ADS1x4S1x 16- and 24-Bit, 8- and 18-Channel, 128kSPS, Delta-Sigma ADC With PGA, Voltage Reference, Sequencer, Digital Comparator and SPI

1 Features

- Low power consumption (as low as 64µA)
- Wide supply voltage range:
  - Analog: 1.74V to 3.6V
  - Digital: 1.65V to 5.25V
- Programmable gain: 0.5 to 256
- Programmable data rate (up to 128kSPS) and speed mode to trade power consumption and noise performance
- Simultaneous 50Hz and 60Hz rejection at 20 or 25SPS with single-cycle settling digital filter
- Analog multiplexer with 8 (ADS1x4S14) or 18 (ADS1x4S18) independently selectable inputs
- Dual-matched programmable current sources
- Internal programmable voltage reference: 1.25V or 2.5V with 35ppm/°C (max) drift
- Internal 1% (max) accurate oscillator
- Internal temperature sensor
- Eight general-purpose I/Os (configurable as either push-pull or open-drain outputs)
- Sequencer with 24 individually programmable configurations and digital comparators
- SPI-compatible interface with optional CRC and daisy-chain capability

2 Applications

- Field transmitters:
  Temperature, pressure, strain, flow
- PLC and DCS analog input modules
- Temperature controllers
- Patient monitoring systems

3 Description

The ADS1x4S1x are precision, low-power, 16- and 24-bit, analog-to-digital converters (ADCs) that offer many integrated features to reduce system cost and component count in the most common sensor measurement applications. The devices feature up to 18 analog inputs through a flexible input multiplexer (MUX), a low-noise, programmable gain amplifier (PGA), a programmable low-drift voltage reference, two programmable excitation current sources, an oscillator, and a temperature sensor.

Four speed modes, with programmable output data rates from 3.9SPS up to 128kSPS, allow to optimize power consumption and noise performance for each application.

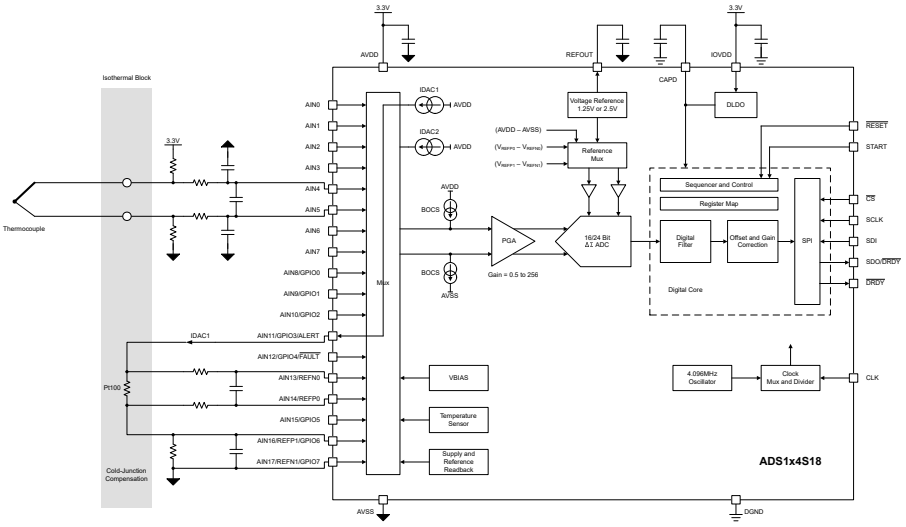
Package Information

PART NUMBER	PACKAGE(1)	PACKAGE SIZE(2)
ADS1x4S1x	PBS (TQFP, 32)	7.00mm × 7.00mm

(1) For more information, see Mechanical, Packaging, and Orderable Information.
(2) The package size (length × width) is a nominal value and includes pins, where applicable.

Device Information

PART NUMBER	RESOLUTION	ANALOG INPUTS
ADS114S14	16 Bit	8
ADS114S18	16 Bit	18
ADS124S14	24 Bit	8
ADS124S18	24 Bit	18



K-Type Thermocouple Measurement With Cold-Junction Compensation Using a 2-wire Pt100 RTD

An IMPORTANT NOTICE at the end of this data sheet addresses availability, warranty, changes, use in safety-critical applications, intellectual property matters and other important disclaimers. PRODUCTION DATA.

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4 Device and Documentation Support

TI offers an extensive line of development tools. Tools and software to evaluate the performance of the device, generate code, and develop solutions are listed below.

4.1 Related Documentation

1. Texas Instruments, *A Basic Guide to RTD Measurements* application note
2. Texas Instruments, *RTD Wire-Break Detection Using Precision Delta-Sigma ADCs* application note
3. Texas Instruments, *A Basic Guide to Thermocouple Measurements* application note
4. Texas Instruments, *A Basic Guide to Bridge Measurements* application note
5. Texas Instruments, *Temperature-sensor (RTD, thermocouple, thermistor) firmware for precision ADCs* tool page

4.2 Receiving Notification of Documentation Updates

To receive notification of documentation updates, navigate to the device product folder on ti.com. Click on *Notifications* 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.

