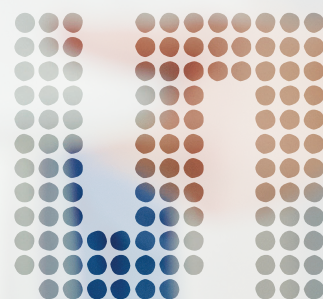


# Product Document



# Sensor Chip for 16-Slice CT

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## **AS5950 – Sensor chip for 16-slice computed tomography detectors**

- Photodiode and ultra-low noise readout circuit side-by-side in single CMOS chip
- Very low input-related noise of typ 0.2 fC results in superior image quality
- Adaptive array enables total sensor dimension of 16 or 32 mm in Z-direction
- Reduced self-heating due to very low power dissipation of typ 0.65mW per channel
- Three-side buttable dice for 8-slice and 16-slice CT detectors

**Sensing  
is life.**

## General Description

The AS5950 is a sensor chip for 16-slice CT detectors that combines the photodiodes and the readout circuit on a single CMOS chip. This sensor solution, which includes an array of photodiodes with ultra-low dark current and a 64-channel ADC side-by-side, allows the assembly of the pixel array on three adjacent edges of the device. Two AS5950 ICs can be placed in Z-direction enabling the design of 16-slice detectors for cost optimized CT machines.

The total sensor dimension in Z-direction is selectable between 16 or 32 mm, enabling two pixel sizes of 1x1 mm<sup>2</sup> and 1x2 mm<sup>2</sup>. This adaptive array concept allows either a high resolution or a large sensor size on the detector. Pixel dimensions can be customized on

request. The available standard product comes with a pixel dimension of 0.98x0.98 mm<sup>2</sup>. The sensor can be directly assembled on a substrate using a wire bonding process for manufacturing of a CT module.

Superior image quality can be achieved as the input-related noise is very low. In high-resolution mode a typical noise of 0.20fC can be reached including the photodiode. This ultra-low noise figure is the result of the small capacitance of the photodiode, and the very low parasitic capacitance of the interconnect between the photodiode and its corresponding ADC channel. The low power consumption of typ 0.65mW/channel reduces self heating effects and the overall costs of cooling the system.

### Benefits

- Ultra-low input related noise down to 0.20 fC
- Fast integration time down to 200  $\mu$ s
- Low power dissipation down to 0.65 mW per channel
- High ADC linearity of  $\pm 300$  ppm of reading and total linearity of  $\pm 600$  ppm including the photodiode
- Up to 25-bit resolution

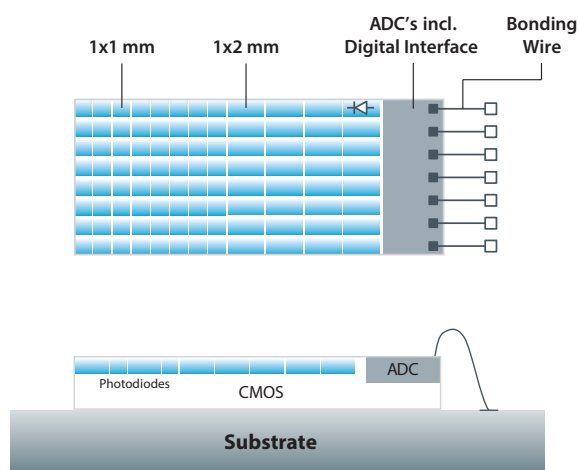
### Features

- High sensitive photodiode and ADC in one integrated sensor
- Calibration mode for external linearity calibration
- Adjustable full scale range, resolution, integration time and active sensor area
- Adaptive array enables selection of total sensor dimension of 16 or 32 mm
- Customization of pixel dimensions on request

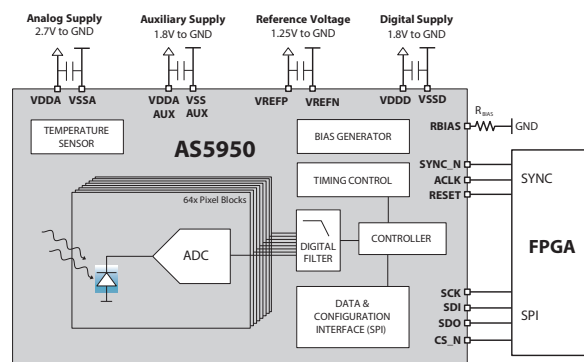
### Applications

- Medical, industrial and security CT machines
- 8-slice and 16-slice CT detectors

### AS5950 Cross Section



### Block Diagram



### Computed Tomography Detection

