Final Program
IMAPS International Conference on
High Temperature Electronics Network
(HiTEN 2011)
July 18 - 20, 2011
St. Catherine’s College Oxford
Oxford, United Kingdom

Program Overview
Session 1: Passives
Chairs: Steve Riches, GE Aviation Systems - Newmarket; Liang-Yu Chen, Ohio Aerospace Institute/NASA Glenn Research Center

Session 2: Packaging
Chairs: Joseph A. Henfling, Sandia National Laboratories; Robert Estes, Baker Hughes

Session 3: SiC
Chairs: F. Patrick McCluskey, University of Maryland - CALCE; David Shaddock, General Electric Global

Session 4: Power
Chairs: Randy Normann, Perma Works LLC; Milton Watts, Quartzdyne, Inc.

Session 5: Test & Characterization
Chair: Hector Torres, Texas Instruments, Inc.

Session 6: Packaging Materials
Chair: R. Wayne Johnson, Auburn University

Session 7: Si Devices
Chairs: Laurent Martinez, CISSOID, S.A.; Ovidiu Vermesan, SINTEF

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HiTEN Conference Focus:
The objective of the HiTEN Conference is to have a unique forum that brings together researchers and practitioners in academia and industry from all over the world. All styles of practical high temperature electronics design and implementation approaches are encouraged, along with a variety of high temperature application areas. Today the main semiconductor focus of HiTEN is silicon and silicon on insulator (SOI). However, HiTEN is not simply a semiconductor focused network. HiIEN provides a conduit for the exchange and dissemination of information on all aspects of high temperature electronics. It is a global network with users, suppliers, developers and fundamental researchers dealing in all aspects of High Temperature Electronics.

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Visit our Corporate Sponsors Booth
Monday, July 18th and Tuesday, July 19th

THANK YOU

A SPECIAL Thank You
TO ALL OF THE MEMBERS OF THE ORGANIZING COMMITTEE,
SPEAKERS, SESSION CHAIRS AND CORPORATE SPONSOR/EXHIBITORS
WHO WILL MAKE HiTEN 2011 A GREAT SUCCESS!
High Temperature Electronics Network Exhibitors
(as of July 4th)

Analog Devices
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IPDiA
Kyocera Fineceramics, Ltd.
Specialty Coating Systems, Inc.
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WE ARE SINCERELY GRATEFUL
THAT YOU HAVE CHOSEN OUR EVENT AT WHICH TO EXHIBIT.
Delegates Arrival/Check-in

Delegates are to report to the Porters Lodge upon arrival. **Check-in is from 2.00 pm onwards on the day of arrival.** If you arrive before this time you can leave your luggage in the safe room at the lodge. The lodge will assign you a room and give you the keys.

The hall will be open at all meal times and delegates can just arrive and be seated. Lunch is served promptly at 1.00 pm and Dinner at 7.00 pm; they are both served meals. Breakfast is more informal, served buffet style from 8.00 am - 9.00 am.

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**Sunday, July 17**

**CHECK-IN:** 2:00 PM (PORTERS LODGE)

**DINNER:** 7:00 PM – 8:00 PM

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**Monday, July 18**

**REGISTRATION:** 7:30 AM – 7:00 PM

**BREAKFAST:** 8:00 AM – 8:50 AM

**EXHIBITION AND TECHNOLOGY SHOWCASE:** 10:30 AM – 5:00 PM

**OPENING REMARKS:** 8:50 AM – 9:00 AM

**CONFERENCE CHAIRS**

**SESSION 1: PASSIVES**

Chairs: Steve Riches, GE Aviation Systems - Newmarket; Liang-Yu Chen, Ohio Aerospace Institute/NASA Glenn Research Center

**9:00 am – 12:30 pm**

- **Reliability Assessment of Passives for 300ºC and 350ºC**
  David Shaddock, Alexey Vert, Tan Zhang, GE Global Research; Rui Zhang, R. Wayne Johnson, Auburn University

- **285ºC Resistor Drift and Failure Analysis**
  Milton Watts, Ron Smith, Quartzdyne, Inc.

- **Reliability Testing on a Multilayer Chip Inductor Fabricated from a Ferrite with a 350 ºC Curie Point**
  James Galipeau, George Slama, NASCEntech Technology, Inc.

**NETWORKING/BREAK IN EXHIBIT HALL:** 10:30 AM - 11:00 AM

- **High Temperature Performance of Oxide Film Capacitors**
  Keith D. Jamison, Bill Balliette, Faradox Energy Storage, Inc.

