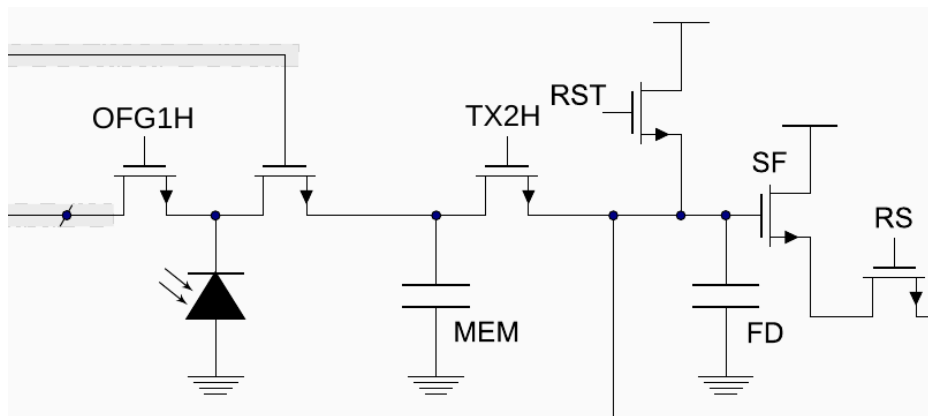


Topic for Diploma Thesis:

## Studies on High Dynamic Range Charge-Domain Global Shutter CMOS Pixels



A major disadvantage with most high-performance modern-day consumer image sensors for commercial imaging is the fact that, to acquire high-quality images, without the presence of motion artifacts, those require a fast mechanical shutter. In the case of industrial machine vision applications, where live video imaging stream is required to feed real-time computer vision processing, the addition of a mechanical shutter forms impractical. During the last 20 years, CMOS image sensor experts have been exploring the fields of global shutter CMOS pixel arrays, however, only during the past 5 years, the world has seen great technological advancements towards high-speed low-noise global shutter (GS) arrays.

Recent advancements in custom CMOS processing technology has enabled the use of low-leakage charge pixel storage nodes, allowing GS pixel arrays with unprecedented noise performance.

The scope of the proposed thesis is to study existing voltage and charge-domain GS pixel architectures, and focus on a new, improved 6T GS pixel, offering high dynamic range and low noise. The student is expected to work in close collaboration with fab experts and analog designers, from our network of connections and will be guided on a day-to-day basis in solid-state pixel design. The outcome of this thesis would form a theoretical study on charge-domain GS pixels and their efficient implementation in current CMOS image sensor design processes.

If you are enthusiastic in working on solid-state integrated circuit design, using state-of-the-art CMOS fabrication nodes and tools, you are very welcome to join our R&D design team where you

would be guided and supported on a daily basis. If the student is a fast-learner and is able to deliver a design matching with our testchip fabrication schedules, there is a possibility for inclusion of his own design with our test devices. This would lead to a thesis including a real chip fabrication and possibilities for evaluation and measurement. We also encourage outcome publications in highly-ranked scientific journals.

The thesis work can be combined with an internship, whose total duration can be flexible and subject to negotiations.

Additional information on the thesis topic can be obtained by Deyan Levski at [deyan.levski@photolitics.com](mailto:deyan.levski@photolitics.com)

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### **About Photolitics**

Photolitics is a custom image sensor design house, specializing in industrial machine vision CMOS Image Sensor development, miniature medical endoscopic camera modules and mixed-signal ASIC design. We are a group of world-class IC design professionals with multi-decade experience in photonic IC design, CMOS Image Sensors and analog mixed-mode integrated circuits. Through our wide network of connections we distinguish ourselves as a small IC design house, with exciting opportunities for growth and professional development.

To find out more about us, visit our website: <http://photolitics.com>

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