced ultra-high thermal conductivity of intering Ag nanoparticles for high power density electronic packaging........163
Shuai Wang, Mingyu Li, Jongmyung Kim

C-029 Study of silver-copper-palladium solder properties for vacuum electronic devices ..................................................................................167
Xiaowei Wang, Yutian Shu, Limin Ma, Fu Guo

C-035 Fabrication and thermophysical properties of short graphite fiber/Cu composites with Mo2C coating by vacuum pressure infiltration....172
ChenZhang, XinboHe, QianLiu
C-041 Preparation of MnO₂/Graphene Nanocomposite for the Application of Supercapacitor .................................................................177
Chunliang Liu, Dayong Gui, Jianhong Liu

C-047 Chip cooling with carbon nanotube heat sink..............................183
Zhenlong Huang, Taisong Pan, Min Gao, Yuan Lin

C-054 Palladium Coated Cu Wire: A Robust Material for Die to Die Cu WB Interconnect ........................................................................186
Allen M. Descartin, Zhang XiaoLong, Li Jun

C-066 Improving the Thermal and Mechanical properties of Epoxy Resins for Electronic Packaging ..........................................................191
Shuang Liang, Dayong Gui, Wenchuan Zhang, Weijian Xiong, Jianhong Liu

C-068 Study of Gold Wire Bonding on 0.1 μm Soft Gold Film Substrate ....196
Ruonan Zhang, Rui Guo, Ming Li, Kaiyou Qian, Hope Chiu

C-077 Evaluation of Ag sintering die attach for high temperature power module applications .................................................................200
Yimin Zhao, Yibo Wu, Kim Evans, John Swingler, Steve Jones, Xiaoping Dai

C-081 Effects of Cu orientation and stand-off-height on the microstructure of Cu/SnAgCu interface ..............................................................205
Han Xiao, Li Peng, Jiaxing Liang, Anmin Hu, Ming Li

C-083 Effect of Ni-coated graphene on the performance of SAC305 solder .....209
Guang Chen, Fengshun Wu, Weisheng Xia, Hui Liu, Changqing Liu

C-101 The Finite Element Analysis of Solder Joints under Temperature Cycling ..........................................................................................214
Fangyi Liu, Wenzhong Lou, Fufu Wang, Xuran Ding, Dakai Wang

C-105 Analysis of Stress and Strain Distribution on Pad During Bump Bonding Process ..............................................................................219
Tang Wenliang, Huang Chunyue, Li Tianming, Liang Ying, Xiong Guoqi, Wu song, Li Chunquan, Ning Zhongping

C-119 Dealloyed nanoporous Cu films on ceramic substrate for low temperature bonding ...........................................................................223
Xiaogang Liu, Kecheng Li, Mingxiang Chen, Sheng Liu

C-122 Research on conformal EMI shielding Cu/Ni layers on package ........227
Fankun Jiang, Ming Li, Liming Gao

C-124 The Improvement of Soldering Process of New Power Module Packaging Material with Large Soldering Area ..........................................................231

Jun Zhang, Bin-bin Zhang, Yun-yan Liu, Jing-ming Fei, Cheng-an Wan

C-131 O₂ Plasma Treatment in Polymer Insulation Process for Through Silicon Vias ................................................................................................................235

Lulu Zhuang, Kun Jiang, Guoping Zhang, Jiaoning Tang, Rong Sun, S. W. Ricky Lee

C-136 Reliability of Sn–Pb solder joints with Cu and Co–P surface finishes under thermal cycling..................................................................................239

Donghua Yang, Guoshuai Yang, Jian Cai, Qian Wang, Yang Hu, Jingwei Li, Liangliang Li

C-144 Preparation, microstructure and properties of Sn-Ag-Cu solder reinforced with Al₂O₃ nanoparticles.............................................................................243

Bomin Huang, Guang Chen, Fengshun Wu, Weisheng Xia, Liping Mo, Hui Liu

C-145 Investigation of ultrasonic bonding interface based on Ni micro-nano cones array....................................................................................................247

Haozhe Wang, Li Peng, Anmin Hu, Ming Li

C-150 Influence of solder volume and interfacial reaction on the undercooling and solidification microstructure of BGA structure Cu/Sn-3.0Ag-0.5Cu/Cu joints .....................................................................251

Lang Zhang, Min-Bo Zhou, Xin-Ping Zhang

C-163 A Novel Temporary Adhesive for Thin Wafer Handling.........................256

Xingtian Shuai, Rong Sun, Guoping Zhang and Libo Deng

C-170 Preparation of raspberry-like SiO₂ nanoparticles and thermo-mechanical properties of its epoxy composites .................................................................262

Liang Huang, Gang Li, Pengli Zhu, Rong Sun, Daoqiang (Daniel) Lu, Chingping Wong

C-178 Study of Electrical and Physical Properties of PrₓAl₂₋ₓO₃ as Metal-oxide-semiconductor Gate Dielectric .................................................................266

Ziming Zhang, Huiqin Ling, Ming Li

C-181 A Novel Nickel Nanocone Array Current Collector for High Performance supercapacitor ..............................................................................................270

Binghe Xie, Cheng Yang, Zijin Su, Zhexu Zhang, Xiaoya Cui, Jingping Liu
C-189   Modeling of Laminar Fluid Flow in Jet Dispensing Process ..........276
          Xiuyang Shan, Yun Chen, Xianan Peng, Hanxiong Li

C-191   Isotropically Conductive Adhesives filled with copper nanoparticles and micron-sized flakes .................................................................280
          Wenjun Chen, Dunying Deng, Fei Xiao

C-195   Thermal Property analysis of boron nitride-filled glass-fiber reinforced polymer composites .................................................................284
          ZHANG Jingyu, ZENG Xiaoliang, SUN Rong, XU Jian-bin

C-198   Preparation and characterization of a high Tg cyanate ester/epoxy composite resin .............................................................................288
          Zhidong Ren, Yuanrong Cheng, Lingqiang Kong, Fei Xiao

C-199   Preparation of direct plated copper ceramic spreader using electroless copper as seed layer .................................................................292
          Ziliang Hao, Xuebin Zhang, Chen Chen, Mingxiang Chen

C-201   Study on the bridge effect of Graphene oxide on thermal conductivity of Al2O3 filled glass fibers reinforced polymer composites ..........296
          Yimin Yao, Xiaoliang Zeng, Rong Sun, Jianbin Xu

C-204   Curing Mechanism and Thermal Properties of A Certain Liquid Crystalline Epoxy Resin Cured with Different Curing Agents ..........301
          Guo Kun, Zeng Xiaoliang, Yu Shuhui, Sun Rong, Xu Jianbin

C-205   High performance electrical conductive composites with ultralow percolation threshold .................................................................306
          Xinfeng Zhang, Matthew Ming-Fai Yuen

C-206   Effect of SiC Whiskers Addition on Microstructure, Microhardness and Wettability of Sn-Ag-Cu Solder ..................................................310
          Kaisheng Xu, Guang Chen, Fengshun Wu, Weisheng Xia, Hui Liu

C-212   Stress Control of Plasma Enhanced Chemical Vapor Deposited SiO2 Film in Through Silicon Via Process .................................................313
          Wenguo Ning, Qiang Zhao, Kai Zheng, Dong Chen, Hongyan Guo, Li Zhang, Zhengxun Hu, K.H. Tan, C.M. Lai

C-214   Preparation of Silver Nanosheets Used for Low Temperature Bonding.................................................................317
          Yunwen Wu, Fengtian Hu, Anming Hu, Ming Li
C-218  Preparation and properties of electroless deposited NiB as barrier layer.  
Junhong Zhang, Huiqin Ling, Yifeng Yan, Ming Li

C-219  Calculation of effective thermal conductivity of silicone matrix embedded 
with particulate phosphors in white led packages by 2D/3D unit cell method
Run Hu, Chao Yuan, Xiaobing Luo, Ting Cheng, Sheng Liu

C-224  Enhancing the Thermal Conductivity of Silicone Composites by 
Increasing Crosslink Degree  Jie Li, Xinfeng Zhang, Matthew Ming-Fai Yuen, Kai Zhang

