

ADS1285 High-Resolution, Delta-Sigma ADC for Seismic Applications

1 Features

- Power-scalable modes (DR at 500 SPS, gain = 1):
 - High-power mode: 134-dB DR, 11.5 mW
 - Mid-power mode: 134-dB DR, 8.5 mW
 - Low-power mode: 131-dB DR, 6.5 mW
- THD: -120 dB
- CMRR: 125 dB
- Data rate: 125 SPS to 4000 SPS
- PGA gain: 1 to 64
- Power-saving buffer mode
- Sample rate converter
- Linear- and minimum-phase digital filter
- Programmable high-pass filter
- Test input channel
- Offset and gain calibration
- General-purpose I/Os
- Analog power supply: 3.3 V or 5 V
- Single or dual power-supply operation
- Reference option: 5 V, 4.096 V, or 2.5 V

2 Applications

- Energy exploration
- Passive seismic monitoring
- Earth sciences
- Precision instrumentation

3 Description

The ADS1285 is a high-resolution, low-power consumption, analog-to-digital converter (ADC), with a programmable gain amplifier (PGA) and a finite impulse response (FIR) filter. The ADC is suitable for the demanding needs of seismic equipment requiring precision digitization with long battery run time.

The ADC features a low-noise PGA (6 nV/√Hz) suitable for direct connection to geophones and transformer-coupled hydrophones without the need of external amplifiers.

Power-scalable modes trade-off dynamic range against power consumption. Optional buffer operation bypasses the PGA to further reduce power consumption.

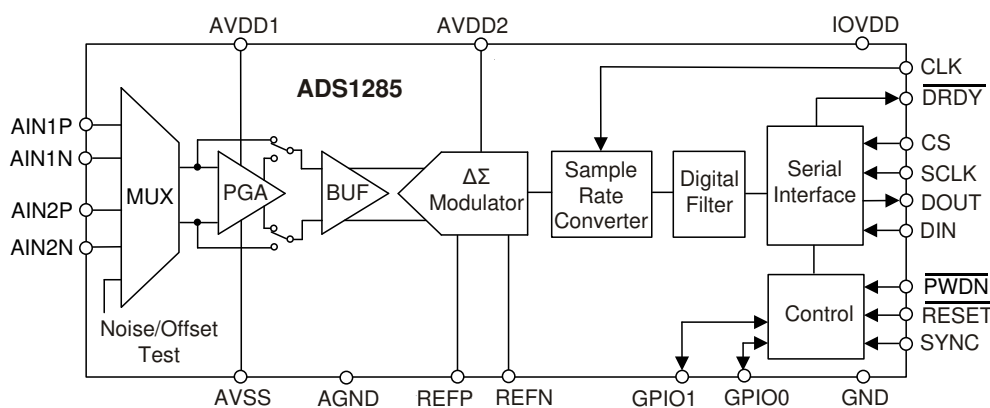
The ADC incorporates a high-resolution, low-drift, delta-sigma ($\Delta\Sigma$) modulator and a FIR digital filter with programmable phase response. The high-pass filter (HPF) removes dc and low-frequency content from the signal. The sample rate converter (SRC) corrects the effect of clock frequency error to within 7-ppb resolution.

The ADC is available in a compact 5-mm × 5-mm VQFN package and is fully specified over the -40°C to +85°C temperature range.

Device Information⁽¹⁾

PART NUMBER	PACKAGE	BODY SIZE (NOM)
ADS1285	VQFN (32)	5.00 mm × 5.00 mm

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



Functional Block Diagram

ADVANCE INFORMATION

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. Click on *Subscribe to updates* 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 Support Resources

TI E2E™ [support forums](#) are an engineer's go-to source for fast, verified answers and design help — straight from the experts. Search existing answers or ask your own question to get the quick design help you need.

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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

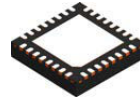
[TI Glossary](#) This glossary lists and explains terms, acronyms, and definitions.

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.

