

2006 1st Electronic Systemintegration Technology Conference

**Dresden, Germany
5-7 September 2006**

Volume 1 of 3



IEEE Catalog Number:
ISBN:

06EX1494
1-4244-0552-1

**Copyright © 2006 by The Institute of Electrical and Electronics Engineers, Inc.
All Rights Reserved**

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republications permission, write to IEEE Copyrights Manager, IEEE Operations Center, 445 Hoes Lane, Piscataway, New Jersey USA 08854. All rights reserved.

IEEE Catalog Number: 06EX1494

ISBN: 1-4244-0552-1

Library of Congress: 2006930050

Additional Copies of This Publication Are Available from:

IEEE Service Center
445 Hoes Lane
Piscataway, NJ 08854
IEEE Service Center
445 Hoes Lane
Piscataway, NJ 08854

Phone: (800) 678-IEEE
(732) 981-1393

Fax: (732) 981-9667

E-mail: customer-service@ieee.org

Table of Contents

New Nano-Thermal Interface Material for Heat Removal in Electronics Packaging	1
<i>Johan Liu, Michael Olugbenga Olorunyomi, Xiuzhen Lu, Wen Xuan Wang, Thomas Aronsson, Dongkai Shangguang</i>	
Characterization of Nanoparticles of Lead Free Solder Alloys	7
<i>Wanbing Guan, Suresh Chand Verma, Yulai Gao, Christina Andersson, Qijie Zhai, Johan Liu</i>	
The Influence of Ultra Fine Solder Powder Related to Waferbumping within the Ultra Fine Pitch Arena	13
<i>Walther Protsch, F. Bartels</i>	
Mixture Properties of Carbon Fibre Composite Materials for Electronics Shielding in Systems Packaging	19
<i>Jian Ding, Simon Rea, David Linton, Eddie Orr, Jonathan McConnell</i>	
A SEM and TEM Study of the Interconnect Microstructure and Reliability for a New XFLGA Package.....	26
<i>Sandy Bennemann, A. Graff, J. Schischka, M. Petzold, H. Theuss, J. Dangelmaier, K. Pressel</i>	
Failure Detection of BGA Transition Structures at High Frequencies	35
<i>Jussi Putaala, Olli Nousiainen, Heli Jantunen, Markku Moilanen</i>	
Identifying the Reliability Affecting Parameters of SBB Flip Chip Interconnections for Automotive Applications.....	41
<i>Marc Dressler, Hartmut Rohde, Gerhard Liebing, Karl-Friedrich Becker, Bernhard Wunderle, Juergen Auersperg, Herbert Reichl</i>	
Properties and Reliability Test of Anisotropic Conductive Film in Chip on Glass Package.....	51
<i>Kai-Chi Chen, Hsun-Tien Li, Chia-Wen Hsu, Ching-Ping Yang</i>	
DC-Compliant Macromodels Based on the Method of Characteristics for Frequency-Dependent Transmission Lines	56
<i>Stefano Grivet-Talocia, Flavio Canavero</i>	
Analysis of Transmission Lines over Slotted Ground Planes and Method of Compensating Resonance Effects	62
<i>Eric Marzolf, M'hamed Drissi</i>	
Common Mode Radiation of a Printed Circuit Board with Embedded Decoupling Capacitors Excited by IC's Shoot-Through Current.....	67
<i>Toshio Sudo, Seiju Ichijo, Takanobu Kushihira, Takuya Yamamoto, Kazuhiro Yamazaki</i>	
EMI-Suppression Design in Flexible Printed Circuit Design in Small Electronic Devices	73
<i>Antti Renko, Tapani Von Rauner</i>	
Single-Mode Oxide-Confined VCSEL for Printers and Sensors	80
<i>Hiromi Otoma, Akemi Murakami, Yasuaki Kuwata, Nobuaki Ueki, Naotaka Mukoyama, Takashi Kondo, Akira Sakamoto, Seiya Omori, Hideo Nakayama, Takeshi Nakamura</i>	
Fiber Optic Transceivers in Surface Mount Technology for High Performance and Low Cost Optical Interconnects	86
<i>Elaine Wong, Wai Hung, Sing Cheng, Thomas Choi, Shu-Kin Yau, Gomer Egnisaban, Tony Mangente, Flora Ho, Alice Chow, Torsten Wipiejewski</i>	
Integrated Optical Mode Field Adapters for Optical Ethernet Systems	93
<i>U. H. P. Fischer, Thomas Windel, Vasileios Giannoglou</i>	
Smart Optical Sensors for Industrial and Consumer Applications.....	101
<i>Alice Chow, Alison Tong, Ada Chau, Kin Kwun, Shirley Shi, Sing Cheng, Flora Ho, Torsten Wipiejewski</i>	
Thermal Management in a 3D-PCB-Package with Water Cooling.....	107
<i>Florian Schindler-Saefkow, Olaf Wittler, Daniel May, Bernd Michel</i>	
Technology Benchmarking of High Resolution Structures on LTCC for Microwave Circuits.....	111
<i>Jens Müller, R. Perrone, Heiko Thust, K.-H. Drië, C. Kutscher, R. Stephan, Johannes Trabert, Matthias Hein, Dieter Schwanke, J. Pohlner, G. Reppe, Reinhard Kulke, Peter Uhlig, Arne F. Jacob, Torben Barras, A. Molke</i>	
Development of SOP Module Technology Based on LCP Substrate for High Frequency Electronics Applications.....	118
<i>Xia Zhang, Qi Zhang, Gang Zou, Liu Chen, Zhaonian Chen, Johan Liu</i>	

