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1 Low-power OLED microdisplay



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2/3 1 inch WUXGA OLED microdisplay



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IC AND SYSTEM DESIGN

Fraunhofer Institute for Organic Electronics, Electron Beam and Plasma Technology FEP

Winterbergstr. 28
01277 Dresden, Germany

Contact persons

Ines Schedwill
Phone +49 351 8823-238
ines.schedwill@fep.fraunhofer.de

Philipp Wartenberg
Phone +49 351 8823-386
philipp.wartenberg@fep.fraunhofer.de

www.fep.fraunhofer.de

From idea to wafer

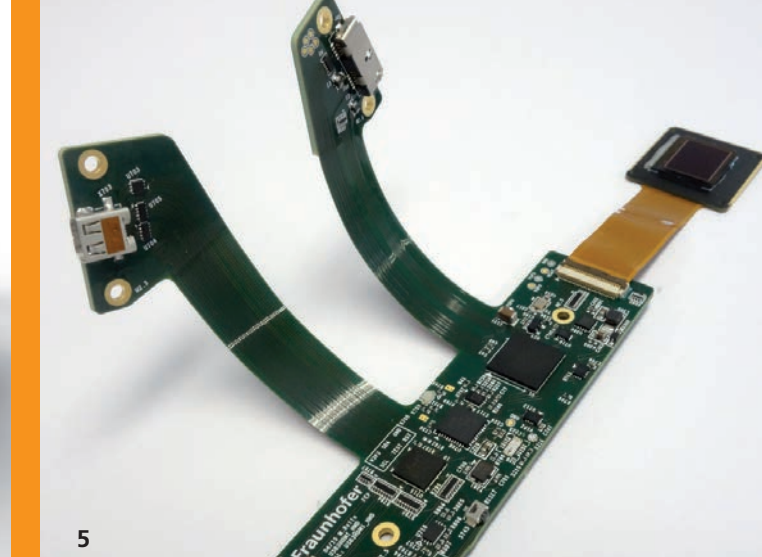
The design of integrated circuits is one of the core competences of Fraunhofer FEP. The long lasting experience in the design of analog, mixed-signal and digital circuits provides the basis for the realization of customized solutions from the first idea to the final device.

The typical applications follow the rule More-Than-Moore, i.e. the integration of additional functions. Therefore a customization of the standard CMOS process or a post-processing can be applied (e.g. deposition of organic light emitting diodes or photodiodes). Fraunhofer FEP itself is fabless and cooperates with different CMOS foundries. For post-processing a 200 mm cleanroom with various possibilities is available in-house.

- State-of-the-art design of analog, digital and mixed-signal circuits
- Typical CMOS processes:
0.13 μm /0.18 μm /0.35 μm
- Design steps:
 - Conception
 - Modelling
 - System design
 - Circuit design
 - Simulation
 - Layout
 - Verification
- Coordination of the external CMOS wafer manufacturing as interface between customer and foundry
- Test, start-up, implementation, lifetime investigation
- Wide portfolio of silicon-proven IP cells



Funded by the Horizon 2020
Framework Programme of the
European Union.
Funding reference: 644101



Idea

Due to its long lasting experience in the design of integrated circuits Fraunhofer FEP can offer its customers the entire workflow from the idea to the product.

Simulation

During the implementation phase a cycle consisting of circuit design, simulation, layout and verification will be completed several times if required.

Test / Start-up

In parallel to the development and the following manufacturing the test and the start up of the device will be prepared. This includes the setup of the complete system as well, e.g. an evaluation platform including hardware and software.

Concept

The focal points are the ideas of the customer, which will be summarized in a specification. At the beginning a concept for the realization of the customer wishes will be developed in close cooperation.

Layout

At the end of the process a database will be available, which enables the fabrication of the integrated circuit by a foundry.

System / Packaging and Assembly

Silicon proven examples:

- Hall sensor effect line
- Display controller for passive OLED displays
- Radiation detectors
- Sensor signal processing
- unidirectional OLED microdisplays (OLED-on-silicon)
- bidirectional microdisplays with embedded image sensors

Schematic

After the concept phase the modelling of the single components will take place. That is the basis for the further implementation steps.

Manufacturing

Fraunhofer FEP provides all tools (state-of-the-art hardware and software), know-how and long lasting experience for the manufacturing of CMOS in all various foundry processes.

4 Multifunction data glasses with integrated OLED microdisplays.
left: demonstrator for augmented reality applications (AR),
right: demonstrator for immersive virtual reality (VR)

5 Example of flex-rigid system electronics



We focus on quality
and the ISO 9001.