- **High-Temperature, High-Power Performance of Ceramic Filter Capacitors**
  K. Bridger, A. Cooke, D. Kohlhafer, R. Strite, Active Signal Technologies, Inc.; W. Schulze, S. Arrasmith, New York State College of Ceramics at Alfred University; J. Weigner, Lockheed Martin MS2; F. Duva, Novacap

- **Ceramic Capacitors and Stacks for High Temperature Applications**
  Abhijit Gurav, Xilin Xu, Jim Magee, John Bultitude, Travis Ashburn, KEMET Electronics Corporation

**LUNCH:** 1:00 PM - 2:00 PM
**SESSION 2: PACKAGING**

Chairs: Joseph A. Henfling, Sandia National Laboratories; Robert Estes, Baker Hughes

2:40 pm - 7:00 pm

- **Thin Film Multichip Packaging for High Temperature Digital Electronics**
  R. Wayne Johnson, Kun Fang, Rui Zhang, Tami Isaacs-Smith, Auburn University; Emad Andarawis, Alexey Vert, GE Global Research Center

- **Characterization of LTCC-Thick Film Technology for 300°C Packaging**
  Tan Zhang, David Shaddock, Alexey Vert, GE Global Research Center; Rui Zhang, R. Wayne Johnson, Auburn University

- **Improvement of Dielectric Performance of a Prototype AlN High Temperature Chip-Level Package**
  Liang-Yu Chen, Ohio Aerospace Institute/NASA Glenn Research Center

**NETWORKING/BREAK IN EXHIBIT HALL: 4:10 PM - 5:00 PM**

- **Au-Sn SLID Bonding for High Temperature Applications**
  Torleif André Tollefsen, Andreas Larsson, SINTEF ICT, Instrumentation; Knut Aasmundtveit, Vestfold University College

- **Optimizing the Performance of the Au-Si System for High Temperature Die Attach Applications**
  M. F. Sousa, C. Johnston, P. S. Grant, Oxford University; S. Riches, GE Aviation Systems

- **Comparison of Au-In Transient Liquid Phase Bonding Designs for SiC Power Semiconductor Device Packaging**
  Brian Grummel, Habib A. Mustain, Z. John Shen, University of Central Florida; Allen R. Hefner, National Institute of Standards and Technology

- **Die Attach of Power Devices Using Silver Sintering - Bonding Process Optimisation and Characterization**
  Cyril Buttay, Amandine Masson, Mihai Lazar, Christophe Raynaud, Hervé Morel, Universite de Lyon; Jianfeng Li, Mark Johnson, University of Nottingham

**DINNER: 7:00 PM - 8:00 PM**

**SESSION 3: SiC**

Chairs: F. Patrick McCluskey, University of Maryland - CALCE; David Shaddock, General Electric Global Research

9:00 am - 12:30 pm

- **1200V 20A SiC BJTs Operating at 250°C**
  Anders Lindgren, Martin Domeij, Tomas Hjort, Fairchild Semiconductor

- **A Performance Comparison of Normally-off and Normally-on SiC VJFETs for High Temperature Modules**

- **>1200 V, >50A Silicon Carbide Super Junction Transistor**
  Ranbir Singh, Siddarth Sundaresan, Stoyan Jeliazkov, Deepak Vereddy, Eric Lieser, GeneSiC Semiconductor Inc.
Electrical Characterization of Lateral 4H-SiC MOSFETs in the Temperature Range of 25 to 600 °C for Harsh Environment Applications

High Temperature Silicon Carbide CMOS Integrated Circuits

A Fully Functional Extreme Environment SiC Wireless Temperature Sensing System
Jie Yang, John R. Fraley, Bryon Western, Roberto M. Schupbach, Arkansas Power Electronics International, Inc.

Keynote Presentation: 2:00 PM - 2:40 PM
Title: High Temperature System Design for Electric and Hybrid Electric Vehicles
Speaker: Ovidiu Vermesan, SINTEF
Co-authors: Lars-Cyril Blystad, SINTEF; Reiner John, Infineon Technologies AG; Marco Ottella, Centro Ricerche Fiat; Egil Mollestad, Think Global AS

Session 4: Power
Chairs: Randy Norman, Perma Works LLC; Milton Watts, Quartzdyne, Inc.
2:40 pm - 7:00 pm

Enhanced High Temperature Power Controller
Joseph A. Henfling, Stan Atcitty, Frank Maldonado, Sandia National Laboratories

Package Reliability of the SiC Power Modules in Harsh Environments
Fengqun Lang, Hiroshi Yamaguchi, Hiroshi Sato, National Institute of Advanced Industrial Science and Technology (AIST)

HADES®: A High Temperature Isolated Gate Driver Solution for SiC-Based Multi-kW Converters
Jean-Christophe Doucet, Aimad Saib, Christian Mourad, François Piette, Etienne Vanzieleghem, Pierre Delatte, CISSOID S.A.

