

FASXCAM - High Frame Rate MAPS Detector for Soft X-rays

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FASXCAM is a monolithic active pixel sensor (MAPS) tailored for high-rate radiation imaging and advanced dosimetry. It was developed and prototypes manufactured using XFAB 180nm SOI technology. The device integrates two identical 32×64 pixel arrays with $60 \times 60 \mu\text{m}^2$ pixels, coupled to parallel 8-bit SAR ADCs for column-wise digitization and detection energy range 2.9 to 21.6 keV. The architecture enables data throughput up to 400 MHz and frame rates approaching 15k FPS, allowing low latency visualization of radiation interactions with minimal dead time. The sensor supports both frame and rolling shutter operation, ensuring flexibility in experimental timing, and incorporates both internal and optional external voltage reference to improve robustness against power fluctuations.

Beyond high-speed imaging, FASXCAM offers features crucial for precision metrology and system integration: on-chip temperature sensing, external charge injection for calibration, configurable analog test outputs, global hit detection circuitry signaling interaction via logic output signal and dual configuration scheme (global and pixel-wise). These functions establish FASXCAM as a versatile platform for radiation detection in research and applied settings. Potential applications include beam diagnostics, fast X-ray imaging, space radiation monitoring, and compact dosimetry systems requiring both spatial resolution and reliable energy measurement.

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