Table of Contents

Microstructured Interconnections for High Security Systems	126
<i>Alan Mathewson, Jean Brun, Catherine Puget, Remi Franiatte, Nicolas Sillon, Frederick Deputot, Beatrice Dubois Bonvalot</i>	
Material-Dependent Reliability Characteristics of Lead-Free Solder Joints	133
<i>Hans-Jürgen Albrecht, Klaus Wilke</i>	
Characteristics of Lead-Free Solders During Flow Soldering (Selective and Wave Soldering)	139
<i>Uwe Pape, Jens-Uwe Schulz</i>	
Comparative Wetting Behavior of Sn-0.7Cu and Sn-0.7Cu-0.3Ni Solders on Cu and Ni Substrates	145
<i>Md. Jahir Rizvi, Chris Bailey, Y. C. Chan, Hua Lu</i>	
Characterization of Mechanical Properties of Eutectic Sn-Co-Cu Lead-Free Alloy	152
<i>Cristina Andersson, Libin Liu, Johan Liu</i>	
Status of Leadfree Automotive Electronics	161
<i>Petrik Lange, Andreas Herenz, Oliver Laker, E. Schall, T. Seubert</i>	
Lead-Free Solders and PCB Finish Effects on Solder Joint Reliability	169
<i>Christopher Hunt, Milos Dusek</i>	
New Accelerating Test Methods for Board Level Solder Joints and Thermal Caused Failure Mechanisms in High Temperature Electronics	180
<i>Wolfgang Neher</i>	
A Comparative Study of Power Cycling and Thermal Shock Tests.....	187
<i>Juha Karppinen, Tomi Laurila, Jorma K. Kivilahti</i>	
Failure Modes of Solder Interconnections under Mechanical Shock Loading at Elevated Temperatures	195
<i>Toni T. Mattila, J. Simecek, Jorma Kivilahti</i>	
Advanced Packages and Board Level Reliability.....	203
<i>Hans-Jurgen Albrecht</i>	
Single and Multi-Piece Behavioral Models of IC Output Buffers	209
<i>Ivan A. Maio, Igor S. Stievano, Patrizia Savi, Flavio G. Canavero</i>	
High Frequency Electrical Model of Through Wafer Via for 3-D Stacked Chip Packaging.....	215
<i>Chunghyun Ryu, Jiwang Lee, Hyein Lee, Kwangyong Lee, Taesung Oh, Jounggho Kim</i>	
On-Chip versus Off-Chip Passives in Radio and Mixed-Signal System-on-Package Design.....	221
<i>Li-Rong Zheng, Xinzhong Duo, Majid Baghaei Nejad, Saul Rodriguez, Mohammed Ismail, Hannu Tenhunen</i>	
Cross Talk Coupling, a Tool to Characterize Electromagnetic Immunity of Integrated Circuits	233
<i>SÃ©bastien Bazzoli, Nedim Ben Slimen, Lamine Kone, Bernard Demoulin</i>	
Analysis of Rectangular Power-Ground Plane Pairs for Noise Suppression.....	241
<i>Enxiao Liu, Zaw Zaw Oo, Erping Li</i>	
Demonstration of Optical Interconnection- and Assembly Technique for Fully-Embedded Optical PCB at Data Rates of 10 Gbps/ch.	247
<i>Tobias Happel, M. Franke, H. Nanai, J. Schrage</i>	
Luminous PWBs – OLED – Displays on FR4	253
<i>Kai Schmieder, Thomas Hoffmann, Ralph Fiehler, Oliver Schneider, Thomas Stübinger, Michael Hofmann</i>	
A New Measurement Technique of Low-Level Strain Retardation in Optoelectronic Materials	257
<i>Kenji Gomi, Yasushi Niitsu, Kensuke Ichinose</i>	
Management of Thermo-Mechanical Packaging Factors for Lasers for WDM Applications	263
<i>Jon Hall, Colin Edge, Jim Fraser, Steve Jones</i>	
Novel Releasable Multi-Fiber Optical Connectivity Solution for Optical Communication using V-Grooves and Micro-Lens Arrays	268
<i>Jens Kunde, Anne-Claire Pliska, Krzysztof Krasnopolski, S. Grossmann, Christian Bosshard, Raimond Bauknecht, A. Soufiane, Roger Krähenbühl, P. Zaina, T. Ammer, A. Peterhans</i>	

