

2012 35th International Spring Seminar on Electronics Technology

(ISSE 2012)

**Bad Aussee, Austria
9 – 13 May 2012**



**IEEE Catalog Number: CFP12509-PRT
ISBN: 978-1-4673-2241-6**

Table of Contents

Electrical Conductivity of Inkjet Printed Silver Tracks Andreea Bonea, Andreea Brodeala, Marian Vlădescu, Paul Svasta	1
Influence of the Organic Transistors' Layout on Electrical Parameters Andreea Bonea, Detlef Bonfert, Iulian Bușu, Paul Svasta	5
Heat Protection Coatings for High Temperature Electronics Felix Bremerkamp, Dirk Seehase, Mathias Nowottnick	9
Influence of Curing Technologies on the Application Quality of PTFE-Conductive Pastes J. Schulze, R. Bauer.....	15
Organic Based Sensors: Novel Screen Printing Technique for Sensing Layers Deposition Radek Soukup, Aleš Hamáček, Jan Řeboun.....	19
Current Transport Mechanisms of Amorphous n-Doped Silicon Carbide/Crystalline Silicon Heterostructure: Impact of Nitrogen Doping Milan Perný, Miroslav Mikolášek, Vladimír Šály, Jozef Huran, Juraj Országh	25
Energetic Analysis of Solder Paste Deposits as Reference for Soldering with Selective Heat Dirk Seehase, Heiko Huth, Felix Bremerkamp, Mathias Nowottnick.....	31
Cross-Sensitivity of Humidity Sensor Layers Based on Organic Materials Tomas Dzugan, Ales Hamacek, Jan Reboun, Karel Hromadka, Robert Vik	37
Influence Factors of Warpage Reduction of Thin Dies by Capillary Action Max Froemmig, Klaus-Juergen Wolter	41
Design of a Singlet Oxygen Generator Based on LED Emitters Jaroslav Freisleben, Ales Hamacek, Robert Vik, Jiri Cerny, Michael Kroupa, Tomas Dzugan	47
Possibilities of Making 3D Resistors in LTCC Technology Martin Klíma, Ivan Szendiuch.....	50
Pressure Sensing: A Novel Method for Characterizing the Processing Zone in Vapour Phase Soldering Systems Attila Geczy, Zsolt Peter, Balazs Illes, Zsolt Illyefalvi-Vitez	55
Investigations on Current Capabilities of PEDOT:PSS Conductors Ciprian Ionescu, Detlef Bonfert, N.D. Codreanu, Paul Svasta.....	59
Complex Permeability Dependence of Commercial LTCC Ferritic Tape on Ambient Temperature Andrea Marić, Nelu Blaž, Goran Radosavljević, Ibrahim Atassi, Ljiljana Živanov, Walter Smetana	65
Current Thermoelectric Materials and an Evaluation of Thermoelectric Material Contacting Approaches Ibrahim Atassi, Ernst Bauer, Johann Nicolics, Bernhard Dangel, Lukas Spendlhofer, Dennis Knospe, Florian Faistauer.....	70
Investigation of Thermal Properties of Power LED Illumination Assemblies P. Krivic, F.-P. Wenzl, C. Sommer, G. Langer, P. Pachler, H. Hoschopf, P. Fulmek, J. Nicolics.....	76
The Manufacture Process Influence on Thermal Conductivity of Polymers Thermal Interface Materials with Carbon Nanotubes Bartosz Platek, Tomasz Falat, Jan Felba	84

