## Datasheet

DS001023

# AS585xB

## 16-Bit 256-Channel Low Noise Charge-to-Digital Converters

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# Content Guide

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# 1 General Description

AS585xB is a family (AS5850B, AS5851B and AS5852B) of 16-bit, 256-channel low-noise charge-to-digital converters designed for digital X-Ray systems. It enables a wide range of applications for digital X-ray including static and dynamic Flat Panel Detectors (FPDs) used in radiographic imaging, digital mammography, fluoroscopy, surgery and industrial non-destructive testing.

Each of the devices consists of 256 analog Charge Sensitive Amplifiers (CSA) with a programmable full-scale range, a Correlated Double Sampler (CDS) for offset compensation with programmable time constant and 128 multiplexed Analog-to-Digital Converters (ADC) for the digital readout of each pixel. The device can be configured for electrons and holes polarity and includes a voltage reference and a temperature sensor. Built-in diagnostic modes enable error detection in the signal chain.

The converted channels are output on a single LVDS interface with a data rate up to 320 Mbps for optimized line time. The serial SPI interface allows the configuration of the analog frontend including timing and different power modes for low stand-by power consumptions and fast startup times.

The AS5850 device is a high-speed design optimized for line times down to 20 µs for dynamic flat panel detectors. In a special low-OSR (the ADC OverSampling Ratio) mode, it can reach even shorter line times of 15 µs. Additionally, it is possible to bin together adjacent channels; with this binning, the fastest achievable line time is 10 µs.
The AS5851 and AS5852 are low-power versions of AS5850 for static, portable and battery supplied flat panels with minimum power dissipations down to 1.1 mW per channel.

AS585xB are the AS585x chips delivered on a Chip on Flex package to minimize sidewall distances and allow direct assembly on the X-ray panel. The Flex design can be customized according to customer requirements upon request. Alternatively, all devices can be delivered as die on foil.

## 1.1 Key Benefits & Features

The benefits and features of AS585xB, 16-Bit 256-Channel Low Noise Charge-to-Digital Converters are listed below:

**Figure 1:**
**Added Value of Using AS585xB**

| Benefits | Features |
|---|---|
| 256 Channels with 16-bit resolution | Flexible and simple configuration via SPI interface supporting daisy-chaining multiple devices |
| Ultra-low noise down to 500 electrons at 2 pC input range for hole and electron integration | Standard and customized flex delivery |
| Low power dissipation down to 1.1 mW per channel at 80 µs line time | Different power-down modes down to 1 µW per channel and fast start-up times |

| Benefits | Features |
|---|---|
| Line time down to 20 µs, 15 µs with low OSR or 10 µs with binning | LVDS data interface with data rate optimized readout modes including fully parallel pipeline mode |
| Adjustable full scale range from 0.5 pC to 16 pC | Correlated Double Sampling (CDS) operation for offset compensation with programmable time constant |
| On-chip voltage reference and temperature sensor | Built-in Diagnostic (anti-blooming circuit, charge injection mode, ADC test) for error detection |

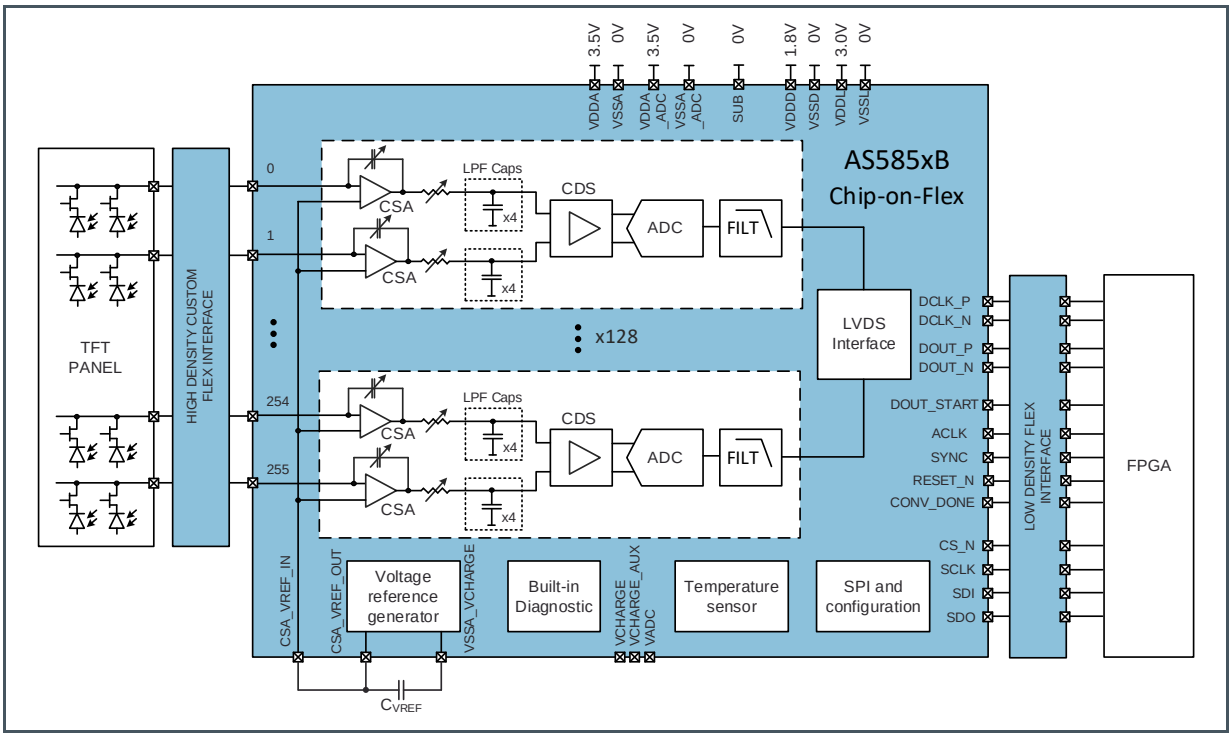
## 1.2 Applications

- X-ray Flat Panel Detectors
- Digital Radiography
- Fluoroscopy Panels and Dynamic X-ray Detectors
- Portable and Mobile X-ray Systems
- Mammography Panels
- Industrial and Security X-ray Scanners