Table of Contents

Silicon Through Vias for System on Wafer (SOW): Technology and SiO₂ Insulation Layer Characterization	274
<i>David Henry, Nicolas Sillon, Djamel Belhachemi, Catherine Brunet-Manquat, Christiane Puget, G. Ponthenier</i>	
Flip-Chip Interconnection Using Anisotropic Conductive Adhesive with Lead Free Nano-Solder Particles	282
<i>Suresh Chand Verma, Wanbing Guan, Christina Andersson, Yulai Gao, Qijie Zhai, Johan Liu</i>	
Properties of Polymer Bumps for Flip Chip Mounting on Molded Interconnect Devices (MID).....	287
<i>Ulrich Kessler, Wolfgang Eberhardt, Adrian Schwenck, Daniel Warkentin, Heinz Kück</i>	
Chip-Package and Antenna Co-Design of a Tunable UWB Transmitter in System-on-Package with On-Chip versus Off-Chip Passives	291
<i>Majid Baghaei Nejad, Hannu Tenhunen, Li-Rong Zheng</i>	
Product-oriented System-in-Package (SiP) Technology for Next Generation Wireless/Portable Electronics.....	299
<i>Man-Lung Sham, Huili Fu, Jyh-Rong Lin, Lap-Wai Leung, Yu-Chih Chen, Tom Chung</i>	
Silicon-Based Passive Devices for Applications up to GHz-Frequency Range.....	304
<i>Robert Faul</i>	
On the Technology of Present-Day Manufactured Supercapacitors.....	307
<i>Vasile V. N. Obreja, Iulian Iordache, D. Petroi, Ciprian Ionescu, Virgil Golumbeanu, Paul M. Svasta</i>	
Dielectric Properties of Insulation Layers of Printed Circuit Boards at High Frequencies.....	313
<i>Kaori Fukunaga, M. Kozai, A. Nishikata</i>	
Growth of Grains Effect on Boron Diffusion in Heavily Implanted Polysilicon Thin Films.....	319
<i>Salah Abadli, Farida Mansour</i>	
Schottky Contacts Electrical Parameters Modelling	324
<i>Valentine V. Baranov, Victor A. Emelyanov, Jaroslav A Solovjov</i>	
Heterogeneous Integration Technique of Optoelectronic Dies to CMOS Circuits via Metallic Bonding	328
<i>Pavlos Robogiannakis, Efsthios D. Kyriakis-Bitzaros, Kyriaki Minoglou, Stavros Katsafouros, Athanasios Kostopoulos, George Konstantinidis, George Halkias</i>	
Polymer/CNTs Composites for Electronic Packaging	334
<i>Adela Bara, Ana Maria Bondar, Paul M. Svasta</i>	
High Energy Density Magnetic Materials for Electronic Packaging	337
<i>Wilhelm Kappel, Mirela M. Codescu, Nicolae Stancu, Jana Pinte, Eros Patroi</i>	
Metallic Porous Parts for Electronics Devices Cooling	343
<i>Mariana Lucaci, Radu Liviu Orban, Gheorghe Soare, Magdalena Valentina Lungu, Wilhelm Kappel</i>	
Development of Quality Control (QC) Tools for Solder Pastes used for Flip Chip Assembly Based on Oscillatory Tests.....	347
<i>Rajkumar Durairaj, A. Seman, N. N. Ekere</i>	
Use of Nanoclays for Polymer Substrate Property Modification.....	354
<i>Jian Ding, Xiangyi Fang, David Linton, Ivana Partridge</i>	
Description of 355 nm Laser Ablation of Polyimide as a Thermal Process	360
<i>B. Balogh, P. Gordon, B. Sinkovics</i>	
Solderability of the Lead Free Surface Finishes.....	365
<i>Frantisek Steiner, Petr Harant</i>	
Intermetallic Compound Formation in Au/Al Thermosonic Wire Bonding During High Temperature Annealing at 150 °C as a Function of Wire Material.....	370
<i>Robert Klengel, H. Knoll, M. Petzold, M. Wahnig, L. Schröpler</i>	
Analytical and Mechanical Methods for Material Property Investigations of SnAgCu-Solder	376
<i>Matthias Petzold, Sandy Bennemann, A. Graff, M. Krause, Mike Müller, Steffen Wiese, Klaus-Jürgen Wolter</i>	
Theory and Practical Experience of Micro-Alloyed SnCu_{0.7}NiGe (SN100C)	383
<i>Michael Lüntzsch</i>	

Table of Contents

Optoelectronic Packaging Interfaces for Submicron Alignment (OPISA) and the Dynamics of Laser Spot Weld Formation	387
<i>Asif Malik, Michael Hughes, Chris Bailey</i>	
Optical Analysis of Short-Distance Optical Interconnect on the PCB-Level	392
<i>Krzysztof Nieweglowski, Klaus-Jürgen Wolter</i>	
Monolithic Miniature Spectral Sensor for Multi-Channel Spectral Analysis	398
<i>Maik Rosenberger, Jörg Margraf, Peter Brückner, Susanne Töpfer, Gerhard Lin</i>	
Design Considerations of Small Size Reflective Type Pulse Oximeter Heads in Special Applications	404
<i>Hunor Sántha, Norbert Stubán, Gábor Harsányi</i>	
Potential of High Speed, Short Distance Optical Data Communication on Large Diameter Optical Fibers	409
<i>Olaf Ziemann, Hans Poisel, Juri Vinogradov</i>	
Wetting Characteristics of Solder Reflow on Copper Traces without Solder Mask.....	415
<i>Jeffery C. C. Lo, S. W. Ricky Lee, Jimmy K. S. Lam, Wallace K. H. Wong</i>	
Solder Pastes for Microwave Application.....	421
<i>Mathias Nowottnick, Wolfgang Scheel, Uwe Pape, Rolf Diehm, Joachim Wiese, Marcel Mallah, Wolfgang Kempe, Manfred Suppa, Peter Fink</i>	
Electroless Ni-W-P Alloys as Barrier Coatings for Liquid Solder Interconnects	428
<i>Keming Chen, Changqing Liu, David C. Whalley, David A. Hutt, Jianfeng F. Li, Samjid H. Mannan</i>	
Assessment of Lead-Free Inert Gas Soldering Using a Novel Reflow Technology	438
<i>Ayoade Oyeboade, Cristina Andersson, Tobias Hjertqvist, Johan Liu</i>	
Reliability of High Temperature Lead-Free Solder Alternative.....	444
<i>F. Patrick McCluskey, Z. Wang, M. Dash, D. Huff</i>	
Transitioning to Lead-Free: The Effect on Low Cycle Fatigue of Contaminating Solder Alloys.....	448
<i>Christopher Hunt, Martin Wickham, Milos Dusek</i>	
Low Cycle Fatigue Behavior of Sn-4.0Ag-0.5Cu Lead-Free Solder Joints in Different Corrosive Environmental Conditions	457
<i>Christina Andersson, Johan Liu</i>	
Testing the Impact of Pb-Free Soldering on Reliability	468
<i>Zsolt Illyefalvi-Vitez, Oliver Krammer, Janos Pinkola</i>	
Reliability Assessment on the Re-Balling of PBGA from SnPb to Pb-Free Solder Spheres	474
<i>Fubin Song, S. W. Ricky Lee</i>	
Reliability Aspects of Lead-Free Soldering in Industrial Applications.....	481
<i>M. H. Biglari, F. Kox, M. Hermans, A. Kodentsov</i>	
Modeling for High-Speed Interconnects in Mobile Device Hinge Structures.....	485
<i>Ilkka Kelandar, Pia Kotiranta, Markku Rouvala</i>	
Full-Wave Modeling of RF Voltage Drop on Printed Circuit Interconnects.....	491
<i>Kye Yak See, Eng Kee Chua, Zhihong Liu</i>	
Optimization of Connector-Track Interface	498
<i>Sergei Kapora, Alexander P. J. van Deursen</i>	
Latency Insertion Method with Frequency Dependent Effect.....	503
<i>Z. Deng, Jose Schutt-Aine, J. Tan, C. Kumar, D. Milosevic</i>	
Electromagnetic Modeling of Display Module Interconnect.....	507
<i>Ali Nadir Arslan, Ville Hurskainen, Ilkka Pankinaho, Ilkka Kelandar, Anttoni Rautio</i>	
Conductive Microstructures and Connections for Microelectronics Made by Ink-Jet Technology.....	511
<i>Andrzej Moscicki, Jan Felba, Włodzimierz Dudzinski</i>	
C4NP as a High-Volume Manufacturing Method for Fine-Pitch and Lead-Free FlipChip Solder Bumping.....	518
<i>Eric Laine, Klaus Ruhmer, Eric Perfecto, Hai Longworth, David Hawken</i>	

