SBAS286 – JUNE 2003

# 24-Bit Analog-to-Digital Converter with 4-Channel Differential Input

## FEATURES

- 240SPS Data Rate
- Input Multiplexer with Four Differential Channels
- Pin-Selectable Input Buffer
- ±5V Input Range (Differential)
- 0.0015% INL
- Self-Calibration
- Simple Two-Wire Serial Interface
- On-Chip Temperature Sensor
- Low Current Consumption: 500 μA
- Sleep Mode < 1μA

## APPLICATIONS

- Portable Instrumentation
- Industrial Process Control
- Smart Transmitters

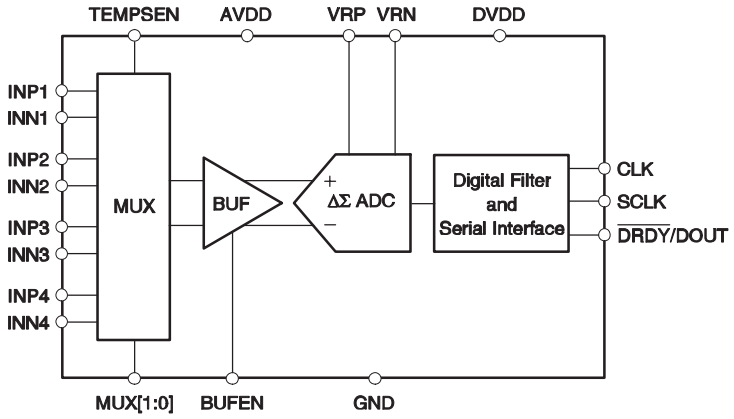
## DESCRIPTION

The ADS1224 is a precision, wide dynamic range analog-to-digital converter (ADC) with 24-bit resolution operating from a 2.7V to 5.5V supply. With a 2.5V reference, the full-scale differential input range is ±5V.

The ADS1224 has multiplexed input channels. Any of four fully differential channels can be selected. Internal buffering can be selected to provide a very high input impedance for direct connection to transducers or low-level voltage signals. Other features include a temperature sensor output and separate analog and digital power supplies to minimize noise coupling. Self-calibration is performed automatically on power-up and on demand to minimize errors due to drift.

A simple, two-wire serial interface provides all the necessary control. Data retrieval, self-calibration, and Sleep mode are handled with a few simple waveforms. When only single conversions are needed, the ADS1224 can be shut down (Sleep mode) while idle between measurements to dramatically reduce the overall power dissipation.

The ADS1224 typically runs on 500μA of current and comes in a TSSOP-20 package.




PRODUCT PREVIEW

## ORDERING INFORMATION

| PRODUCT | PACKAGE–LEAD | PACKAGE DESIGNATOR(1) | SPECIFIED TEMPERATURE RANGE | PACKAGE MARKING | ORDERING NUMBER | TRANSPORT MEDIA, QUANTITY |
|---|---|---|---|---|---|---|
| ADS1224 | TSSOP-20 | PW | –40°C to +85°C | ADS1224 | ADS1224IPWT | Tape and Reel, 250 |
| | | | | | ADS1224IPWR | Tape and Reel, 2500 |

(1) For the most current specification and package information, refer to our web site at www.ti.com.

## ABSOLUTE MAXIMUM RATINGS

over operating free-air temperature range unless otherwise noted(1)

| | ADS1224 | UNIT |
|---|---|---|
| VDD to GND | –0.3 to +6 | V |
| AVDD to GND | –0.3 to +6 | V |
| DVDD to GND | –0.3 to +6 | V |
| Input current | 100, momentary | mA |
| Input current | 10, continuous | mA |
| Input voltage to GND | –0.3 to VDD + 0.3 | V |
| Analog input voltage to GND | –0.3 to AVDD + 0.3 | V |
| Digital input voltage to GND | –0.3 to DVDD + 0.3 | V |
| Maximum Junction Temperature | +150 | °C |
| Operating Temperature Range | –40 to +85 | °C |
| Storage Temperature Range | –60 to +150 | °C |
| Lead Temperature (soldering, 10s) | +300 | °C |

(1) Stresses above these ratings may cause permanent damage. Exposure to absolute maximum conditions for extended periods may degrade device reliability. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those specified is not implied.

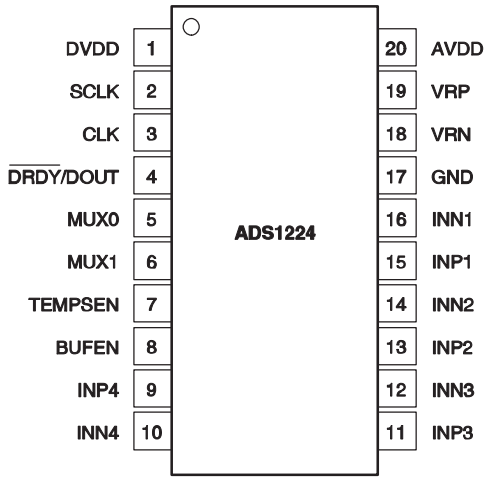
This integrated circuit can be damaged by ESD. Texas Instruments recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

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.