C-227  Dry Etching of Fused Silica Glass in C4F8/Ar Inductively Coupled 
Plasmas for Through Glass Via (TGV) Applications
Laicun Lin, Mingchuan Zhang, Delong Qiu, Xiangmeng Jing, Feng Jiang, Daquan Yu

C-235  Mechanical property and void ratio of several Pb-containing and Pb-free 
solder joints in space power electronics
Yarong Chen, Zongpeng He, Zhenming Zhang, Meng Yang, Rong An

C-245  Assembly process research of TO package power transistor in Aerospace 
electronic products
Ningning Wang, Qiong Wu, Zongpeng He, Zhenming Zhang, Wei Zhang

C-248  Hermetic Packaging of Kovar Alloy and Low-carbon Steel Structure in 
Hybrid Integrated Circuit (HIC) System Using Parallel Seam Welding Process
Junde Wang, Xiaoqi He, Xunping Li, Yunfei En, Xinping Zhang

C-253  The study of novel Metal/Composite thermal interface materials for chip 
testing
Wang Shen, Cai Xionghui, Chen Guang, Wu Fengshun, Xia Weishen, Zhu Wenbo, Liu Ruhua, Zhang Yi

C-261  Study on local recrystallization and damage mode of Lead-free BGA 
solder joint
Xing Xu, Gaiqing Chen, Mingsheng Cheng

C-267  Plasma Cleaning and Its application in Microwave Module Wire Bonding 
Technology
Han Zongjie, Hu Yongfang, Yan Wei, Li Xiaoxuan
C-268 Research on Factors Influencing the Board Level Product Quality ....363
Wang Yuming, Zhao Zhenyu, Chuan Chen, Zou Guisheng, Cai Jian, Wang Qian, Wu Liang, Dong Chun, Bai Han

C-270 Characterization of Thermal and Curing Behaviors of Epoxy Molding Compounds...............................................................369
SHEN Huiqiang, QIN Fei, XIA Guofeng, BIE Xiaorui

C-283 Influence of Curing Procedures on the Electrical Properties of Epoxy-Based Isotropic Conductive Adhesives ..........................373
Nana Xiong, Zhiling Li, Jingze Li, Hui Xie, Yuehui Wang

C-293 An Advanced Constitutive Model for SnPb and SnAg Solder Materials 378
Xu He, Yao Yao

C-304 Large-scale production of oxidation-resistant Cu@SiO₂ core–shell nanoparticles for dielectric applications..............................384
Gang Li, Shuhui Yu, Rong Sun

C-307 Preparation and evaluation of embedded capacitors with high permittivity BT/ER composites by graft modified method..............388
Maobai Lai, Shuhui Yu, Wenhu Yang, Rong Sun

C-313 Investigating the rheological and thermomechanical properties of SiO₂/epoxy nanocomposites: probing the role of silane coupling agent........
..........................................................................................................................391
Gang Li, Pengli Zhu, liang.huang, Tao Zhao, Rong Sun, Daoqiang (Daniel) Lu.

C-319 Solder Joint Reliability with Various Silver Finish on PCB...............396
Liu Hai, Jin Li, Gu Liqun, Li Juanjuan, Li Ying, Chen Qiang, Du Maouha, Zhou Jianwei, Chang TaeSub

C-335 Research on Reliability of Sn-1.0Ag-0.5Cu Low-Ag Lead-free Solder Alloy .................................................................401
Yating Hu, Bing An, Rong Chen, Weiwen Lv, Yiping Wu

C-351 Surface treatments of hexagonal boron nitride for thermal conductive epoxy composites..........................................................405
Tianke Qi, Yan Li, Yuanrong Cheng, Fei Xiao

C-377 Magnetic Deposition of Ni/Au Coated Polymer Core Particles for Flip-chip Interconnection.......................................................409
Junlei Tao, David Whalley, Changqing Liu

C-383 Sulfur-containing compound in epoxy molding compound.........................414
Xingming Cheng, Hongjie Liu, Wei Tan, Chi Qiu, Lanxia Li, Jianglong Han

C-396 Study of Metal Mask Assisted TSV Bottom the Dielectric Layer Etching Process.................................................................418
Fengwei Dai, Zhongcai Niu, Wenqi Zhang

C-397 Packaging of Graphite/Epoxy Composite Film as Electric Heating Devices...........................................................................................................422
Chang Li, Xingsong Su, Yitao Xu, Shiguo Chen, Xianzhu Fu, Rong Sun, Chingping Wong

C-401 The reversible transformation between Cu$_2$(In,Sn) and Cu(In,Sn)$_2$ compounds during solid-state aging...........................................................425
Zhi-Quan Liu, Fei-Fei Tian

C-404 Study on size effect and cross-interaction in Cu/Sn/Ni-P interconnects .429
Mingliang Huang, Fan Yang, Ning Zhao, Xiaohua Liu, Jingyun Wang

C-405 Reverse Polarity Effect in Cu/Sn-9Zn/Ni Interconnect under High Current Density at High Temperature.................................................................433
Mingliang Huang, Zhijie Zhang, Ning Zhao, Xiaofei Feng

C-413 Spray Coating Process with Polymer Material for Insulation in CIS-TSV Wafer-Level-Packaging .............................................................................437
Yuechen Zhuang, Daquan Yu, Fengwei Dai, Guoping Zhang, Jun Fan

C-414 Influences of Material and Structural Factors on the Stress Conditions in Cu/low-k Chips during Cu Wire Bonding............................441
Xiaoyi Bai, Baohua Chang, Dong Du

C-421 The effect of low-melting point alloy re-melting process on the quality of mixed BGA joint and its reliability.......................................................447
Hongqin Wang, Zhonghua Wan, Daojun Luo, Zilian Liu.

C-435 Applications of Low Temperature Sintering Technology as Die Attach for High Temperature Power Modules .................................................452
Yibo Wu, Yimin Zhao, Yangang Wang, Steve Jones, Xiaoping Dai, Guoyou Liu

C-437 Development of Aluminum Compatible Photoresist Stripper for High Density Pillar Bump Technology .................................................................458
Libbert Peng, Bing Liu, Jianghua Liu, Justan Sun
C-443  High dielectric performance of polymer composites based on BaTiO$_3$-supporting Ag hybrid fillers..........................................................462

Fang Fang, Suibin Luo, Shuhui Yu, Rong Sun

C-449  Study of the return loss performance of an improved TSVs structure...466

Zuo Guoyi, Miao Min, Li Zhensong

C-452  A Kind of Novel Silicon-, Phosphorus-Containing Hybrid Material and Its Use as the Modifier of DGEBA Epoxy Resins........................................470

Hu Chaohui, Zhou Lina

C-454  Research on tensile property and creep resistance of electroplating nickel reinforced by Al$_2$O$_3$ nanoparticles .................................................................476

Chunjin Hang, Yanhong Tian, Chunqing Wang, Hong Wang

C-468  Development and characterization of graphene-enhanced thermal conductive adhesives....................................................................................480

Marcello Casa, Shirong Huang, Paolo Ciambelli, Nan Wang, Lilei Ye, Johan Liu

C-471  Effect of CuO on laser absorption in glass to glass laser bonding...........484

Kui Fu, Yi Li, Luqiao Yin, Jianhua Zhang

C-486  Rapid Formation of Cu-Sn Intermetallic Compounds by Strong Electric Current........................................................................................................489

Baolei Liu, Yanhong Tian, Shang Wang, Rui Zhang, Xin Zhao, Chenglong Dong, Chunqing Wang

C-492  Study on the Preparation of Aluminum Nitride with High Thermal Conductivity .................................................................................................493

Zhao Dongliang, Gao ling

Session D -- Packaging Design & Modeling

D-002  Solder Joint Fatigue Life Prediction in Large Size and Low Cost Wafer-Level ChipScale Packages.................................................................496

Ming-Che Hsieh, Su-Lan Tzeng

D-003  Design and Stress Analysis for Fine Pitch Flip Chip Packages with Copper Column Interconnects ..........................................................502