Table of Contents

Interconnections in Multilayer PCBs Based on Microvias Metallized by Magnetron Sputtering Deposition	525
<i>Janusz Borecki, Jan Felba, Jozef Gromek, Witold M. Posadowski</i>	
Investigation of Micro Stress in Adhesive Bonds in Electro Optics and Micro Optics.....	532
<i>Thomas Gesang, Rolf Zickwolf, Gerhard Friedsam</i>	
A New Method of Flip Chip Assembly Using a Light Silver Filled Glue	540
<i>Michael Feil, Martin König, Karlheinz Bock</i>	
LTCC-Based Micro-Scale PEM Fuel Cell	544
<i>Uwe Partsch, Adrian Goldberg, Michael Stelter</i>	
Dilute Cu Alloying for Sn-Cu Bumping by Annealing Electroplated Cu/Sn Stacks on Ti/Ni/Pd UBM.....	550
<i>Hirokazu Ezawa, Kazuhito Higuchi, Masaharu Seto, Masayuki Uchida, Takashi Togasaki</i>	
An Analysis of a Microfabricated Solenoid Inductor	556
<i>Hua Lu, David Flynn, Chris Bailey, Marc Desmulliez</i>	
Electronics Packaging for Microfluidics Applications	562
<i>Steffen Howitz, Lars Rebenklau, Andreas Richter</i>	
Integration and Packaging of Microsystems by Polymer Overmoulding	567
<i>Dennis Patrick Webb, David A. Hutt, Neil Hopkinson, Paul J. Palmer, Paul P. Conway</i>	
An FE-Investigation of the State of Stress and Fracture Mechanics Properties of Intermetallic Compounds	575
<i>Wolfgang H. Müller, Taoufiq Hannach, Hans-Jürgen Albrecht</i>	
Laser Soldering of Glass Materials Using Diode Laser	583
<i>Susanne Kasch, Hartmut Müller, Sebastian Wächter, Yvonne Gudde</i>	
On Approximation of Random Signals and their Usage in Electronic Packaging	589
<i>Ioan Golet, Horia Carstea, Romeo Negrea</i>	
Thermal Effect Characterization of Laser-Ablated Silicon-Through Interconnect	594
<i>Chen Yu-Hua, Lo Wei-Chung, Kuo Tzu-Ying</i>	
Nanostructured Alumina Coatings for Room Temperature Processibility of Au Bonding Wires	600
<i>Sebastian Schindler, Christoph Klaus, Christian Wenzel, Johann W. Bartha, Frank Rudolf, Klaus-Jürgen Wolter</i>	
Low Temperature Processing of Highly Integrated Assemblies by Selective Microwave Heating	608
<i>Rolf Diehm, Uwe Pape, Mathias Nowotnick, Wolfgang Kempe</i>	
Selective Soldering with Precise Amounts of Liquid Solder	612
<i>Jörg Niemeier, Günther Seliger, Jan Seutemann</i>	
Predicting Component Self-Alignment in Lead-Free Reflow Soldering Technology by Virtue of Force Model	617
<i>Olivér Krammer, Balint Sinkovics, Balázs Illés</i>	
Automatic and Secure Rework in a Lead-Free Environment.....	624
<i>Bruno Affolter</i>	
System on Chip Signal Conditioner for LVDT Sensors	629
<i>Andrei Drumea, Alexandru Vasile, Mircea Comes, Marian Blejan</i>	
Match-X based Microsystem for Structural Health Monitoring.....	635
<i>Lars Schubert, Bernd Frankenstein, Günter Reppe</i>	
Fabrication of Smallest Vias in LTCC Tape	642
<i>Gunter Hagen, Lars Rebenklau</i>	
Electronic Ballast for a Fluorescent Lamp Supplied from a Battery	648
<i>Dorin Petreus, Cristian Farcas, Niculaie Palaghita, Zoltan Juhos, Ionut Ciocan</i>	
Matlab Based Platform for Anti-Perturbative Design of Digital Connections.....	655
<i>Dan Pitica, Serban Lungu, Ovidiu Pop, Ionut Ciocan</i>	
Scattering Parameters of Planar Strips	661
<i>Karel Heindl, Tomas Blecha, Vlastimil Skocil, Jaromír Braun</i>	