PRODUCT PREVIEW

## PIN ASSIGNMENTS

PW PACKAGE
TSSOP
(TOP VIEW)




## Terminal Functions

| TERMINAL NAME | TERMINAL NO. | DESCRIPTION |
|---|---|---|
| DVDD | 1 | Digital power supply |
| SCLK | 2 | Serial clock input |
| CLK | 3 | System clock input |
| $\overline{\text{DRDY}}$/DOUT | 4 | Data ready output (active low)/serial data output |
| MUX0 | 5 | MUX select bit 0, digital input |
| MUX1 | 6 | MUX select bit 1, digital input |
| TEMPSEN | 7 | Temperature sensor enable, digital input |
| BUFEN | 8 | Input buffer enable, digital input |
| INP4 | 9 | Positive input, channel 4 |
| INN4 | 10 | Negative input, channel 4 |
| INP3 | 11 | Positive input, channel 3 |
| INN3 | 12 | Negative input, channel 3 |
| INP2 | 13 | Positive input, channel 2 |
| INN2 | 14 | Negative input, channel 2 |
| INP1 | 15 | Positive input, channel 1 |
| INN1 | 16 | Negative input, channel 1 |
| GND | 17 | Analog and digital ground |
| VRN | 18 | Negative voltage reference |
| VRP | 19 | Positive voltage reference |
| AVDD | 20 | Analog power supply |

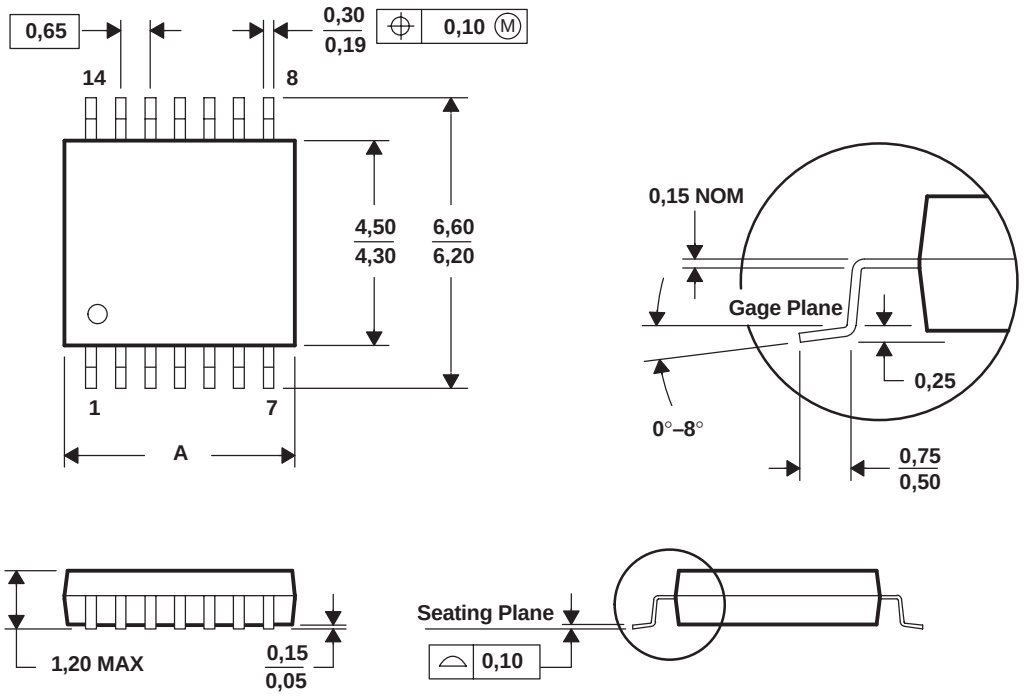
PRODUCT PREVIEW

PRODUCT PREVIEW

## PW (R-PDSO-G**)

## PLASTIC SMALL-OUTLINE PACKAGE

**14 PINS SHOWN**




| DIM \ PINS ** | 8 | 14 | 16 | 20 | 24 | 28 |
|---|---|---|---|---|---|---|
| A MAX | 3,10 | 5,10 | 5,10 | 6,60 | 7,90 | 9,80 |
| A MIN | 2,90 | 4,90 | 4,90 | 6,40 | 7,70 | 9,60 |

**4040064/F 01/97**

NOTES: A. All linear dimensions are in millimeters.
B. This drawing is subject to change without notice.
C. Body dimensions do not include mold flash or protrusion not to exceed 0,15.
D. Falls within JEDEC MO-153

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Mailing Address: Texas Instruments
Post Office Box 655303 Dallas, Texas 75265