

Pe²gasus

**Pilot Line for Energy Efficient GaN-
on-Si Power Switching Devices**

Goal of the Project

- Set up an industry-standard Pilot-line for high voltage GaN-on-Si power devices
 - Voltage rating 600V, might extend up to 1.2 kV in a second phase
 - Current rating 1-20A first phase, up to 50A in second phase
 - D-mode devices and Schottky rectifiers
 - $R_{on}Q_g < 1500 \text{ m}\Omega \cdot \text{nC}$
- Qualification of 600V rated products : Schottky and D-mode HEMT
 - Offer devices as bare die, or packaged in industry-standard QFN, SO8FL or TO-247 packages
 - Offer E-mode through co-packaging of LV Si MOSFET with HV D-mode HEMT
- Strengthen Europe's efforts on Wide Band Gap GaN-based power devices and electronics.



Pilotline

- Start on 6 inch, all equipments are 8 inch compatible.
- Fully automated, SPC controlled.
- Minimum feature size 0.3 μm .
- Cleanroom class 10, can be class 1.
- Wafer throughput : 150 6 inch wafers/week when running in full production mode (2015).
- Location : Oudenaarde, Belgium.
- Cleanroom needs to be installed, processing equipment will be purchased or existing equipment refurbished.
- Pilotline will be operational in Q1 2013.



Status GaN at ONsemi

- Focus on D-mode HEMT, GaN-on-Si, Au-free process

Ron < 3 mΩ.cm²

Ioff wafer map

No hysteresis

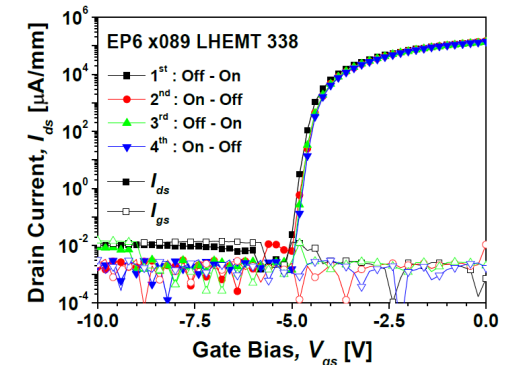
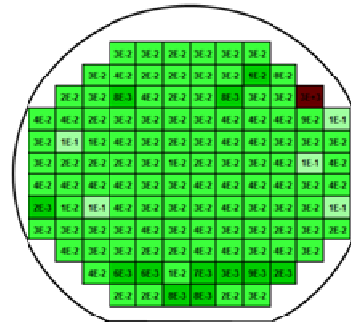
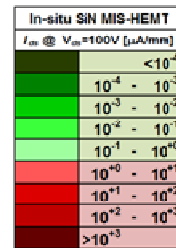
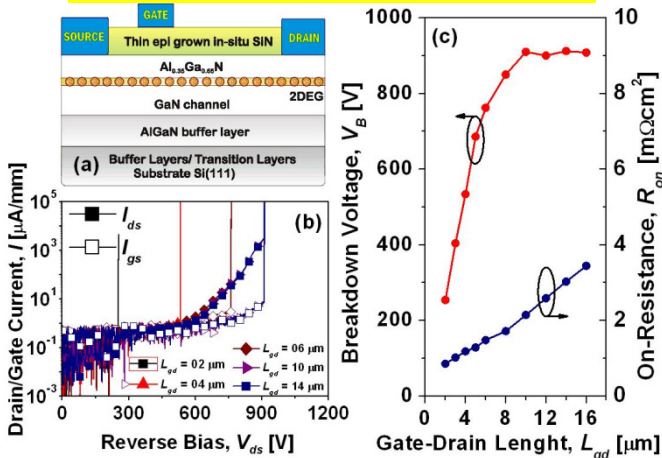
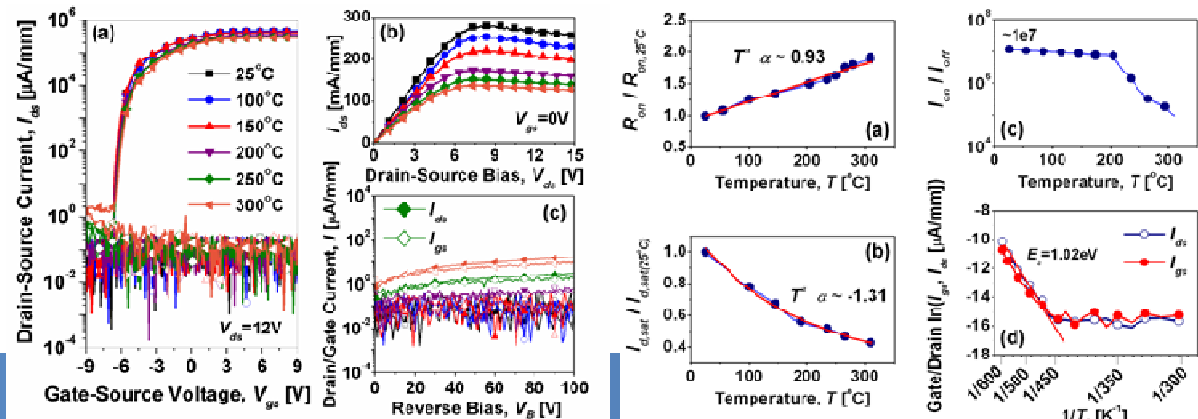
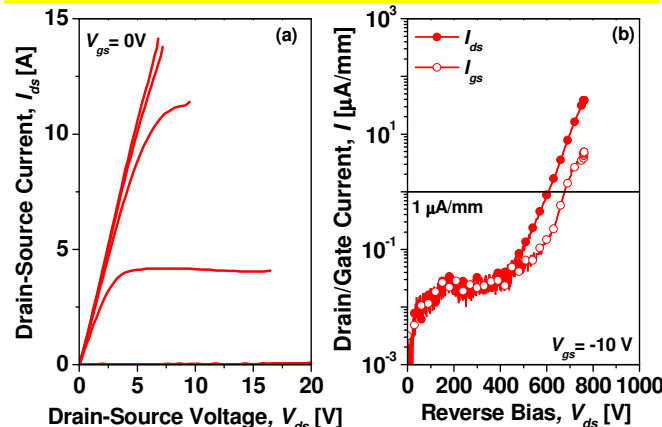


Fig. 12. Hysteresis curve on x089 LHEMT 338 for EP6.

Power device :
I_{on} > 15A, I_{off} < 1μA/mm

High Temp (up to 310 °C)
No leakage up to 200 °C



Confidential Proprietary



Partners

- MC² : Pulsed I-V measurements for assessment of current collapse
- IUNET : collaboration for long-term reliability understanding
- CNM-CSIC : transfer of ON Semi proprietary process on 4 inch
- Demonstrators
 - UPS : Schneider electric (France)
 - DC-DC and DC-AC compact inverters for automotive applications : Bitron (Italy)



What we are looking for...

- Atomic layer deposition (ALD) equipment suppliers for MISHEMT structures
- Fab Inspection tool suppliers
- In-line electrical measurement tools
- Single wafer wet cleaning tools (with lots of flexibility)

Contact info

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