



AD7190

4.8 kHz Ultra Low-Noise 24-Bit Σ - Δ A/D Converter with PGA

The AD7190 is a low-noise, complete analog front end for high precision measurement applications. It contains a low-noise, 24-bit sigma-delta (Σ - Δ) A/D converter. The on-chip low-noise gain stage means that signals of small amplitude can be interfaced directly to the A/D converter.

The device can be configured to have two differential inputs or four pseudo differential inputs. The on-chip channel sequencer allows several channels to be enabled, and the AD7190 sequentially converts on each enabled channel. This simplifies communication with the part. The on-chip 4.92 MHz clock can be used as the clock source to the A/D converter or, alternatively, an external clock or crystal can be used. The output data rate from the part can be varied from 4.7 Hz to 4.8 kHz.

The device has two digital filter options. The choice of filter affects the rms noise/noise-free resolution at the programmed output data rate, the settling time, and the 50 Hz/60 Hz rejection. For applications that require all conversions to be settled, the AD7190 includes a zero latency feature.

The part operates with 5V analog power supply and a digital power supply from 2.7V to 5.25V. It consumes a current of 6 mA. It is housed in a 24-lead TSSOP package.

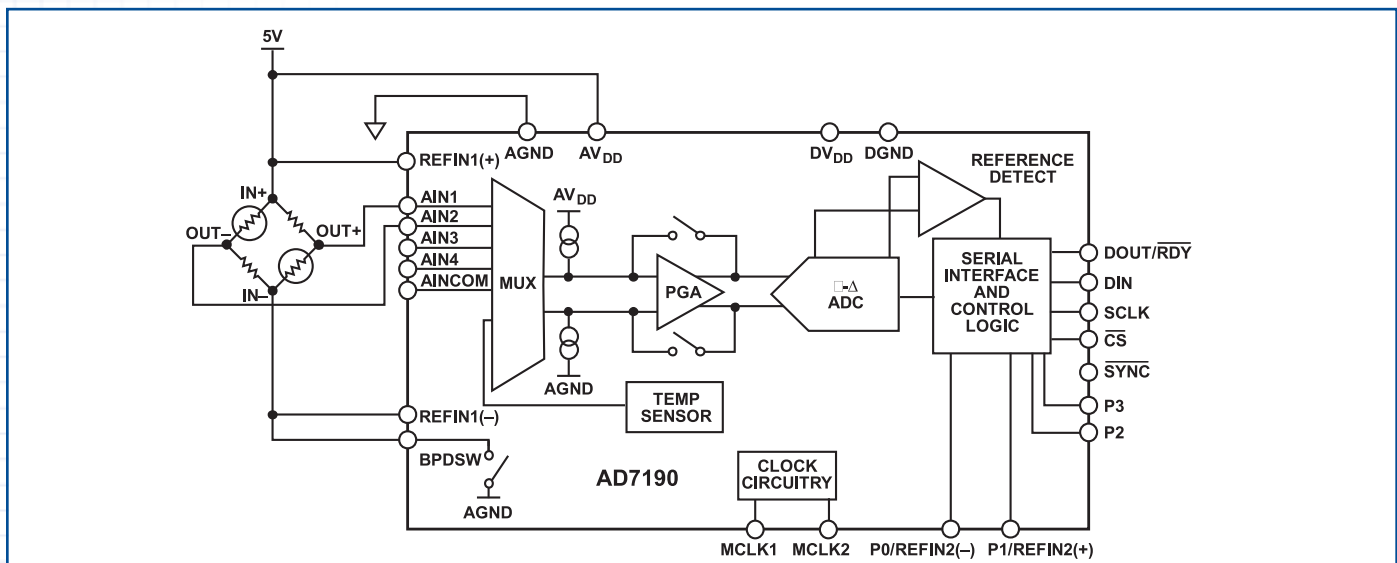
Applications

- Weigh scales
- Dataloggers
- Temperature measurement
- Pressure measurement
- Chromatography

