TEXAS INSTRUMENTS

ADS8920B
ADS8922B
ADS8924B

SBAS729 – JUNE 2016

ADS892xB 16-bit, High-Speed SAR ADCs With Integrated Reference Buffer, Integrated LDO, and multiSPI™ Digital Interface

1 Features

- Resolution: 16-bit
- High Sample Rate With No Latency Output:
  - ADS8920B : 1 MSPS
  - ADS8922B : 500 kSPS
  - ADS8924B : 250 kSPS
- Integrated LDO Enables Single-Supply Operation
- Burst-Mode Operation With Precise First Sample
- Excellent AC and DC Performance:
  - SNR: 96.8 dB, THD: –125 dB
  - INL: ±0.5 LSB (Max)
  - DNL: ±0.5 LSB (Max), 16-Bit NMC
- Wide Input Range:
  - Unipolar Differential Input Range: $\pm V_{REF}$
  - V_{REF} Input Range: 2.5 V to 5 V
- Single-Supply, Low-Power Operation (Includes Internal Reference Buffer and LDO)
  - ADS8920B : 21 mW at 1 MSPS
  - ADS8922B : 16 mW at 500 kSPS
  - ADS8924B : 14 mW at 250 kSPS
- multiSPI™ Digital Interface
- Extended Temperature Range: –40°C to +125°C
- Small Footprint: 4-mm × 4-mm VQFN

2 Applications

- Test and Measurement
- Medical Imaging
- High-Precision, High-Speed Industrial Data Acquisition

3 Description

The ADS8920B, ADS8922B, and ADS8924B (ADS892xB) belong to a family of pin-to-pin compatible, high-speed, high-precision successsive approximation register (SAR) based, analog-to-digital convertors (ADCs) with an integrated reference buffer and integrated low-dropout regulator (LDO). These devices support unipolar, fully-differential analog input signals with ±0.5-LSB INL (max) and 96-dB SNR (min) specifications over the specified range of operating conditions.

The integrated LDO enables single-supply operation with low power consumption. The integrated reference buffer supports burst-mode data acquisition with 16-bit precision for the first sample. External reference voltages in the range 2.5 V to 5 V are supported, offering a wide selection of input ranges without additional input scaling.

The integrated multiSPI digital interface is backward-compatible to the traditional SPI protocol. Additionally, configurable features simplify board layout, timing, and firmware, and support high throughput at lower clock speeds. The multiSPI digital interface allows for easy interface with a variety of microcontrollers, digital signal processors (DSPs), and field-programmable gate arrays (FPGAs).

The ADS892x family is offered in a space-saving, 4-mm × 4-mm, VQFN package, and is fully specified over the extended temperature range of –40°C to +125°C.

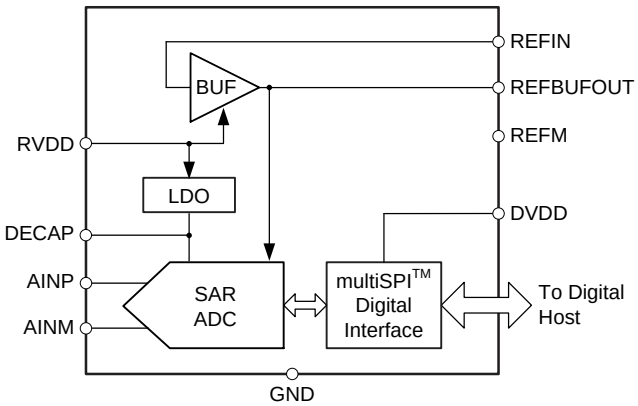
Device Information

PART NUMBER	PACKAGE	BODY SIZE (NOM)
ADS892xB	VQFN (24)	4.00 mm × 4.00 mm

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

PRODUCT PREVIEW

Functional Block Diagram



4 Device and Documentation Support

4.1 Related Links

The following table lists quick access links. Categories include technical documents, support and community resources, tools and software, and quick access to sample or buy.

Table 1. Related Links

PARTS	PRODUCT FOLDER	SAMPLE & BUY	TECHNICAL DOCUMENTS	TOOLS & SOFTWARE	SUPPORT & COMMUNITY
ADS8920B	Click here	Click here	Click here	Click here	Click here
ADS8922B	Click here	Click here	Click here	Click here	Click here
ADS8924B	Click here	Click here	Click here	Click here	Click here

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.

TI E2E™ Online Community ***TI's Engineer-to-Engineer (E2E) Community.*** Created to foster collaboration among engineers. At e2e.ti.com, you can ask questions, share knowledge, explore ideas and help solve problems with fellow engineers.

Design Support ***TI's Design Support*** Quickly find helpful E2E forums along with design support tools and contact information for technical support.

