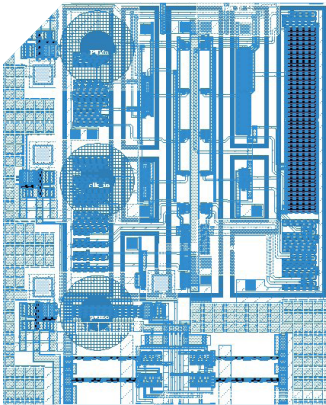




EleGaNT GaN Transistor Integrated Circuits



Discrete GaN power electronic devices have penetrated the consumer market and first products have amply demonstrated a disruptive improvement of the performance and reduction of the form factor at system level.

Monolithic integration of a half-bridge, together with the drivers and control functions opens further perspectives for improved performance, cost reduction and form factor reduction.

With demonstrated robustness for heavy ion radiation and neutron radiation, p-GaN enhancement mode HEMTs allow disruptive innovative designs for space applications. Among the different power IC applications, the most critical is also the least developed up to now: low voltage / high current circuitry. This is an instrumental and key element for many space-borne payload units which needs point-of-load (PoL) converters.

However, to unlock the full potential of the technology for point of load convertors, three important limitations need to be solved, as addressed in this project, i.e.:

1

the reduction of the inductive parasitics through monolithic integration of drivers and power devices (GaN-IC)

2

optimization of the inductive passive components together with the active devices

3

a strong interaction between point of load convertor design and GaN-IC design.

Electrical performance and radiation robustness will be evaluated and assessed for space applications in the upcoming frame of satellites massive digitalization. The project with duration of 36 months, comprises of two learning cycles in definition and refinement of the application requirements, design and manufacturing of the GaN-ICs and passive devices, and development of the point of load convertor boards, first with focus on the basic building blocks and initial prototypes, followed by further optimization towards the target requirements.

The consortium has been joined by Thales Alenia Space (France and Belgium) and Würth Elektronik as space and terrestrial point of load convertor manufacturers. IMEC contributes with its state-of-art GaN-IC platform technology and Würth Elektronik with the design and prototype manufacturing of the passives. MinDCet designs the optimized GaN-ICs and contributes with a state-of-art controller.

ELEGANT makes this technology platform available as an accessible European supply chain for the space industry. This project contributes to EU non-dependence of GaN technology and pushes the state-of-the-art with higher level of integration (GaN-IC).

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This project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement

No 101004274