4.3 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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4.4 Trademarks

TI E2E™ is a trademark of Texas Instruments.
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4.5 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.

4.6 Glossary

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

5 Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

DATE	REVISION	NOTES
October 2026	*	Initial Release

6 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.

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PACKAGING INFORMATION

Orderable part number	Status (1)	Material type (2)	Package | Pins	Package qty | Carrier	RoHS (3)	Lead finish/ Ball material (4)	MSL rating/ Peak reflow (5)	Op temp (°C)	Part marking (6)
ADS114S18IPBSR	Active	Production	TQFP (PBS) | 32	1000 | LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-50 to 125	A114S18
ADS124S18IPBSR	Active	Production	TQFP (PBS) | 32	1000 | LARGE T&R	Yes	NIPDAU	Level-2-260C-1 YEAR	-50 to 125	A124S18

(1) **Status:** For more details on status, see our product life cycle.

(2) **Material type:** When designated, preproduction parts are prototypes/experimental devices, and are not yet approved or released for full production. Testing and final process, including without limitation quality assurance, reliability performance testing, and/or process qualification, may not yet be complete, and this item is subject to further changes or possible discontinuation. If available for ordering, purchases will be subject to an additional waiver at checkout, and are intended for early internal evaluation purposes only. These items are sold without warranties of any kind.

(3) **RoHS values:** Yes, No, RoHS Exempt. See the TI RoHS Statement for additional information and value definition.

(4) **Lead finish/Ball material:** Parts 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.

(5) **MSL rating/Peak reflow:** The moisture sensitivity level ratings and peak solder (reflow) temperatures. In the event that a part has multiple moisture sensitivity ratings, only the lowest level per JEDEC standards is shown. Refer to the shipping label for the actual reflow temperature that will be used to mount the part to the printed circuit board.

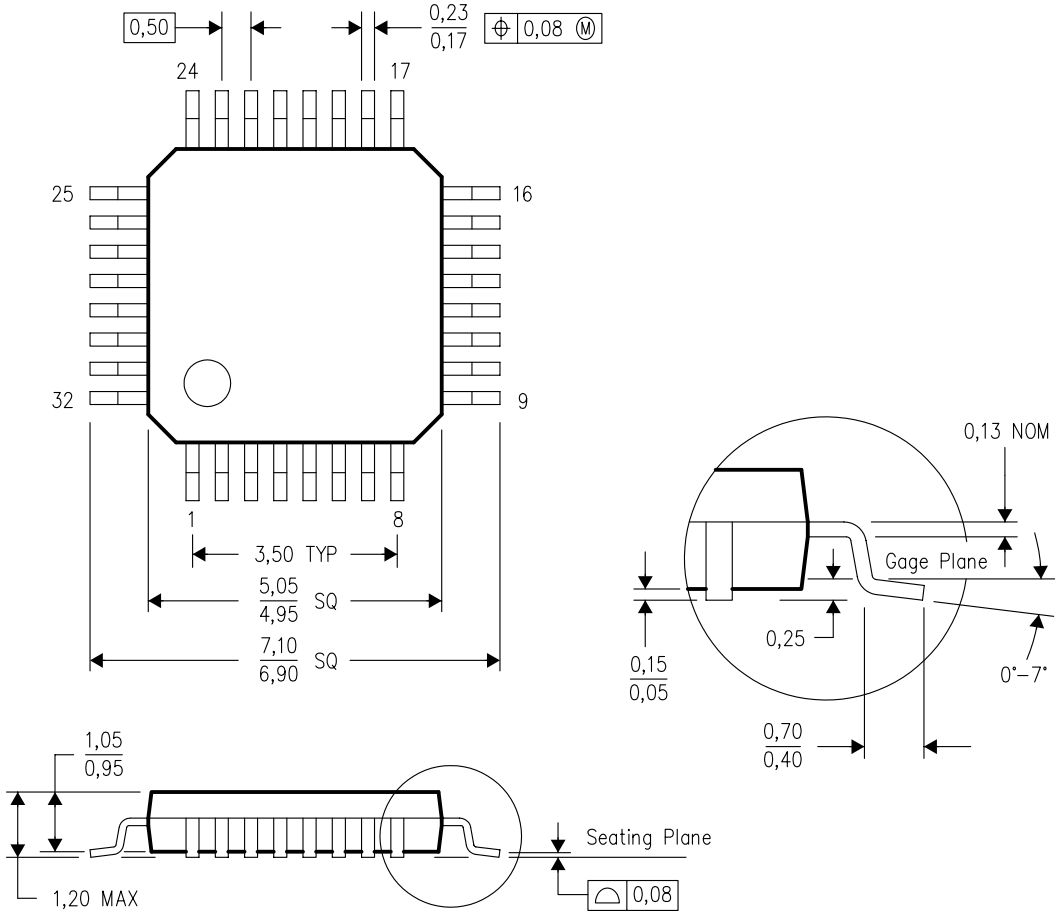
(6) **Part marking:** There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

Multiple part markings will be inside parentheses. Only one part marking contained in parentheses and separated by a "~" will appear on a part. If a line is indented then it is a continuation of the previous line and the two combined represent the entire part marking for that device.

