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X-FAB Expands CMOS Optical Sensors Portfolio with Industry's First 4-Transistor Image Sensor Process for High-Speed Applications Requiring Large Pixels

New XS018 specialized 4-transistor pixel sensor delivers critical speed for medical and scientific applications

ERFURT, Germany, Oct. 28, 2015 – X-FAB Silicon Foundries, the leading More-than-Moore foundry, today introduced XS018, the first specialized 0.18µm CMOS process for fast and large image sensor pixels. Unlike the 4-transistor pixels used in consumer products such as mobile phones and digital cameras, which have small sizes, the new XS018 technology is the first to support high-speed large pixels required for medical and scientific applications such as computer tomography and x-ray scanners for 3D images. The XS018 process supports pixel sizes up to 200µm x 200µm with high-speed reading capability. The charge transfer time can be as short as 20ns with almost no image lag. The low dark current of less than 5pA/cm² gives designers a high signal-to-noise ratio (SNR) that allows high dynamic pixel designs.

XS018 has a 3.3V core that results in a very low mask count, reducing cost if 1.8V devices are not necessary. Optionally, it can be extended for higher integration by using a 1.8V module.

The new 4-transistor pixel cells with pinned photo diodes offer lower dark current and lower noise than the 3-transistor cells commonly used today for large pixel designs. The pinned photo diode available with four different pinning voltages and a 3.3V n-channel MOS transistor with five different options for low-threshold voltages can be used as source follower, reset device or row select device in the pixel, making it easier for designers to find the right device for their applications. This flexibility allows for higher voltage swing as the source follower, and higher floating diffusion voltage as the reset device, diminishing image lag and increasing transfer speed. The XS018 also offers a 3.3V low-noise buried n-channel transistor that can reduce pixel noise.

According to Detlef Sommer, Business Line Manager CMOS Sensors at X-FAB, "Our customers in the medical and scientific sectors require large pixels and often large dies to handle the high-speed optical sensing their applications demand. We are pleased to meet this need with our new XS018 CMOS image sensor process – the first to support 4-transistor large pixel designs. In addition, our proven stitching process supports large dies – up to one die per wafer – giving our customers a clear edge for their advanced designs."

X-FAB will offer a free webinar about its new XS018 process on Wednesday, Nov. 4 for designers in Asia and Europe, and on Thursday, Nov. 5 for the North and South American audience. Please click here for full details.

Availability
The new XS018 process, which includes a process design kit (PDK) is available for immediate use.

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Acronyms
BCD   Bipolar-CMOS-DMOS
CMOS   Complementary Metal Oxide Semiconductor
EDA   Electronic Design Automation
MEMS   Microelectromechanical Systems
PDK   Process Design Kit
SOI   Silicon on Insulator

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