XENSIV™ 4-side buttable CT sensor

Key benefits & features

The benefits and features of XENSIV™ AS5966, 4-side buttable CT sensor are listed in Table 1.

Table 1 Added value of using AS5966

Benefits of AS5966	
Integration of 80-channel ADC and photodiode array in one ASIC using TSV technology	4-side buttable ASIC to achieve Z-coverage of 2 cm to 16 cm in ISO center
Lowest input related noise of 0.38 fC at 335 nA input range	Pixel size 1.1 x 1.02 mm^2. Customization of pixel dimensions on request
Low power dissipation of 0.94 mW/pixel at 195.5 µs	No need of X-ray shield for ADC protection
Integration time of min. 195.5 µs	
15 MHz CMOS level interface for data streaming and device configuration	

Applications

- Medical, industrial and security CT detector modules
- CT detectors across all segments

General description

The AS5966 is a sensor chip for CT detectors that combines the photodiodes and the readout circuit on a single CMOS chip by using through silicon vias (TSV). This sensor solution, which integrates an array of 10 x 8 photodiodes and an 80-channel ADC on top of each other, allowing the assembly of the pixel array on four adjacent edges of the device.

Featuring on-chip photodiodes, the AS5966 offers high performance for CT detectors across all segments. The TSV technology allows for very low parasitic capacitance between back-side illuminated photodiode and the ADC front-end. This leads to superior image performance that can be achieved because of the very low input-related noise of 0.38 fC at a maximum input current range of 335 nA. The ultra-low power consumption of 0.94 mW/pixel reduces self-heating effects and lowers the overall cost of cooling the system.

The digital data readout can be accessed via a 15 MHz CMOS level interface. An appropriate separate interface is used for device configuration as well as data output operation. An integrated temperature sensor enables monitoring of the junction temperature.

Its 4-side buttability allows to place AS5966 on all four adjacent edges of the IC that enables a wide range of CT detector designs from 20 mm to 160 mm of Z-coverage in ISO center. The AS5966 is directly assembled on a substrate using a soldering and underfill process for manufacturing of the CT tile.

The assembly of 2x4 ICs on a substrate allows sensor dimension in Z-direction of 35.108 mm, therefore equivalent to a Z-coverage of 20 mm in ISO center. AS5966 has a pixel dimension of 1.1 x 1.02 mm^2, pixel dimensions can be customized on request.

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1 Cross section

The AS5966 integrates photodiodes and an 80-channel ADC in one single device using through silicon vias (TSV). The cross section of this CT detector device is shown in Figure 1.

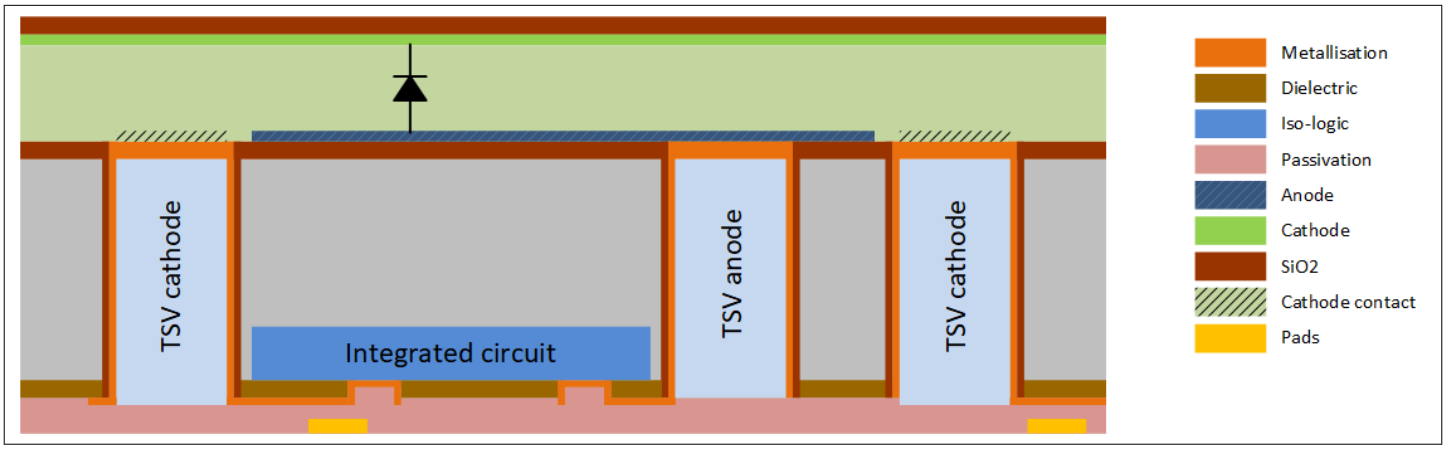


Figure 1 Cross section of AS5966

2 Ordering information

Product type (Infineon)	Product type (ams OSRAM)	Ordering code	Package	Delivery form
AS5966-WLP-SAW	AS5966	SP006309887	WLCSP	Wafer/Die on Foil

3 Abbreviations

Table 2 Abbreviations

Term	Description
PD	Photodiode
TSV	Through Silicon Via
ADC	Analog-to-Digital Converter
CCO	Coarse Quantizer
QP	Charge Pump
D-IF	Data Interface
P-IF	Programming Interface/Configuration Interface
IP	Integration Period
RH	Relative Humidity

Revision history

Document revision	Date	Description of changes
1.00	2026-10-24	Document rebranded from ams OSRAM to Infineon; technical specifications remain unchanged; added Infineon part numbers in Ordering information table. **Legacy ams OSRAM changes from previous released version to revision V1.00:** • Updated general description and ordering information in chapter 1 and 2

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