Quad/Octal, Simultaneous Sampling, 24-Bit Analog-to-Digital Converters

Check for Samples: ADS1274, ADS1278

FEATURES

- **Simultaneously Measure Four/Eight Channels**
- **Up to 144kSPS Data Rate**
- **AC Performance:**
  70kHz Bandwidth
  111dB SNR (High-Resolution Mode)
  –108dB THD
- **DC Accuracy:**
  0.8µV/°C Offset Drift
  1.3ppm/°C Gain Drift
- **Selectable Operating Modes:**
  High-Speed: 144kSPS, 106dB SNR
  High-Resolution: 52kSPS, 111dB SNR
  Low-Power: 52kSPS, 31mW/ch
  Low-Speed: 10kSPS, 7mW/ch
- **Linear Phase Digital Filter**
- **SPI™ or Frame-Sync Serial Interface**
- **Low Sampling Aperture Error**
- **Modulator Output Option (digital filter bypass)**
- **Analog Supply: 5V**
- **Digital Core: 1.8V**
- **I/O Supply: 1.8V to 3.3V**

APPLICATIONS

- **Vibration/Modal Analysis**
- **Multi-Channel Data Acquisition**
- **Acoustics/Dynamic Strain Gauges**
- **Pressure Sensors**

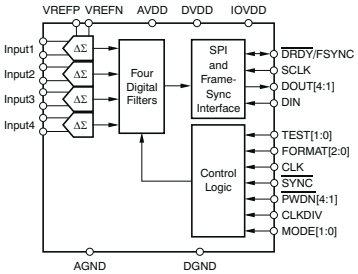
DESCRIPTION

Based on the single-channel ADS1271, the ADS1274 (quad) and ADS1278 (octal) are 24-bit, delta-sigma (ΔΣ) analog-to-digital converters (ADCs) with data rates up to 144k samples per second (SPS), allowing simultaneous sampling of four or eight channels. The devices are offered in identical packages, permitting drop-in expandability.

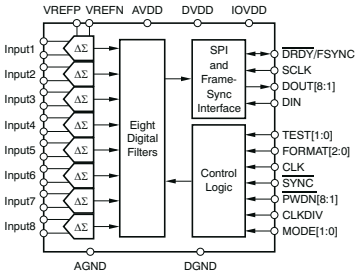
Traditionally, industrial delta-sigma ADCs offering good drift performance use digital filters with large passband droop. As a result, they have limited signal bandwidth and are mostly suited for dc measurements. High-resolution ADCs in audio applications offer larger usable bandwidths, but the offset and drift specifications are significantly weaker than respective industrial counterparts. The ADS1274 and ADS1278 combine these types of converters, allowing high-precision industrial measurement with excellent dc and ac specifications.

The high-order, chopper-stabilized modulator achieves very low drift with low in-band noise. The onboard decimation filter suppresses modulator and signal out-of-band noise. These ADCs provide a usable signal bandwidth up to 90% of the Nyquist rate with less than 0.005dB of ripple.

Four operating modes allow for optimization of speed, resolution, and power. All operations are controlled directly by pins; there are no registers to program. The devices are fully specified over the extended industrial range (–40°C to +105°C) and are available in an HTQFP-64 PowerPAD™ package.



ADS1274



ADS1278

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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.

ORDERING INFORMATION

For the most current package and ordering information, see the Package Option Addendum at the end of this document, or visit the device product folder at www.ti.com.

ABSOLUTE MAXIMUM RATINGS

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

		ADS1274, ADS1278	UNIT
AVDD to AGND		–0.3 to +6.0	V
DVDD, IOVDD to DGND		–0.3 to +3.6	V
AGND to DGND		–0.3 to +0.3	V
Input current	Momentary	100	mA
	Continuous	10	mA
Analog input to AGND		–0.3 to AVDD + 0.3	V
Digital input or output to DGND		–0.3 to IOVDD + 0.3	V
Maximum junction temperature		+150	°C
Operating temperature range	ADS1274	–40 to +125	°C
	ADS1278	–40 to +105	°C
Storage temperature range		–60 to +150	°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.

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