Table of Contents

Simulation and Optimisation of Power DMOS Transistors Parameters	666
<i>Victor A. Emelyanov, Velantine V. Baranov, Ivan I. Roubtsevich, Dmitry L. Anufriev</i>	
Optimal Method for Electronic System Partition in Order to Implement the Fault Protective Redundancy	671
<i>Horia Calin Carstea, Dumitru Margeloiu, Romeo Negrea, Ioan Golet</i>	
On Wafer Broadband Measurement for Substrate Material Characterisation.....	674
<i>Jian Ding, David Linton</i>	
Multiphysics Simulation of Electromagnetic Shielding and Thermal Stressing within Ceramic and Silicon Multilayer Packages for RF Applications.....	679
<i>Jian Ding, David Linton, Mervyn Armstrong, Neil Mitchell, Vince Fusco</i>	
Analysis of Signal Propagation in Transmission Lines in Configuration Process of CAN-Bus Controller	684
<i>Kazimierz Kamuda, Włodzimierz Kalita, Jerzy F. Kolodziejcki</i>	
An Introduction of RoHS Legislation in SMD Thick-Film Hybrid Technology – A Case Study	690
<i>Darko Belavic, Dubravka Rocak, Janeta Fajfar Plut, Marko Horvat, Janez Pavlic, Zdzislaw Drozd, Srecko Macek, Ian McGill, Krystyna Bukat</i>	
LTCC Technology at High Millimeter Wave Frequencies.....	696
<i>Manju Henry, Charles E. Free, Quentin Reynolds, Stefan Malkmus, Jim Wood</i>	
Development of Functional Ceramic Films for Nano and Microsystems Technology	702
<i>Andreas Schönecker, S. Gebhardt, F. Schlenkrich, I. Endler, T. Mayer-Uhma, S. Uhlig</i>	
Carbon/Ceramic Composites Designed for Electronic Application	708
<i>Ana Maria Bondar, Iulian Iordache, Paul Svasta</i>	
Failure Mechanisms of Direct Copper Bonding Substrates (DCB).....	714
<i>Michael Günther, Klaus-Jürgen Wolter, Martin Rittner, Wolfgang Nüchter</i>	
Predicting the Shear Strength of a Wire Bond using Laser Vibration Measurements	719
<i>Holger Gaul, Martin Schneider-Ramelow, Klaus-Dieter Lang, Herbert Reichl</i>	
Thermal Fatigue Life Evaluation of Aluminum Wire Bonds	726
<i>Toshihiro Matsunaga, Yasumi Uegai</i>	
Test Methods for Characterizing the Local Plastic Deformability of Bonding Wires	732
<i>Christian Dresbach, H. Knoll, J. Schischka, M. Petzold, K. Hosseini, L. Schröpler</i>	
Estimation of Data-Dependent Jitter Using Single Pulse Analysis Method in High-Speed Differential Signaling	741
<i>Eakhwan Song, Junho Lee, Jinguok Kim, Dong Gun Kam, Chunghyun Ryu, Jounggho Kim</i>	
Full Wave Analysis and Electrical Modeling of Eight Copper Interconnects Placed in a Giga-Scale Integrated Environment for Signal Integrity Evaluation.....	747
<i>Freddy Ponchel, Jean-Francois Legier, Erick Paleczny, Christophe Seguinot, Denis Deschacht</i>	
Behavior of Microvia Transmission Lines in Frequency Domain	753
<i>Tomas Blecha, Karel Heindl, Vlastimil Skocil, Jaromir Braun</i>	
Study on the Multi-Scale Properties of the Internal Structure in ACA Interconnection	757
<i>Yan Zhang, Ragnar Larsson, Jing-yu Fan, Johan Liu</i>	
Diffusion of Water in Amorphous Polymers at Different Temperatures Using Molecular Dynamics Simulation.....	762
<i>Emmanouella D. Dermizaki, Jörg Bauer, Bernhard Wunderle, Bernd Michel</i>	
Viscoelastic Characterization of Polymer Matrix of Thermally Conductive Adhesives	773
<i>Tomasz Falat, Jan Felba, Artur Wymyslowski, Kaspar M. B. Jansen, John S. Nakka</i>	
Cure Shrinkage and Bulk Modulus Determination for Moulding Compounds.....	782
<i>Manoj Kumar Saraswat, K. M. B. Jansen, L. J. Ernst</i>	
Carbon Contacts and Resistors in Printed Circuit Boards – A Practical Overview.....	788
<i>Frank Windrich</i>	