Ming-Che Hsieh, Su-Lan Tzeng

D-005  Simulation on heat transfer of microchannels and thermal vias for high
power electronic packages ................................................................. 508

Lan-Ying Zhang, Yang-Fei Zhang

D-007 Vibration analysis of nanomechanical mass sensor based on circular graphene sheets ................................................................. 511

Xionghui Gong, Shengwei Jiang, Xuefang Wang, Sheng Liu, Shuo Wang

D-008 Finite element analysis of graphene resonator tuned by pressure difference ........................................................................... 516

Xionghui Gong, Shengwei Jiang, Xuefang Wang, Sheng Liu, Shuo Wang

D-016 Impact Influence of BGA Chip’s Layout on Solder Balls Fatigue Life ... 520

Tian Wenchao, Guan Rongcheng

D-017 Impact Anti-vibration Structure Analysis and Optimizing on BGA Packaging Module ........................................................................... 524

Tian Wenchao, Guan Rongcheng

D-018 Low Effect and Experiment of Screw Locations on BGA Viscoelastic Fatigue Life ........................................................................... 529

Tian Wenchao, Guan Rongcheng

D-030 Fatigue Life Prediction for CBGA under Random Vibration Loading by Finite Element Method ................................................................. 535

Shang Wang, Yanhong Tian, Xuguang Guo

D-031 Analysis of the Influence of SOP Lead Shape on Solder Joint Reliability ................................................................. 538

Ren Chao, Zeng Chenhui, Shao Jiang, Xue Heping, Xu Wenzheng

D-033 Modeling and Analysis of Wearable Low-Cost MEMS Inertial Measurement Units ................................................................. 542

Xuebing Yuan, Shuai Yu, Shengzhi Zhang, Chaojun Liu

D-039 Electrical Performance Analysis and Structure Optimization for QFP-48 Sockets ........................................................................... 547

Sun Ling, Wang Xuemin, Sun Haiyan, Wang Shenglong, Yang Lingling

D-048 Modeling and Comparison of Different Edge Radiation Suppression Methods in Printed Circuit Boards ................................................................. 551

Hua-Yun Xu, Mu-Shui Zhang, Hong-Zhou Tan

D-049 Electrical Simulation of Thin Film Inductors on Silicon and Glass Substrates ........................................................................... 555
Zheng Qin, Cheng Pang, Xiaoli Ren, Wenyang Shang, Dongkai Shangguan, Daquan Yu

D-050 A Comparative Investigation on Power Noise Suppression Methods between Two Blocks in Printed Circuit Boards ........................................560
Yu Zou, MuShui Zhang, Hong Zhou Tan

D-052 Modeling, Simulation and Analysis of Coplanar Waveguide on Glass Substrate for 2.5D Integration ..........................................................564
Zheng Qin, Cheng Pang, Xiaoli Ren, Wenyang Shang, Dongkai Shangguan, Daquan Yu

D-060 High Bandwidth Application on 2.5D IC Silicon Interposer ..............568
Chen-Chao Wang, Hung-Hsiang Cheng, Ming-Feng Chung, Po-Chih Pan, Cheng-Yu Ho, Chi-Tsung Chiu, Chih-Pin Hung

D-061 Utilizing Plating Bar Structure to Enhance Passive Equalizer Compensation Technique .................................................................573
Chen-Chao Wang, Hung-Chun Kuo, Fu-Chen Chu, You-Le Lin, Tsai-Yun Hsieh, Chi-Tsung Chiu, Chih-Pin Hung, Sheng-Hua Huang, Chih-Wen Kuo

D-084 Influence of Compliant Layer Thickness on Stress and Strain of Solder Joints in Wafer Level Chip Scale Package under Thermal Cycle ..........577
Liang Ying, Li Tianming

D-086 A Novel Method for IR-Drop Reduction in High-Performance Printed Circuit Boards ..................................................................................583
Xiangmeng Jing, Yue-Hui Huang, Mu-shuizhang, Hong-zhou Tan

D-102 Interaction effect between electromigration and microstructure evolution in BGA structure Cu/Sn-58Bi/Cu solder interconnects ...............................587
Hong-Bo Qin, Wu Yue, Chang-Bo Ke, Min-Bo Zhou, Xin-Ping Zhang, Bin Li

D-115 Effect of Defects on Thermal Conductivity of Graphene ....................592
Kai Tang, Fulong Zhu, Ying Li, Ke Duan, Sheng Liu, Yanming Chen

D-120 Studies on Thermally Strain Relieving Behavior of Ring Configurations for a Packaged SAW Device Chip ..................................................596
Deyang Yan, Wei Xu, Lei Chen, Cheng Zhao, Yao Liang, Liwang Jiang

D-121 A New Interconnection/Transition Method Using Bumping-bridge Structure for 1-level Package of RF MEMS Devices ..............................599
Lei Chen, Wei Xu, Deyang Yan, Cheng Zhao, Yi Wang, Yue Sun

D-127 A Numerical Model for Diffusion Driven Gas Bubble Growth in Molten
Sn-based Solder .............................................................................................................602
Anil Kunwar, Haitao Ma, Junhao Sun, Lin Qu, Shuang Li, Jiahui Liu

A new designed trench structure to reduce the wafer warpage in wafer level packaging process .................................................................606

Determination of Solder/Cu Interfacial Cohesive Zone Model Parameters by Inverse Analysis .............................................................................610
Guohui Jin, Pengwei Wu, Yangjian Xu, Lihua Liang, Xiaogui Wang

Electrical Characterization and Analysis on the Via-Solder Ball Structure ..................................................................................................................615
Yi He, Jun Li, Fengman Liu, Peng Wu, Liqiang Cao

Modeling the Bottom-Up Filling of Through Silicon Vias with Different Additives ........................................................................................................618
Zuyang Wang, Wei Luo, Liming Gao, Ming Li

Thermal Performance Investigation of Three-dimensional Structure Unit in Double-sided Cooling IGBT Module .................................................................622
Chunlei Wang, Libing Zheng, Li Han, Huachao Fang, Ju Xu

Packaging and process optimization for Three-dimensional structure unit of Double-sided cooling IGBT module .................................................................626
Chunlei Wang, Libing Zheng, Li Han, Huachao Fang, Ju Xu

Electromigration Reliability Evaluation in FCBGA Package Based on Orthogonal Experimental Design .................................................................630
Yuanxiang Zhang, Lihua Liang, Richard Rao

Thermal Effect on Performance of Micromachined Hemispherical Gyroscope .............................................................................................................637
Weihui Wang, Zhang Luo, Ming Wen, Qiang Dan, Sheng Liu

Phase field simulation of Kirkendall voids at the interface of microscale Sn/Cu system lead-free interconnects .............................................................641
Shui-Bao Liang, Chang-Bo Ke, Wen-Jing Ma, Min-Bo Zhou, Xin-Ping Zhang

Effects of Bubbles in Coating Gel on The Performance of MEMS Pressure Sensor ...........................................................................................................646
Qiang Dan, Fanliang Li, Sheng Liu
D-188 Study of Response Time of A Micro Flow Sensor ...........................................651
   Xing Guo, Chunlin Xu, Qiang Dan, Shengzhi Zhang, Sheng Liu

D-194 Modeling and Simulation of Self-heating Effect with Temperature Difference Air Flow Sensor .................................................................655
   Chunlin Xu, Xing Guo, Hao Jiang, Zhefeng Zhang, Sheng Liu

D-197 Simulation of Effects of Package Parasitics on Modulation Characteristics of Semiconductor Lasers .................................................................660
   Yongyong Lu, Sheng Hu, Yonglin Yu

D-203 Effects of Residual Stress in the Membrane on the Performance of Surface Micromachining Silicon Nitride Pressure Sensor .....................664
   Hao Jiang, Gang Cao, Chunlin Xu, Zefeng Zhang, Sheng Liu

D-216 Study on the effect of the phosphor distribution on the phosphor layer temperature in light emitting diodes by lattice Boltzmann method ......671
   Lan Li, Chao Yuan, Run Hu, Huai Zheng, Xiaobing Luo

