

Product Document



Datasheet

DS001024

AS5850A

16-Bit 256-Channel Low Noise Charge-to-Digital Converter

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1 General Description

The AS5850A is a 16 bit, 256-channel low-noise charge-to-digital converter 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 and high-speed fluoroscopy.

The AS5850 device 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 μ s. In a special low-OSR (the ADC OverSampling Ratio) mode, it can reach even shorter line times of 15 μ s. Additionally, it is possible to bin together adjacent channels; with this binning, the fastest achievable line time is 10 μ s.

AS5850A is the AS5850 chip delivered on a Chip-on-Flex package (A-type Flex) to minimize sidewall distances and allow direct assembly on the X-Ray panel. Chapter 2 lists also other alternative delivery forms. Additionally, the Flex design can be customized according to customer requirements upon request.

1.1 Key Benefits & Features

The benefits and features of AS5850A, 16-Bit 256-Channel Low Noise Charge-to-Digital Converter are listed below:

Figure 1:
Added Value of Using AS5850A

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 down to 60 μ m pitch on the high-density side
Low power dissipation down to 1.1 mW per channel at 80 μ s line time	Different power-down modes down to 1 μ W 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

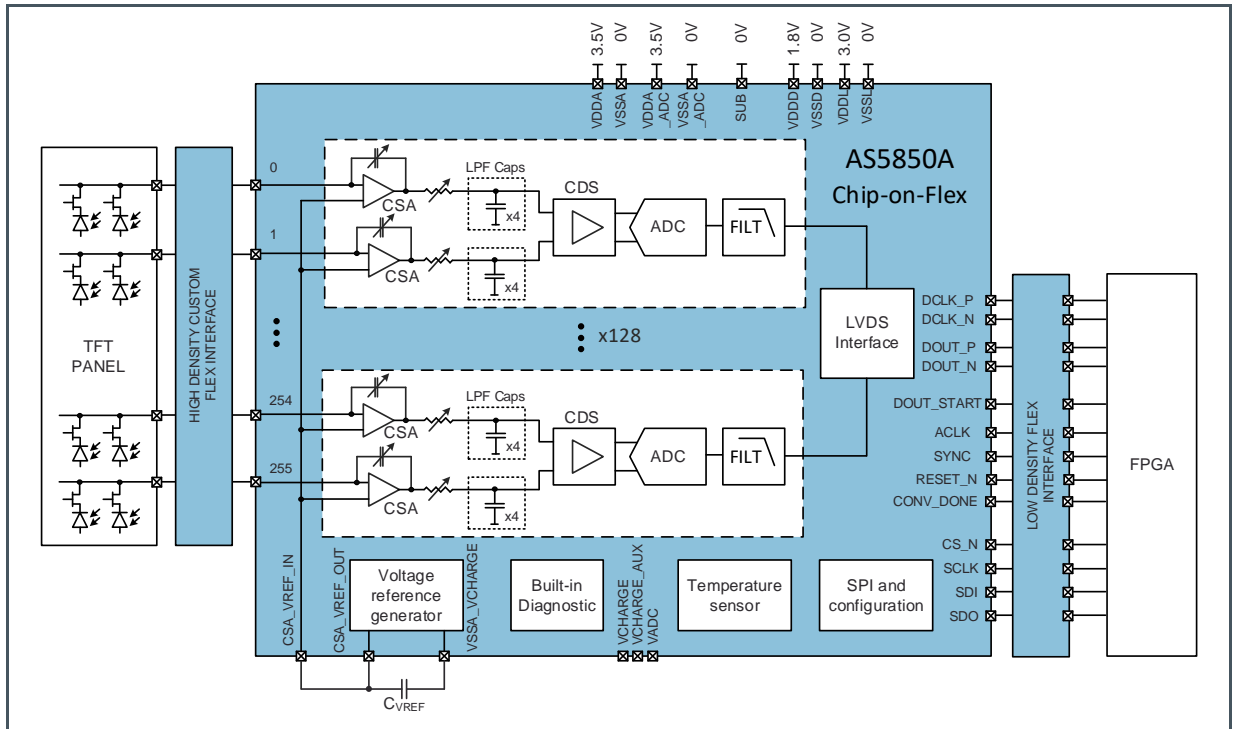
1.2 Applications

- 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 Scanner

1.3 Block Diagram

The functional blocks of this device are shown below:

