



## INFINEON Technologies Austria AG: From Research, Development to First Industrial Deployment: Taking power semiconductors to the next level and unlocking future collaborations

### Company presentation

Infineon Austria is a group subsidiary of Infineon Technologies, a world-leading provider of semiconductor solutions. Infineon Austria pools competencies for research and development, production as well as global business responsibility. Microelectronics from Infineon reduce the energy consumption of consumer electronics, domestic appliances and industrial facilities. They make a major contribution to the convenience, security and sustainability of vehicles and enable secure transactions in the Internet of Things. The head office of Infineon Austria is in Villach, with further branches in Graz, Klagenfurt, Linz and Vienna. With 4,820 employees from 73 countries (including 2,100 in research and development), in the financial year 2021 the company achieved a turnover of € 3.9 billion. Microelectronic solutions developed and produced by Infineon Austria can be found all over the world making an important contribute to the group's global leadership position.

### Project information

- Technology field(s): Power Semiconductor
- Project coordinator: Infineon Technologies Austria AG
- Project duration: 09/19 – 03/24
- National funding agencies: FFG and aws
- Locations: Villach (Headquarter), Klagenfurt, Graz, Linz, Wien

## Challenges

Digitalization and electrification are shaping our world and have gained further dynamic due to the pandemic. Microelectronics or semiconductor solutions form the technological backbone of our modern life as we know it today. Semiconductors are the dominant technology on which all other developments, systems and technologies in the area of digitalization are based. The industry is increasingly becoming the focus of economic and geopolitical competition in all regions of the world. Across the world investments in microelectronics, education, research and manufacturing are accelerating in order to secure supply security.

At the same time, power electronics are an essential key to reducing energy consumption and reaching climate targets. The global chip-market situation clearly shows the high importance of investments in innovative and energy-efficient technologies as well as its value chain. For Europe, thus adequate control of key technologies becomes a question of strategic sovereignty. Infineon is able to supporting this with power electronic technologies, products and processes. The challenge is to serve the expected market increases with additional capacities, research and innovation in order to ensure global future viability and competitiveness. This needs continuous investments in technology development as well as in first industrial deployment and collaboration along the semiconductor value chain. In the end this will ensure affordable energy-efficient solutions as well as security of supply for European industry and the global market.

## Objective

The overall goals are to provide new technologies of components and semiconductor materials to drastically reduce the power consumption to various downstream markets, such as automotive, energy conversion, mobile and industrial applications. Thus Infineon emphasizes on research and development of energy efficient power electronics including new semiconductor materials such as silicon carbide (SiC) and gallium nitride (GaN) as well as leading-edge 300-mm thin wafer manufacturing technologies.

With this Infineon can make a significant impact to energy efficiency, electromobility or charging and sensing tasks. The work targets to the main application domains like efficient generation, transmission and conversion of electrical energy (e.g. home appliances, power tools, renewable energy, adapters, wireless chargers) and eco-friendly mobility (e.g. efficient powertrain for combustion engines, electric and hybrid vehicles, charging stations, trains e-bikes or e-scooters). Additionally, Infineon aims to form tight collaborations with several partners along the entire semiconductor value chain for targeted new generations of advanced power semiconductor technologies. In close cooperation with industries, universities and R&D institutions Infineon will work on requirements for 300 mm power silicon raw wafer supply, equipment and process innovation as well as on chip embedding and assembly packaging.

### Project coordinator

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## Solution approaches

Infineon's work in the technology field of power electronics is divided into several subtasks. The technological focus includes power semiconductors, thin wafer technologies as well as new semiconductor materials. In the R&D&I phase of the subprojects, Infineon Austria is developing the technologies based on challenging requirements with respect to major indicators like reduced energy losses, new technological features for the Wide band gap semiconductors (SiC, GaN) as well as specific unit process developments to achieve 300 mm thin wafer on industrial scale.

The First Industrial Deployment phase focus is in bridging the gap from the development process to the mass production. Therein technology learning and process finetuning is addressed to reach expected yields, to ensure reliability and quality of the product. Infineon Austria complements the core activities by:

- Advancing the use of wide bandgap materials in the high-performance power electronics domain,
- Increasing energy-efficiency and tackling power density in mobility and energy conversion applications
- Spearheading system-on-chip solutions consisting of analogue, digital and power parts in IoT systems and mobile applications,
- Strengthening power device reliability in mobile applications used in harsh environmental conditions by adoption of new materials, processes and digital solutions,
- Increasing devices' robustness to increase life time of devices and reduce electronic waste in downstream markets.

The knowledge generated is disseminated via spillover activities and positive spillovers are realized beyond participant countries across Europe. This targets to reinforce new collaborations with SMEs, startups and large enterprises along the value chain as well as with universities, research institutions and STEM students in the East and South-East of Europe. Spillover activities like PhD programs, internships, workshops and educational activities will strengthen the semiconductors talent pipeline in a long term.

## Perspectives

Infineon Austria's involvement amplifies microelectronic component manufacturing in Europe by supporting R&D&I and first industrial deployment activities in one single initiative, which makes it a unique European initiative. The cooperation with 12 other IPCEI partner will enable smart processes and joint equipment optimizations. The systems developed can be used in all industries where power semiconductors play a crucial role. Additionally; the energy-saving generated is enabling Europe's green transition and making a significant contribution to the Green Deal.

The important aspect of spill-over effects guarantees new cooperation with research organizations and is focusing on the EU 13 countries. This will positively impact the entire European semiconductor eco-system in this key enabling technology field and strengthen the semiconductors talent pipeline.

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