Networking/Break in Exhibit Hall: 4:10 PM - 5:00 PM

High Temperature Silicon-on-Insulator Gate Driver for SiC-FET Power Modules

High Temperature Silicon Carbide Power Modules for High Performance Systems

STROMBOLI®: A New Platform for Isolated DC-DC Converters with Reliable Operation from -55°C up to 225°C
Pierre Delatte, Aimad Saib, Etienne Vanzieleghem, Jean-Christophe Doucet, CISSOID S.A.

Development of a Silicon Nitride High Temperature Power Module
R. Wayne Johnson, Michael J. Palmer, Jeffrey Suhling, Mohammad Motalab, Auburn University; James D. Scofield, AFRL/PRPE

Dinner: 7:00 PM - 8:00 PM
SESSION 5: TEST & CHARACTERIZATION
Chair: Hector Torres, Texas Instruments, Inc.
9:00 am - 10:30 am

ESEM as a Tool for Studying High Temperature Electronics
Stefan Svensson, Fredric Ericson, Klas Hjort, Lena Klintberg, Uppsala University

Universal High-Temperature (250°C) Test Fixture
Randy A. Normann, Alastair Black, Charles Normann, James Parker, Forever Testing Company

Comparative Reliability Prediction Using Physics of Failure Models
Milton Watts, K. Rob Harker, Quartzdyne, Inc.

BREAK: 10:30 AM - 11:00 AM

SESSION 6: PACKAGING MATERIALS
Chair: R. Wayne Johnson, Auburn University
11:00 am - 12:30 pm

Nanocomposite Epoxy Resin for SiC Module
Kenji Okamoto, Yuji Takematsu, Miyako Hitomi, Yoshinari Ikeda, Yoshikazu Takahashi, Fuji Electric Co., Ltd.

250°C Operating Temperature Dielectric Film Capacitors
Mark Donhowe, Jeff Lawler, Sean Souffie, E. Lee Stein, Jr., W. L. Gore & Associates, Inc.

A High Temperature and UV Stable Vapor Phase Polymer for Electronics Applications
Rakesh Kumar, Specialty Coating Systems

LUNCH: 1:00 PM - 2:00 PM

SESSION 7: SI DEVICES
Chairs: Laurent Martinez, CISSOID, S.A.; Ovidiu Vermesan, SINTEF
2:00 pm - 6:30 pm

Latch-Up Immunity in High Temperature Bulk CMOS Devices
R. Lowther, W. Morris, D. Gifford, D. Duff, R. Fuller, Silicon Space Technology, Inc.

High Temperature Reliability Investigations of EEPROM Memory Cells Realised in Silicon-on-Insulator (SOI) Technology

An Analysis of OTP ROM Programmable Devices in 1.0um SOI CMOS
Marshall Soares, Paul W. Moody, RelChip/Novatek

Design and Evaluation of a 200°C COTS Data Collection System for the Drilling Industry
Hector Torres, Texas Instruments, Inc.; Randy A. Normann, Perma Works LLC

BREAK: 4:00 PM - 4:30 PM

Implementation of Silicon-on-Insulator (SOI) Control Electronics to Accelerometers for High Temperature Applications
S. T. Riches, I. White, G. Rickard, GE Aviation Systems - Newmarket; G. Chadwick, DJB Instruments
A Robust SOI Gain-Boosted Operational Amplifier Targeting High Temperature Precision Applications up to 300°C
Alexander Schmidt, Abdel Moneim Marzouk, Holger Kappert, Rainer Kokozinski, Fraunhofer Institute for Microelectronic Circuits and Systems

Ultra Low Power CMOS Circuits Working in Subthreshold Regime for High Temperature and Radiation Environments
E. Boufouss, L. A. Francis, P. Gérard, M. Assaad, D. Flandre; Université Catholique de Louvain (UCL)

High Temperature Endurance of Packaged SOI Devices for Signal Conditioning and Processing Applications
S. T. Riches, GE Aviation Systems - Newmarket; C. Johnston, M. Sousa, P. Grant, Oxford University Materials

**CLOSING REMARKS: 6:30 PM**