5.1 Mechanical Data

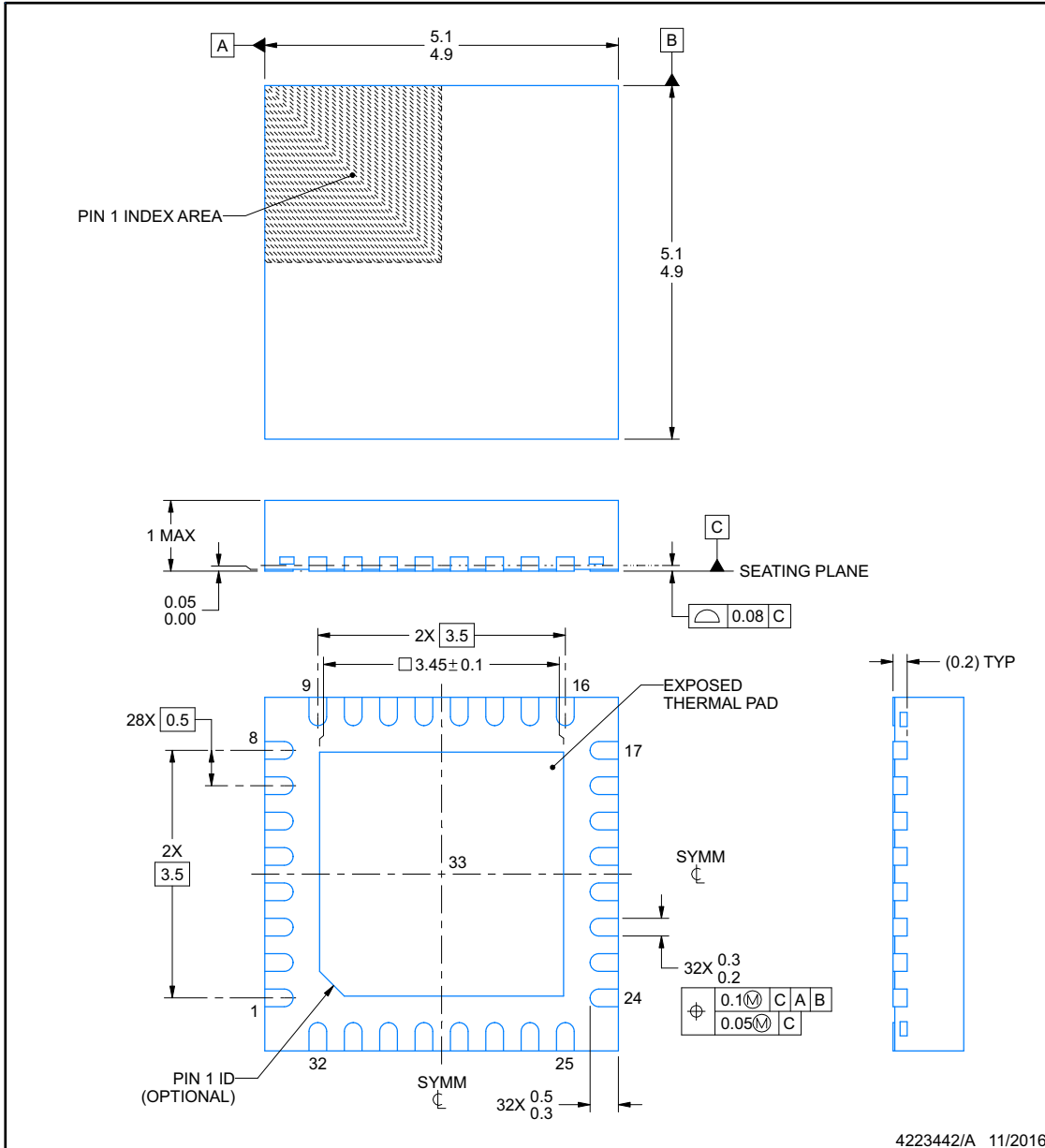
RHB0032E



PACKAGE OUTLINE

VQFN - 1 mm max height

PLASTIC QUAD FLATPACK - NO LEAD



NOTES:

1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. The package thermal pad must be soldered to the printed circuit board for thermal and mechanical performance.

