ECS 2024 GHENT BELGIUM 5-6 December

ALL2GaN

Power Electronics

Affordable smart GaN IC solutions for greener applications

Challenges and objectives

…drives collaboration in a Pan-European innovation network with the focus on **performance and reliability of GaN power and RF technologies** to meet a substantial higher utilization level covering the full supply chain from substrates to application systems and end users.

…strengthens the European Power Electronics Industry by offering an **EU-born smart GaN Integration Toolbox** as a case for applications with significantly increase **material-and energy efficiency,** thus meeting the global energy needs while keeping the Co2 footprint to the minimum.

Technical goals

- **24-28 GHz mmW power amplifier** implemented as Monolithic Microwave Integrated Circuit (MMIC) with power efficiency above 40% (peak)
- **3.5 GHz Doherty power amplifier** based on SMPT implementation of GaN RF devices with efficiency above 65% (peak)
- Controllable, high gain, highly efficient and power dense **isolated GaN power module** capable to operate in wide input voltage range with efficiency above 96% and power density of over 45 kW/dm3
- **GaN based power electronics building blocks** with ultra-high effective switching frequency with ZVS (>2.5MHz) and compact footprint (<100 cm2)
- **Wireless charger system** that meets EV charging systems ISO 15118-20:2022 and EMC standards with efficiency above 93%.
- with efficiency of 98.4% ,power density of approx. 2. **GaN power converters for native DC microgrids** 3 kW/dm3 and reduction of the system costs for 25%).
- **Intelligent integrated GaN-based power module for the next generation of solar inverters** in the 12 kW residential area with a part load efficiency of > 92% and a power density of > 1.8 kW/dm³.

Expected impact

- **Technological leadership in industrial GaN epitaxy and device manufacturing** and thus safeguard Europe's pole position for power semiconductors also for GaN devices by **reaching unprecedented die size and drastic decrease of manufacturing cost.**
- Fundamentally **new learnings** regarding advanced metallization's for **interconnect over active GaN, electric field management, and defect reduction**
- Enable broad adoption of GaN power devices by reaching **unprecedented ease of use and attractive cost position**
- **RF-GaN-Si** providing the ground for the fabrication of stable and reliable devices. Thus, enabling **cost efficient 6G rollout**.
- **Reliability know-how and digitalisation methods** that shortens the development time of new GaN systems for the European industry and strengthen its global market position.

INFINEON TECHNOLOGIES AUSTRIA AG

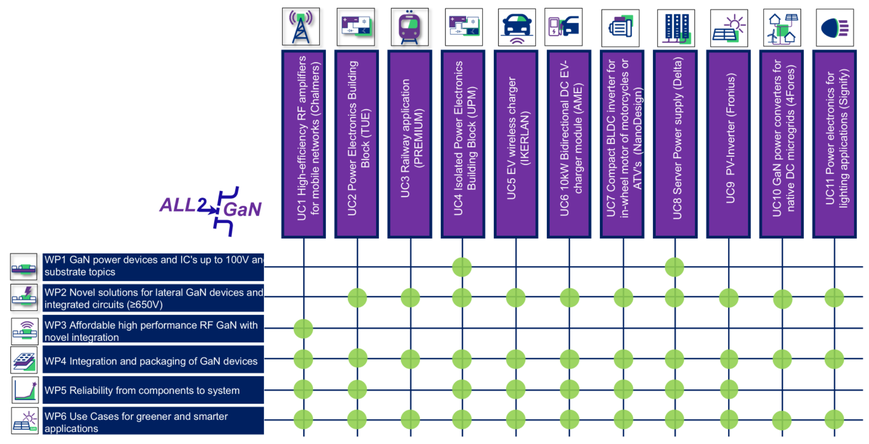
Project Coordinator: Herbert Pairitsch

Project Manager: Shaena Fischer

all2gan@infineon.com

https://www.all2gan.eu/home

LinkedIn: all2gan



Additional information

Project number: 101111890

Duration: 01/05/2023 – 30/04/2026

Project Budget: € 60,026,056.18

45 active Partners

12 countries

11 applications

Chips JU