



Motion GaN

First active-matrix WVGA GaN microdisplay with 10 μm pixel pitch

What is Motion GaN?

Tomorrow's microdisplays will have to offer both high resolution and high brightness (100 times brighter than those of today) to meet the growing demand for augmented reality applications.

Self-emissive GaN-based technology can now offer such performances; CEA-Leti is developing high-resolution, 10 μm pitch GaN microdisplay technology by patterning high-density μLED arrays and hybridizing them on CMOS circuits using its micro-tube technology.

This demonstrator is a monochrome (blue or green) active-matrix prototype with 873 x 500 pixel WVGA resolution and a 10 μm pixel pitch.

Applications

GaN displays have a number of potential applications including:

- Augmented reality glasses for consumers and professionals
- Head-up displays for transport
- Pico- and compact projectors

What's new?

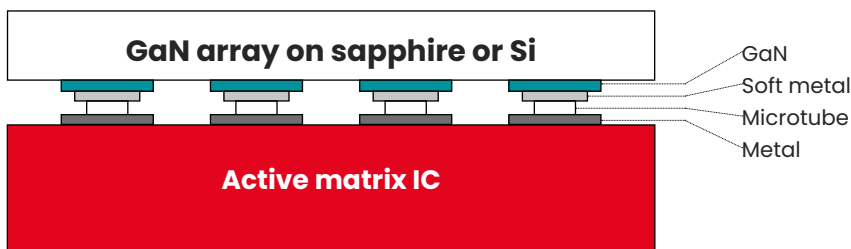
This prototype provides the highest (873 x 500) pixel resolution with the smallest (10 µm) pixel pitch ever.

These performance characteristics result from:

- Advanced high-resolution, small pixel pitch µLED patterning [Ref. 1]
- CEA-Leti unique micro-tube hybridization technology, which is compatible with 5–10 µm pixel pitches [Ref. 2].

Ref 1: L. Dupré et al. "Processing and characterization of high resolution GaN/InGaN LED arrays at 10 micron pitch for micro display applications" *Proc. of SPIE Vol. 10104 (2017)*

Ref 2: F. Templier et al. "High-Brightness GaN LED Arrays Hybridized on Silicon Interconnect at a Pixel Pitch of 10 µm" (IDW/AD'14), December 3–5, Niigata, Japan (2014)

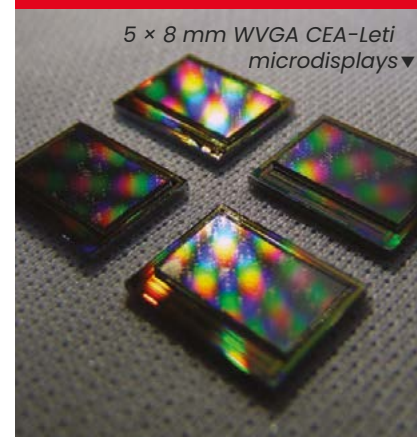


What's next?

- Even smaller pixel pitches (< 5 µm)
- 3 µm pitch feasibility: process under development, new findings to be presented at SID Display Week 2017
- A key challenge: full-color GaN microdisplays, for which solutions are now being developed, leading to first prototypes in 2018–2019

Key facts

- Innovation Award at **TechConnect World 2015**, Washington DC
- Best paper award at **International Display Week (IDW) '16**, Fukuoka Japan Dec.2016: "A new Approach for Fabricating High-Brightness GaN LED Microdisplays with High Resolution and Very Small Pixel-pitch"
- CEA-Leti holds more than **10 patents** in this technology



Interested in this technology?

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