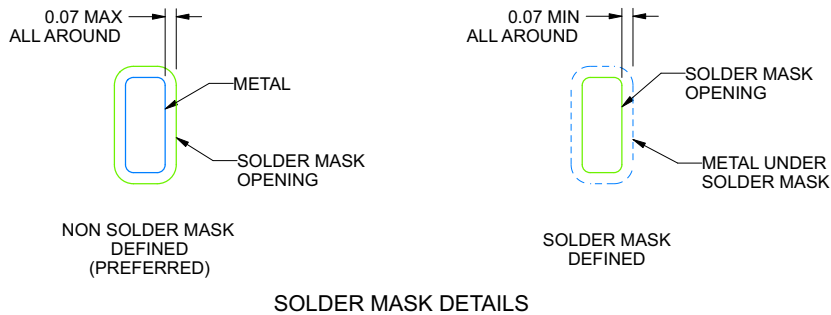
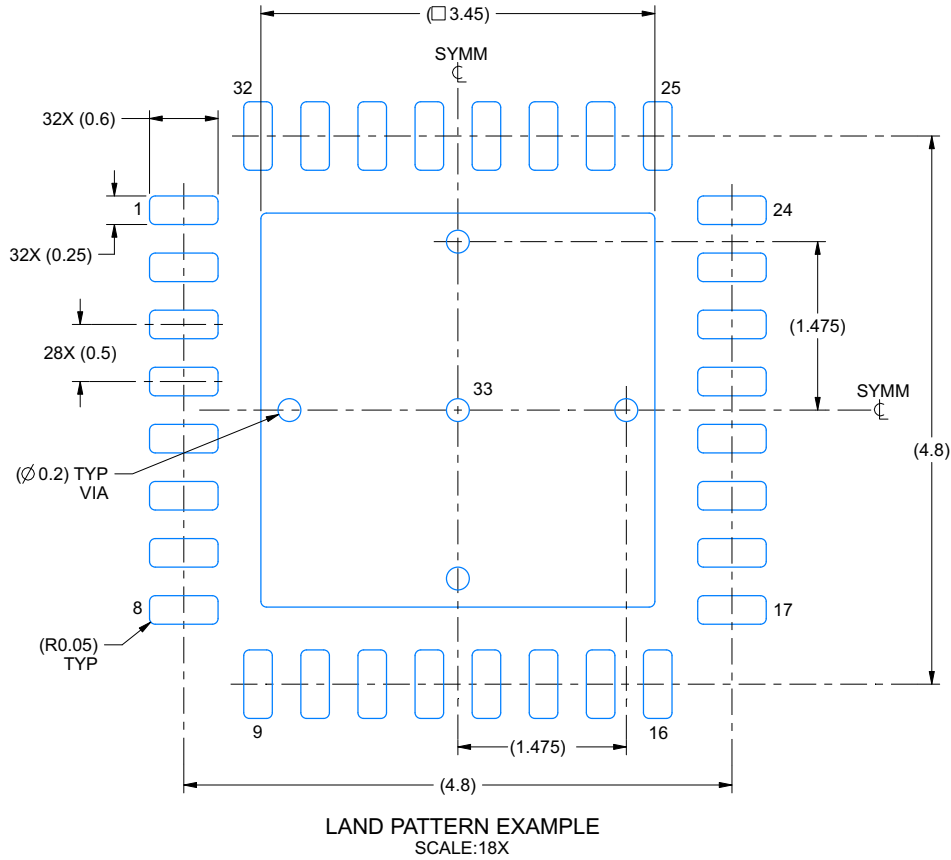
ADVANCE INFORMATION

EXAMPLE BOARD LAYOUT

RHB0032E

VQFN - 1 mm max height

PLASTIC QUAD FLATPACK - NO LEAD



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NOTES: (continued)

