

# ADS1283 High-Resolution, Analog-to-Digital Converter

## 1 Features

- High Resolution:
  - SNR: 130 dB (250 SPS, PGA = 1)
- High Accuracy:
  - THD: –122 dB
- Low Power Consumption:
  - 18 mW (PGA = 1, 2, 4, or 8)
  - Shutdown Mode: 10  $\mu$ W
- Low-Noise PGA: 5 nV/ $\sqrt{\text{Hz}}$
- Two-Channel Input Multiplexer
- Inherently-Stable Modulator With Fast Responding Overrange Detector
- Flexible Digital Filter:
  - Sinc + FIR + IIR (Selectable)
  - Linear or Minimum Phase Response
  - Programmable High-Pass Filter
  - Selectable FIR Data Rates: 250 SPS to 4 kSPS
- Offset and Gain Calibration Engine
- SYNC Input
- Analog Supply: 5 V or  $\pm 2.5$  V
- Digital Supply: 1.8 V to 3.3 V

## 2 Applications

- Energy Exploration
- Seismic Monitoring
- High-Accuracy Instrumentation

## 3 Description

The ADS1283 is an extremely high-performance, single-chip, analog-to-digital converter (ADC) with an integrated, low-noise programmable gain amplifier (PGA) and two-channel input multiplexer (mux). The ADS1283 is suitable for the demanding needs of seismic monitoring equipment.

The converter uses a fourth-order, inherently stable, delta-sigma ( $\Delta\Sigma$ ) modulator that provides outstanding noise and linearity performance. The modulator digital output is digitally filtered and decimated by the on-chip digital filter to yield the ADC conversion result.

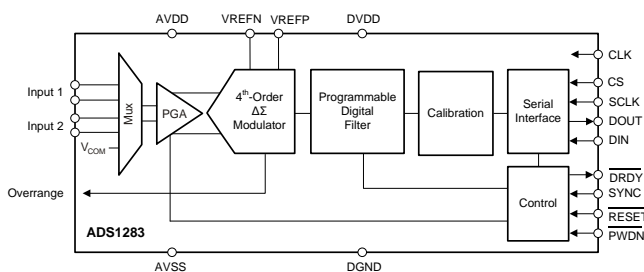
The flexible input mux provides an additional external input for measurement, as well as internal self-test input connections. The PGA features outstanding low noise (5 nV/ $\sqrt{\text{Hz}}$ ) and very-high input impedance, allowing easy interfacing to geophones and hydrophones over a wide range of gains.

The digital filter provides selectable data rates from 250 to 4000 samples per second (SPS). The high-pass filter (HPF) features an adjustable corner frequency. On-chip gain and offset scaling registers support system calibration.

The synchronization input (SYNC) can be used to synchronize the conversions of multiple ADS1283 devices.

The ADS1283 is available in a compact 24-lead, 5-mm  $\times$  4-mm VQFN package, and is fully specified from  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ , with a maximum operating temperature range of  $-50^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$ .

**Simplified Schematic**



**Device Information<sup>(1)</sup>**

PART NUMBER	PACKAGE	BODY SIZE (NOM)
ADS1283	VQFN (24)	5.00 mm $\times$ 4.00 mm
ADS1283A		
ADS1283B		

(1) For all available packages, see the package option addendum at the end of the data sheet.

**Device Comparison**

PART NUMBER	OFFSET OPTION	THD (TYP)	GAIN
ADS1283	100 mV	–122 dB	1 to 64
ADS1283A	100 mV	–118 dB	1, 4, 16
ADS1283B	75 mV, 100 mV	–122 dB	1 to 64



## 4 Device and Documentation Support

### 4.1 Receiving Notification of Documentation Updates

To receive notification of documentation updates, navigate to the device product folder on [ti.com](http://ti.com). In the upper right corner, click on *Alert me* to register and receive a weekly digest of any product information that has changed. For change details, review the revision history included in any revised document.

### 4.2 Community Resources

The following links connect to TI community resources. Linked contents are provided "AS IS" by the respective contributors. They do not constitute TI specifications and do not necessarily reflect TI's views; see TI's [Terms of Use](#).

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### 4.3 Trademarks

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### 4.4 Electrostatic Discharge Caution



This integrated circuit can be damaged by ESD. Texas Instruments recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

### 4.5 Glossary

[SLYZ022](#) — *TI Glossary*.

This glossary lists and explains terms, acronyms, and definitions.

## 5 Mechanical, Packaging, and Orderable Information

The following pages include mechanical, packaging, and orderable information. This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the left-hand navigation.

## PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
ADS1283AIRHFR	ACTIVE	VQFN	RHF	24	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR	-40 to 85	ADS 1283A	<a href="#">Samples</a>
ADS1283AIRHFT	ACTIVE	VQFN	RHF	24	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR	-40 to 85	ADS 1283A	<a href="#">Samples</a>
ADS1283BIRHFR	ACTIVE	VQFN	RHF	24	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-3-260C-168 HR	-40 to 85	ADS 1283B	<a href="#">Samples</a>
ADS1283BIRHFT	ACTIVE	VQFN	RHF	24	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-3-260C-168 HR	-40 to 85	ADS 1283B	<a href="#">Samples</a>
ADS1283IRHFR	ACTIVE	VQFN	RHF	24	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR	-40 to 85	ADS 1283	<a href="#">Samples</a>
ADS1283IRHFT	ACTIVE	VQFN	RHF	24	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR	-40 to 85	ADS 1283	<a href="#">Samples</a>

(1) The marketing status values are defined as follows:

**ACTIVE:** Product device recommended for new designs.

**LIFEBUY:** TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

**NRND:** Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

**PREVIEW:** Device has been announced but is not in production. Samples may or may not be available.

**OBSOLETE:** TI has discontinued the production of the device.

(2) **RoHS:** TI defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, "RoHS" products are suitable for use in specified lead-free processes. TI may reference these types of products as "Pb-Free".

**RoHS Exempt:** TI defines "RoHS Exempt" to mean products that contain lead but are compliant with EU RoHS pursuant to a specific EU RoHS exemption.

**Green:** TI defines "Green" to mean the content of Chlorine (Cl) and Bromine (Br) based flame retardants meet JS709B low halogen requirements of <=1000ppm threshold. Antimony trioxide based flame retardants must also meet the <=1000ppm threshold requirement.

(3) MSL, Peak Temp. - The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

<sup>(6)</sup> Lead/Ball Finish - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead/Ball Finish values may wrap to two lines if the finish value exceeds the maximum column width.

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