Product Document

Published by
ams OSRAM Group

Datasheet

SD000109

AS5950

Sensor Chip for 16-Slice CT Detector

v1-00 • 2019-Dec-10

Content Guide

1 General Description 3

1.1 Key Benefits & Features 3
1.2 Applications 4
1.3 Cross Section 4

2 Ordering Information 5

3 Revision Information 6

4 Legal Information 7

1 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 64 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 mm or 32 mm because of its adaptive array concept, enabling two standard pixel sizes of 1x1 mm^2 and 1x2 mm^2. It allows either a high resolution or a large sensor size on the detector. Pixel dimensions can be customized on request, the available AS5950B comes with a pixel dimension of 0.98x0.98 mm^2. 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 because the input-related noise is very low, down to as little as typ. 0.20 fC in high-resolution mode. This ultra-low noise figure is the result of the very low capacitance of the photodiode and the parasitic capacitance of the interconnect between the photodiode and its corresponding ADC channel through metal layers on the same silicon.

The low power consumption of typ. 0.65 mW per channel reduces self-heating effects and reduces the overall cost of cooling the system. The digital data readout can be accessed via SPI interface. It is also used to configure parameters such as pixel resolution, input current range, active sensor area and enabling the calibration mode. An integrated temperature sensor enables monitoring of the junction temperature. Featuring on-chip photodiodes, the AS5950 offers a cost-optimized solution and is delivered as die on foil.

1.1 Key Benefits & Features

The benefits and features of AS5950, Sensor Chip for 16-Slice CT Detector, are listed below:

Figure 1:
Added Value of Using AS5950

Benefits	Features
Ultra-low input related noise down to 0.20 fC	High sensitive photodiode and ADC in one integrated sensor
Fast integration time down to 200 µs	Calibration mode for external linearity calibration
Low power dissipation down to 0.65 mW per channel	Adjustable full scale range, resolution, integration time and active sensor area
High ADC linearity of ±300 ppm of reading and ±600 ppm including the photodiode	Adaptive array enables selection of total sensor dimension of 16 mm or 32 mm
Up to 25-bit resolution	Customization of pixel dimensions on request

