



Low-Power, Low-Noise, 24-Bit, Analog-to-Digital Converter for Small Signal Sensors

Check for Samples: [ADS1220](#)

FEATURES

- **Low Current Consumption:**
 - Duty-Cycle Mode: Only 120 μA
 - Normal Mode: Only 415 μA
- **Wide Supply Range: 2.3 V to 5.5 V**
- **Programmable Data Rates: Up to 2 kSPS**
- **50-Hz and 60-Hz Rejection at 20 SPS**
- **Low-Noise PGA: 120 nVrms at 20 SPS**
- **Dual Matched Current Sources: 10 μA to 1500 μA**
- **Internal Temperature Sensor: 0.5°C Error (max)**
- **Low-Drift Internal Reference**
- **Low-Drift Internal Oscillator**
- **Two Differential or Four Single-Ended Inputs**
- **SPI™-Compatible Interface**
- **Ultrasmall QFN Package: 3,5 mm × 3,5 mm × 0,9 mm**

APPLICATIONS

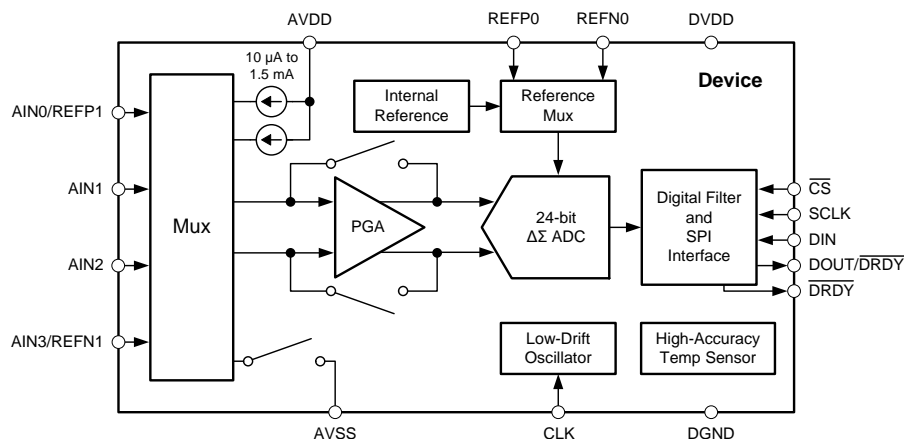
- **Temperature Sensors:**
 - Thermocouples
 - RTDs (PT-100, PT-1000, CU10, and more)
 - 2-, 3-, and 4-Wire RTD Excitation
- **Bridge Sensors**
- **Portable Instrumentation**
- **Factory Automation and Process Control**

DESCRIPTION

The ADS1220 is a precision, 24-bit, analog-to-digital converter (ADC) offered in an ultrasmall, leadless, QFN-16 package or a TSSOP-16 package. The device is designed with precision, power, and ease of implementation. The device features two differential or four single-ended inputs, an internal reference, an oscillator, and a temperature sensor. Data are transferred through an SPI-compatible interface.

The device can perform conversions at rates of up to 2000 samples-per-second (SPS) with single-cycle settling. An internal, high input impedance, programmable gain amplifier (PGA) offers gains of up to 128 V/V. This PGA makes the ADS1220 ideally suited for applications measuring small signals such as thermocouples, resistance temperature detectors (RTDs), thermistors, and bridge sensors. The device supports true bipolar analog supplies in the event that single-ended signals referenced to ground must be measured using the PGA. Alternatively, the device can be configured to bypass the internal PGA while still providing gains of up to 4 V/V, allowing for rail-to-rail input signals with no loss of signal integrity when running from a single analog supply. The device also features a very flexible input multiplexer (mux), two matched programmable current sources, and a low-side bridge switch, making the ADS1220 a complete solution for interfacing with sensors.

The device operates in either duty-cycle mode (consuming only 120 μA of current), normal mode (consuming only 415 μA of current), or turbo mode (for highest data rates). The ADS1220 operates over a temperature range of -40°C to $+125^{\circ}\text{C}$.



