

## Registration (Fax Reply)

To: ECPE e.V.  
Att.: Ingrid Bollens

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Register before **3 November 2006**

### Participation fee:

- .. €480,-\*
- .. €380,-\* for university members  
The fee includes dinner, lunch, coffee/soft drinks  
and seminar handouts.
- .. €120,-\* for students (shortened seminar package)

With the confirmation of seminar registration you will  
receive the invoice. (\* plus 16 % VAT)

Three participants from each ECPE member company  
free of charge. Allocation in sequence of registration.

Sender:

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title, given name, name

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company, department

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full address

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phone, fax

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e-mail

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date, signature

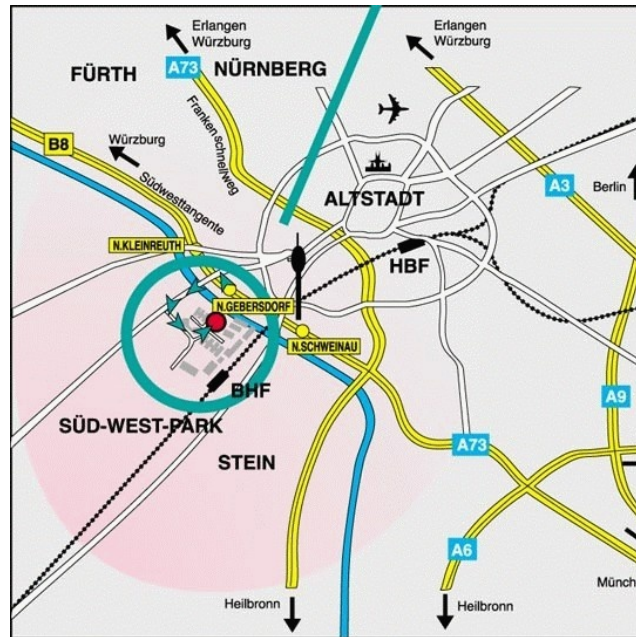
## Organisational information

Organiser: ECPE e.V.  
90443 Nürnberg, Germany  
[www.ecpe.org](http://www.ecpe.org)

Chair of seminar: Eckhard Wolfgang, Siemens CT  
Dave Saums, DS&A LLC Consult.  
Thomas Harder, ECPE e.V.

Organisation: Ingrid Bollens, ECPE e.V.  
+49 (0)911 / 81 02 88 – 10  
[ingrid.bollens@ecpe.org](mailto:ingrid.bollens@ecpe.org)

Place of seminar: Süd-West-Park Conference Center  
Nürnberg, Germany



Further information (hotel list and maps) will be  
provided after registration.



**ECPE European Center for  
Power Electronics e.V.**

## Seminar High Temperature Electronics and Thermal Management

**9 – 10 November 2006  
Süd-West-Park Conference Center,  
Nürnberg, Germany**

**in cooperation with  
Siemens AG CT, Munich**

## Introduction

### ECPE Seminar High Temperature Electronics and Thermal Management

9 – 10 November 2006  
Nürnberg, Germany

The general trend towards increasing power density of power electronics systems yields to major consequences:

- the surface for heat exchange to ambient is reduced,
- therefore, the temperature of the components rises,
- the reliability of components and interconnects decreases.

In addition, more and more applications require to operate power electronics at ambient temperatures above 120°C, like in automotive, aerospace, and lighting applications.

Component manufacturers are aware of this trend and are providing "high temperature" solutions. In any case, however, thermal management has to be optimized.

The seminar aims for describing the state of the art of silicon high temperature power devices and electronics. SiC electronics will not be treated because of the ECPE SiC User Forum held in March 2006. The major part of the Seminar will deal with thermal management where all aspects of materials and methods known and available will be discussed. This is done by case studies as well as basic information necessary to work out practical solutions.

Prof. Eckhard Wolfgang (Siemens Corporate Technology, Munich) will chair the seminar together with Mr. Dave Saums (DS&A LLC Consulting, USA) and Mr. Thomas Harder (ECPE). All presentations and discussions will be in English.

## Program

### Thursday, 9 November 2006

- 10.00 Beginning of Registration
- 10.30 Opening and welcome address  
**General Introduction**  
T. Harder (ECPE)  
**High Temperature Electronics & Reliability**  
E. Wolfgang (Siemens CT, Germany)  
**Thermal Management**  
D. Saums (DS&A LLC, USA)
- 12.00 Case Study I: **Extended max. junction temperature operation**  
U. Scheuermann (Semikron Elektronik, Germany)
- 12.30 Lunch
- 13.30 Case Study II: **Advanced cooling techniques for an ultra compact isolated DC/DC converter**  
J. Biela (ETH Zurich, Switzerland)
- 14.00 Case Study III: **Low profile thermal management solutions**  
E. Walsh (University of Limerick, Ireland)
- 14.30 Basics:  
- **Thermal convection,**  
- **Thermal conduction,**  
- **Thermal radiation**  
M. März (Fraunhofer IISB, Germany)
- 15.30 Coffee break
- 16.00 Case Study IV: **Heat pipe cooling**  
C. Capriz (AAVID Thermalloy, Italy)
- 16.30 Case Study V: **Thermal performance of advanced power electronic packages**  
S. Dieckerhoff (Fraunhofer IZM/TU Berlin, Germany)
- 17.00 **Thermal conduction:**  
- **Materials: metals, MMC,**  
- **Heat pipes**  
- **Thermal interface material (TIM)**  
D. Saums

## Program

- 17.45 Wrap up 1<sup>st</sup> day  
E. Wolfgang, D. Saums
- 19.30 Dinner with dinner speech:  
**Thermal management in 10 years**  
D. Saums
- Friday, 10 November 2006
- 8.30 **Heat generation:  
Power semiconductors, passives, bus bars**  
M. März
- 9.30 Case Study VI: **Double-sided liquid cooling**  
M. Mermet-Guyennet (ALSTOM Transport, PEARL, France)
- 10.00 Coffee break
- 10.30 Case Study VII: **Ceramic substrates and micro channel cooler**  
J. Schulz-Harder (Curamik Electronics, Germany)
- 11.00 Case Study VIII: **Thick film applications for automotive power electronics**  
J. Cocker (DuPont MCM, UK)
- 11.30 **Measurements of TIM properties**  
D. Saums
- 12.30 Lunch
- 13.30 Case Study IX: **Active power cycling at high temperature swings**  
J. Lutz (TU Chemnitz, Germany)
- 14.15 **Reliability**  
E. Wolfgang
- 15.00 Wrap up 2<sup>nd</sup> day  
E. Wolfgang, D. Saums
- 15.30 End of seminar