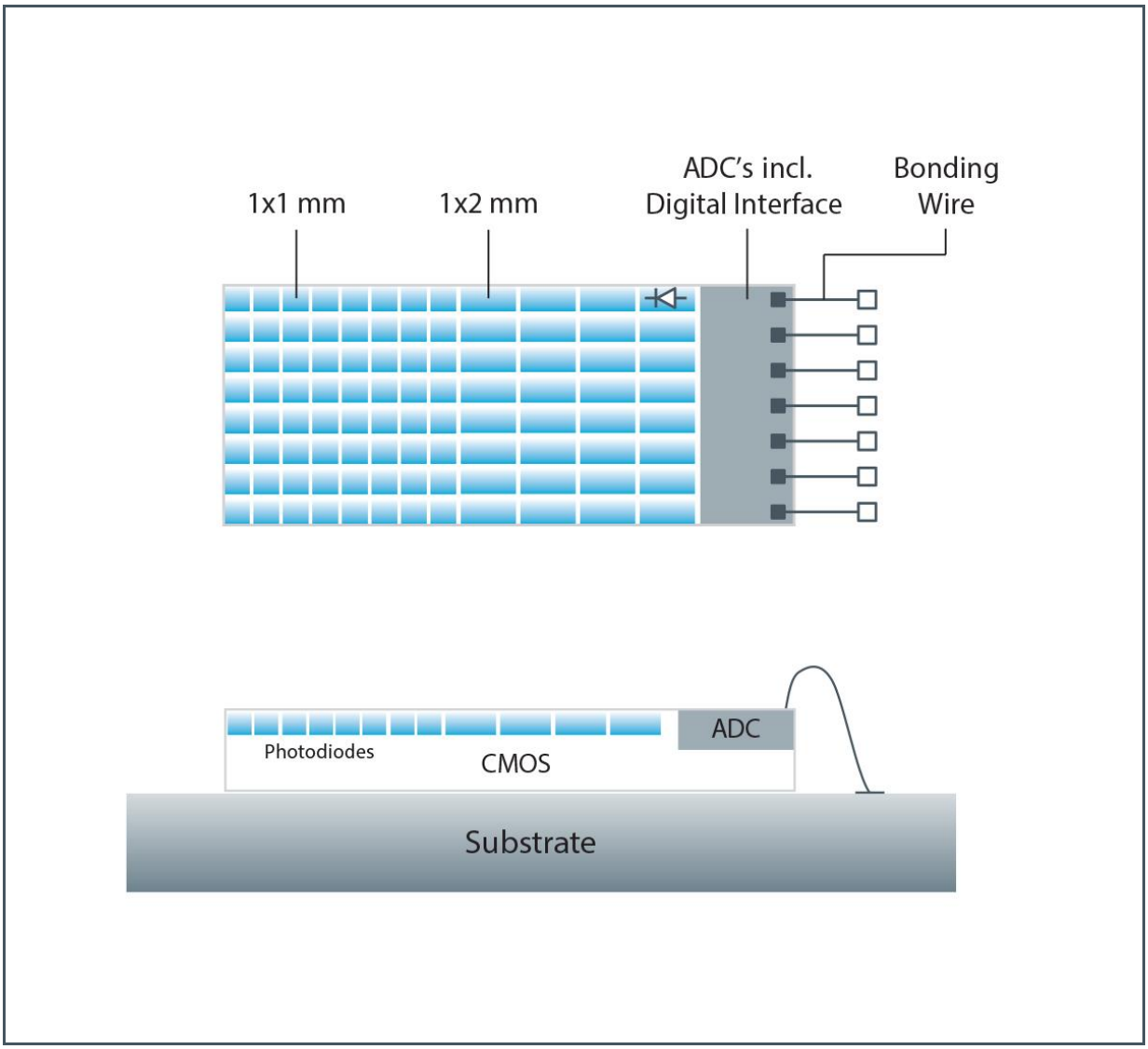
1.2 Applications

- Medical, industrial and security CT detector modules
- 8-slice and 16-slice CT detectors

1.3 Cross Section

The AS5950 integrates photodiodes and a 64-channel ADC in one single CMOS device. The cross section of this CT detector device is shown below. Figure 2 shows the assembly on a substrate through bonding wires for a CT module.

Figure 2:
Cross Section of AS5950



2 Ordering Information

Ordering Code	Package	Marking	Delivery Form	Availability
AS5950A-CSDF-1.00x1.00	Sorted Die	Digital register readout	Wafer / Die on Foil	On request(1)
AS5950B-CSDF-0.98x0.98	Sorted Die	Digital register readout	Wafer / Die on Foil	On stock

(1) Pixel dimensions can be customized on request. Please contact **ams** for more information.

3 Revision Information

Document Status	Product Status	Definition
Product Preview	Pre-Development	Information in this datasheet is based on product ideas in the planning phase of development. All specifications are design goals without any warranty and are subject to change without notice
Preliminary Datasheet	Pre-Production	Information in this datasheet is based on products in the design, validation or qualification phase of development. The performance and parameters shown in this document are preliminary without any warranty and are subject to change without notice
Datasheet	Production	Information in this datasheet is based on products in ramp-up to full production or full production which conform to specifications in accordance with the terms of ams AG standard warranty as given in the General Terms of Trade
Datasheet (discontinued)	Discontinued	Information in this datasheet is based on products which conform to specifications in accordance with the terms of ams AG standard warranty as given in the General Terms of Trade, but these products have been superseded and should not be used for new designs

Changes from previous version to current revision v1-00	Page
Initial version of short datasheet	all

- Page and figure numbers for the previous version may differ from page and figure numbers in the current revision.
- Correction of typographical errors is not explicitly mentioned.

4 Legal Information

Headquarters
ams AG
Tobelbader Strasse 30
8141 Premstaetten
Austria, Europe
Tel: +43 (0) 3136 500 0

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