Table of Contents

Epoxy/BaTiO₃ (SrTiO₃) Composite Films and Pastes for High Dielectric Constant and Low Tolerance Embedded Capacitors in Organic Substrates	794
<i>Kyung-Wook Paik, Jin-Gul Hyun, Sangyong Lee, Kyung-Won Jang</i>	
A Compact Integrated ISM Bandpass Filter Based on Comblne Structures on Organic Substrate.....	802
<i>Lim Ying Ying, Mihai Dragos Rotaru</i>	
New Technologies on Tantalum and Niobium Oxide Capacitors for Space-Limited Designs	805
<i>Stepan Diblik, Tomas Zednicek</i>	
Frequency Dependence of Impedance of Adhesive Joints.....	812
<i>Pavel Mach, Vaclav Papez, Ales Duraj</i>	
Improvement of the Adhesive Bond Strength between Metals and Polymers by Plasmachemical and Wet-Chemical Pretreatments.....	818
<i>Jörg Friedrich, Renate Mix</i>	
Flow Behaviour of Anisotropic Conductive Adhesive Film during COG Bonding Process in Flat Panel Display Assembly	827
<i>Fabien Raugi, Mohammad Kamruzzaman Chowdhury, Helge Kristiansen, Johan Liu</i>	
Flow Properties and Correct Dosage of Adhesives in Micro-Applications.....	834
<i>Jana Kolbe, Angelika Paproth</i>	
Deformation Property Measurement for Single Anisotropic Conductive Adhesive Particles	840
<i>Guangbin Dou, David Whalley, Changqing Liu</i>	
Accident Analysis to Avoid PPM Peaks on Purchased Semiconductor Components.....	848
<i>Reinhard Kleyna, Hans Cerva, Martin Franke, Matthias Kiening, Rolf Muench</i>	
Practical Usage of Design of Experiments in the Production of SMT-Boards	854
<i>Heinz Wohlrabe, Klaus-Jürgen Wolter</i>	
Implications of Assembly Sequences on Yield and Costs for 3D-CSP Modules.....	860
<i>George Karvounas, Michael Foukopoulos, Reiner Goetzen, John Sifnaios</i>	
Machine and Process Capabilty Analysis in SMT Manufacturing	867
<i>Romain Schmitt</i>	
Nanopackaging: Nanotechnologies and Electronics Packaging.....	873
<i>James E. Morris</i>	
Development and Characterization of Microcoolers using Carbon Nanotubes	881
<i>Teng Wang, Martin Jönsson, Elisabeth Nyström, Zhimin Mo, Eleanor E.B. Campbell, Johan Liu</i>	
Evaluation of Metallic Nano-Lawn Structures for Application in Microelectronic Packaging.....	886
<i>Stefan Fiedler, Michael Zwanzig, Ralf Schmidt, Ellen Auerswald, Matthias Klein, Wolfgang Scheel, Herbert Reichl</i>	
Development of Carbon Nanotube Bumps for Ultra Fine Pitch Flip Chip Interconnection.....	892
<i>Teng Wang, Martin Jönsson, Eleanor E. B. Campbell, Johan Liu</i>	
New Technology for Joining of LTCC and Polymer Assemblies.....	896
<i>Volker Franke, Frank Sonntag, Georg Richter, Udo Klotzbach</i>	
Fatigue Life Prediction and Analysis of Wafer Level Packages With SnAgCu Solder Balls.....	903
<i>Rainer Dudek, Sven Rzepka, Stephan Dobritz, Ralf Döring, Kerstin KeyBig, Steffen Wiese, Bernd Michel</i>	
The Influence of Size and Composition on the Creep of SnAgCu Solder Joints.....	912
<i>Steffen Wiese, Mike Röllig, Maik Müller, Sven Rzepka, Nocke Kerstin, Claudia Luhmann, Frank Krämer, Karsten Meier, Klaus-Jürgen Wolter</i>	
Constitutive Modeling of Kinematic-Hardening and Damage in Solder Joints	926
<i>Stephen Ridout, Chris Bailey, Milos Dusek, Chris Hunt</i>	
Packaging Parameter Analysis on Solder Joint Reliability for Twin Die Stacked Packages by Variance in Strain Energy Density of Each Solder Joint	933
<i>Mao Chao-Yang, Chen Rong-Sheng</i>	

Table of Contents

Establishing The Stress / Strain Behaviour of Solder Alloys under Multiple Constant Strain Cycles with Isothermal Conditions	941
<i>Milos Dusek, Chukwudi Okoro, Christopher Hunt</i>	
ESD Susceptibility of Thick Film Chip Resistors by Means of Transmission Line Pulsing.....	946
<i>Detlef Bonfert, Henry Wolf, H. Gieser, A. Stocker</i>	
Laser-Shaped Thick-Film and LTCC Microresistors	953
<i>Edward Mis, Marcin Borucki, Andrzej Dziedzic, Slawomir Kaminski, Lars Rebenklau, Klaus-Jürgen Wolter, Frank Sonntag</i>	
Microvaristors for Thick-Film and LTCC Microcircuits	960
<i>Andrzej Dziedzic, Edward Mis, Witold Mielcarek</i>	
Electromagnetic Behavior of Inductive Planar Structures with Non-Homogenous Magnetic Environment	965
<i>Paul M. Svasta, Ciprian Ionescu, Virgil Golumbeanu, Norocel-Dragos Codreanu, Alexandru Romanescu, Alena Pietrikova, Jenica Neamtu</i>	
Resin / Rosin Free Solder Paste and Fluxes.....	973
<i>Wolfgang Schmitt</i>	
Rapid Tooling for High Reliability Transfer Molded Devices	982
<i>Karl-Friedrich Becker, Mathias Koch, J. Gramckow, Tanja Braun, Volker Bader, Erik Jung, Klaus-Dieter Lang, Rolf Aschenbrenner, Herbert Reichl</i>	
A Study of Inter-Metallic Compounds (IMC) Formation and Growth in Ultra-Fine Pitch Sn-Ag-Cu Lead-Free Solder Joints	987
<i>Budiman Salam, N. N. Ekere, Rajkumar Durairaj</i>	
Rheological Characterisation of New Lead-Free Solder Paste Formulations for Flip-Chip Assembly	994
<i>Rajkumar Durairaj, S. Mallik, A. Marks, M. Winter, R. Bauer, N. N. Ekere</i>	
Low Warpage Molding Compound Development for Array Packages	1000
<i>Irving Y. Chien, Jack Zhang, Lou Rector, Michael Todd</i>	
Thermal-Mechanical Analysis of Flexible Substrates During Lead-Free Solder Reflow	1006
<i>Chunyan Y. Yin, M. J. Rizvi, H. Lu, Chris Bailey</i>	
Creep-Fatigue Life of Sn-8Zn-3Bi Solder Under Multiaxial Loading	1011
<i>Takamoto Itoh, Takaei Yamamoto, Masao Sakane, Yutaka Tsukada</i>	
Reliability Qualification of Flexible Printed Circuits with Common and New Methods	1019
<i>Markus Detert, Daniel Ernst, Thomas Zerna, Heinz Wohlrabe, Klaus-Jürgen Wolter</i>	
Laser Manufacturing of Mechanical Structures in Flexible Substrates for Lifetime Increasing	1024
<i>Richárd Berenyi, Gabor Juhasz, Zsolt Illyefalvi-Vitéz</i>	
Flip Chip Interconnection Systems and its Reliability Performance	1031
<i>Charles Lee, Alfred Yeo, Tan Ai Min</i>	
Implementation of Methods to Characterise Encapsulation Behaviour of Intended Implantable Materials	1039
<i>Sascha Kammer, Marzellus grobe Holthaus, Jui-Mei Hsu, Klaus Peter Koch, Florian Solzbacher</i>	
Biostability of Electronic Packaging Materials	1046
<i>Natalia Beshchasna, Jürgen Uhlemann, Klaus-Jürgen Wolter</i>	
Electronics Suitable for Both Galvanometric and Impedimetric Biosensor Devices.....	1053
<i>Humor Sántha, Dóra Makai, László Gál</i>	
Hydrogel-Based Piezoresistive pH Sensors: Modeling, Simulation and Experimental Verification.....	1060
<i>Quang-Thong Trinh, Magarita Günther, Jörg Sorber, Gerald Gerlach</i>	
Investigation and Optimization of Residue-Free Plasma-Assisted Reflow Soldering of SnAgCu by DoE	1070
<i>Thomas Herzog, Klaus-Jürgen Wolter, Krishna Canchi Purushothama, Vignesh Manokaran</i>	
A Study on the 0-Level Package Design of a High Accuracy Silicon MEMS Resonator	1081
<i>Mario Gonzalez, Anne Jourdain, Iwijn De Vlaminck, Bart Vandeveldel, Harrie A. C. Tilmans</i>	

