

1st world GaN production MBE

MBE NEWS

MBE GaN QUALIFIED FOR HEMT EPIWAFER PRODUCTION

BENEFITS

- **High yield: 95%**
- **High throughput: 4,800 wafers per year (HEMT 1.8 μ m)**
- **High efficiency: low cost of consumable and maintenance**
- **Low cost of ownership**

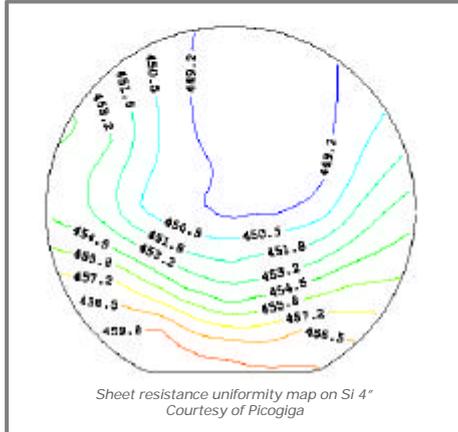
The world first industrial MBE GaN has achieved successfully its qualification phase for production. During the past few months and within the frame of a joint development agreement, Riber and its partner have team up to step forward on GaN-on-silicon technology. GaN growth process on silicon is very demanding as it involves complex process steps including stress management, nucleation, accurate precursor and material delivery. Based on the industry renowned production platform, the multiple 4-inch MBE 49, Riber successfully delivered a solution managing, complicated ammonia cycles, harsh environment with capable components such as cells and heaters.

Qualification phases, have been completed. Demonstration of industry state-of-the-art performances for production of 3-inch, 4-inch and 6-inch GaN epi-wafer from Si, SiC and SopSiC substrates have been achieved.

Next steps following the timely execution of the program and the excellent results of the MBE 49 GaN, Riber is looking forward to develop the next generation of GaN MBE for the production of power diode devices as well as LED devices.

EQUIPMENT PERFORMANCES

Uniformity specifications, as targeted and as demonstrated.



4" Si and 3" SiC:

Thickness and composition <math>< \pm 1\%</math>

Sheet resistance <math>< \pm 1\%</math>

Wafer to wafer on one platen:

3x4" Si and 5x3" SiC

Thickness and Composition <math>< \pm 1\%</math>

Surface resistance <math>< \pm 1\%</math>

Run to run reproducibility:

Thickness and Composition <math>< \pm 2\%</math>

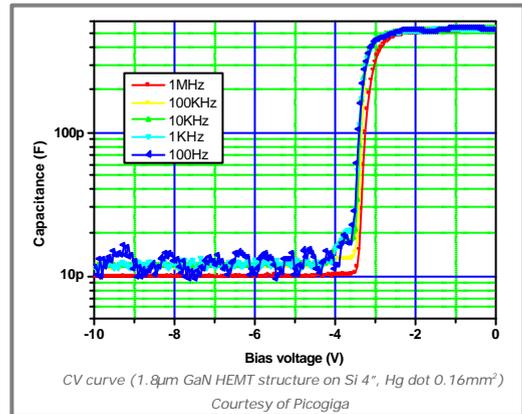
Electrical characteristics : transistor electrical properties.

HEMT structure growth on Si 4" :

- Low reverse bias current leakage: <math>< 2\text{ nA}</math>
- High breakdown voltage: >150V
- Residual capacitance on CV : ~ 10 pF
- High current

HEMT structure growth on SiC 3" :

- Very low reverse bias current leakage: ~1 nA
- Residual capacitance on CV : <math>< 3\text{ pF}</math>
- High current



KEY FEATURES

<p>YIELD Excellent crystal quality Excellent uniformity</p>	<ul style="list-style-type: none"> - Ammonia injector design - Gallium and Aluminium sources - Substrate oven design - Ammonia pumping and recycling
<p>THROUGHPUT High growth rates Multi wafer design Reliability Ammonia handling</p>	<ul style="list-style-type: none"> - Ammonia precursor growth rate: up to 1.5µm/h - 3x4" scalable to 7x6" - Based on the MBE49 platform - Benefit from R&D program: ANISET (E.U community) & DEMONI (ANR)
<p>EFFICIENCY Reduced LN2 consumption Reduced power consumption</p>	<ul style="list-style-type: none"> - Dedicate cryopanel - Low temperature process

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