D-228 A new fast moisture sensitivity analysis method using equal moisture distribution simulation .................................................................676
   Xiaosong Ma

D-229 Simulation Analysis of Jet Dispenser Based on Piezoelectric Actuators..680
   Yajie Wen, Guiling Deng, Can Zhou

D-230 Study on Temperature Field of Fluid Jet-dispenser Based on Two Piezoelectric Stacks ..................................................................................684
   Zhichao Gu, Guiling Deng, Can Zhou

D-271 Interfacial stress analysis in TSVs by considering the sidewall scallop ..688
   WU Wei, QIN Fei, LI Wei, SHI Ge

D-275 Numerical simulation of the intermetallic compound cracking in solder joint ..............................................................................................693
   AN Tong, QIN Fei

D-282 Homogenization Schemes for TSV Interposer Packages .....................698
   BIE Xiaorui, QIN Fei, SHEN Ying, CHEN Si

D-284 Numerical Analysis on MUF Process for Flip Chip Packaging ..........703
   Xiyun Cheng, Qian Wang, Lin Tan, Guanhua Li, Yu Chen, Jian Cai

D-297 Thermal Analysis of 2.5-D Package Designs With Joule heating Effect
along TSVs.................................................................711

H.Y. Zhang

D-299 Investigation of warpage induced reliability of a system in package in assembly process .................................................................718

Qiuxiao Qian,Yong Liu

D-314 Study on the board-level drop test of the stacked memory device by FEA .. ........................................................................................................................724

Junwen Pang, Jun Wang,Liyou Zhao

D-318 The investigation of board-level vibration for the stacked memory device . ........................................................................................................................728

Xiao Li, Jun Wang,Liyou Zhao

D-325 The Optimization of Thermal Performance in Power Electronics Modules........................................................................................................734

Paul Evans, Alberto Castellazzi, C Mark Johnson,Hua Lu, Chris Bailey

D-334 Stress modeling for the impacts of flip chip process on the ultralow-k chips..............................................................................................................740

Lin Lin, Jun Wang,Chen Yang

D-337 Modeling and Characterization of Joule Heating in Metal Core of TSV ..... ........................................................................................................................745

Yong-Sheng Li,Xing-Chang Wei, Er-Ping Li

D-338 The Use of Buried TechnologyIn Microsystem Packaging AchievesThe New Type of Electronic Band Gap .................................................................749

Wang liuping, ShangGuanDong kai, Cao liqiang, Liu Yuan

D-341 Electromagnetic Noise Coupling Analysis of TSV Array by using Cylindrical Mode Expansion Method ..............................................................753

Jun Li,Hui-Chun Yu, Xing-Yun Luo,Xing-Chang Wei, Er-Ping Li

D-343 A flexible module design with LED chips based on the PET-copper foils .... ........................................................................................................................757

Yun Chao Chen, Miao Cai, Hong Liang Jia, D.G. Yang

D-346 Low silver lead-free solder joint reliability of VFBGA packages under board level drop test at-45°C........................................................................762

Xiaoyan Niu, Zhanbiao Zhang, Guixiang Wang, Xuefeng Shu
D-352  Heat transfer of gas-water two-phase flow in microgap ...........................766
Zhihui Wen, Zhipeng Zhou, Jiancheng Shen, Jinsong Zhang

D-358  Light Extraction Analysis of High-power LED based on Flip Chip Technology .................................................................771
He Liyun, Ye Lezhi

D-363  Thermal analysis for COB based on glass substrate .........................775
Xin Chen, Yiping Wu

D-415  Harmonic Vibration Analysis and S-N Curve Estimate of PBGA Mixed Solder Joints ..............................................................778
Lu Tao, Zhou Bin, Pan Kailin, En Yunfei, Gong Yunbin

D-420  Modeling and analysis of TSV noise coupling and suppression methods for 20nm node and beyond ........................................783
Runiu FANG, Xin SUN, Yufeng JIN, Min MIAO

D-446  Study of Ground-Signal-Ground TSV in terms of Transmission Performance ........................................................................788
Li Qinghai, Miao Min, Li Zhensong

D-447  Study on Encapsulation Reliability ......................................................792
Peng DING, Renhui LIU, Yu CHEN, Guanqiang SONG, Guanhua LI

D-461  Fine Pitch BGA Device Solder Bridging Mechanism Investigation Through Solder Shape Modeling ........................................796
Xiaoqing Li, Yuchuan Wang, Jianwei Zhou, Tae Sub Chang

D-462  Experimental and Numerical Study of Moisture Effect on Warpage of Plastic Package ..........................................................801
Yinglei Chen, Maohua Du, Jianwei Zhou, Tae Sub Chang

D-469  Study on the influencing factors of thermal spreading resistance of HP-LED package ..........................................................806
Jinlong Zhang, Luqiao Yin, Peng Song, Yang Bai, Jianhua Zhang

D-489  Microwave Multichip Module Tridimensional Assembly Technology Based on LTCC ..........................................................811
T. Zhang

D-491  A Novel High Performance 40GHz Hermetic SMT Ceramic Package for Microwave Applications .................................................815
Qiao Zhizhuang, Gao Ling, Liu Linjie
Session E -- Inter-connection technologies

E-072  Electroless Ni-P-ZrO2 metallization for lead-free solder interconnection ..........................................................820
Xiao HU, Y.C.CHAN

E-315  Back Drilling in High-Speed Interconnect System ..................................................825
Xu Wang, Weidong Ding

E-385  Simulation Study of a Novel TSV Structure ..................................................829
Zhensong Li, Min Miao, Qinghai Li, Dacheng Yang

E-460  Signal Integrity Analysis of a High-Performance Processor Package with Silicon Interposer ..........................................................833
Kecheng Li, Xiaogang Liu, Mingxiang Chen, Sheng Liu

E-495  Power QFN Tiger Device Down Bond Bond-ability Study..........................838
Hanmin Zhang, M. Hu, B.G Yin, Q.C He, D.H Ye, Sonder Wang

Session F -- Advanced Manufacturing & Packaging Equipment

F-013  Experimental Estimation of Adhesive Fracture Energy of Compliant Adhesive Tape ..........................................................842
Zunxu Liu, Pengpeng Tang, YongAn Huang, Zhouping Yin

F-076  The Reliability of High-lead Solder Joints in Flip-Chip Devices..............847
Lingjuan Tian, Yuanfu Zhao, Quanbin Yao, Yusheng Cao, Binhao Lian

F-078  The influence of the solder joint void on the CCGA package reliability .....850
Yingzhuo Huang, Binhao Lian, Quanbin Yao, Xiaorui Lv, Pengrong Lin

F-187  Reliability Study of the Solder Joints in CCGA Package during Thermal Test ..........................................................854
Xiaorui Lv, Yingzhuo Huang, Pengrong Lin, Xueming Jiang, Binhao Lian, Quanbin Yao

F-220  Defect Inspection of Copper Bonding Using Ultrasound ..........................858
Lei Su, Tielin Shi, Li Du, Pengfei Chen, Guanglan Liao, Xiangning Lu

F-236 Reactive ion etching characteristics of partially-cured benzocyclobutene...
........................................................................................................................862

Yang Yang, Zhen Song, Yuxin Du, Zheyao Wang

F-279 Residual stress measurement of the ground wafer by Raman Spectroscopy
........................................................................................................................867

SUN Jinglong, QIN Fei, REN Chao, WANG Zhongkang, TANG Liang

F-281 Subsurface Damage Distribution of Ground Silicon Wafers
........................................................................................................................871

YAN Debao, QIN Fei, SUN Jinglong, WANG Zhongkang, TANG Liang

F-349 Modeling and simulation of silicon wafer backside grinding process
........................................................................................................................874

Zhaoqiang Li, Xiangmeng Jing, Feng Jiang, Wenqi Zhang

F-384 Strain field simulation of transferring process on large wafers
........................................................................................................................878

Tang Liang, Ye Lezhi

F-407 A Novel Modeling of TSV MOS Capacitance by Finite Difference Method
........................................................................................................................881

