WIDE-BANDGAP TECHNOLOGIES FOR TOMORROW'S HIGHLY EFFICIENT AND RELIABLE AUTOMOTIVE TRANSPORT SOLUTIONS

HiEFFICIENT

Online Webinar Series

September 24th, 26th, 30th and October 1st 2024

www.HiEFFICIENT.eu

| Speakers

imec
Herbert de Pauw
Senior R&D Engineer

AT&S
Markus Kastelic
Senior R&D Engineer

AVL
Kunal Goray
Department Manager
Power Electronics HW

AVL
Olcay Korkmaz
Project Manager

TECHNISCHE UNIVERSITÄT CHEMNITZ
Jan Albrecht
Head of Group
Component Reliability

VUB EPOWERS EFFICIENT POWER ELECTRONICS, POWERTRAIN & ENERGY SOLUTIONS RESEARCH GROUP
Sajib Chakraborty
Team Lead
Digital Twin and Reliability

TNO innovation for life
Cor Rops
Scientific Research Engineer

Project Coordinator | Christoph Abart | AVL List GmbH

This project has received funding from the Chips Joint Undertaking (Chips JU) under Grant Agreement Number 101007281. The Chips JU receives support from the European Union's Horizon 2020 Research and Innovation Programme and Austria, Germany, Slovenia, Netherlands, Belgium, Slovakia, France, Italy, Turkey.

Chips JU

| Introduction

Wide-bandgap technologies for tomorrow‘s highly efficient and reliable automotive mobility solutions

Electromobility has long been regarded as an important driver for environmentally friendly transportation and a decisive step towards reducing CO2 emissions in the transport sector. In recent years, the transition to electromobility has gained momentum. However, the current state of the art still has limitations in terms of range and reliability, and the prices of electric cars are still higher than those of conventional vehicles. Research is actively working on innovative solutions and on making electric cars more affordable, which is crucial for their broad acceptance.

The use of wide bandgap semiconductors in automotive applications is an interesting possibility. This semiconductor technology plays a crucial role in enabling highly efficient power electronics for electric cars, ultimately increasing their range. The HiEFFICIENT project focuses on the application of wide bandgap semiconductors specifically for automotive applications, including inverters, charging systems and test solutions. Of particular interest are reliability and health status.

As part of the HiEFFICIENT project, 31 partners from 9 European countries have been working together since May 2021 and significant progress has already been made:

- Integrated GaN half bridges as System in Package (100 V) and System on Chip (100 V and 650 V),
- Advances in power electronics chip embedding in the printed circuit board,
- Innovative cooling solutions for increased power density,
- Modular and flexible power electronic concepts for different automotive applications.

This webinar series provides valuable insights into the HiEFFICIENT project, focusing on the application of wide bandgap semiconductors in the automotive sector. The first part will focus on new gallium nitride (GaN) power semiconductors and the resulting advances. We will then look at highly innovative embedding concepts. The third presentation will focus on the lifetime of power electronics and finally advanced cooling strategies and their use in the respective application will be highlighted.

If you find these topics inspiring, we warmly invite you to be part of our upcoming webinar series. Stay tuned for more insights and engaging discussions. See you there!

| Key Topics

- New frontiers in GaN power technologies
- Advances in power electronics embedding and its application in automotive inverter
- Two phase cooling technology
- Power electronics lifetime and reliability

| Webinar Sessions

#1 | Tuesday, September 24th, 4:00 - 4:45 p.m.

| A new frontier in GaN power technology: GaN system-on-chips for power electronic applications

JOIN

Speaker: Herbert de Pauw

In this webinar we will show how imec's GaN-IC platforms are exploited to enable more efficient integration and performant power electronics by integrating power switches, drivers and sensors in one system-on-chip.

#2 | Thursday, September 26th, 4:00 - 4:45 p.m.

| Advances in chip embedding and its usage in a 48 V inverter application

JOIN

Speakers: Markus Kastelic, Kunal Goray, Olcay Korkmaz

This talk will showcase the work done on chip embedding of GaN dies within the HiEFFICIENT project and will provide practical insights into its implementation for a 48 V traction inverter application (3 Phase, 48 V). Know-how transfer of the learnings to a higher voltage inverter will also be discussed.

#3 | Monday, September 30th, 4:00 - 4:45 p.m.

| How to boost power electronics limits while ensuring reliability?

JOIN

Speakers: Jan Albrecht, Sajib Chakraborty

The webinar will present methodological improvements in the design phase of new power electronics through Design for Reliability (D4R), as well as in the field using novel condition monitoring concepts.

#4 | Tuesday, October 1st, 4:00 - 4:45 p.m.

| Microfluidic two-phase cooling for power electronics

JOIN

Speaker: Cor Rops

TNO's microfluidic two-phase cooling is shown to handle heat fluxes of 250 W/cm^2 at low flow rates whilst keeping the chip junction temperature below 110°C. This cooling method is very applicable for power electronics due to its high and inherently stable heat transfer.