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CNRS-INPG-UJF

International

Workshop

on Thermal

investigations

of ICs and

Microstructures

SEPTEMBER
25-27, 1996
Budapest
Hungary



PROGRAMME

25th September

- 14.00 Registration
- 15.00 Welcome address
B. Courtois general chair, TIMA, Grenoble, France
- 15.10 Opening address
S. Bottka vice-president of OMFB, Budapest, Hungary
- 15.20 Invited talk
A. Ortega, Univ. of Arizona, USA
Chair : V. Székely
Techn. Univ. of Budapest, Hungary
Conjugate heat transfer : beyond the adiabatic heat transfer coefficient in air cooling of electronics
- 16.00 Coffee
- 16.20 SESSION 1 Thermal Simulation
- 18.00 Chair : G. Kelly, NMRC, Cork, Ireland
- 16.20 V.A. Koval, D.V. Fedasyuk
State Univ. of Lviv, The Ukraine
The 3D transient thermal simulation of microelectronic systems
- 16.40 A. Csendes, V. Székely, M. Rencz
Techn. Univ. of Budapest, Hungary
uS-THERMANAL : an efficient thermal simulation tool for microsystem elements and MCMs
- 17.00 V. Székely
Techn. Univ. of Budapest, Hungary
THERMODEL : a tool for compact dynamic thermal model generation
- 17.20 P. Tounsi, J.M. Dorkel, Ph. Leturcq, P. Vales, Ph. Dupuy
LAAS - CNRS, Toulouse, France
INSA, Toulouse, France
3D thermal modelling for electronic devices based on the two-port network theory
- 17.40 M. Furmanczyk, G. Jablonski, A. Napieralski
Techn. Univ. of Łódź, Poland
Thermal simulation with TULSOFT package in the Cadence design framework
- 19.00 Social event Cruise on the Danube & reception
- 22.00

26th September

- 8.40 Invited talk
R. Vahrmann
TEMIC Semiconductors, Heilbronn, Germany
Chair : V. Székely
Techn. Univ. of Budapest, Hungary
analog expert design system - jessi ac12 - analog design methodology and thermal effects
- 9.20 Coffee
- 9.40 Session 2 Temperature sensors & monitoring
- 11.00 Chair : W. Claeys thermal effects
Univ. of Bordeaux, Talence, France
- 9.40 E. Montane, S.A. Bota, J. Samitier
Univ. of Barcelona, Spain
A compact temperature sensor for a 1.0 um CMOS technology using lateral pnp transistors
- 10.00 V. Székely, Cs. Márta, Zs. Kohári, M. Rencz
Techn. Univ. of Budapest, Hungary
New temperature sensor for DfTT applications
- 10.20 R.C.S. Freire%, G.S. Deep% , P. Loumeaun
% DEE-CCT-UFPB, Bodocongó, Brazil
n ENST-ELEC-ANA, Paris, France
A pn junction-based precision temperature transducer integrated circuit
- 10.40 J. Altet, A. Rubio
Univ. Polit. de Catalunya, Barcelona, Spain
Analysis of ambient temperature effects on dynamic thermal testing of integrated circuits
- 11.00 Coffee
- 11.20 Poster Session Introduction to posters
- 12.40 Chair : M. Rencz, Techn. Univ. of Budapest, Hungary

J.L. Blanchard
Zuken-Redac S.A., Les Ulis, France
Temperature of copper tracks in a substrate cooled by radiation

A.K. Stubos
NCSR Demokritos, Attikis, Greece
Enhanced chip cooling via boiling in porous layers

Y. Scudeller* , C. Valn
* Univ. of Nantes, France
n 3D+, France
Heat transfer analysis on tridimensional stacking of thin plastic packages

S.P. Kolev*, I. Bársony%, A. van der Bergn, C. Cobianul

* Univ. of Sofia, Bulgaria

% Res. Inst. of Materials Sci., Budapest, Hungary

n Univ. of Twente, Enschede, The Netherlands

l Inst. of Microelectronics, Bucharest, Romania

Mathematical modelling of porous silicon based pellistor-type catalytic flammable gas sensor

