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CS5360

24-Bit Stereo A/D Converter for Digital Audio

The following information is based on the technical datasheet:

CS5360 DS280PP1 SEP '97

Please contact Cirrus Logic : Crystal Semiconductor Products Division for further information.

CRYSTAL SEMICONDUCTOR PRODUCTS DIVISION PRODUCT INFORMATION

PI280PP1 MAR '98

24-Bit Stereo A/D Converter for Digital Audio

Features

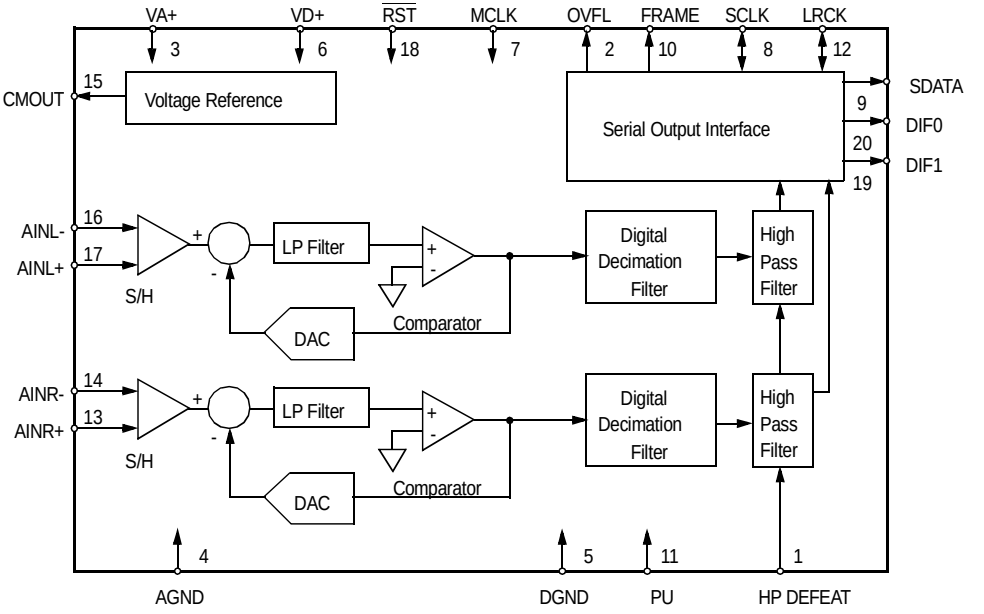
- 24 Bit Digital Output
- 105 dB Dynamic Range
- -95 dB THD+N
- 128X Oversampling
- Fully Differential Inputs
- Linear Phase Digital Anti-Alias Filtering
  - 21.7 kHz passband (Fs = 48kHz)
  - 85 dB stop band attenuation
  - 0.0025 dB pass band ripple
- High Pass Filter - DC Offset Removal
- Peak Signal Level Detector
  - High Resolution and Bar Graph Modes
- Pin Compatible with CS5334 and CS5335

Description

The CS5360 is a 2-channel, single +5 V supply, 24-bit analog-to-digital converter for digital audio systems. The CS5360 performs sampling, analog-to-digital conversion and anti-alias filtering, generating 24-bit values for both left and right inputs in serial form. The output word rate can be up to 50 kHz per channel.

The CS5360 uses 4th-order, delta-sigma modulation with 128X oversampling followed by digital filtering and decimation, which removes the need for an external anti-alias filter. This ADC uses a differential architecture which provides excellent noise rejection.

The CS5360 has a filter passband to 21.7 kHz. The filter has linear phase, 0.0025 dB passband ripple, and >85 dB stopband rejection. An on-chip high pass filter is also included to remove DC offsets.



Overview

The CS5360 is a 24-bit, 2-channel analog-to-digital converter designed for digital audio applications. This device uses two one-bit delta-sigma modulators which simultaneously sample the analog input signals at 128 times the output sample rate (Fs). The resulting serial bit streams are digitally filtered, yielding a pair of 24-bit values. This technique yields nearly ideal conversion performance independent of input frequency and amplitude. The converter does not require difficult-to-design or expensive anti-alias filters and does not require external sample-and-hold amplifiers or a voltage reference. Very few external components are required to support this ADC. Normal power supply decoupling components and a resistor and capacitor on each input for anti-aliasing are all that's required.

An on-chip voltage reference provides for a differential input signal range of 2.0 Vrms. Output data is available in serial form, coded as 2's complement, 24-bit numbers. Typical power consumption is 325 mW which can be reduced to 1.0 mW by using the power-down feature.

FAQs

1) Is the CS5360 Crystal's lowest priced 24-bit converter?

A: Yes. The CS5360 is the lowest priced 24-bit converter offering 105 dB dynamic range and -95 dB total harmonic distortion + noise. Crystal also offers three higher performance 24-bit audio A/D converters - the CS5394, CS5396, and CS5397. The CS5394 offers 117 dB dynamic range with -103 dB THD+N and the CS5396 and CS5397 are the worlds only 24-bit, 96 kHz audio A/D converters. The CS5396 and CS5397 are also the first audio A/D converters to achieve 120 dB dynamic range.

2) When used with the CS4390 24-bit DAC, what is the dynamic range performance in loopback mode (analog in to analog out)?

A: 102-103 dB dynamic range.

3) What advantage does the high pass filter offer over traditional calibration techniques to reduce offsets?

A: The CS5360 high pass filter can remove both offsets in the input circuitry driving the ADC and internal offsets generated within the ADC. The use of a digital high pass filter technique to reduce offsets consistently produces a zero LSB offset which cannot be achieved with traditional calibration techniques.

4) Is the high pass filter defeatable for applications where DC information is important.

A: Yes.

5) How is the peak signal level detector used?

A: The peak signal detector monitors the input signal level into the ADC and outputs 8 bits which correspond to the peak input level. These bits can be used to implement a low cost bar graph display. These 8 bits are output from the ADC following the audio data, and they indicate whether the input signal is clipping (5 dB above full scale) or -60 dB from full scale in 1 dB step resolution. The peak signal detector is updated by toggling the PU (peak update) pin.

6) How is the overflow output used?

A: The OVFL pin goes high when the audio data exceeds the analog input range of the ADC. This pin can be used to light an LED on a system front panel indicating an overrange condition. This pin is cleared with the PU (peak update) pin.

Ordering Information

CS5360-KS	-10° to 70°C	20-pin Plastic SSOP

For further information on Crystal products, please visit our website "www.crystal.com" or call our literature department (800) 888-5016 ext. 3594 or (512) 912-3594 for data sheets and application notes.

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