

Organisational Information

Sign up at: www.ecpe.org/events

Registration Deadline:

16 May 2023

Participation Fee:

- € 670,- * for industry
- € 520,- * for universities/institutes
- € 180,- * for students/PhD student
(limited spaces; copy of students ID required)

* plus VAT

- The participation includes dinner, lunches, coffee/soft drinks and digital proceedings. The reduced (PhD) students fee includes all except for dinner (can be booked for an extra fee of € 50,-*)
- Digital proceedings will be provided by download link latest one day before start of the event. A printed handout is available on request (€ 50,-*).
- Upon receipt of registration confirmation via email you are signed-up for the event. The invoice will be sent via email.
- 25 % discount for participants from ECPE member companies.
- 10% discount on university/institute fee for participants from ECPE competence centres.
- Further information (hotel list and maps) will be provided after registration and can be found on the ECPE web page.
- Cancellation policy: Full amount will be refunded in case of cancellation upon to 2 weeks prior to the event. After this date 50 % of the fee is non-refundable (replacement is possible).

14/04/23

Organisational Information

Organiser ECPE e.V.
90443 Nuremberg, Germany
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Technical Chair Prof. Dr. Uwe Scheuermann,
Semikron Danfoss (DE)

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Venue Hotel "Zum ERDINGER Weissbräu"
Lange Zeile 1 + 3
85435 Erding close to Munich Airport,
Germany



Source photo: Hotel "Zum Erdinger Weissbräu"
Source graph front page: ABB

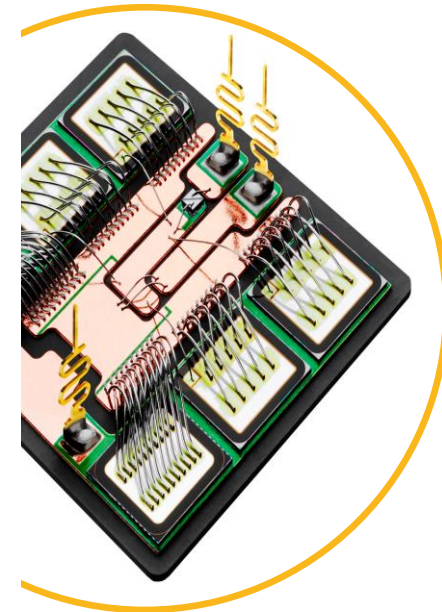


European Center for
Power Electronics e.V.

ECPE Tutorial

Power Electronics Packaging

23 - 24 May 2023
Erding/Munich
Germany



Power Electronics Packaging

23 - 24 May 2023
Erding/Munich, Germany

In addition to the conventional electronics packaging functions, in Power Electronics one has to deal with further requirements such as handling high voltages and currents as well as handling electrical losses with the required heat dissipation.

The tutorial starts with the presentation of the basic features of power electronics packaging including functions, materials and thermal management as one of the key issues.

The packaging of components and modules as well as the converter level packaging is covered starting from low power discrete and monolithic solutions up to hundreds of kW converters. Power electronics packaging is discussed in a system environment focussing on cooling techniques and thermal interface materials.

Since there is a dominant impact of packaging on the reliability of components and systems, one session is devoted to failure mechanisms and reliability testing.

The current drivers in power electronic systems are power density, manufacturability, reliability and costs. The shortcomings and bottlenecks of state-of-the-art packaging will be discussed and the emerging interconnection and integration technologies that aim to address these challenges will be reviewed.

This tutorial is aimed at engineers who are engaged in power electronics and want to improve their knowledge and understanding of power electronics packaging including ongoing developments and future trends.

Course Instructors:

Prof. Dr. Uwe Scheuermann, Semikron Danfoss (DE)

(Chair of tutorial)

Dr. Reinhold Bayerer, Physics of Power Electronics (DE)

Gudrun Feix, ECPE (DE)

Dr. Karsten Guth, Infineon Technologies (DE)

Dr. Max H. Poech, Senior Scientist (DE)

All presentations and discussions will be in English.

Programme

Tuesday, 23 May 2023

09:00 Registration & Welcome Coffee

09:30 Welcome and Introduction
Gudrun Feix, ECPE

Introduction and Basics

09:40 Introduction to Power Electronics Packaging
Basics and functions | features of PE packaging |
basic structure of PE packaging world
Karsten Guth

10:25 Packaging Materials
Properties of materials | Materials classification |
Substrate materials and technologies | Thermal
interface materials and applications
Max H. Poech

11:25 Materials Properties and Reliability Aspects
Loads and thermo-mechanical behavior | Degradation
mechanisms
Max H. Poech

12:15 Lunch

13:15 Backside Interconnect Technologies
Soldering | diffusion soldering | sintering
Karsten Guth

14:30 Frontside Interconnect Technologies
Wire bonding | pressure contacts | welded
interconnects
Karsten Guth

15:40 Coffee Break

16:00 Encapsulation and Housing
Transfer molding of discretes and modules | Module
potting and housing | Conformal coating
Reinhold Bayerer

Components and Modules

16:45 Discrete Power Semiconductors & System
Integration
Through-hole SMD and CSP packages | Assembly and
interconnection technologies | Multichip packages
Karsten Guth

17:25 Final discussion

17:45 End of 1st day

19:30 Dinner

Programme

Wednesday, 24 May 2023

08:30 Start of 2nd Day

08:30 Power Modules
Function | Design | Characteristics | Reliability
Reinhold Bayerer

09:30 Basics of Thermal Management Part 1
Power losses and cooling | Rth and Zth | Thermal
models and simulation
Reinhold Bayerer

10:15 Coffee Break

10:35 Basics of Thermal Management Part 2
Reinhold Bayerer

Converter Level Packaging

11:15 Cooling of High Power Systems
Air cooling | Liquid cooling | Advanced cooling solution
Uwe Scheuermann

12:25 Lunch

13:25 Low and Medium Power Systems
PCB assemblies with through-hole and SMT |
Packaging aspects of passive components | Thermal
management on PCB level | High current PCBs and
IMS substrates
Max H. Poech

Robustness and Reliability

14:20 Failure Mechanisms
Overstress mechanisms and wearout mechanisms |
Random failures | End-of-life failure | Mission profiles
and condition monitoring
Uwe Scheuermann

15:10 Short Break

15:25 Lifetime and Reliability Testing
Qualification according to standards | Thermo-
mechanical stress | Lifetime models
Uwe Scheuermann

WBG Packaging and System Integration

16:35 WBG Packaging
Gudrun Feix

17:05 Questions and Final Discussion

17:15 End of Tutorial