GaNonCMOS

Project ID: 721107
Funded under:
H2020-EU.2.1.3. - INDUSTRIAL LEADERSHIP - Leadership in enabling and industrial technologies - Advanced materials

GaN densily integrated with Si-CMOS for reliable, cost effective high frequency power delivery systems

From 2017-01-01 **to** 2020-12-31, ongoing project

Project details

Total cost:	**Topic(s):**
EUR 7 428 885,75	NMBP-02-2016 - Advanced Materials for Power Electronics based on wide bandgap semiconductor devices technology
EU contribution:	**Call for proposal:**
EUR 6 246 064,50	H2020-NMBP-2016-two-stage See other projects for this call
Coordinated in:	**Funding scheme:**
Belgium	RIA - Research and Innovation action

Objective

Power electronics is the key technology to control the flow of electrical energy between source and load for a wide variety of applications from the GWs in energy transmission lines, the MWs in datacenters that power the internet to the mWs in mobile phones. Wide band gap semiconductors such as GaN use their capability to operate at higher voltages, temperatures, and switching frequencies with greater efficiencies. The GaNonCMOS project aims to bring GaN power electronic materials, devices and systems to the next level of maturity by providing the most densely integrated materials to date. This development will drive a new generation of densely integrated power electronics and pave the way toward low cost, highly reliable systems for energy intensive applications.

This will be realized by integrating GaN power switches with CMOS drivers densely together using different integration schemes from the package level up to the chip level including wafer bonding between GaN on Si(111) and CMOS on Si (100) wafers. This requires the optimization of the GaN materials stack and device layout to enable fabrication of normally-off devices for such low temperature integration processes (max 400oC). In addition, new soft magnetic core materials reaching switching frequencies up to 200 Mhz with ultralow power losses will be developed. This will be assembled with new materials and methods for miniaturised packages to allow GaN devices, modules and systems to operate under maximum speed and energy efficiency. A special focus is on the long term reliability improvements over the full value chain of materials, devices, modules and systems. This is enabled by the choice of consortium partners that cover the entire value chain from universities, research centers, SME's, large industries and vendors that incorporate the developed technology into practical systems such as datacenters, automotive, aviation and e-mobility bikes

Coordinator

Katholieke Universiteit Leuven
Oude Markt
3000 Leuven
Belgium

Belgium

EU contribution: EUR 801 808,24

Activity type: Higher or Secondary Education Establishments

Participants

EPIGAN NV
Kempische Steenweg 293
3500 Hasselt
Belgium

Belgium

EU contribution: EUR 619 663,75

Activity type: Private for-profit entities (excluding Higher or Secondary Education Establishments)

FRAUNHOFER GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V.
HANSASTRASSE 27C
80686 MUNCHEN
Germany

Germany

EU contribution: EUR 700 000

Activity type: Research Organisations

IBM RESEARCH GMBH
SAEUMERSTRASSE 4
8803 RUESCHLIKON
Switzerland

Switzerland

EU contribution: EUR 0

Activity type: Private for-profit entities (excluding Higher or Secondary Education Establishments)

AT & S AUSTRIA TECHNOLOGIE & SYSTEMTECHNIK AKTIENGESELLSCHAFT
FABRIKSGASSE 13
8700 LEOBEN
Austria

Austria

EU contribution: EUR 461 250

Activity type: Private for-profit entities (excluding Higher or Secondary Education Establishments)

IHP GMBH - INNOVATIONS FOR HIGH PERFORMANCE MICROELECTRONICS/LEIBNIZ-INSTITUT FUER INNOVATIVE MIKROELEKTRONIK
IM TECHNOLOGIEPARK 25
15236 FRANKFURT (ODER)
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Germany

EU contribution: EUR 939 541,25

Activity type: Research Organisations

UNIVERSITY COLLEGE CORK - NATIONAL UNIVERSITY OF IRELAND, CORK
Western Road
- CORK
Ireland

Ireland

EU contribution: EUR 1 501 295

Activity type: Higher or Secondary Education Establishments

RECOM ENGINEERING GMBH & CO KG
MUNZFELD 35
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Austria

Austria

EU contribution: EUR 612 130

Activity type: Private for-profit entities (excluding Higher or Secondary Education Establishments)

PNO INNOVATION
EXCELSIORLAAN 51
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EU contribution: EUR 323 718,76

Activity type: Private for-profit entities (excluding Higher or Secondary Education Establishments)

NXP SEMICONDUCTORS NETHERLANDS BV
High Tech Campus 60
5656 AG EINDHOVEN
Netherlands

Netherlands

EU contribution: EUR 181 595

Activity type: Private for-profit entities (excluding Higher or Secondary Education Establishments)

X-FAB SEMICONDUCTOR FOUNDRIES AG
HAARBERGSTRASSE 67
99097 ERFURT
Germany

Germany

EU contribution: EUR 105 062,50

Activity type: Private for-profit entities (excluding Higher or Secondary Education Establishments)

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