Shuai Yu, Chaojun Liu, Shengzhi Zhang, Xuebing Yuan, Qiang Dan, Sheng Liu

F-488 Diamond sawing process of 12 inch low-K silicon wafer applied in smart card
........................................................................................................................885

Xiangfei Kong, Xiulei Wang, Caifeng Wu

Session G -- Quality & Reliability

G-014 Mechanical Properties and Microstructure of Sn-Based Solder Joints at Cryogenic Temperature
........................................................................................................................888

Xue Du, Yanhong Tian, Xin Zhao

G-022 Tensile testing and microstructure analysis on Sn-Pb-Cd and Sn-Pb eutectic solder
........................................................................................................................893

Y. Ding, G. D. Wu, X. L. Wang, G. S. Yan, C.J. Hang

G-026 Effects of Electromigration on the Creep of Sn0.3Ag0.7Cu Solder Joint
........................................................................................................................898
Yong Zuo, Limin Ma, Fu Guo, Lei Qiao, Yutian Shu, Jing Han

G-027 Failure behaviors of Sn-0.3Ag-0.7Cu solder joint under creep and current stressing

Lei Qiao, Yong Zuo, Limin Ma, Yutian Shu, Fu Guo

G-034 Study of microstructure evolution and temperature distribution in eutectic SnBi solder joints under high current density

Qian Liu, Yutian Shu, Limin Ma, Fu Guo

G-038 Reliability analysis of power MOSFET

Peisheng Liu, Jinxin Huang, Ying Lu, Longlong Yang

G-045 Optimization of Lead-free Wave Soldering Process for Inverter Air-conditioner Motherboard by DOE

Xiaojian Liu, Ling Wang

G-046 Study of Key Failure Modes of PTH in High Density Printed Board and Case Study

Yao Bin, Chen Hui, Lu Yudong, Luo Daojun

G-051 Reliability evaluation on high power light emitting diodes

Lu Guoguang, Hao Mingming, Huang Yun, Zhang Hongqi

G-063 The Simulation Analysis for the Correlation between Failure of BGA Solder Joints and the Loading Modes

Wang Lifeng, He Bing, Yu Yangyang

G-064 The growth behavior of IMC on the Sn/Cu interface during solidification of multiple reflows

Shuang Li, Yao Du, Lin Qu, Anil Kunwar, Junhao Sun, Jiahui Liu, Ning Zhao, Mingliang Huang, Haitao Ma

G-065 Investigate influence of solder thickness on the fatigue failure behavior of solder joint under high temperature

Yongxin Zhu, Xiaoyan Li, Ruiting Gao, Chao Wang

G-067 Effect of Ar Reflow Atmosphere on the SAC305 Solder Joint Reliability

Ting Li, Dongyan Ding, Yeqing Tao, Jason Guo, Ting He, Yunhong Yu

G-069 The study of interfacial reaction during rapidly solidified lead-free solder Sn3.5Ag0.7Cu/Cu laser soldering

Jiahui Liu, Haitao Ma, Shuang Li, Junhao Sun, Anil Kunwar, Wang Miao,
Jianjie Hao, Yanpeng Bao

G-082 A Framework to Test Reliability and Security of Wi-Fi Device ...............953

Dong Wang, Ming Zhou

G-087 Comparative Study on the Reliability of QFN and AAQFN Packages ...959

Jia Xi, Fei Xiao, Hu Wang

G-088 Temperature Cycling and Drop Reliability of a 3D System-in-Package Device ............................................................................................................963

Jia Xi, Kun Lin, Fei Xiao, Xiaofeng Sun

G-090 Numerical simulation and analysis on thermal coupling effect of MCM packaging........................................................................................................967

WANG Kaikun, GAO Qi, GE Zhipeng

G-091 Study of the Thermal Field and Thermal Stress Field of Typical BGA Packaging by Numerical Simulation..........................................................971

GAO Qi, WANG Kaikun

G-095 In situ study on growth behavior of interfacial bubbles and its size effect on Sn-0.7cu/Cu interfacial reaction............................................................976

Junhao Sun, Yao Du, Anil Kunwar, Lin Qu, Shuang Li, Jiahui Liu, Binfeng Guo, H.T. Ma

G-109 Formation of single phase Cu-Sn IMCs via layer-by-layer electroplating of Cu and Sn metals .....................................................................................980

Rong An, Huiwen Ma, Hailong Li, Zhen Zheng, Chunqing Wang

G-113 Parallel-gap resistance welding between gold-plated silver interconnects and silver electrodes in germanium solar cells..........................................985

Rong An, Di Xu, Chunqing Wang

G-117 Effect of Temperature Cycling on Reliability of Flip Chip Solder Joint ...... ........................................................................................................................989

Xueming Jiang, Pengrong Lin, Yuezhong Song, Yingzhuo Huang, Binhao Lian, Quanbin Yao

G-132 Analysis of laser typing spots at gold-plated kovar alloy cavity ..........992

Yuwei Zheng, Shengxiang Bao, Zhenzhen Rao, Chengshi Zhang, Yao Yan

G-133 Effect of magnetism of specimen on energy spectrum analysis.........996

Yan Yao, Shengxiang Bao, Zheng Yuwei
G-134 Failure analysis of the Winding inductor caused by hot dip coating tin......

Yuwei Zheng, Shengxiang Bao, Zhenzhen Rao, Chengshi Zhang, Yao Yan

G-135 Effect of Interfacial Reaction on Tin Whisker Formation of Sn/Ni Films Deposited on Copper Lead-frame ............................................................1005

Ting Liu, Dongyan Ding, Yu Hu, Yihua Gong

G-137 Failure Analysis of Sm2Co17 Type Permanent Magnet for High Temperature ...............................................................................................1010

Yan Yao, Shengxiang Bao, Zhang Xiaowen, Wang Zuwen, Shen Anguo, Zhang Ming

G-141 A Simulation of Intelligent Power Module Under Power Cycling Condition ....................................................................................................1015

Yong Wang, Wen Zhao, Ming Li, Ming Chen

G-142 Effect of Al-0.5%Cu thin film on reliability of IGBT module ...........1021

Wen Zhao, Yong Wang, Ming Li, Liming Gao

G-143 Reliability of 1206 capacitor/SAC305 solder joint reflowed in protective atmosphere..................................................................................................1026

Yeqing Tao, Dongyan Ding, Ting Li, Jason Guo, Ted He, Yunhong Yu

G-152 The influence of imposed electric current on the tensile fracture behavior of micro-scale Cu/Sn-3.0Ag-0.5Cu/Cu solder joints .......................1030

Wangyun Li, Hongbo Qin, Minbo Zhou, Xinping Zhang

G-154 Effect of Cu/Al Substrate Thickness on the Deformation and Fatigue Life of Bumps Array ..................................................................................1035

Shijie Chen, Fengshun Wu, Weisheng Xia, Hui Liu, Ming Xiao, Lin Huang

G-158 Effect of Micro-Channel on Warpage and Residual Stress Due to Reflow Process in IGBT Modules.................................................................1040

Yang Zhou, Ling Xu, Zefeng Zhang, Sheng Liu

G-162 Modeling of the coalescence of micro-voids under the influence of elastic stresses and electromigration.........................................................1047

