

# The 46<sup>th</sup> International Spring Seminar On Electronics Technology

10<sup>th</sup> – 14<sup>th</sup> May 2023, Timișoara, Romania

*"Revolutionizing the Electronics Ecosystems – Chiplet and Heterogeneous Integration"*



**Keynote speaker:**

**Name:** Andrew Wood

**Job position:** Senior Principal Engineer  
Discrete Power Devices

**Company:**

**Infineon Technologies Austria AG**

**e-mail:** Andrew.Wood@infineon.com

**Title of the presentation:**

***Trends and challenges in Automotive power MOSFETs - the switches enabling clean, safe and smart cars.***

**Short CV:**

Andrew Wood graduated with a BSc(Hons) in Physics from the University of Manchester and a PhD in Applied Physics from the University of Durham. He first worked on MOSFETs as a post-doctoral research associate at the University of Newcastle-upon-Tyne. In 1995 he moved into industry and worked on the design and development of discrete semiconductor devices (diodes, bipolars and MOSFETs) at Zetex plc. Since 2006 he has been with infineon Technologies Austria AG working on the development of automotive power MOSFET technologies. He has been granted over 25 US patents and is a member of the Institute of Physics and a Chartered Physicist.

**Abstract:**

This talk will discuss the key role played by MOSFETs in enabling the car of the future.

While the wide-bandgap enabled high power electronics of the battery vehicle drive-train often steals the headlines, silicon MOSFETs still play a key role in powering, driving and switching the other electronic circuits in a modern car.

Making cars clean requires a move to electric operation. While this revolution opens up significant opportunities for silicon MOSFETs, it also results in significant new challenges and requirements. Changes to the electronic system architecture, for example, have implications for MOSFETs used in power distribution applications, as well as changing the supply conditions for applications driven by the low-voltage network. The efficiency of the MOSFETs has a direct impact on the electricity consumption during operation, and must be optimized to give the highest vehicle range for a given battery capacity. As long as charging uses electricity which is not 100% carbon-free this will also have an impact on the carbon footprint of the vehicle.

# The 46<sup>th</sup> International Spring Seminar On Electronics Technology

10<sup>th</sup> – 14<sup>th</sup> May 2023, Timișoara, Romania

*"Revolutionizing the Electronics Ecosystems – Chiplet and Heterogeneous Integration"*



Making cars safe involves adding new features to sense and react to events inside and outside of the car. These systems need to operate reliably and predictably – this has implications for the quality requirements of the MOSFETs powering and switching these applications.

Making cars smart involves the addition of increasing levels of driver assistance culminating in self-driving vehicles. These driver assistance systems need to be provided with power, and to be able to switch and drive protection systems. These systems require MOSFETs able to operate efficiently and reliably under all conditions.

In this presentation examples will be given of the impact of these trends on the MOSFET requirements, discussing what challenges are posed and how these can be addressed. Examples will include optimization of both the MOSFET chip and the package in which it is housed. We will explain how the latest MOSFET technologies are optimized for efficient and reliable operation, and discuss in particular static, dynamic and thermal challenges.