Selective Electrochemical Etching for the Investigation of Solder Joint Microstructures Attila Bonyár, Tamás Hurtony, Gábor Harsányi.....	89
Method for In-Situ Power LEDs' Junction Temperature Measurements Petko Mashkov, Berkant Gyoch, Stanislav Penchev, Hristo Beloev	95
LED Lamp – Design and Thermal Management Investigations Petko Mashkov, Berkant Gyoch, Hristo Beloev, Stanislav Penchev	101
Comparison of Two High-End Infrared Thermography Systems with Different Spectral Sensitivity for Thermal Investigations of Sensor Heater Elements R. Glatz, P. Fulmek, J. Nicolics, S. Skerlan, M. Siegele, G. Radosavljevic	107
Physical Properties of Silver Inkjet Printed Circuits A. Brodeala, A. Bonea, C. Ionescu, M. Vladescu, P. Svasta.....	114
Effect of Surface Treatment on the Conductive Adhesive Interconnection of Flexible Solar Cells A. Reithe, M. Münch, K.-J. Wolter	117
Packaging of Electronic Devices for Long-Term Implantation Sabine Kirsten, Jürgen Uhlemann, Markus Braunschweig, Klaus Jürgen Wolter	123
Zero Shrink LTCC 3D Structure Interconnections Michal Nicák, Boleslav Psota, Petr Kosina, Jiří Starý, Josef Šandera	128
Evaluation of Soldering Processes for High Efficiency Solar Cells Paul Gierth, Lars Rebenklau, Alexander Michaelis	133
Investigation of Rheology Behavior of Solder Paste Alena Pietrikova, Michal Kravcik	138
Silver Micropowders as SiC Die Attach Material for High Temperature Applications Ryszard Kisiel, Zbigniew Szczepański, Piotr Firek, Jakub Grochowski, Marcin Myśliwiec, Marek Guziewicz..	144
Reliability Investigation of Low Silver Content Micro-Alloyed SAC Solders Olivér Krammer, Tamás Garami	149
Solder Joints Properties as Function of Multiple Reflow Vapor Phase Soldering Process Mihai Branzei, Ioan Plotog, Florin Miculescu, Gaudentiu Varzaru, Paul Svasta, Andreas Thumm	155
Electron Beam Welding of Micro-Housings with Dissimilar Metals for Electronic Circuits M. Steinhauser, C. Körbs, R. Bauer	161
Online-Monitoring of Electronic Components Under Temperature Stress Test Alexander Klemm, Martin Oppermann, Thomas Zerna.....	164
Surface Insulation Resistance Testing of Solder Pastes with Protective Coating Mihaela Pantazica, Cristina Marghescu, Cosmin Tamas, Paul Svasta, Ioan Plotog, Gaudentiu Varzaru	168
Reliability Testing of Lead-Free Solder Joints Marius Băzu, Virgil Emil Ilian, Lucian Gălăteanu, Dragos Vârsescu, Alena Pietriková.....	173
Risk Analysis of Reflow Technologies in Electronics Assembly Jan Jirsa, Karel Dušek, Petr Černek	178
Effects of Reflow Soldering Methods on the Lifetime of Capacitors Rajmond Jánó, Dan Pitică, Paul Svasta, Gaudentiu Vărzaru	183
A Review of Data-Driven Prognostics in Power Electronics Ahsanul Kabir, Christopher Bailey, Hua Lu, Stoyan Stoyanov	189

Comparison of Commonly Used Fluxes Aggression on Copper Surface K. Dušek, V. Náhlík	193
Study of the Components Self–Alignment in Surface Mount Technology K. Dušek, M. Novák, A. Rudajevová.....	197
Effect of Nitrogen Atmosphere on the Soldering Process for Different Types of Lead–Free Solders Petr Schnederle, Martin Adámek, Ivan Szendiuch.....	201
Automatic Testing of Multimedia Units Vaclav Wirth, Tomas Blecha, Ladislav Herc, Lukas Klocker, Richard Linhart, Karel Rendl, Petr Sehnal, Frantisek Steiner.....	207
Influence of Intermetallic Compounds Growth on Properties of Lead–Free Solder Joints Tomas Novak, Frantisek Steiner	213
Mechanical and Structural Analysis of Thermosonic Wire Bonds Janos Szeceenyi, Reka Batorfi, Zsolt Illyefalvi–Vitez	218
Application of Photoelastic Microscopy for Researches in MEMS Technology and Photonics O. Oliinyk, B. Tsyganok, B. Serdega, I. Matiash.....	224
Model Based FMEA – An Efficient Tool for Quality Management of the Free Lead Soldering Martin Molhanec, Evgeniya Povolotskaya.....	230
Quality Management from the Perspective of Model Based Project Management Framework Martin Molhanec, Pavel Mach	237
Investigating Whisker Growth on Immersion Tin Surface Finishing Balázs Illés, Barbara Horváth, Balázs Lipák, Attila Géczy.....	242
Study of Curing Process of Electrically Conductive Adhesives Using Differential Scanning Calorimetry Pavel Mach, Evgenija Povolotskaya	248
Resistance of Conductive Adhesive Joints on Non–Noble Surface Finishes Vitalii Ivanov, Bjoern Boehme, Klaus–Juergen Wolter.....	254
Fuzzy Risk Analysis Approach Test–Case: Lead–Free Soldering Process Povolotskaya Evgenia, Mach Pavel	260
Using Fractional Factorial Experiments for Determination of Factors Influencing Parameters of Electrically Conductive Adhesives Seba Barto, Radoslav Radev	266
Electrical Stress on Intrinsically Conductive Polymer Layer Detlef Bonfert, Dieter Hemmetzberger, Indranil Bose, Gerhard Klink, Karlheinz Bock, Paul Svasta, Ciprian Ionescu.....	270
Material Characteristics of the LTCC Base Material CeramTape GC M. Franz, I. Atassi, A. Maric, B. Balluch, M. Weilguni, W. Smetana, C. P. Kluge, G. Radosavljevic.....	276
Optimization of Wire Loop Formation in Wirebonding Process Using Computer Simulation Boleslav Psota, Martin Buršík, Ivan Szendiuch	282
Multi – Capacitor Sensor Algorithm for Water Level Measurement Vlad Bande, Dan Pitica, Ioan Ciascai.....	286
Image Intensifier Power Supply Yavor Dzhenkov.....	292