Peng Zhou, Jie Wang

G-167 The study of different transmission lines in high speed optical module

Huimin He, Baoxia Li, Yu Sun
<table>
<thead>
<tr>
<th>G-176</th>
<th>Morphology, Kinetics and service reliability of Cu6Sn5 texture formed on Sn/Cu interface</th>
<th>1056</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Zhihao Zhang, Huijun Cao, Yong Xiao, Mingyu Li</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>G-183</th>
<th>Digital Image Distortion and Proofreading Technology in Micro Focal Spot X-ray Inspection</th>
<th>1060</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Weiwen Lv, Bing An, Yiping Wu</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>G-193</th>
<th>Effect of Heat Sink on Electromigration Lifetime of Ni Thin Film</th>
<th>1063</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lin Huang, Shijie Chen, Fengshun Wu, Weisheng Xia, Hui Liu, Yanjun Xu</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>G-221</th>
<th>Is thermal management outside the package enough for higher LED reliability?</th>
<th>1068</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Qi Chen, Quan Chen, Run Hu, Xiaobing Luo</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>G-234</th>
<th>Electromigration - induced failure mechanism and lifetime prediction in NiCu Thin Film</th>
<th>1071</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yanjun Xu, Lin Huang, Guang Chen, Fengshun Wu, Weisheng Xia, Hui Liu</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>G-237</th>
<th>Warpage and Stress Optimization of Wafer-level Package of MEMS with Glass Frit Bonding</th>
<th>1075</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gaowei Xu, Chunsheng Zhu, Jiaotuo Ye, Heng Li, Wei Gai, Le Luo</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>G-242</th>
<th>Reliability of Au-Si eutectic bonding</th>
<th>1080</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tianxiang Ye, Zhen Song, Yuxin Du, Zheyao Wang</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>G-249</th>
<th>Reliability of BGA Assembled with Lead-Free Low Melting and Medium Melting Mixed Solder Alloys</th>
<th>1083</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yan Liu, Joanna Keck, Erin Page, Ning-Cheng Lee</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>G-256</th>
<th>Acceleration of the growth of tin whisker by thermal aging and external tension</th>
<th>1096</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>G-260</th>
<th>The effect of coating thickness and external force on the growth of tin whisker</th>
<th>1100</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Z.X.Yao, L.M.Yin, L.P. Zhang, J. Zhou, Z.X.Yao</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>G-262</th>
<th>Mechanistic study of Failed SnPb/Cu-Fe-P Solder Joints in Power MOSFET</th>
<th>1104</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lihua Cao, Zhi-Quan Liu, Yongliang Zhang, Cui Zhang, Renzhe Zhao</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>G-263</th>
<th>Research of parallel scheduling strategy for hierarchical SiP test using IEEE 1500 standard</th>
<th>1108</th>
</tr>
</thead>
</table>
G-265 Data analysis method of the small samples and zero-failure data for space TWT accelerated life test................................................................. 1112

Fangfang Song, Zhenwei Zhou, Shajin Li, Yunfei En, Bin Li

G-272 EFFECT of N-WELL for SINGLE EVENT UPSET in 65 NM CMOS TRIPLE-WELL TECHNOLOGY in 6T SRAM CELLS....................... 1116

Jian Wang, Lei Li

G-274 Study of Tin Whisker Growth Accelerated by Rare Earth Phase and the Mechanism of Tin Whisker Growth..................................................... 1120

Yan Yao, Shengxiang Bao, Zheng Yuwei

G-316 Measurement and analysis of low-frequency noise in large capacity high voltage aluminum electrolytic capacitors ........................................ 1127

Wu Yong, Ma Zhongfa, Du Lei, He Liang

G-320 Experimental and Finite Elemental Investigations on Residual Stress of TSV................................................................................................. 1133

Fei Su, Tianbao Lan, Yunhui Zhu, Jing Chen

G-327 Thermo-mechanical Reliability of 3D package under different thermal cycling............................................................................................... 1138

Tianbao Lan, Fei Su

G-330 Effect of Package Thermal Warpage for POP Assembling Technique...........

...................................................................................................................... 1142

Yabing Zou, Yabing Zou

G-332 Contact Resistance Investigation of Electrical Connector with Different Shrink Range...................................................................................... 1146

Ke Duan, Fulong Zhu, Ying Li, Kai Tang, Sheng Liu, Yanming Chen

G-354 Molecular modeling of the conductivity of carbon nanotubes under different temperature and humidity ......................................................... 1150

Ning Yang, Xianping Chen, Miao Cai, Daoguo Yang, Guoqi Zhang

G-357 The Morphology Change of SnAgCu Solder Under Current Stressing 1155

Zheng Zhang, Yuan Wang, Fei Su

G-360 De-embedding Research in Cold Test of Output Window of Gyro-TWT (Gyro Traveling Wave Tube).................................................................. 1159

Qian Liu, Li Wang, Ran Yan
Different diffusion behavior of Cu, Ni and Zn atoms in Cu/Sn-9Zn/Ni interconnects during Liquid-Solid electromigration

Q. Zhou, Y. Zhou, X. Qin, X. J. Wang, M. L. Huang

Investigation on Reliability and Failure Analysis of Plastic Encapsulated Microelectronics

Huiwei Wu, Shengzong He, Liyuan Liu, Xianjun Kuang, Dengyun Lei, Haijun Li

Effect of Pb content on shear performance of SnAgCu-xSnPb/Cu Mixed solder joint

Wangxin, Li Xunping, Pan Kailin, Zhou bin, Jiang Tingbiao

Characterization of After-Reflow Misalignment on Head-in-Pillow Defect in BGA Assembly

Chuan Chen, Jian Cai, Qian Wang, Yuming Wang, Guisheng Zou, Zhengyu Zhao, Chang Yong Park

Abnormal Grain Growth in Cu6Sn5 Grains Formed at Sn-based Solder/Cu Interfaces

Ming Yang, Mingyu Li, Jianxin Wu, Jinhua Xu

Research on Mobility Variance Caused by TSV Induced Mechanical Stress in 3D-IC

Yangyang Zhao, Hailong You, Ran Cui, Yu Zhang, Xinzhang Jia

Effect of electromigration on the tensile strength of Cu/Sn-9Zn/Cu solder interconnects

Mingliang Huang, Fei Zhang, Fan Yang, Ning Zhao

Typical Failure Mechanism of LED Package

Guangning Xu, Zeya Peng, Huanxiang Xu, Xianjun, Lei Zhang

Influences of viscoelasticity of polybutylene terephthalate (PBT) on the thermal interface contact of LED spotlight module

Hongyu Tang, Yong Yu, Min Jia, Stanley Y. Y. Leung, Cheng Qian, Cadmus C. A. Yuan, Xiang Zhou, G. Q. Zhang

A novel design of heatsink-less LED base fluorescent lamp retrofit

Jia Zhao, Yan Liu, Hongyu Tang, Stanley Y Y Leung, Cadmus C A Yuan, G Q Zhang

Research of surface wettability of plating on the ceramic shell

Dongmei Li, Xiaocheng Feng, Jinchun He, Binhao Lian, Yong Wang
Study on Fracture Mechanism of the Aged Sn2.5Ag0.7Cu0.1RE/Cu Soldering Joint with External Energy .................................................................1212
Xingdong Guo, Keke Zhang

Physics-of-failure-based prognostics and health management for electronic products.................................................................1215
Decai Yang

Electrothermal-coupled simulation of electrodes with flip-chip LEDs. 1219
Peng Song, Luqiao Yin, Wen Gu, Jinlong Zhang, Jianhua Zhang

Failure Analysis For IC Plastic And Substrate/Leadframe Package ....1225
Gongchang Zhang, Jianqiang Li, Yanning Chen, Renqing Wang, Miaomiao Yang

Effects of Resin Thickness on the Stress Intensity Factors of Edge-cracked Adhesive Joints .................................................................1229
Xin Lan, Nao-Aki NODA

Microstructure and Properties of Sn2.5Ag0.7Cu0.1RE Lead-Free Soldering Joints with ultrasonic Assisted .................................................................1233
Yu-jie Liu, Ke-ke Zhang, Xiao-jiao Zhang, Kai Zhao, Ran-feng Qiu, Hong-xin Shi

Session H -- Microwave and Power electronics Packaging

A Band-Notched UWB Slot Antenna with High Skirt Selectivity and Controllable Bandwidth .................................................................1237
Chao Wang, Xubo Wei, Bo Ding, Mingxia Zhang, Dan Wang, Zetao He, Yu Shi

Miniaturized CQ Bandpass Filter with Mixed Coupling ....................1241
Zetao He, Yu Shi, Xubo Wei

Compact CPW-fed tri-band stepped monopole antenna with inverted-L strip for WLAN/WiMAX applications .................................................................1244
Yuanfu Liu, Peng Wang, Hao Qin

