

Collection of papers presented at the



International Workshop on Thermal investigations of ICs and Microstructures

September 25-26 , 1995

*Grenoble (Grand Hotel de Paris in Villard de Lans)
France*

THERMINIC WORKSHOP PROGRAMME

25th September 1995

- **8.30 Opening Address**
- **8.40 INVITED TALK : D. Blackburn NIST, Gaithersburg, USA**
ISSUES IN THE MEASUREMENT OF TEMPERATURE AND THERMAL CHARACTERIZATION OF MICROELECTRONIC COMPONENTS
- **9.20-11.00 SESSION 1 Thermal and Temperature Sensors**
Chair : C. Cahill NMRC, Cork, Ireland
 - 9.20 M. Kimura, J. Manaka, K. Nagai Tohoku-Gakuin Univ., Tagajo, Japan Ricoh Seiki Co., Develop. Center, Tokyo, Japan
ABSOLUTE-HUMIDITY SENSING INDEPENDENT OF THE AMBIENT TEMPERATURE
 - 9.40 V. Székely, Cs. Márta, M. Rencz, Zs. Benedek, B. Courtois TU Budapest, Hungary TIMA Laboratory, Grenoble, France
DESIGN FOR THERMAL TESTABILITY (DfTT) AND A CMOS REALIZATION
 - 10.00 W. Wójciak, A. Napieralski TU Łódź, Poland
AN ANALOGUE TEMPERATURE SENSOR INTEGRATED IN THE CMOS TECHNOLOGY
 - 10.20 T. Kudoh, S. Ikebe, H. Sato, K. Komatsu, M. Kimura TERUMO Corp., Kanagawa, Japan Tohoku-Gakuin Univ., Tagajo, Japan
HIGHLY SENSITIVE THERMISTOR BOLOMETER FOR A CLINICAL TYMPANIC THERMOMETER
 - 10.40 U.A. Dauderstädt, P.H.S. de Vries, R. Hiratsuka, P.M. Sarro Delft Univ. of Technology, The Netherlands Nippon Steel Corporation, Japan DIMES-ICP, Delft, The Netherlands
SIMULATION OF A THERMAL ACCELEROMETER
- **11.00-11.20 Coffee**
- **11.20-12.40 SESSION 2 Thermal Simulation**
Chair : V. Székely TU Budapest, Hungary
 - 11.20 A. Napieralski, G. Jablonski TU Łódź, Poland
PYRTHERM FOR WINDOWS - USER FRIENDLY THERMAL CAD SOFTWARE
 - 11.40 J.L. Blanchard, S. Louage Zuken-Redac S.A., Les Ulis, France
AN INTERACTIVE AND INTEGRATED THERMAL CHARACTERIZATION OF COMPONENT PLACEMENT
 - 12.00 A.J. Przekwas, S.D. Habchi CFD Research Corp., Huntsville, USA
MULTI-SCALE SIMULATION OF ELECTRONICS THERMAL PACKAGING ETP AND SYSTEM COOLING
 - 12.20 K.O. Petrosjanc, I.A. Kharitonov, N.I. Rjabov, A.V. Panjukhin Moscow Univ. of Electronics and Mathematics, Russia
SOFTWARE FOR SEMICONDUCTOR DEVICES, MONOLITH AND HYBRID IC's DESIGN AND SIMULATION
- **12.50 Lunch**
- **14.20-16.00 SESSION 3 Packages Thermal Modelling and Investigation**
Chair : A. Napieralski TU Łódź, Poland
 - 14.20 L. Tielemans, G. Gregoris, L. De Schepper DESTIN N. V., Diepenbeek, Belgium Alcatel Espace, Toulouse, France Limburgs Univ. Centrum, Diepenbeek, Belgium
THERMAL DEGRADATION OF POWER MODULES
 - 14.40 M. O'Flaherty, C. Cahill, K. Rodgers, O. Slattery NMRC, Cork, Ireland
VALIDATION OF NUMERICAL MODELS OF CERAMIC PIN GRID ARRAY PACKAGES
 - 15.00 H. I. Rosten DELPHI - Flomerics Ltd., Surrey, United Kingdom
A EUROPEAN-FUNDED PROJECT FOR THE DEVELOPMENT OF LIBRARIES AND PHYSICAL MODELS FOR AN INTEGRATED DESIGN ENVIRONMENT
 - 15.20 V.A. Koval, D.V. Fedasyuk State Univ. "Lviv Polytechnic", The Ukraine
THERMAL SIMULATION OF THE SEMICONDUCTOR IC's : GENERAL AND PRACTICAL APPROACH