Figure 2 :
Functional Blocks of AS5850A



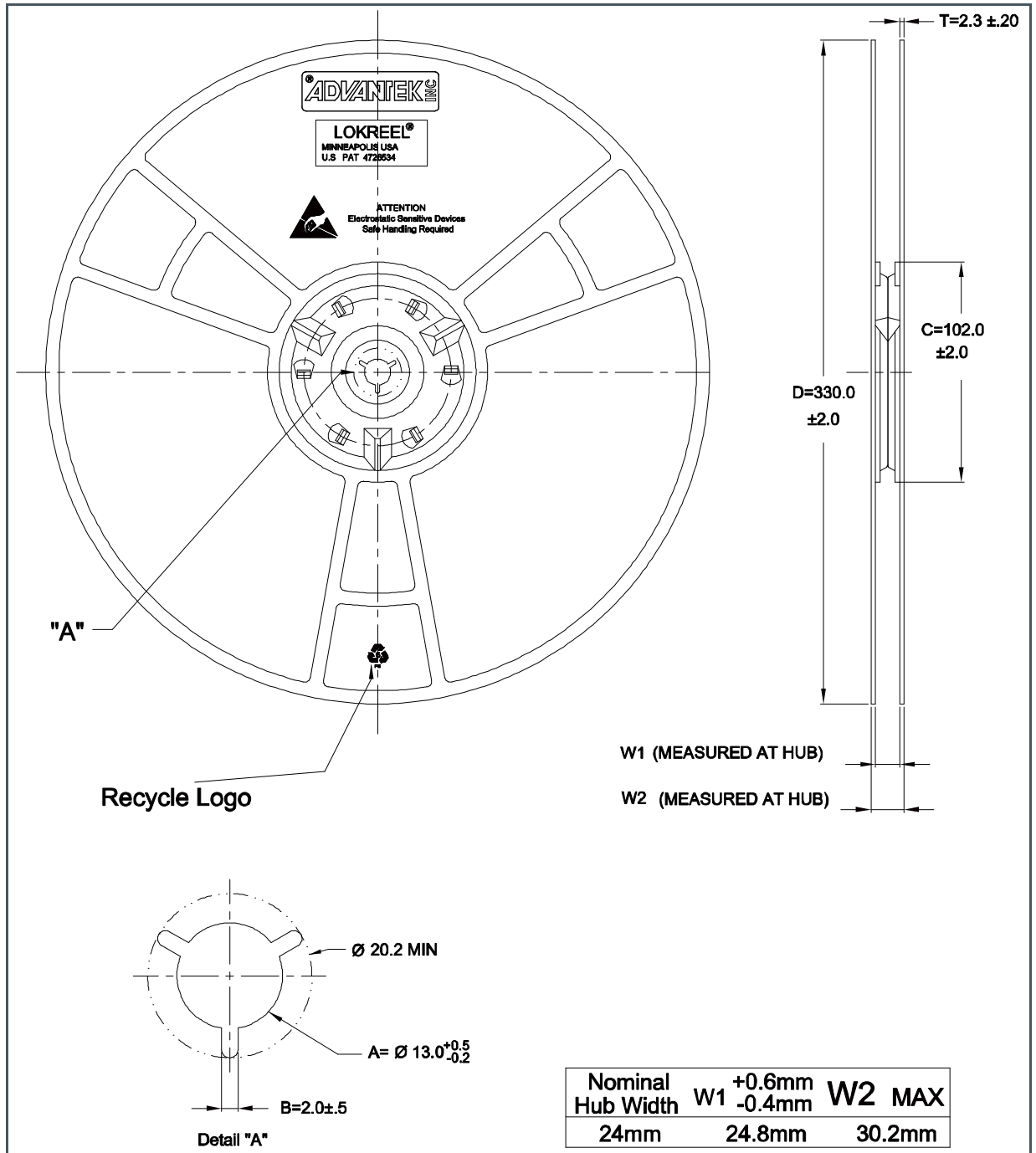
2 Ordering Information

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.

3 Tape & Reel Information

Figure 3:
Reel 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
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Changes from previous version to current revision v2-00	Page
This short datasheet was derived from v2-00 of the full datasheet	

- 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.

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