Compact Dual-Band Bandpass Filter Using Combined CRLH Resonator And Right-Handed Open Stubs Loaded Resonator .................................................................1248
Long Chen, Yonglun Luo, Xiaolei Ma

A Compact Printed Filtering Antenna With Flat Gain Using Annular Slot
And UIR..........................................................................................................................1252

Bo Ding, Xubo Wei, Chao Wang, Mingxia Zhang, Zetao He, Yu Shi

H-166 A compact tri-band monopole antenna with asymmetric CPW grounds for WLAN/WiMAX applications.................................................................1256

Hao Qin, Peng Wang, Yuanfu Liu

H-172 Circuit Modeling and Structure Optimization of Integrated Passive Inductors........................................................................................................1260

Jie Pan, Huijuan Wang, Delong Qiu, Xiaoli Ren, Yuan Lu, Daquan Yu, Dongkai Shangguan

H-285 Design of wide stopband bandpass filter using composite right/left handed transmission line.................................................................1265

Pu-chao Wu

H-286 A novel Absorption Band-pass Filter with Compact Structure and Wide Relative Bandwidth..................................................................1270

Wei-wei Qin, An-gang Shu

H-295 Compact UWB Signal Interference Filter Using Interdigital Coupled Lines ......................................................................................................................1275

Y Zhang, YL Luo, ZY Xin

H-303 A Highly Linear Short-wave Broadband Doublebalanced Mixer ..........1278

Hongjun Ying, Yu Shi, Qingfu Yang

H-308 Development of Circularly Polarized Antennas Based on Dual-mode Hexagonal SIW Cavity .................................................................1283

Gen Zhang, Ziqiang Xu

H-317 A Highly Linear Short-wave Ultrawideband Balanced Amplifier ..........1287

Gaogan Yu, Yu Shi, Huayi Zheng

H-322 Microstructures and Properties of Alumina/Copper Joints Fabricated by Ultrasonic-Assisted Brazing for Replacing DBC in Power Electronics Packaging..................................................................................................................1291

Hongjun Ji, Hao Chen, Mingyu Li

H-326 A band-notched UWB antenna with good shape factor .........................1295

Nie Fan, Jin Long

H-328 Compact Dual-band Bandpass Filter Using Stepped Impedance Resonators ..................................................................................................................1299
Xubo Wei, Bo Ding, Guotao Yue, Chao Wang, Zetao He, Yu Shi

H-350 A simple Ultra-Wideband filter with Notch band using SIR and Three parallel lines ......................................................... 1302
Su Song Yang, Ran Liu, Zhi Li Li, Peng Zhou

H-356 MICROSTRUCTURE AND MAGNETIC PROPERTIES OF COSN-DOPED MTYPE BARIUM FERRITE WITH LOW TEMPERATURE SINTERING FOR LTCC APPLICATION ........... 1305
Wang Yu, Zhang Huaiwu, Wang Yue, Yang Kai, Yingli Liu

H-359 Novel Design of A Compact Band-pass Filter With Two Finite Transmission Zeros Using LTCC Technology ........................................ 1308
Zhiyu Zhao, Yingli Liu, Kai Yang, Lei Shi, Liyun Gan

H-364 A HIGH-EFFICIENCY CLASS-F POWER AMPLIFIER USING DOUBLE CRLH-TL FOR LTE APPLICATION ........................................ 1312
Xian-ping Xiong, Yong-Lun Luo, Yun Zhang, Xiao-Lei Ma, Pu-chao Wu, Long Chen

H-373 DESIGN OF COMPACT BANDPASS FILTER WITH ENHANCED STOPBAND CHARACTERISTICS .............................................. 1316
Mingxia Zhang, Shuanglin Yuan, Xubo Wei, Dan Wang

H-374 A PIN Diode Controlled Variable Attenuator On Rectangular Waveguide In Millimeter Wave Band ........................... 1320
Liu Chen, Cheng Chen, Xin Wang

H-375 A Novel Waveguide Directional Coupler With High Directivity and Broad Bandwidth .......................................................... 1322
Cheng Chen, Liu Chen, Tingting Yang

H-378 Study on the Magnetic Properties of Low-Fired NiCuZn Ferrite Prepared by a Combined Method ........................................ 1324
Kai Yang, Yingli Liu, Zhiyu Zhao, Lei Shi

H-380 Rectangular Waveguide Band-pass Filter with High Power Harmonic Suppression ......................................................... 1327
Peng Zhao, Xin Wang, Cheng Chen

H-382 A THZ Cross-guide Waveguide Directional Coupler With High Directivity ............................................................... 1329
Xin Wang, Peng Zhao, Tingting Yang

H-386 A LTE Doherty Power Amplifier using Envelope Tracking Technique ...........
Zihao Zhang, Zhenyu Xin

H-387 Compact Microstrip Triple-Mode Filter Based on Stepped-Impedance Resonators .................................................................1335

Ran Liu, Li Zhi Li, Wen Shi

H-388 A Novel Compacted microstrip Bandpass Filter using Stepped Impedance Resonator(SIR) and defected ground structure(DGS) .......................1338

Zhili Li, Wen Shi, Ye Yuan

H-389 A Compact Ultra-wideband Bandpass Filter Design Based on Open Stub Loaded SIR Structure..................................................1341

Ye Yuan, Su Song Yang, Ran Liu

H-390 A Q-Band Very Broad Band On-Chip Antenna for Q-LINKPAN Applications.................................................................................1344

Peng Gao, Ning Wang, Zhi Ning Chen

H-391 A 60-GHz On-Chip Antenna Using Standard 0.18μm CMOS technology .............................................................................................1347

Ning Wang, Peng Gao, Kai Kang

H-392 A planar 60GHz antenna for MIMO/diversity applications........1350

Caipu Zhang, Peng Gao

H-393 A Compact Microstrip Ultra-wideband Filtenna............................1353

Rongda Wang, Peng Gao

H-394 A Modified Broadband Hybrid-Ring Directional Coupler in W-Band.......1356

Wen Shi, Ye Yuan, Su Song Yang, Bo Sheng Liang

H-423 A Novel X-band Oscillator using Substrate Integrated Waveguide Resonators ..........................................................................................1359

Jin Long, Qian Kewei

H-424 A Waveguide Phase Shifter With Good Flatness and Broad Bandwidth......1362

Tingting Yang, Shitou Liu, Xin Wang

H-427 A Microstrip Miniaturized Triple-mode Filter.................................1364
Shitou Liu, Tingting Yang, Peng Zhao

H-431 Design of A Novel L-band High Selectivity Miniaturized Planar Filter ................................................................. 1366

Xian-Hu Luo, Ya Gao, Kai Yang, Tian-Liang Zhang, Xiang-yang Ren

H-440 Technique of multi-temperature Stepped Welding in Microwave Modules ................................................................. 1370

Hongyuan Luo, Chengde Cai, Hailun Li

H-457 High Power RF Amplifiers Module Assembly –Issues to Consider, Design, Materials and Process ................................................................. 1375

Tennyson Nguty, An Xiao, Henk Thoonen

H-463 A Compact 90° Waveguide Twist at Terahertz Frequency .......................................................................................... 1381

Tingting Yang, Xin Wang, Cheng Chen

H-464 A Full Bandwidth H-plane Power Divider Worked in Millimeter Wave Band .......................................................................................... 1383

Peng Zhao, Shitou Liu, Liu Chen

H-465 A Capacity Loaded Dual-mode Satellite Band-pass Filter .......................................................................................... 1385

Liu Chen, Cheng Chen, Shitou Liu

H-466 A Compact 10 dB E-Plane Waveguide Directional Coupler With Full Bandwidth .......................................................................................... 1388

Xin Wang, Tingting Yang, Liu Chen

H-467 A Waveguide Diplexer Based On E-Plane T-Junction .......................................................................................... 1390

Cheng Chen, Liu Chen, Peng Zhao

H-472 12 G to 20 G compact rectangle waveguide to circular waveguide mode convertor .......................................................................................... 1392