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PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
ADS1220IPW	PREVIEW	TSSOP	PW	16	60	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR	-40 to 125	ADS1220	
ADS1220IPWR	PREVIEW	TSSOP	PW	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR	-40 to 125	ADS1220	
ADS1220IRVAR	PREVIEW	VQFN	RVA	16	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR	-40 to 125	1220	
ADS1220IRVAT	PREVIEW	VQFN	RVA	16	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR	-40 to 125	1220	

(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) 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.

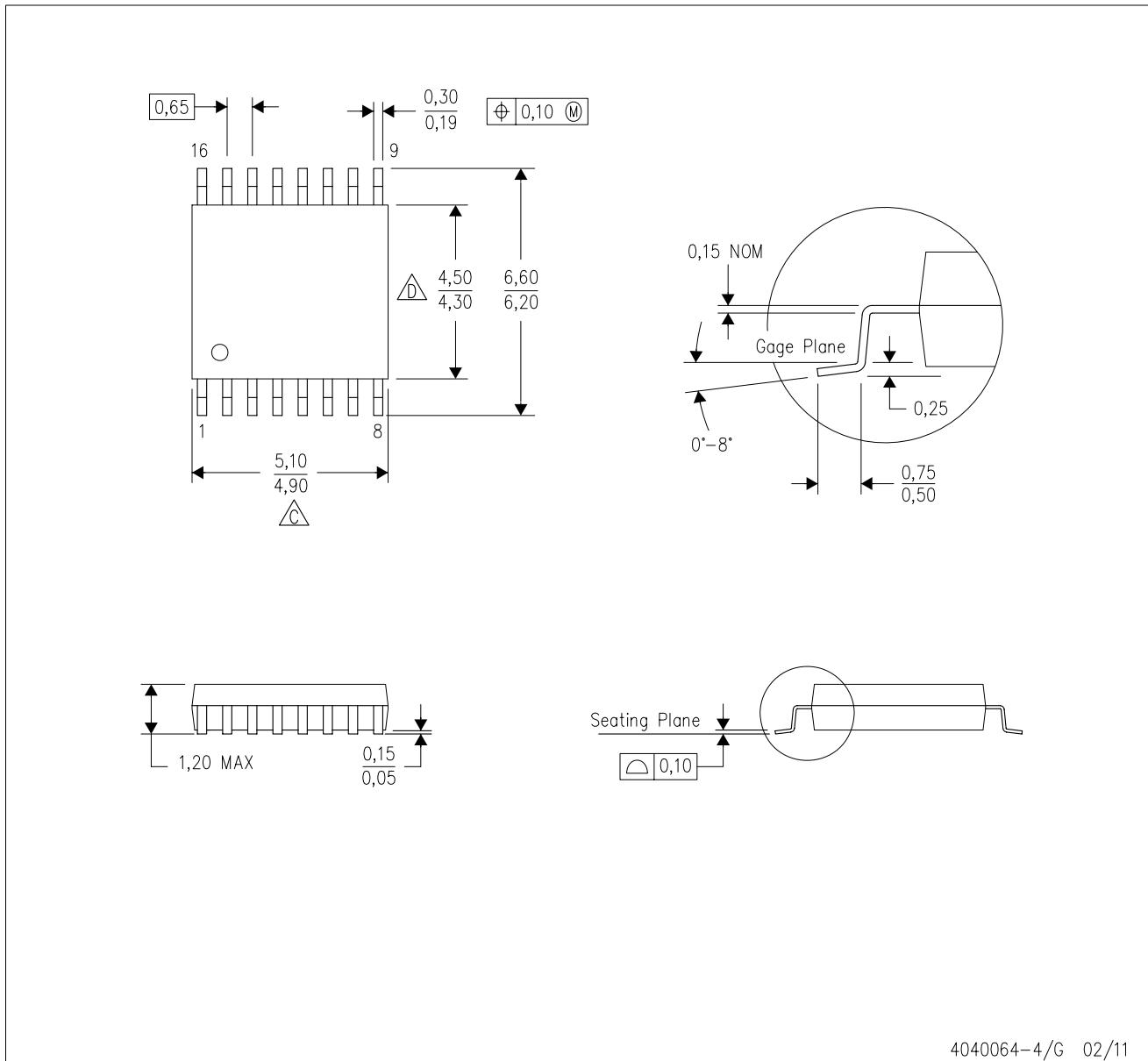
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PW (R-PDSO-G16)