- 15.40 L. Albo, A. Coello-Vera, P. Pipard Alcatel Espace, Toulouse, France
THERMAL ANALYSIS OF MCM-V STACKS
- **16.00-16.20 Coffee**
- **16.20-18.00 SESSION 4 Thermal Simulation**
Chair : V. Koval TU Lviv, The Ukraine
 - 16.20 B. Lanzendörfer SICAN GmbH, Hannover, Germany
THERMAL ANALYSIS AND SIMULATION OF MCM-SI AND MICROMECHANIC COMPONENTS
 - 16.40 M. Furmánczyk, G. Jablónski, A. Napieralski, J. Pacholik TU Łódź, Poland
THE 3D TRANSIENT THERMAL SIMULATION WITH ARBITRARY BORDER CONDITION
 - 17.00 K. Hofmann, J.M. Karam, V. Moleavin, T. Niculiu, B. Courtois, M. Glesner TH Darmstadt, Germany TIMA/TIMC, Grenoble, France Univ. Bucharest "Politechnica", Romania
MODELLING AND SIMULATION OF THERMAL EFFECTS ON THE SYSTEM LEVEL
 - 17.20 T. Niculiu, K. Hofmann, M. Glesner Univ. Bucharest "Politechnica", Romania TH Darmstadt, Germany
ANALOG HDL BASED THERMAL CIRCUIT SIMULATION FOR MICROSYSTEMS
 - 17.40 D. Agonafer, A. Free IBM, Poughkeepsie, NY, USA
AN INTEGRATED SOLID MODEL BASED CFD MODELING METHODOLOGY FOR COMPUTER PACKAGING APPLICATIONS
- **19.00 Dinner**
- **20.30 PANEL SESSION**
Chair : G. De Mey Univ. of Ghent, Belgium
HOW BAD IS THERMAL EDUCATION OF ELECTRONICS ENGINEERS ?
Introductory talk : G. De Mey, Univ. Ghent, Belgium
MISUNDERSTANDINGS OF HEAT TRANSFER IN THE ELECTRONICS ENGINEERING COMMUNITY
Panelists : D. Blackburn, A. Napieralski, V. Székely, C. Zardini
NIST, Gaithersburg, USA, TU Łódź, Poland, TU Budapest, Hungary, IXL, Talence, France

26th September 1995

- **8.30 INVITED TALK : T. Tarter AMD, Sunnyvale, USA**
FACING CHALLENGES IN MICROPROCESSOR COOLING ; PORTABLE POWER
- **9.10-10.10 SESSION 5 Evaluation of Thermal Measurements**
Chair : D. Blackburn NIST, Gaithersburg, USA
 - 9.10 B Bocquet, D. Allal, Y. Leroy IEMN, Villeneuve d'Ascq, France
THERMOMETRY OF LOSSY COPLANAR LINES BY MICROWAVE CORRELATION RADIOMETRY
 - 9.30 G. Oliveti, A. Piccirillo, P.E. Bagnoli CSELT, Torino, Italy Univ. Pisa, Italy
ANALYSIS OF LASER DIODES THERMAL PROPERTIES WITH SPATIAL RESOLUTION BY MEANS OF T.R.A.I.T. METHOD
 - 9.50 V. Székely TU Budapest, Hungary
A NEW EVALUATION METHOD OF THERMAL TRANSIENT MEASUREMENT RESULTS
 - 10.10 Introduction to the poster session Chair : M. Rencz TU Budapest, Hungary
- **10.40-11.40 POSTER + Coffee**
 - S. Rael, Y. Marechal, C. Schaeffer LEG/ENSIEG, St. Martin d'Heres, France
A 3D ELECTROTHERMAL MODELLING FOR PARALLELED CHIPS
 - M. Mullins, R. Bayford, J. Butcher, A. van Putten MUMEC, London, United Kingdom
EFFECTIVE 3D THERMAL AND ELECTRICAL SIMULATION OF SILICON THERMAL FLOW SENSORS WITH HSPICE BEHAVIOURAL MODELS
 - A. Csendes, Zs. Kohári TU Budapest, Hungary
THERMAL INVESTIGATION OF MICROSTRUCTURES BY DIFFERENT SIMULATION AND MEASUREMENT TOOLS
 - W. Wójciak, A. Napieralski TU Łódź, Poland
THE DISTANCE DEPENDENT METHOD FOR TEMPERATURE MEASUREMENT OF SINGLE HEAT SOURCE IN SEMICONDUCT - OR DEVICES - THE FIRST APPROACH