Microgrid Model for Fast Development of Energy Management Algorithms Radu Etz, Toma Patarau, Stefan Daraban, Dorin Petreus	297
Modelling and Testing the Impact of Hot Solder Dip Process on Leaded Components Stoyan Stoyanov, Chris Best, M. O. Alam, Chris Bailey, Peter Tollafeld, Mike Parker, Jim Scott	303
Modeling Supercontinuum Generation in Microstructured Fibers by Femtosecond Pump Pulses Using Split–Step Fourier Method Yurii Bashkatov, Boris Tsyganok, Vadim Khomenko, Natalia Kachalova, Valerii Voitsekhovich, Iryna Uvarova ..	309
Day and Night Vision Detectors – Design of Antireflection Coatings T. Pencheva, B. Gyoch, P. Mashkov	312
Phase Thickness Deviations’ Influence on Properties of Antireflection Coatings for Near Infrared Detectors B. Gyoch, P. Mashkov, S. Penchev	318
Choice of the Mounting Beams Place Considering MEMS Disk Asymmetric Vibration Ianovska Iuliia, Bogdan Oleksandr, Petrishev Oleg, Yakimenko Yuriy	324
Electro–Thermal Modeling of Power LED Using SPICE Circuit Solver Catalin Negrea, Paul Svasta, Marius Rangu	329
Modeling NMOS Snapback Characteristic Using PSpice Ina Toteva, Anna Andonova	335
Transient Thermomechanical Study of a Thick–Wire Bond With Particular Attention to the Interfacial Shearing Stress Bernhard Nagl, Ephraim Suhir, Walter Gschohsmann, Johann Nicolics	339
Capability of Biopolymers in Electronics Manufacturing René Schramm, Andreas Reinhardt, Joerg Franke	345
The Battery Management in Green Energy Production Emilian Ceuca, Adrian Tulbure, Simona Plesa	350
Feasibility Study and Life Cycle Energy Balance of Thermoelectric Generator Modules for Automotive Applications M. Weilguni, M. Franz, N. Slyusar	355
The Layered Nanocomposite Coatings for Protecting Electronic Devices from Electromagnetic Radiation Alexandr Machulyansky, Dmitry Tatarchuk, Yury Yakimenko	360
Sac 305 Solder Paste With Silver Nanopowder and Carbon Nanotubes Addition – Basic Properties of Pastes and Solder Joints Marek Kościelski, Krystyna Bukat, Janusz Sitek, Małgorzata Jakubowska, Wojciech Niedźwiedź, Anna Młóżniak	363
Thickness Measurement of Thin Soft Organic Films Daniela Mladenova, Vasil Siderov, Ivaylo Zhivkov, Ota Salyk, Miloslav Ohlidal, Irena Yordanova, Roumen Yordanov, Philipp Philippov, Martin Weiter	367
Design of Low Pass Filter for UWB Application Alena Pietrikova, Kornel Ruman, Igor Vehec, Pavol Galajda	373
Bus Encoding Algorithm to Reduce Crosstalk Effects Mihai Daraban, Dan Pitica	377