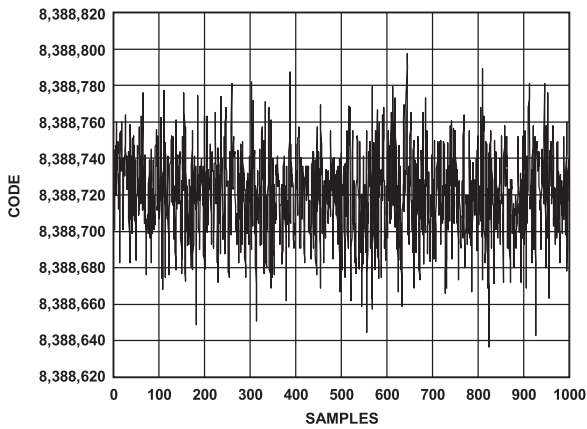
Features

- Programmable gain (1 to 128)
- Data rate: 4.7 Hz to 4.8 kHz
- RMS noise: 8.5 nV at 4.7 Hz (gain = 128)
- 16 noise-free bits at 2.4 kHz (gain = 128)
- Up to 22.5 noise-free bits (gain = 1)
- Offset drift: 5 nV/ $^{\circ}$ C
- Gain drift: 1 ppm/ $^{\circ}$ C
- Simultaneous 50 Hz/60 Hz rejection
- Operating temperature range: -40° C to $+105^{\circ}$ C
- Internal or external clock
- Four general purpose digital output pins
- Power supply:
 - Analog: 4.75V to 5.25V
 - Digital: 2.7V to 5.25V
 - Current: 6 mA
- Interface
 - 3-wire serial
 - SPI, QSPI[™], MICROWIRE[™], and DSP compatible

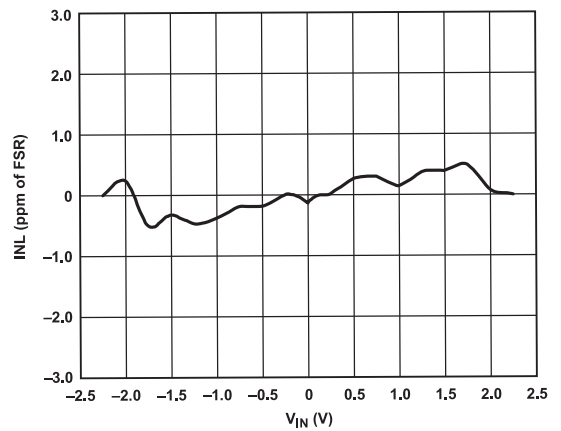
Application Example



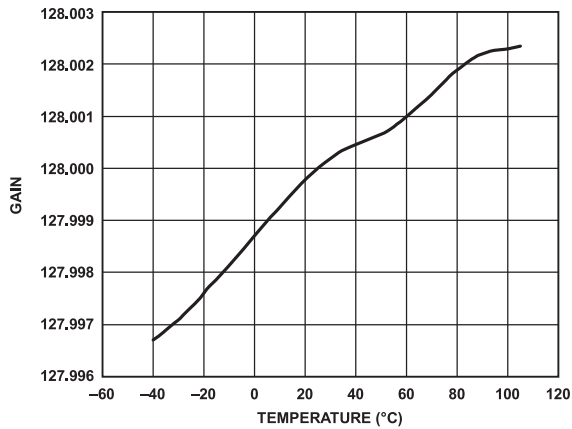
Performance Characteristics



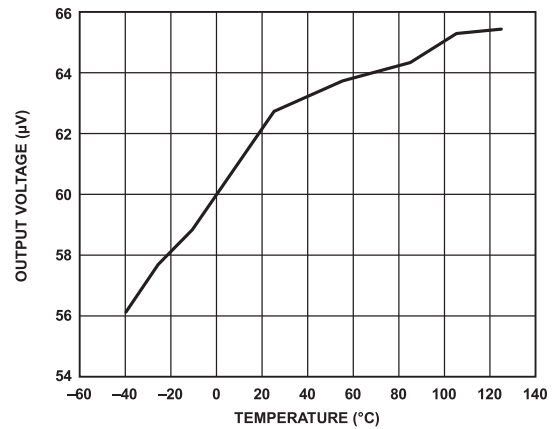
Noise ($V_{REF} = 5\text{ V}$, Output Data Rate = 4800 Hz, Gain = 1, Chop Disabled, Sinc⁴ Filter)



INL (Gain = 1)



Gain Error (Gain = 128, Chop Disabled)



Offset Error (Gain = 1, Chop Disabled)

Ordering Guide

Models	Temperature Range	Package Description	Package Options
AD7190BRUZ ¹	-40°C to +105°C	24-lead TSSOP	RU-24
AD7190BRUZ-REEL ¹	-40°C to +105°C	24-lead TSSOP	RU-24
EVAL-AD7190EBZ ¹	—	Evaluation board	—

Notes

¹ Z = RoHS compliant part.

For more information, such as datasheets and app notes, visit www.arrow.com/arrowedge.