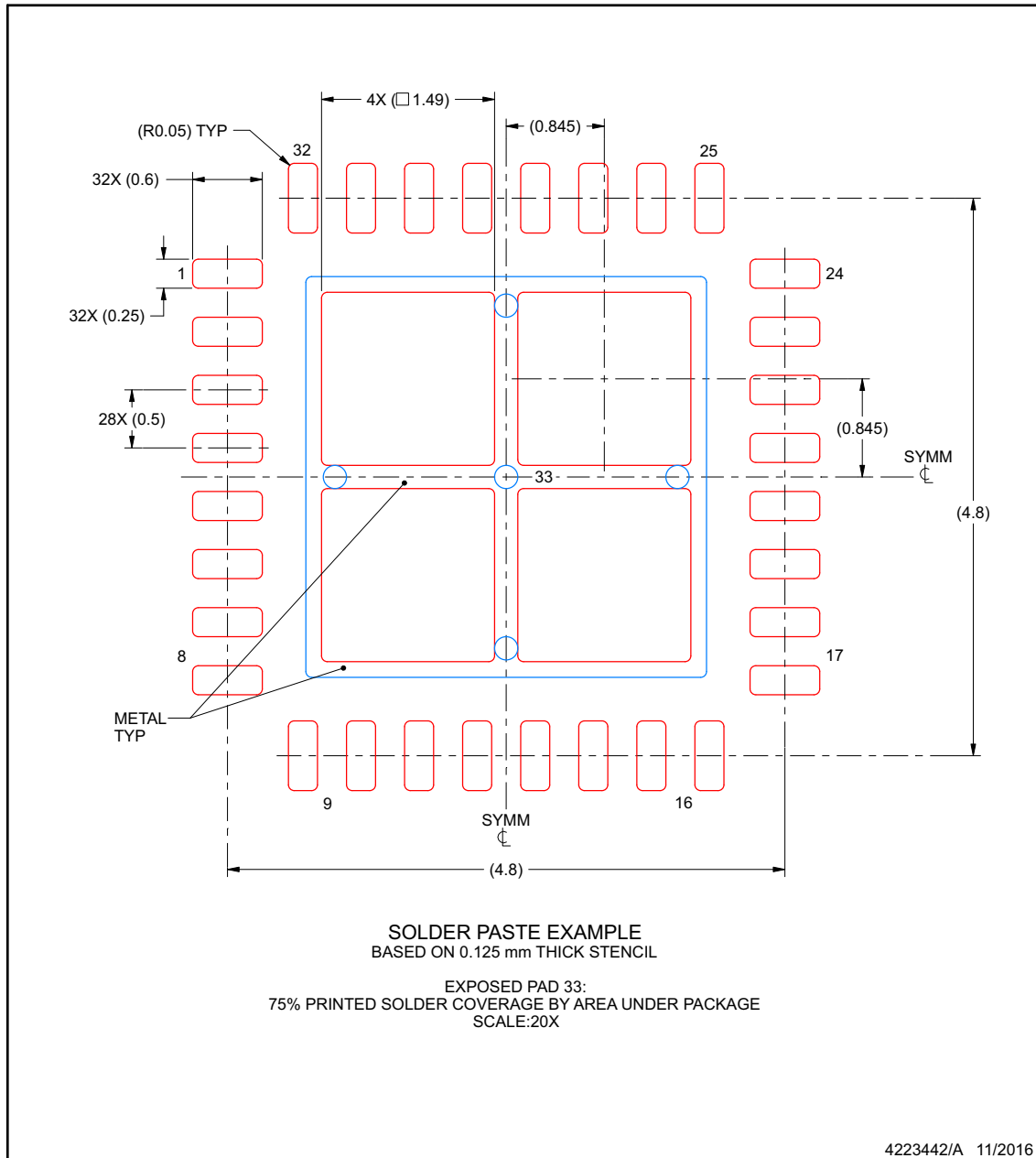
- This package is designed to be soldered to a thermal pad on the board. For more information, see Texas Instruments literature number SLUA271 (www.ti.com/lit/slua271).
- Vias are optional depending on application, refer to device data sheet. If any vias are implemented, refer to their locations shown on this view. It is recommended that vias under paste be filled, plugged or tented.

EXAMPLE STENCIL DESIGN

RHB0032E

VQFN - 1 mm max height

PLASTIC QUAD FLATPACK - NO LEAD



ADVANCE INFORMATION

NOTES: (continued)

- 6. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead finish/ Ball material (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
PADS1285IRHBR	ACTIVE	VQFN	RHB	32	3000	TBD	Call TI	Call TI	-40 to 85		Samples

(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.

OBSELETE: 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.

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

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