

## Registration (Fax Reply)

To: ECPE e.V.  
Att.: Ingrid Bollens, [Ingrid.bollens@ecpe.org](mailto:Ingrid.bollens@ecpe.org)  
Please **e-mail** a scanned copy of the completed form or  
send a fax to: +49 (0)911 / 81 02 88 – 28

Register before **31 October 2012**

### Participation fee:

- €480,- \* for industry
- €380,- \* for universities/institutes
- €150,- \* for students/Ph.D.

The fee includes dinner, lunch, coffee/soft drinks and hand-outs.

With the confirmation of registration you will receive the invoice (\*plus VAT). 50 % discount for ECPE Member Companies.

In case of cancellation after 31 October 2012 or non-attendance 50 % of the participation fee are payable.

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### Sender:

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Title, given name, name

\_\_\_\_\_

Company, department

\_\_\_\_\_

Full address

\_\_\_\_\_

Phone, fax

\_\_\_\_\_

E-mail

\_\_\_\_\_

Date, signature

## Organisational information

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<b>Organiser</b>	ECPE e.V. 90443 Nuremberg, Germany <a href="http://www.ecpe.org">www.ecpe.org</a>
<b>Course instructor</b>	Prof. Dr. Eckhard Wolfgang, ECPE Dr. Gerald Deboy, Infineon Technologies Austria Dr. Wolfgang Gerling, Consultant
<b>Organisation</b>	Ingrid Bollens, ECPE e.V. +49 (0)911 / 81 02 88 – 10 <a href="mailto:ingrid.bollens@ecpe.org">ingrid.bollens@ecpe.org</a>
<b>Venue</b>	Graz University of Technology Electric Drives and Machines Institute Inffeldgasse 18/1, 8010 Graz, Austria

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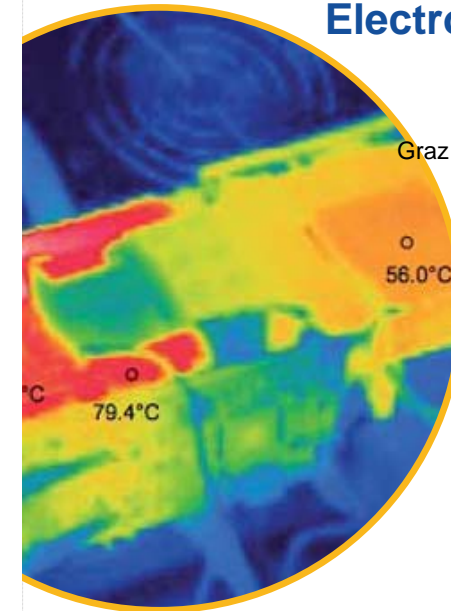
Further information (hotel list and maps) will be provided after registration.



## ECPE Tutorial

### Reliability of Power Electronic Systems

**7 – 8 November 2012**  
Graz University of Technology  
Graz, Austria



# Reliability of Power Electronic Systems

7 – 8 November 2012  
Graz, Austria

The aim of the tutorial is to teach the basics of modern reliability engineering for the design of an electronic system and for its confirmation by simulation and test. The procedure is based on the intended application profile (“Mission Profile”) and the Physics-of-failure-concept with respect to the effects of the application stresses. It will also consider the trend of user requirements for electronic systems for lower volume, operate under more severe conditions and increase of reliability.

The Mission Profile contains the combination of stresses versus time, to which the electronic system is subjected to during its operation which is also dependent on its construction (design) physical failure mechanisms and correspondingly its life time.

Essential are

- knowledge / definition of the application stress profile
- system design with respect to these stresses
- understanding the physical failure mechanisms, their modeling and application
- application related testing of the life time using accelerating “end-of-life”-test methods

for “building-in reliability” and confirming it including a safety or “robustness margin”.

Appropriate procedures will be explained for system design, simulation and confirmation corresponding to the “Robustness Validation Process” and exemplified.

The course instructor of the reliability tutorial is  
Prof. Dr. Eckhard Wolfgang, ECPE e.V.

Co-instructors are

Dr. Gerald Deboy, Infineon Technologies Austria  
Dr. Wolfgang Gerling, Consultant

**All presentations and discussions will be in English**

## Programme

Wednesday, 7 November 2012

9:30 Start of Registration

10:00 Welcome,  
T. Harder, ECPE e.V.

10:10 Thematic Introduction

### Requirements

10:30 1. Requirements  
- Specification  
- Mission Profile  
E. Wolfgang

### Reliability

11:00 2. Reliability  
- Definitions, Parameters  
- Failure Mechanisms, Examples  
W. Gerling

12:00 Lunch

### Virtual Prototyping

13:00 3.1 Components and Circuit Design  
- CoolMOS, SiC JFET  
- Building-in Reliability  
G. Deboy

14:30 Coffee Break

15:00 3.2 Thermal Management  
- Simulation  
- Measurements  
E. Wolfgang

15:30 3.3 Cooling Technologies  
E. Wolfgang

### Virtual Reliability Assessment

16:00 4.1 Physics-of-Failure Concept  
W. Gerling

16:40 4.2 Requirement Engineering  
W. Gerling

17:20 Summary of 1<sup>st</sup> day

19:00 Dinner

## Programme

Thursday, 8 November 2012

9:00 Open Questions 1<sup>st</sup> Day

9:20 4.3 Mission Profile for System Components  
- Robustness Margin Bond Wire  
E. Wolfgang

10:00 4.4 Life Time Prognosis Solder Joint  
E. Wolfgang

10:40 Coffee Break

11:10 4.5 Risk Assessment  
E. Wolfgang

12:00 Lunch

### Reliability Validation

13:00 5.1 Concepts for Qualification and  
Robustness Validation  
W. Gerling

14:00 5.2 Accelerated Tests Power Module  
E. Wolfgang

14:40 Coffee Break

15:00 5.3 Simulation and Test of an ECU  
E. Wolfgang

15:40 5.4 Robustness Validation Process  
W. Gerling

16:20 Final Discussion, Feedback

16:30 End