Identification of Fast–Moving Objects in Frequency Band 2.45 GHz	
Tomáš Blecha, Jiří Čengery, Petr Kuberský, Michael Kroupa.....	383
Potentiostat Solution for Electrochemical Amperometric Gas Sensor	
Petr Kuberský, Aleš Hamáček, Michael Kroupa, Jiří Štulík, Vlastimil Zwiefelhofer.....	388
Modeling and Characterization of LC Displacement Sensor in PCB Technology	
Nelu Blaž, Goran Mišković, Andrea Marić, Mirjana Damnjanović, Goran Radosavljević, Ljiljana Živanov ...	394
LTCC Membranes With Integrated Heating Structures, Temperature Sensors and Strain Gauges	
Nam Gutzeit, Jens Müller, Claudia Reinlein, Sylvia Gebhardt.....	399
Low Temperature Cofired Ceramics (LTCC)–Based Miniaturized Load Cells	
Christian Lenz, Steffen Ziesche, Uwe Partsch, Holger Neubert	406
Wide–Range Flow Meter for Air and Gases	
V.F. Zavorotnyi, Yu.I. Yakimenko	412
Communication Circuit with Pulse Modulation for Transmission of Signals from Sensors	
Daniel Alexandru Visan, Ioan Lita.....	416
Power Line Communication Module for Distributed Control Systems	
Ioan Lita, Daniel Alexandru Visan.....	420
Wireless Passive Pressure Sensor Using Frequency Coded SAW Structures	
Denys Chernenko, Mykola Zhovnir, Borys Tsyganok, Ostap Oliinyk	424
Resonant Sensors for Wireless Pressure Monitoring Realized in LTCC–Technology	
G. Radosavljević, A. Marić, Lj. Živanov, S. Toškov, W. Smetana.....	429
Thick–Film Piezoresistors – Benchmarking of LTCC Substrates	
Marko Hrovat, Darko Belavič, Kostja Makarovič, Janez Holc.....	434
Sensors and Control System for Tilting of Underground Trains in Curves	
Nencho Nenov, Nikolay Dodev, Dobrinka Atmadzhova, Georgi Stoychev	439
Examination of the Signal Recorded by Micro Sensor System for Detecting Damages on Rail Vehicle Undercarriage	
Nencho Nenov, Emil Dimitrov, Vasil Vasilev, Vasko Nikolov.....	444
The Non-linear Thermal Behavior of SU–8	
Harald Steiner, Franz Keplinger, Wilfried Hortschitz, Michael Stifter.....	450
Design and Fabrication of Flexible Ink–Jet Printed Resonant–Circuit Sensor	
Nataša Samardžić, Dragana Vasiljević, Nikola Jeranče, Goran Stojanović.....	455
Optimized Methods for Theoretical and Practical Training	
Todor Vlad, Dan Pitičá, Lucian Man, Jánó Rajmond.....	459
Measuring and Improvement of Diagnostic Processes By Using KPI’s and Statistical Method	
Martina Winkelhöferová, Veronika Maříková, Jiří Tupa.....	465
Methodology for Mapping and Modelling of Diagnostic Processes	
Veronika Maříková, Martina Winkelhöferová, Jiří Tupa.....	471
Virtual Laboratory for the e–Learning Education in the Electronics Technologies	
Dominik Demeter, Juraj Banský	476
Automated Design System for Gate Array–Based CMOS Integrated Circuits	
Rumen Yordanov, Irena Yordanova, Juriy Ivanov.....	481

Planar Thick Film Frequency Filter Design	
Jiri Pulec, Jakub Somer	485
Fabrication and Characterization of p–NiO/n–ZnO Heterojunction Towards Transparent Diode	
J. Grochowski, M. Guziewicz, R. Kruszka, M. Borysiewicz, K. Kopałko, A. Piotrowska.....	488
Authors Index	492