Organisational Information

For registration please use the registration form which is available on the ECPE web page:

www.ecpe.org/events

Deadline for registration:

- 13 November 2018

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, lunches, 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

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Programme

ECPE Workshop

The Future of Simulation in Power Electronics Packaging for Thermal and Stress Management

20 - 21 November 2018
Maritim Hotel Nürnberg
Germany

in cooperation with
The progress in computing capacity allows today the simulation of realistic geometric models of power electronic assemblies but increasing model sizes will not be sufficient to enable the prediction of different assembly steps on the package. To improve the correspondence between FEM simulations and real measurements, the coupling of different physical domains within the simulation process is inevitable.

### Thermo-electrical coupling

The first area of improvement is the realistic simulation of distribution of load current and thus the distribution of power losses on a chip and between parallel chips. In the past, thermal simulation assumed a constant loss density on a chip and on parallel chips. However, since on-state voltage at a defined current is a function of temperature, the losses will also vary in the presence of pronounced lateral temperature gradients. Thermo-electrical coupling is needed to include the interaction between temperature distribution and dissipated losses.

### Thermo-mechanical coupling

The second area of improvement is the mechanical deformation of power modules or packages in operation. Assuming a stress-free condition at a fixed temperature does not reflect the complexity of power packages, since those are produced from sub-assemblies with different (thermal) process history. Even a leadframe transfer-mold device requires at least two assembly steps, the bonding of the chip on the lead frame and the subsequent mold process. Both processes will freeze in stress at different temperature levels, so that the package will suffer from inherent stress even at room temperature. Thermo-mechanical coupling allows to simulate the impact of different assembly steps on the package. However, a realistic simulation of the assembly process requires the knowledge of (rate-dependent) material parameters in the full temperature (and humidity) range to understand the thermo-mechanics of the chip-package-module interactions and to fully exploit the benefits of physics-of-failure-based lifetime modelling for reliability prediction. The determination of material data is a considerable challenge and requires a collaboration of industry and academia.

The ECPE Workshop is chaired by Prof. Uwe Scheuermann (Semikron) and Prof. Bernhard Wunderle (TU Chemnitz). All presentations and discussions will be in English language.