- M. Kaluza, S. Delmas, E. Sicard, C. Garres TU Łódź, Poland INSA, Toulouse, France Matra Marconi Space, Toulouse, France
DESIGN AND SIMULATION OF CMOS-COMPATIBLE INDUCTORS FOR THE POWER SUPPLY OF IMPLANTED THERMAL SENSORS
- P. Godts, L. Camberlain, C. Machut, D. Leclercq IEMN, Villeneuve d'Ascq, France
A NEW CONTACTLESS TEMPERATURE MICROSENSOR
- L. Méchin, J.C. Villégier, P. Langlois, D. Robbes, D. Bloyet LETI-CEA, Grenoble, France GREYC, Caen, France
THERMALLY ISOLATED YBaCuO AIR BRIDGES ON SILICON SUBSTRATES FOR HIGH PERFORMANCE BOLOMETERS
- R.G.C. Artus Univ. of Reading, Berkshire, United Kingdom
THE DESIGN AND THERMAL MANAGEMENT OF A VIRTUAL WAFER-SCALE MULTI-CHIP MODULE SYSTEM
- B. Wiecek TU Łódź, Poland
THERMAL MANAGEMENT IN SURFACE MOUNTED ICs
- T. Ochi, T. Ogushi, R. Aoki Osaka Univ., Japan Mitsubishi Electric Corp., Hyogo, Japan
DEVELOPMENT OF A HEAT PIPE THERMAL DIODE AND ITS HEAT TRANSPORT PERFORMANCE
- M.J. Marongiu MJM Consulting Services, Naperville, IL,
SOME COMPRESSIBLE FLOW ISSUES IN THE DESIGN OF USA MICRO CHANNEL COOLING SYSTEMS
- M. Mermet-Guyennet, J.M. Paladel, P. Galliard, R. Billoud, T. Fromont, Y. Stricot CSTI, Lyon, France BULL, Les Clayes, France
THERMAL MANAGEMENT OF TAB AND TBGA COMPONENTS IN AN AIR COOLED SUPERCOMPUTER
- J. Bedmar, J.A. Puente, J.Pérez Oria UPM, Madrid, Spain Univ. Cantabria, Santander, Spain
A TECHNIQUE FOR SOLVING THE THERMAL DISSIPATION PROBLEM IN FAST VLSI ELECTRONIC SYSTEMS

• **11.40-13.00 SESSION 6 Thermography**

Chair : M. Glesner TH Darmstadt, Germany

- 11.40 A. Csendes, V. Székely, M. Rencz TU Budapest, Hungary
RESOLUTION, ACCURACY AND OTHER FEATURES OF LIQUID CRYSTAL THERMAL MAPPING
- 12.00 M. Ashauer, J. Ende, H. Glosch, H. Haffner, K. Hiltmann Inst. für Mikro- und Informationstechnik, Villingen-Schwenningen, Germany
THERMAL CHARACTERIZATION OF MICROSYSTEMS BY MEANS OF HIGH-RESOLUTION THERMOGRAPHY
- 12.20 M. Grecki, J. Pacholik, B. Wiecek, A. Napieralski TU Łódź, Poland
APPLICATION OF COMPUTER -BASED THERMOGRAPHY TO THERMAL MEASUREMENTS OF INTEGRATED CIRCUITS AND POWER DEVICES
- 12.40 P. Dondon, J. Lauriou, C. Zardini IXL, Talence, France
THERMAL TRANSIENT CHARACTERIZATION OF ELECTRONIC ASSEMBLIES BY INFRARED THERMOGRAPHY IN FAST LINE SCAN MODE

• **13.00 Lunch**

• **14.30-16.10 SESSION 7 Electro-thermal Simulation**

Chair : M. Kimura Tohoku-Gakuin Univ., Tagajo, Japan

- 14.30 V. Székely, A. Poppe, M. Rencz, A. Csendes, T. Kocsis TU Budapest, Hungary
SELF-CONSISTENT ELECTRO- THERMAL SIMULATION : FUNDAMENTALS AND PRACTICE
- 14.50 J. Litsios, B. Schmithüsen, W. Fichtner ETH-Zentrum, Zürich, Switzerland
THERMAL MIXED MODE DEVICE AND CIRCUIT SIMULATION
- 15.10 W. K. Chu, W. H. Kao Cadence Design Systems Inc., San Jose, CA, USA
A THREE-DIMENSIONAL TRANSIENT ELECTRO- THERMAL SIMULATION SYSTEM FOR IC's
- 15.30 M. Wilklund, S. Mattisson Lund Inst. of Technology, Sweden
SIMULATION OF THERMAL EFFECTS IN INTEGRATED CIRCUITS USING STANDARD CIRCUIT SIMULATORS

- 15.50 J. Ecrabey, L. Hebrard, J. Berger-Toussan, M. Le Helley LEAME, Ecole Cent. de Lyon, France

A 3D MODEL FOR PACKAGES IN ELECTROTHERMAL SIMULATIONS OF
INTEGRATED CIRCUITS

- **16.10 End of session 7**
- **16.30 Buses leave (option A)**
- **16.30 Free discussion on Thermal Simulation (option B)**

Back To [[THERMINIC INFORMATION](#) | [TIMA-CMP HOME PAGE](#)]
