



Complete 4 Channel, 24 Bit Analog to Digital Converter in a 40-pin Metal DIP Package for Extreme Environments

FEATURES

- 4 independent 24 bit Analog to Digital converters
- 4 differential input amplifiers with 4 selectable gains
- Amplifier gains may be customer specified
- Amplifiers feature input noise of $< 2nV / \sqrt{Hz}$
- Selectable sample rates from 1 Hz to 4000 Hz
- Internal 2.500 volt reference
- High speed SPI data and command ports (4 MHz)
- Easy interface with the TX5309 DAC and TX5328 Oscillator
- Low power, dual supply operation

APPLICATIONS

- High Temperature SCADA Systems
- Petroleum reservoir monitoring
- Petroleum LWD, MWD and SWD tools
- Seismic data acquisition systems
- High accuracy instrumentation
- Energy Exploration

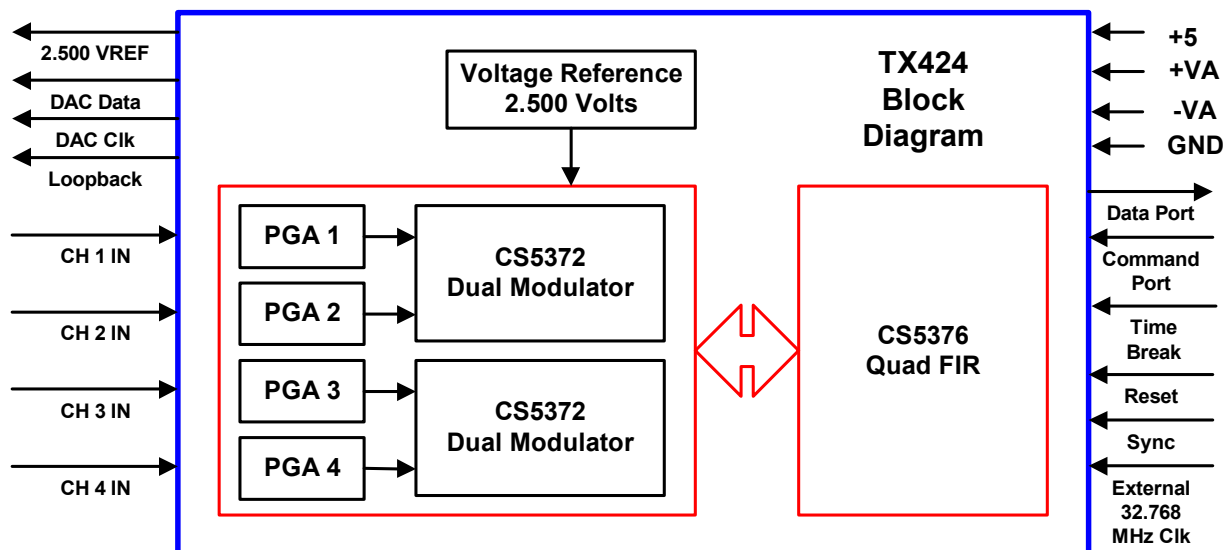
DESCRIPTION

The TX424 is a complete, low-power, 4 channel, 24 bit analog to digital converter in a single 40 pin package. It is a compact, state-of-the-art implementation, which uses two dual 24 bit modulators and a quad FIR filter from Cirrus® semiconductor. The device also contains four low-noise, programmable gain, discrete amplifiers and a precision voltage reference.

The TX424 communicates via two high speed SPI ports, one of which outputs the streaming conversion data, while the other port is used for communication with the decimation engine for setting functions such as sample rate, amplifier gains, offset and gain registers and configuration parameters for an external calibration DAC.

Also provided are digital control inputs for reset, sync, and time break functions. The 'loopback' output is used to control an external input multiplexer, which can route calibration signals or sensor input to the converter.

The four precision, fully differential, amplifiers feature input noise of $1.6nV / \sqrt{Hz}$ (typical) and three configurable gains. The fourth gain value is determined by the combination of the three resistor values used to set gains 1 through 3.



TX424 -- Specifications

Operating Temperature Range

-55°C to +200°C

Analog Inputs

4 Fully Differential inputs
 Max Common Mode Range : ± 1.5 Volts
 Max Differential Input : ± 2.5 Volts
 Noise : $1.6 \text{ nV} / \sqrt{\text{Hz}}$ typ.
 Offset : 500 μV typ.
 Input bias current : 2 μA typ.
 Amplifier Drift : $\pm 10 \text{ } \mu\text{V} / ^\circ\text{C}$ typ.
 Crosstalk Isolation : > 100 dB

Note : NEITHER input can EVER be left open as this will allow this pin to float above the specified common mode voltage and cause excessive current flow between the + and – power supplies.

Amplifier Gains

4 gain ranges controlled by the CS5376A GPIO register. User may specify the first 3 gain ranges within limits of 3 and 300.

Reference (external bypassing recommended)

Voltage : $2.500 \text{ V} \pm 0.5\%$ (25°C)
 Drift (-50°C to +150°C) : 5 ppm
 Drift (+150°C to +200°C) : 10 ppm
 Available Output Current : $\pm 1 \text{ mA}$

Analog to Digital Performance

Noise : -110dB (Sample rate = 1000sps)
 Distortion : -105 db typ (Sample rate = 1000sps)

Power Supply Requirements

Digital: +3.30 to 5.25 Volts
 Analog: +VA : 4.75 to 5.25 Volts
 -VA : -4.75 to -5.25 Volts

Power Consumption

200 to 400 mW – Application dependent

External Clock Input

32.768 MHz – Low Jitter (critical for performance)

Digital I/O

Vcc + 0.3V --- Gnd – 0.3V Max

Serial Peripheral Interface Rate

Up to 4 Mbits / Second

Pinout – Top View

● 1 IN2-	IN3- 40	○
○ 2 IN2+	IN3+ 39	○
○ 3 IN1+	IN4+ 38	○
○ 4 IN1-	IN4- 37	○
○ 5 GND	GND 36	○
○ 6 GND	GND 35	○
○ 7 GND	GND 34	○
○ 8 GND	GND 33	○
○ 9 LOOPB	GND 32	○
○ 10 GND	GND 31	○
○ 11 +VA	-VA 30	○
○ 12 GND	TIMEB 29	○
○ 13 +5	RESET 28	○
○ 14 AGND	REF+ 27	○
○ 15 TBSCLK	TBSDATA 26	○
○ 16 SYSCLK	SDTKI 25	○
○ 17 MOSI	SDCLK 24	○
○ 18 MISO	SDRDY 23	○
○ 19 SSI	SDDAT 22	○
○ 20 SCKI	SYNC 21	○

* All GND PINS CONNECTED TO CASE *