Shitou Liu, Peng Zhao

H-484 COMPACT BANDPASS FILTER USING NOVEL STEPPED IMPEDANCE RESONATORS .......................................................................................... 1394

Dan Wang, Xubo Wei

H-487 Design of miniature tri-band monopole antenna for WLAN and WiMAX applications .......................................................................................... 1397

Junyu Guo, Ziqiang Xu

H-490 Multilayer Dual-mode Filter Based on Substrate Integrated Hexagonal
Cavity (SIHC) ......................................................................................................................... 1400

M. J. Xu, K. Chen

H-493 Compact Dual-band BPF with Improved Stopband ......................... 1404

Zetao He, Yu Shi, Xubo Wei

H-494 Design and Fabrication of Integrated Waveguide Filter based on High-Resistivity Silicon ............................................................... 1407

Lin Du, Shi Pu

H-496 Improvement of Manufacturing Process for Multilayer Substrate Integrated Waveguide Cavity ...................................................... 1411

Ziqiang Xu, Gen Zhang, Guangliang Cao, Gesheng Cheng

H-497 A Compact Dual-band Planar Antenna for 2.4/5.5 GHZ WLAN Applications ......................................................................................... 1415

Gen Zhang, Ziqiang Xu, Hao Liu, Junyu Guo, Guangliang Cao, Zhao Chen

Session I -- Solid State Lighting Packaging and Integration

I-023 Whisker Thermal Impedance Measurements of Layered Metal Core PCB used in LED lighting ................................................................. 1419

Shijuan Zhang, Wen Xu, Yongtao Wang, Wenfeng Wang

I-107 Application of Color Temperature Tunable LEDs in Smart Lighting System ......................................................................................... 1423

Xiu Ziren, Li Hao

I-116 Warpage Analysis of DBC Substrate based on Noncontact Shadow Moiré Technology ................................................................. 1427

Ke Duan, Fulong Zhu, Mingxiang Chen, Ying Li, Kai Tang, Sheng Liu, Yanming Chen

I-155 Experimental and modeling study of high-viscosity silicone jet dispensing process for LED packaging .................................................. 1431

Yun Chen, Fuliang Wang, Hanxiong Li, Xiuyang Shan

I-156 Investigation of Lumen Degradation Mechanisms of Mid-power LED by HAST ...................................................................................... 1437

Jianlin Huang, Sau Koh, Xiupeng Li, Guoqi Zhang

I-179 Reactive spreading and dewetting of liquid SnPb solder on Cu thin films...
W. Liu, P. Jin, S.D. Zhang

I-200 Thermal resistance analysis of high power LED module under power cycling test ................................................................. 1446
Hao Huang, Miao Cai, Kunmiao Tian, Yunchao Chen, Hongliang Jia, Daoguo Yang

I-215 Two-step thermoelectric modeling for junction temperature prediction of LED lamps ................................................................. 1450
Kunmiao Tian, Miao Cai, Ping Zhang, Xianping Chen, Daoguo Yang

I-223 Compact Thermal Model of Double-Layer Microchannel Heat Sink with High Temperature Uniformity for Multiple LEDs .............. 1456
Yongming Zhu, Run Hu, Jinyan Hu, Xiaobing Luo

I-259 Investigation of microstructure and optical property of high power LED based on rapid thermal cycling ........................................... 1464
Jibing Chen, Yanfang Yin, Jianping Ye, Bing An, Yiping Wu

I-333 Inhibition of phosphor sedimentation for White Light-Emitting Diodes with a facilely realizable and economical method ................... 1468
Xiang Lei, Huai Zhen, Xiaobing Lu, Sheng Liu

I-408 Secondary optical design of LED lamps with high CRI and adjustable CCT ....................................................................................... 1472
Keming Zeng, Yujie Li, Jin Chang, Chunjin Hang, Chunqing Wang, Keming Zeng, Yujie Li, Jin Chang, Chunqing Wang

I-448 Development of a Real-time Monitoring System with Uni-photodetector for LED Long Term Reliability Tests ................................. 1477

I-459 Measurement of LED Junction Temperature Using Thermoreflectance Thermography ................................................................. 1482
J.H.L. Ling, A.A.O. Tay

I-476 A Sandwich Structure of Multi-Chip COB LED with Double Flat Glass boards coated with Phosphors Film by Screen Printing Technique..... 1486
Cheng Lin, Baolin Liu, Cheng Lin, Xiaohong Li, Yafeng Shen, Zhenxiang Lin
**Session J -- Emerging Technologies**

J-006  **Whisker growth in the crack region of the cathode interface during current stressing process in leadfree solder joints** .............................................1491

*Hongwen He, Liqiang Cao, Hu Hao, Limin Ma, Fu Guo*

J-010  **Buckling Analysis for a Rectangular Membrane for Touch Panel Applications** .................................................................1495

*C.-H. Chuang, K.-S. Chen, R.-C. Hong, C.-C. Chen*

J-025  **Synthesis of Sn-3.5Ag nanoparticles of tiny sizes** .............................................1499

*Jiang Zhi, Ding Su, Tian Yanhong, Wang Chunqing*

J-042  **Review on Simulation Methods of Micro Focal Spot X-ray Tubes’ Electron Emission System** ........................................................1502

*Jingwen Hu, Weiwen Lv, Bing An, Yiping Wu*

J-053  **Study on the Verification of IR and RTD Methods Applied in the Thermal Measurement of High Power Chips** .............................................1507

*Yan Zhang, Chu-yun He, Yong Zhang, Jing-yu Fan, Yifeng Fu, Johan Liu*

J-059  **Localization of Critical Frequency for Simulation of High-Speed Interconnects** .................................................................1512

*Wen Ding, Feng Liu, Sheng Liu, Gaofeng Wang*

J-062  **Intel Enterprise Server Processor Packaging Challenge and Future Trend** .................................................................1516

*Richard Zhao*

J-093  **Study on different material parameters on TSV interconnect structures stress and strain under random vibration load** .......................1522

*Xiong Guoji, Huang Chunyue, Li Tianming, Liang Ying, Tang Wenliang, Wusong, Li Chunquan, Ning Zhong ping*

J-094  **Optimistic design of freestanding horseshoe metal interconnects for stretchable electronic circuits** .............................................1526

*Na Wei, Kailin Pan, Hua Lin, Renzhang Chen, Benshuai Guo*

J-148  **Effect of modulation structure on the laser-ignited self-propagating behavior of Ti/Al multilayer films** .............................................1530

*Rong An, Yanhong Tian, Chunqing Wang*

J-161  **Mold flow analysis of molding process for a MEMS fingerprint sensor**
Guoxing Li, Daoguo Yang, Ruifeng Li, Miao Cai, Chao Li, Lingen Wang

Superior Thermal Stability Of Redistribution Layer Tailored By Nanotwinned Copper And The Influence On Wafer Warpage

Heng Li, Chunsheng Zhu, Gaowei Xu, Le Luo, Shenwu Tian

A highly conductive thermoplastic electrically conductive adhesive for flexible and low cost electronics

Haoyi Wu, Cheng Yang, Jingping Liu, Xiaoya Cui, Binghe Xie, Zhexu Zhang

A Characterization of the Performance of MEMS Vibratory Gyroscope in Different Fields

Ming Wen, Zhang Luo, Weihui Wang, Sheng Liu

Fabrication of ZnO Nanogenerator Potentially to Be Embedded in Flexible Printed Circuit Board

Yanbiao Chu, Lixi Wan, Xueping Guo, Zhongyao Yu

Evolution of ESD Process Capability in Future Electronic Industry

Nakata lin, Yun Liang, Dr. Paul Wang, Tom Pelc

Magnetically Coupled Resonant Using Mn-Zn Ferrite for Wireless Power Transfer

Weidong Ding, XuWang

Application of Nano Copper Conductive Ink for Printed Electronics

Yating Hu, Bing An, Chenxu Niu, Weiwen Lv, Yiping Wu

High temperature induced mechanical degradation in flexible solar cell and its effect on reliability of the packaging module

Chang Cao, Xing Chen, Simin Wang, Sheng Liu