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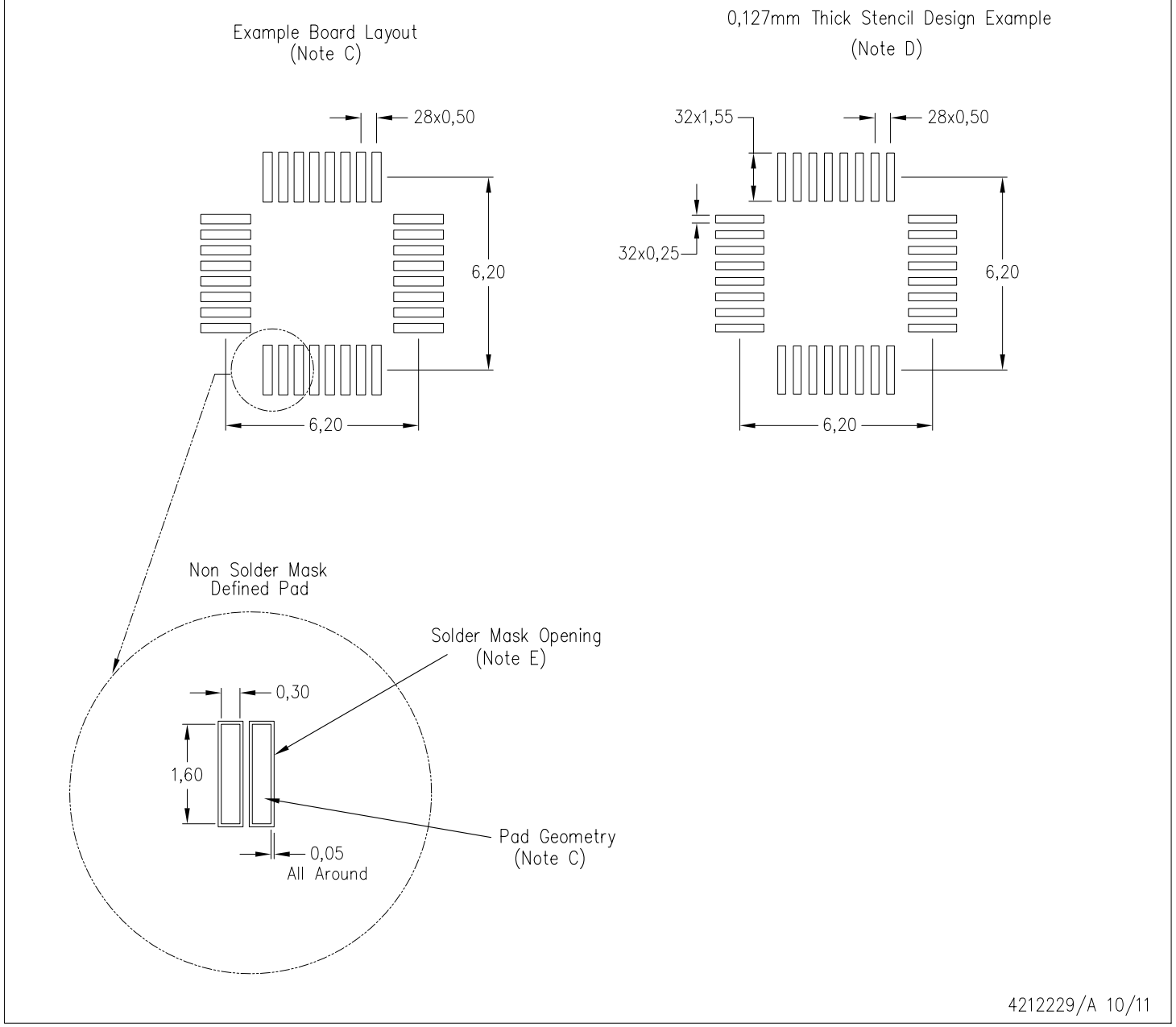
PBS (S–PQFP–G32) PLASTIC QUAD FLATPACK



4087735/B 07/05

NOTES: A. All linear dimensions are in millimeters.
B. This drawing is subject to change without notice.

PBS (S–PQFP–G32) PLASTIC QUAD FLATPACK



NOTES:
A. All linear dimensions are in millimeters.
B. This drawing is subject to change without notice.
C. Publication IPC–7351 is recommended for alternate designs.
D. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC 7525 for stencil design considerations.
E. Customers should contact their board fabrication site for recommended solder mask tolerances between and around signal pads.

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