

Organisational Information

For registration please use the registration form which is available on the ECPE web page: www.ecpe.org
> ECPE Events > ECPE Workshops: Thermal Reliability Modelling > Registration Form

www.ecpe.org/ecpe-events

Deadline for registration:

- **23 November 2016**

Participation fee:

- **€ 595,-** * for industry
- **€ 445,-** * for universities/institutes
- **€ 150,-** * for students/PhD students
(copy of student ID requested)
(limited number only)
(optional dinner: € 50,-* extra fee)

*plus 19 % VAT

- The participation fee includes dinner, lunch, coffee/soft drinks and a flash drive with the workshop presentations. Students/PhD students can book the dinner for an extra fee of € 50,-*.
- A printed version of the workshop handout is available on request (€ 50-*).
- With the confirmation of registration by email you are registered for the workshop and the invoice will be sent by post.
- Three participants from each ECPE member company free of charge. Allocation in sequence of registration.
- Further information (hotel list and maps) will be provided after registration and is available on the ECPE web page.
- In case of cancellation later than two weeks before beginning or non-attendance 50 % of the participation fee is payable.

Organisational Information

Organiser ECPE e.V.
90443 Nuremberg, Germany
www.ecpe.org

Chairmen Prof. Eckhard Wolfgang, ECPE
Dr. Markus Thoben, Infineon
Prof. Bernhard Wunderle,
Technical University Chemnitz

Organisation Ingrid Bollens, ECPE e.V.
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Workshop venue Stadthalle Fürth
Rosenstrasse 50
90762 Fuerth/Nuremberg
Germany

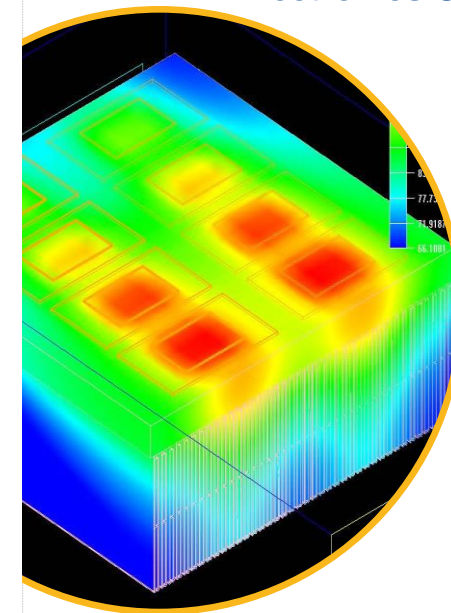


Further information (hotel list and maps) will be provided after registration.



ECPE Workshop

Thermal and Reliability Modelling and Simulation of Power Electronics Components and Systems



**30 November –
1 December 2016**
Fuerth/Nuremberg,
Germany

In cooperation with



ECPE Workshop

Thermal and Reliability Modelling and Simulation of Power Electronics Components and Systems

30 November – 1 December 2016
Fuerth/Nuremberg, Germany

This Workshop will be the second one on "Lifetime Modelling and Simulation" under given mission profiles. The first workshop took place in July 2013 in Dusseldorf. The successful series was followed by an ECPE Workshop on "Intelligent Reliability Testing" in December 2014.

Thermal engineering with simulation of power electronic systems is a key to achieve high performance and reliability. After a review of the basic theory of heat transfer, and loss calculation, different thermal simulation approaches will be addressed including equivalent thermal network calculation, finite element modelling (FEM) and CFD simulations for fluid dynamics.

Lifetime modelling and simulation is an important part of the SAE J1211 Robustness Validation procedure. It is based on the Physics-of-Failure approach which means that appropriate models are a prerequisite for lifetime simulation. In addition the different stresses which are applied during operation have to be considered (mission profiles).

The workshop will present and discuss the state-of-the-art of thermal and reliability simulation in the field of power electronics. Of course models have to be calibrated by experiments. The workshop is chaired by Prof. Eckhard Wolfgang (ECPE), Dr. Markus Thoben (Infineon), and Prof. Bernhard Wunderle (Technical University Chemnitz).

All presentations and discussions will be in English language.