Table of Contents

Electronic Assemblies with Hidden Dies - Design Support by Means of FE Analysis	1087
<i>Johann-Peter Sommer, Bernd Michel, Andreas Ostmann</i>	
A Fully Coupled Compact Self-Heating Model for a Thin SOI LIGBT with Packaging	1095
<i>Sahan Gamage, Florin Udrea, Zeeshan Ali, Vasantha Pathirana</i>	
Combination of Modern Test Methods for Thermo-Mechanical Deformation Analysis in Flip-Chip-Assemblies	1102
<i>David Pustan, Martin Lapisa, M. Rieber, E. Zukowski, Jürgen Wilde</i>	
Optimisation Modelling for Design of Advanced Interconnects.....	1107
<i>Stoyan Stoyanov, Chris Bailey</i>	
Lean Manufacturing of RFID Products – Put the Chip on the Box!.....	1117
<i>Ralf God</i>	
Application of Simulation-Based Scheduling in a Semiconductor Backend Facility	1121
<i>Sven Horn, Gerald Weigert, Petra Schöning, Gerolf Thamm</i>	
Cost Efficient Quality Strategies for Microsystems and Electronics Production.....	1126
<i>Martin Oppermann, Wilfried Sauer, Klaus-Jürgen Wolter</i>	
The EC Technology Challenges of Copper Deposition in Through Mask Application	1132
<i>Tom Thieme</i>	
Integrated Smart System Solution	1136
<i>Gregor Langer, Markus Wuchse, Andreas Zluc, Nikolai Haslebner, Wolfgang Schrittwieser, Arno Kriechbaum, Erik Moderegger, Wolfgang Bauer, Markus Riester</i>	
Assessing the Assumptions Used in Reliability Prediction Modeling.....	1142
<i>Anuj Goel, Robert J. Graves</i>	
A Novel RF-Curing Technology for Microelectronics and Optoelectronics Packaging.....	1148
<i>Keith I. Sinclair, Marc P. Y. Desmulliez, Alan J. Sangster</i>	
An RFID Reader Based on the Atmel AT91SAM7S64 Micro-Controller	1157
<i>Emmanuel Gelinotte, Reinhold Frosch, Dan Tudor Vuza, Lucian Pascu</i>	
Application of Process Management Tools for PCB Manufacturing and Diagnostics	1165
<i>Jiri Tupa, Josef Basl, Vlastimil Skocil</i>	
Evaluation of Stress-Induced Effects in Electronic Characteristics of nMOSFETs	1173
<i>Masaaki Koganemaru, Toru Ikeda, Noriyuki Miyazaki, Hajime Tomokage</i>	
Comparison of the Phase Morphology for Several Sn-Ag Based Solder Ball Alloys in FBGA Packages	1181
<i>Susann Leinert, Norbert Martin, Dirk Breuer, Wolfgang Werner</i>	
Failure Modes and Fatigue Testing Characteristics of SMT Solder Joints	1186
<i>Zdzislaw Drozd, Marcin Szwach</i>	
Parametric Approach to Numerical Design for Optimisation of Stacked Packages.....	1193
<i>Lukasz Dowhan, Artur Wymyslowski, Rainer Dudek, Jürgen Auersperg</i>	
Impedance Measurements in Cell Cultures on Polymer Slides	1202
<i>Martin Jäger, Frank Sonntag, Sebastian Zaunseder, Rüdiger Poll, U. Klotzbach, Matthias Rabenau</i>	
Thermal Characterization of Multi Stack Packages Using Linear Superposition Method.....	1208
<i>Jaewook Yoo, Yunhyeok Im, Kiwon Choi, Taeje Cho, Sayoon Kang, Seyong Oh</i>	
Analysis of the Thermo Mechanical Effects on Packaging Process of Performance Enhanced AMLCD's and the Optical Performance of the Display	1213
<i>Yek Bing Lee, Chris Bailey, Hua Lu, Steve Riches, Martin Bartholomew, Nigel Tebbit</i>	
Junction Temperature Elevation as a Result of Thermal Cross Coupling in a Multi-Device Power Electronic Module	1217
<i>Michael J. Whitehead, C. M. Johnson</i>	

