Organisational Information

Sign up at: www.ecpe.org/events

Registration Deadline:

20 June 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 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).

16/06/23

Organisational Information

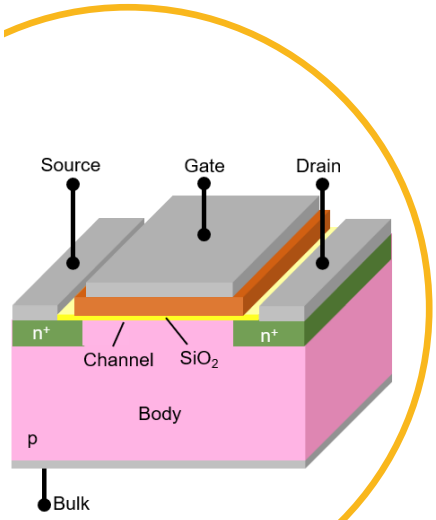
Organiser	ECPE e.V. 90443 Nuremberg, Germany www.ecpe.org
Technical Chair	Dr. Anton Mauder, Infineon Technologies (DE) Prof. Nando Kaminski University of Bremen (DE)
Technical Contact	Gudrun Feix, ECPE e.V. +49 911 81 02 88 – 15 gudrun.feix@ecpe.org
Organisation	Marietta Di Dio, ECPE e.V. +49 911 81 02 88 – 13 marietta.didio@ecpe.org
Venue	Maxhaus Schulstraße 11 40213 Düsseldorf Germany

Source foto: Maxhaus, Düsseldorf
Source graph front page: Dr. Anton Mauder

European Center for Power Electronics e.V.

ECPE Tutorial

Power Semiconductor Devices & Technologies



27 – 28 June 2023
Düsseldorf
Germany

Cluster Leistungselektronik

ECPE Tutorial

Power Semiconductor Devices & Technologies

27 - 28 June 2023
Düsseldorf, Germany

The tutorial is aimed at engineers who are engaged in power electronics and want to improve their knowledge and understanding of power devices including the developments expected in near future.
The course starts with a general overview on required power device properties and a very basic treatment of semiconductor material and device physics.
Blocking capability of the devices, unipolar and bipolar current transport and gate control will be discussed. Diodes, MOS transistors (including compensated superjunction MOS) and Insulated Gate Bipolar Transistors (IGBT) will be treated in detail including their dynamical properties, safe operation and temperature limits.
The wide bandgap semiconductor materials silicon carbide and gallium nitride have become important competitors to silicon. Their superior properties for application and the expectations for the next years will be discussed. Also, issues concerning control, packaging and integration will be treated in the corresponding contributions.
The following chapters demonstrate basic principles of power electronic systems and the basics of intelligent IGBT / MOSFET control circuits. MOS transistor and IGBT gate drivers for various fields of application are discussed in detail. Finally a short overview of hybrid power electronic integration and the most relevant aspects (cooling, reliability and EMC problems) will be presented.

Course Instructors:

Dr. Anton Mauder, Infineon Technologies (DE)
Prof. Nando Kaminski, University of Bremen (DE)
Dr. Reinhard Herzer, Consultant Power Devices & -ICs (DE)
Dr. Peter Türkes, Consultant Compact Power Devices Models (DE)

All presentations and discussions will be in English.

Programme

Tuesday, 27 June 2023

09:00 **Registration & Welcome Coffee**

09:30 **Welcome, Opening**
Gudrun Feix, ECPE

09:40 **Introduction: From Power Electronic Applications to Power Devices**
Anton Mauder

10:20 **Basics of Semiconductor & Device Physics**
Nando Kaminski

12:00 **Lunch**

13:00 **Basics of Power Semiconductor Devices**
Anton Mauder

14:00 **Power Diodes and Thyristors**
Anton Mauder

14:30 **Coffee Break**

15:00 **Si Power MOSFETs and Super Junction Devices**
Anton Mauder

15:45 **Insulated Gate Bipolar Transistor (IGBT)**
Anton Mauder

16:30 **Unipolare Wide Bandgap Devices (SiC, GaN)**
Nando Kaminski

17:45 **End of 1st Day**

19:30 **Dinner at „Brauerei zum Schiffchen“**

Programme

Wednesday, 28 June 2023

08:30 **Start of 2nd Day**

08:30 **Packaging of Power Devices and Modules I:**
- Technologies
- Thermal Management
- Reliability
Nando Kaminski

09:30 **Packaging of Power Devices and Modules II:**
- Parasitics
Anton Mauder

10:05 **Coffee Break**

10:35 **Modelling and Virtual Prototyping**
Peter Türkes

11:50 **Basics of Gate Drivers**
Reinhard Herzer

12:50 **Lunch**

13:45 **Gate Drivers with Galvanic Isolation (Medium and High Power), Integration in Smart Power Technologies**
Reinhard Herzer

14:15 **Fully Integrated Gate Drivers (Low Power)**
Reinhard Herzer

14:45 **Multi Chip Gate Drivers and Technologies; IPM and Single Chip Inverter; Gate Drivers for SiC and GaN Devices**
Reinhard Herzer

15:15 **Open Discussion**

15:30 **End of Tutorial**