PLASTIC SMALL OUTLINE

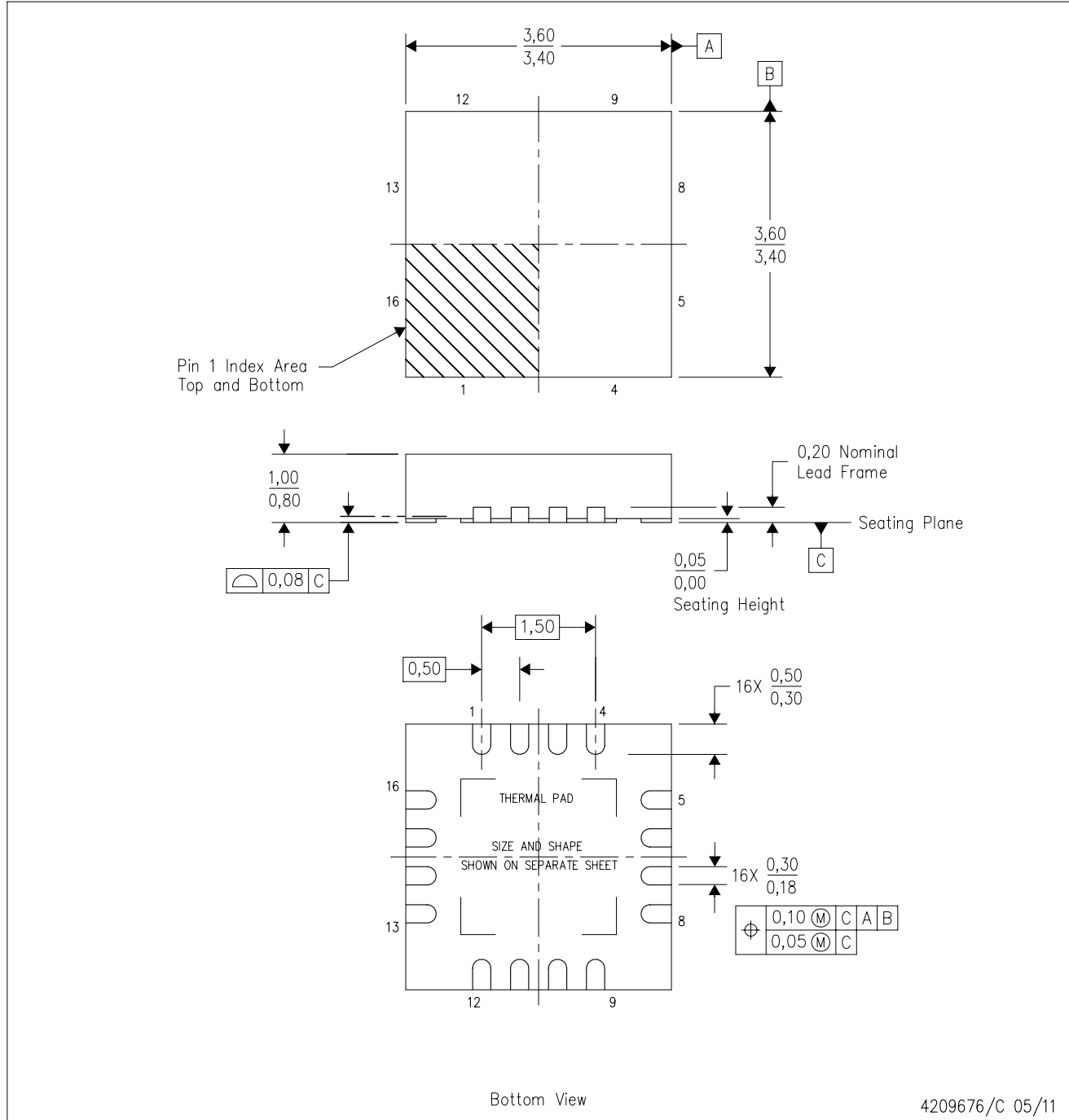


4040064-4/G 02/11

- 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.
 -  Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0,15 each side.
 -  Body width does not include interlead flash. Interlead flash shall not exceed 0,25 each side.
 - E. Falls within JEDEC MO-153

RVA (S-PVQFN-N16)

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. QFN (Quad Flatpack No-Lead) 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.

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