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
ADS8920BRGER	PREVIEW	VQFN	RGE	24	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR	-40 to 125	8920B	
ADS8920BRGET	PREVIEW	VQFN	RGE	24	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR	-40 to 125	8920B	
ADS8922BRGER	PREVIEW	VQFN	RGE	24	3000	TBD	Call TI	Call TI	-40 to 125		
ADS8922BRGET	PREVIEW	VQFN	RGE	24	250	TBD	Call TI	Call TI	-40 to 125		
ADS8924BRGER	PREVIEW	VQFN	RGE	24	3000	TBD	Call TI	Call TI	-40 to 125		
ADS8924BRGET	PREVIEW	VQFN	RGE	24	250	TBD	Call TI	Call TI	-40 to 125		

(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) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.
TBD: The Pb-Free/Green conversion plan has not been defined.
Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.
Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.
Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

(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/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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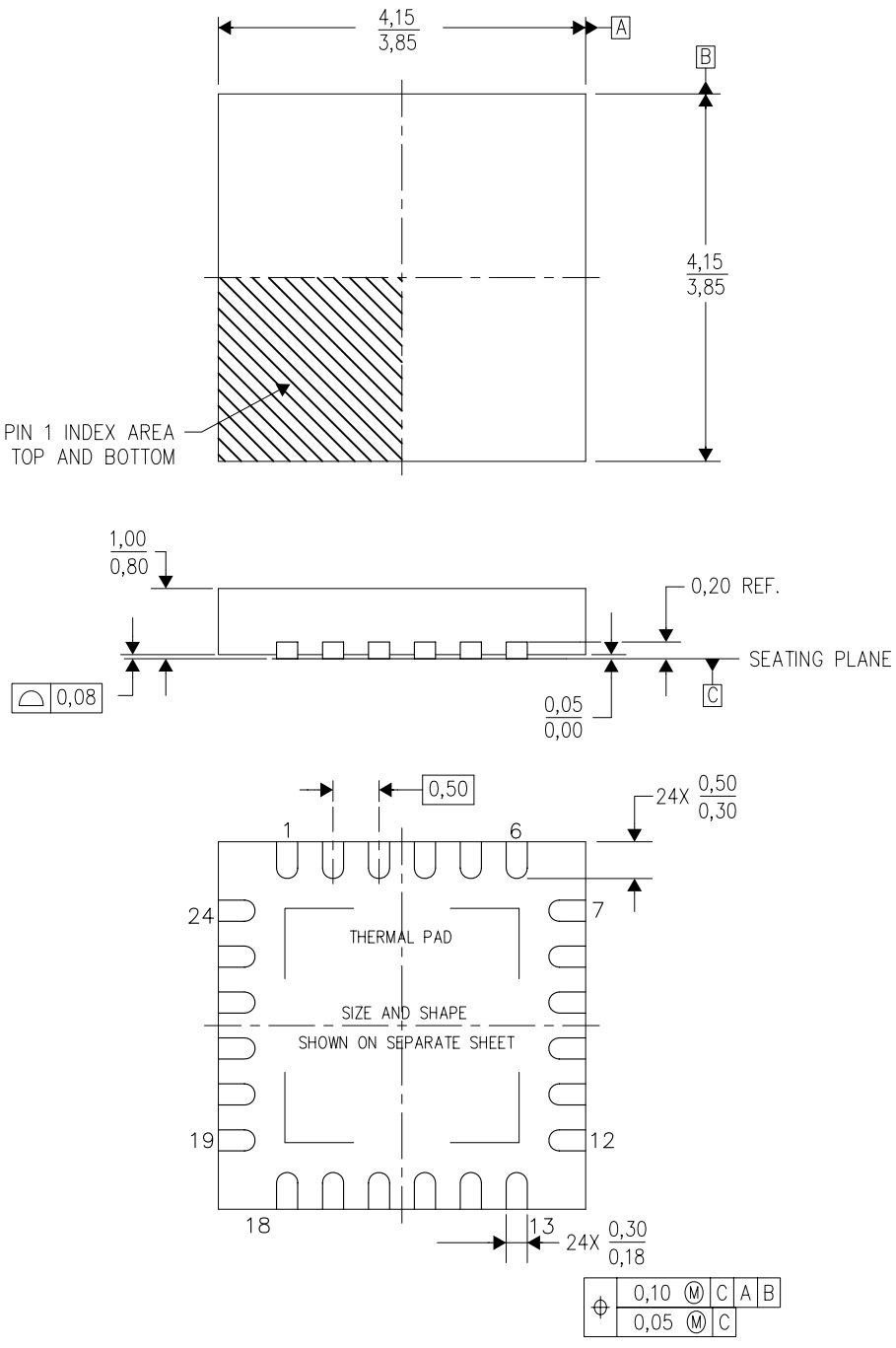
RGE (S–PVQFN–N24) PLASTIC QUAD FLATPACK NO–LEAD



NOTES:
A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M–1994.
B. This drawing is subject to change without notice.
C. Quad Flatpack, No–Leads (QFN) package configuration.
D. The package thermal pad must be soldered to the board for thermal and mechanical performance.
E. See the additional figure in the Product Data Sheet for details regarding the exposed thermal pad features and dimensions.
F. Falls within JEDEC MO–220.

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