W. Kalita, J. Potencki

Techn. Univ. of Rzeszow, Poland

Thick-film distributed rc networks in synthesis of sensors and control systems

G.A. Frolov*, O.M. Grudin*, I.I. Katsann, B.I. Lupinan

* Sensor Systems Co., Kiev, The Ukraine

n Kiev Polytechnic Inst., Kiev, The Ukraine

Thermal gas density sensor

Y. Assouad, F. Gatfosse, T. Gautier

Thomson RCM, Elancourt, France

Transient characterization and modelling of ceramic packages

A. Kos

Univ. of Mining & Metallurgy, Krakow, Poland

Estimation of thermal dynamics of ICs

V. Jiménez, F. Masana, M. Domínguez, L. Castañer

Univ. Polit. de Catalunya, Barcelona, Spain

Electro-thermal simulation in hot-wire flow sensors

M. Orlikowski, M. Zubert, W. Wójciak, A. Napieralski

Techn. Univ. of Łódź, Poland

General approach to VHDL-A modelling of an integrated micropump

F. Migom, W. Temmerman, J. Peeters

Alcatel Telecom, Antwerp, Belgium

Thermal models for integrated resistor technology

F. Dhondt*, P.A. Rolland*, N. Haese*, S. Delagen, H. Blanckn, E. Chartiern

* IEMN, Villeneuve d'Ascq, France

n Thomson LCR, Orsay, France

Self-consistent electro-thermal modelling of multifingers HBTs for power application

M. Wiklund

Univ. of Lund, Sweden

Electro-thermal simulation of MOS transistor circuits with SPICE using portable subcircuits

W. Szczesniak

Tech. Univ. of Gdansk, Poland

Reduction of thermal interactions between chosen elements of electronic circuits

A. Soulos, D. de Cogan, K.O. Chichlowski
Univ. of East Anglia, Norwich, UK
Sub-surface feature location and identification using inverse TLM techniques

- 12.40 Lunch
- 14.20 Session 3 Electro-thermal simulation
- 16.20 Chair : G. De Mey, Univ. of Ghent, Belgium
- 14.20 G. Digele^{*}, S. Lindenknecht^{*}, E. Kaspern
n R. Bosch GmbH, Reutlingen, Germany
^{*} Univ. of Stuttgart, Germany
Fully-coupled dynamic electro-thermal simulation
- 14.40 V. Székely, A. Poppe, A. Páhi, A. Csédes, G. Hajas, M. Rencz
Techn. Univ. of Budapest, Hungary
Electro-thermal and logi-thermal simulation of VLSI designs
- 15.00 S. Wünsche
Fraunhofer Inst., Dresden, Germany
Simulator coupling for electro-thermal simulation of integrated circuits
- 15.20 M.N. Sabry, A. Bontemps, V. Aubert
ANACAD, Meylan, France
Realistic and efficient simulation of electro-thermal effects in VLSI circuits
- 15.40 S. Nooshabadi^{*}, G.S. Visweswaran^{*}, D. Nagchoudhuri n, K. Eshraghiann
^{*}Northern Territory Univ., Australia
n Indian Inst. of Techn., New Delhi, India
n Edith Cowan Univ., Australia
A SPICE MOS transistor thermal subcircuit
- 16.00 S. Azzopardi, Ch. Zardini
Univ. of Bordeaux, France
Temperature effects on the internal physical and electrical behaviour of n-channel punch-through insulated gate bipolar transistor
- 16.20 Coffee
- 16.40 The BARMINT Project : open questions on thermo-mechanical aspects
D. Esteve, Project leader, LAAS-CNRS, Toulouse, France
- 17.00 Vendor presentations
- 18.00 Dinner
- 20.00 Panel discussion
Moderator : C. Lasance
Philips Research, Eindhoven, The Netherlands
Industrial needs with respect to thermal issues in electronic parts
Coorganized with IEEE Design and Test of Computers
Panelists :

H. Rosten, Flomerics Ltd, Hampton Court, UK
H. Jaouen, SGS-Thomson, Crolles, France
D. Blackburn, NIST, Gaithersburg, USA
A. Ortega, Univ. of Arizona, USA