For better understanding and to stimulate discussions there will be a table top exhibition. Following companies take part in the exhibition:
Aavid Thermalloy, ADAM Research, Adapted Solution, DfR Solutions/RELNETxY, Mentor Graphics, Plexim

Programme

Wednesday, 30 November 2016

09:00 Start of registration/Welcome Coffee

09:30 Welcome, Opening
T. Harder, E. Wolfgang, ECPE e.V.

09:50 Overview: Co-Design and Reliability Modelling for Power Electronics Modules: Current Status and Future Challenges
C. Bailey, University of Greenwich (UK)

Session Thermal

10:30 Transient Thermal Analysis of Complex Systems by Linear Superposition
K. Olesen, Danfoss Silicon Power, (D)

10:50 Transient Thermographic Techniques for Non-Destructive Failure Analysis and Condition Monitoring in Experiment and Simulation
B. Wunderle, D. May, TU Chemnitz (D)

11:10 Thermal Modelling of a Directly Cooled Power Module with Application of CFD Analysis
E. Hymon, Infineon Technologies (D)

11:30 Coffee Break

11:50 Thermal Simulation Case Studies
A. Sce, Aavid Thermalloy(I)

12:10 IGBT Cooler Design Optimization
A. Simon-Kajda, Mentor Graphics (D)

12:30 Vendors Presentation

13:00 Lunch and Table Top Exhibition

Session Power Devices

14:20 Reliability Analysis of Wire Bonds in Semiconductor Packages
B. Czerny, G. Khatibi, TU Vienna (A), A. Mazloun-Nejadari, Infineon (D)

14:40 Double Sided Soldered Power Devices
M. Klingler, Bosch (D)

15:00 High Temperature Model for SiC Diode
G. Wachutka, Technical University Munich (D)

15:30 Coffee Break and Table Top Exhibition

Round Table Aging of Silver Sinter Joints

16:20 U. Scheuermann, Semikron (D); R. Dudek, Fraunhofer ENAS (D); O. Wittler, Fraunhofer IZM (D); T. Herboth, Bosch (D); L. Tinschert, TU Chemnitz (D); A. Schletz, Fraunhofer IISB (D)

18:00 Short Discussion

19:30 Dinner at „Logenhaus“, Dambacher Strasse 11, Fuerth

Programme

Thursday, 1 December 2016

Session Automotive

08:30 Lifetime Calculation of Automotive Power Modules based on PoF
S. Letz, Fraunhofer IISB (D)

08:50 Modelling of Thermal Aspects in Advanced Power Packaging and Implications to Reliability
M. Poech, Fraunhofer ISIT (D)

09:10 DC Link Capacitor for xEV Applications: Design Optimization for Thermal Performance and Lifetime
D. Dibra, EPCOS AG (D)

09:30 State Space Modelling of a DC / DC Converter
J.-L. Blanchard, Valeo (F)

09:50 Discussion

10:00 Coffee Break and Table Top Exhibition

Session Lifetime

10:40 Virtual Prototyping for Power Electronics
P. Evans, University of Nottingham (UK)

11:10 Empirical Lifetime Model and Correlation to Thermo-Mechanical Lifetime Simulation
R. Bayerer, K. Mainka, Infineon Technologies (D)

11:40 Deriving Lifetime for Power Modules following Environmental and Functional Requirements in Wind Applications
K. Mainka, Infineon Technologies (D)

12:00 Thermal Simulation for Embedded Power Modules
H. Stahr, AT&S (A)

12:30 ETH Reliability Odometer
M. Ciappa, ETH Zurich (CH)

12:50 Lunch and Table Top Exhibition

Session Reliability

14:00 Reliability of DC-Link Capacitors in Power Electronic Converters
H. Wang, Aalborg University (DK)

14:30 Aeging and Reliability of Polymeric Epoxy Materials
O. Hoelck, Fraunhofer IZM (D)

14:50 Impact of Humidity on High Voltage Semiconductor Devices
N. Kaminski, C. Zorn, University of Bremen (D)

15:10 Cosmic Ray Effects on Power Semiconductor Devices: from Experiment to Simulation
G. Busatto, University of Cassino (I)

15:40 Discussion

16:00 End of Workshop