

## Tutorial Title

**Switching Losses in Power Semiconductors: A Comprehensive How-To for Accurate and Reliable Loss Data**

## Instructor Team

Team Chair:

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## Abstract

This tutorial conveys an overview about techniques to measure switching losses in power semiconductor and about the challenges that these techniques are currently facing due to the more demanding properties of Wide Band Gap (WBG) Power Semiconductors, such as Silicon Carbide (SiC) or Gallium Nitride (GaN).

As the DPT is currently the most widely-used method to determine switching losses, a particular focus lies on the necessary measurement tools, their distinctive properties and their influence on the quality of the DPT measurement. We investigate side effects of current and voltage probes on the Device under Test and provide possible solutions to get better results when characterizing fast-switching WBG power semiconductors.

These side-effects limit the applicability of the DPT method in certain areas of operation, and a corresponding methodology to identify such situations and to estimate the systematic errors is developed. Based on this methodology, solution spaces for given combinations of power semiconductors and sensors are derived, and a tool to transfer this methodology to arbitrary semiconductor/sensor combinations is presented.

## Instructor Team Biographies

Sebastian Sprunck

- Group Manager Devices and Measurement Systems at Fraunhofer Institute for Energy Economics and Energy System Technology IEE, Kassel, since 2020.
- B.Sc., M.Sc. and Ph.D. at University of Kassel in 2014, 2016 and 2021, respectively.

Christian Lottis

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