27th September

- 8.40 Session 4 THERMAL characterization of packages
- 10.20 Chair : D. Blackburn,
NIST, Gaithersburg, USA
- 8.40 H.I. Rosten
Flomerics Ltd, Hampton Court, UK
DELPHI - A status report on the European-funded project for the development of libraries and physical models for an integrated design environment
- 9.00 M. O'Flaherty, C. Cahill, K. Rodgers, O. Slattery
NMRC, Cork, Ireland
Thermal resistance measurement protocols
- 9.20 E.P. Fitzgerald, M.R.D. Davies
Univ. of Limerick, Ireland
Thermal conductivity of plastic encapsulations
- 9.40 B. Wiecek, G. De Mey
Univ. of Ghent, Belgium
Evaluation of heat dissipation by natural convection for VLSI packages
- 10.00 L. Albo, Ph. Coulloch, A. Coello-Vera
Alcatel Espace, Toulouse, France
Thermal parametric characterisation of an MCM-V stack for space applications
- 10.20 Coffee
- 10.40 Session 5 Thermal transient measurements
- 12.00 Chair : H. Rosten, Flomerics, Surrey, UK
- 10.40 T. Phan*, S. Dilhaire*, V. Quintard*, D. Lewis*, W. Claeys*, J.C. Batsalen
*LCO, Talence, France
n LEPT, Talence, France
Modelling and measurement of micrometric interconnects' transient temperature - application to thermal conductivity identification
- 11.00 Y. Scudeller, N. Hmina
Univ. of Nantes, France
Experimental investigation on thermal properties of metal - oxides submicron structures
- 11.20 M. Malinski, Z. Suszynski, L. Bychto
Techn. Univ. of Koszalin, Poland
Determination of the quality of the soldering of semiconductor chips by the thermal wave method

- 11.40 G. De Meyn, C. Munteanu*
n Univ. of Ghent, Belgium
*Techn. Univ. of Cluj-Napoca, Romania
Measuring thermal parameters by induced thermal waves
- 12.40 Lunch
- 14.20 Session 6 Temperature mapping
- 15.40 Chair : A. Ortega
Univ. of Arizona, USA
- 14.20 Ch. Herzum, Ch. Bolt, J. Kölzer, J. Otto, R. Weiland
Siemens AG, München, Germany
High resolution temperature mapping of microelectronic structures using quantitative fluorescence microthermography
- 14.40 D. Lewis*, S. Dilhaire*, T. Phan*, V. Quintard*, V. Hornungn, W. Claeys*
*Univ. of Bordeaux, Talence, France
n Alcatel Alsthom Rech., Marcoussis, France
Heat deposition and transport in a semiconductor laser diode: modelling and experimental study
- 15.00 B. Wiecek, E. DeBaetselier, G. De Mey
Univ. of Ghent, Belgium
Active thermography application for solder thickness measurement in SMD technology
- 15.20 D. Poganyn*, N. Seligern, T. Lalinskyo, J. Kuzmik*, P. Habasn, P. Hrkútn, E. Gornikn
n Tech. Univ. of Vienna, Austria
*Inst. El. Eng., Slovak Acad. of Sci, Bratislava, Slovakia
n Inst. Comp. Sci., Slovak Acad. of Sci, Bratislava, Slovakia
Study of thermal effects in GaAs micromachined power sensor microsystems by an optical interferometer technique
- 15.40 Coffee
- 16.00 Session 7 Thermal sensors & actuators
- 18.00 Chair : Y. Zorian
Lucent Technologies, USA
- 16.00 U. Dillner, E. Kessler, S. Poser, V. Baier, J. Müller
IPHT, Jena, Germany
Thermal simulation of a micromachined thermopile-based thin-film gas flow sensor
- 16.20 J.M. Karam, R.A. Bianchi, F.V. Santos, B. Courtois
TIMA Laboratory, Grenoble, France
Design and fabrication of an array of CMOS compatible IR sensors
- 16.40 D. L. Blackburnn, A. Ortegan
n NIST, Gaithersburg, USA

n Univ. of Arizona, USA

The application of micromachined, thin film thermal converter as an active local heat transfer sensor

- 17.00 P. Ancey, J.P. Fontaine, K. Ishihara, M. Gschwind
IMRA Europe S.A., Sophia Antipolis, France
Design of a thermoelectric oscillator by numerical simulation & thermography, application to thermal flux sensing
- 17.20 G. Kelly, J. Alderman, C. Lyden, J. Barrett
NMRC, Cork, Ireland
Packaging a thermally actuated micromachined silicon membrane pump
- 17.40 L. Lin, M. Chiao
National Taiwan Univ., Taipei, Taiwan
Electro, thermal and elastic characteristics of suspended micromachined beams
- 20.00 Banquet
Halászbástya Restaurant Buda Castle