## 1.3 Block Diagram

The functional blocks of this device are shown below:

**Figure 2 :**
**Functional Blocks of AS585xB**



# 2 Ordering Information

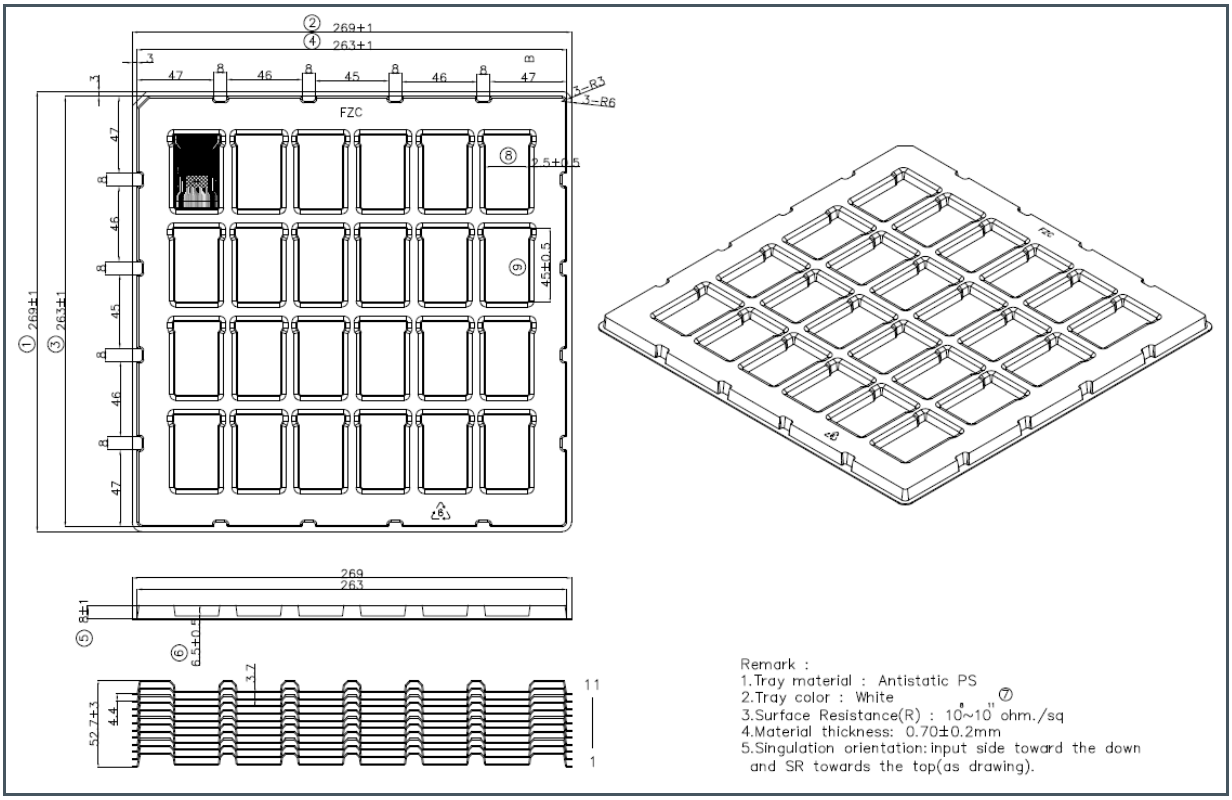
| Ordering Code | Package | Marking | Delivery Form | Delivery Quantity |
|---|---|---|---|---|
| AS5850-CSDF-240 (1) | Die, 240 Channels Device | AS5850-CSDF-240 | Die on Foil | 8 inch wafer |
| AS5850-CSDF-256 (1) | Die, 256 Channels Device | AS5850-CSDF-256 | Die on Foil | 8 inch wafer |
| AS5850A-CCFT-240 (1) | A-type Chip on Flex (COF), 240 Channels | AS5850A-CCFT-240 | Reel | 1500 flex/reel |
| AS5850A-CCFT-256 | A-type Chip on Flex (COF), 256 Channels | AS5850A-CCFT-256 | Reel | 1500 flex/reel |
| AS5850B-CCFR-256 | B-type Chip on Flex (COF), 256 Channels | AS5850B-CCFR-256 | Tray | 240 flex/package |
| AS5851B-CCFR-256 | B-type Chip on Flex (COF), 256 Channels | AS5851B-CCFR-256 | Tray | 240 flex/package |
| AS5852B-CCFR-256 | B-type Chip on Flex (COF), 256 Channels | AS5852B-CCFR-256 | Tray | 240 flex/package |

(1) Availability of these devices upon request, subject to **ams** approval.

The B-type Flex corresponds to the FZC design described in sections 9.3, 9.4 and chapter 10 of the full AS505xB datasheet.
The A-type Flex corresponds to the FUC design, not described in the AS505xB datasheet.

# 3 Tray Information

**Figure 3:**
**Tray Dimensions**




(1) All dimensions in mm

# 4 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 |
|---|---|
| This short datasheet was derived from v1-00 of the full datasheet | |
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- 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.

# 5 Legal Information



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