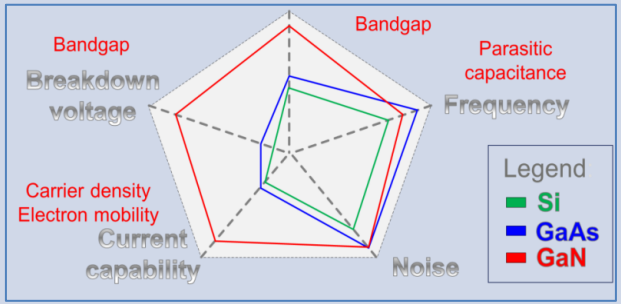
Abstract/Description

The proposed technology relies on the use of GaN (Gallium Nitride) direct bandgap semiconductor.

GaN based devices offer outstanding performances compared to precursor Si (Silicon) or GaAS (Gallium Arsenide) ones, as summarized in next figure, allowing to operate at much higher temperatures and voltages. This provides significant benefits when implemented in power conversion equipment, namely: increase of power density and efficiency, and reduction of mass and cost.



GaN allows to manage high power systems in a very efficient way, decreasing the total system loses, while operating in harsh radiation & magnetics environment.

Original/Potential Field of Application

The technology was implemented in miniaturized MosFET (Metal-Oxide-Semiconductor Field Effect Transistor), particularly suitable for space applications, where mass and volume of electronic equipment are two key issues.

It has been successfully qualified to operate under space conditions (radiation, temperature, vacuum), achieving high power density (W/Kg) levels for power conversion cells, so that demonstrating its capability to handle in orbit power in the range of several tens of kW.

Use of GaN technology enables high output power, high level of linearity in a wide range of frequencies and low noise, so that with potential to by applied in the following fields:

- Ground applications where high power efficiency is required, so high voltages and/or currents are to be managed, in harsh radiation/magnetic environment (ie. nuclear).
- Ground applications requiring outstanding efficiency figures, out of scope for classical Si/GaAS technology while achievable for GaN power electronics.

Proposal SWOT Analysis

Strengths

- Efficiency (>98%) and power density, thus lower mass and volume.
- Competitiveness at equipment level.
- Product differentiation

Weaknesses

- Few number GaN MosFET manufacturers
- Long-life not yet demonstrated in space conditions vs. mature technologies.

Opportunities

- Appropriate for on-ground applications beyond space sector.
- Makes possible new space missions (exploration), not reachable with classical technologies.

Threats

- Alternative technologies (ie. SiC), also improving current technical state-of-the-art.
- Economies of scale (EEE procurement).

IPR Status & Contact Information

Background IPRs apply.

Current qualification status reached thanks to internal R&D.

For further information, the contact point is:

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