Table of Contents

A Wireless Biosensing Device	1223
<i>Markus P. K. Turunen, Erkka Herola, Jorma K. Kivilahti</i>	
Failure Analysis of Diode (Thyristor) Dice from Power Semiconductor Modules After Operation Above the Maximum Specified Temperature.....	1229
<i>Vasile V. N. Obreja, Cecilia Podaru, Elena Manea, Alexandru Obreja, Paul M. Svasta</i>	
Dynamic Re-Configuration Model for System-On-Chip Design for Test and Testability	1235
<i>Gabriel Chindris, Dan Pitica, Marius Muresan</i>	
The Improvement of Temperature Uniformity for Polymerase Chain Reaction Chip with a Micro-Hotplate (Nickel).....	1241
<i>Mao Chao-Yang, Chen Rong-Sheng, Chen Yung-Shieng</i>	
Selection Panel for Reliable Soldering Systems.....	1248
<i>Sabine Nieland, Mario Báhr</i>	
Influence of Medical Sterilization on Material Systems of Electronics.....	1251
<i>Jürgen Uhlemann, Frank Rudolf, Birgitt Meusel, Ekkehard Meusel, Klaus-Jürgen Wolter</i>	
Fully Automated Multi Sensor Metrology for Use in Microelectronics.....	1254
<i>Thomas Fries</i>	
Temperature Field Simulation of Thick-Film Microcircuits Using Electro-Thermal Analogy	1260
<i>Grzegorz Blad, Włodzimierz Kalita, Dariusz Klepacki, Jerzy Potencki, Mariusz Weglarski</i>	
Influence of Intermetallic Phases on Reliability in Thermosonic Au-Al Wire Bonding.....	1265
<i>Tobias Müller, Lutz Schröpfer, Frank Altmann, Heiko Knoll, Matthias Petzold</i>	
Novel Aluminium/Copper Fibre-Reinforced Bonding Wires for Power Electronics.....	1273
<i>Johan Dalin, Andreas Knauber, Rolf Reiter, Volker Wesling, Jürgen Wilde</i>	
Challenges in the Manufacture of Glass Substrates for Electrical and Optical Interconnect	1278
<i>David A. Hutt, Karen Williams, Paul Conway, Fuad Khoshnaw, Xiaoyun Cui, Deepa Bhatt</i>	
Development and Characterisation of Lithographically Printed Voltaic Cells.....	1285
<i>Darren Southee, Gareth I. Hay, Peter S. A. Evans, David J. Harrison</i>	
Thermal Interface Materials - A Review of the State of the Art	1291
<i>Farhad Sarvar, David C. Whalley, Paul P. Conway</i>	
Influence of Cooling Rate and Composition on the Solidification of SnAgCu Solders.....	1302
<i>Maik Müller, Steffen Wiese, Klaus-Jürgen Wolter</i>	
Test Chip for Characterization of Mechanical Stress Caused by Packaging Processes	1311
<i>Soeren Hirsch, Marc-Peter Schmidt, Bertram Schmidt</i>	
Optical Characterization of Electronic Packages with Confocal Microscopy	1317
<i>Marco Luniak, Hermann Hölte, Rainer Brodmann, Klaus-Jürgen Wolter</i>	
Influence of High Current Load on Electrical Properties of Adhesive Conductive Joints.....	1322
<i>Ales Duraj, Pavel Mach, Radoslav Radev, Jan Matejec</i>	
Determination of Deformation Fields and Visualization of Buried Structures by Atomic Force Acoustic Microscopy	1329
<i>Bernd Köhler, Beatrice Bendjus, André Striegler</i>	
Imprint Technologies on Conductive Polymers and Metals for Interconnection and Bumping Purposes.....	1335
<i>Fabien Corsat, Cecile Davoine, Adrien Gasse, Manuel Fendler, Guy Feuillet, Lydie Mathieu, Francois Marion, Adam Pron</i>	
Integration of Multilayer PWB into Plastic Covers by Injection Moulding	1341
<i>Tero Peltola</i>	
Emerging from Lab to LAP: Development of Large Area Processing Technologies for Low-Cost Photonic Interconnects on PCBs	1346
<i>Marika Immonen, Dewei Tian, Seija Junnila, Tarja Rapala-Virtanen</i>	

Table of Contents

Ultra-Flat “Mounted” Electronics.....	1355
<i>Karl Habberger, Michael Feil</i>	
Thermal Stability of Self-Assembled Monolayer Copper Preservatives for Fluxless Soldering.....	1359
<i>Stephen J. Ebbens, David A. Hutt, Changqing Liu</i>	
Characterization of Thermal Interface Materials	1366
<i>Ralph Schacht, Daniel May, Bernhard Wunderle, Olaf Wittler, Astrid Gollhardt, Bernd Michel, Herbert Reichl</i>	
Modeling LTCC-Based Microchannels Using a Network Approach	1373
<i>Gerd Schlottig, Lars Rebenklau, Jürgen Uhlemann, Christoph Nytsch-Geusen, Klaus-Jürgen Wolter</i>	
Analyzing Parameters Influencing Stress and Drift in Moulded Hall Sensors	1377
<i>Sebastian Fischer, Thomas Fellner, Jürgen Wilde, Harald Beyer, Ralf Janke</i>	
Effect of Component-Level Heat Conduction on Reflow Soldering Failures	1385
<i>Balázs Illés, Olivér Krammer, Gábor Harsányi, Zsolt Illyefalvi-Vitéz, András Szabó</i>	
Assessment of Lead-Free Modules under Forced Mechanical Vibrations by Linear Dynamic Finite Element Methods: Modeling, Result Evaluation and Calibration by Experiments.....	1392
<i>Axel Müller, Jan Reichelt, Sven Rzepka</i>	
Wafer Bonding with BCB and SU-8 for MEMS Packaging.....	1400
<i>Maik Wiemer, Chengping Jia, Michael Töpper, Karin Hauck</i>	
Packaging of an Iron-Gallium Nanowire Acoustic Sensor.....	1405
<i>Ronald J. DiSabatino Jr., F. Patrick McCluskey, Alison B. Flatau</i>	
Thin Film Encapsulation for Secondary Batteries on Wafer Level	1409
<i>Krystan Marquardt, Robert Hahn, Thomas Luger, Herbert Reichl</i>	
An Energy-Autarkic Micro Sensor System	1416
<i>Franz Wenninger, Karl Habberger, Karlheinz Bock, Lars Netsch</i>	