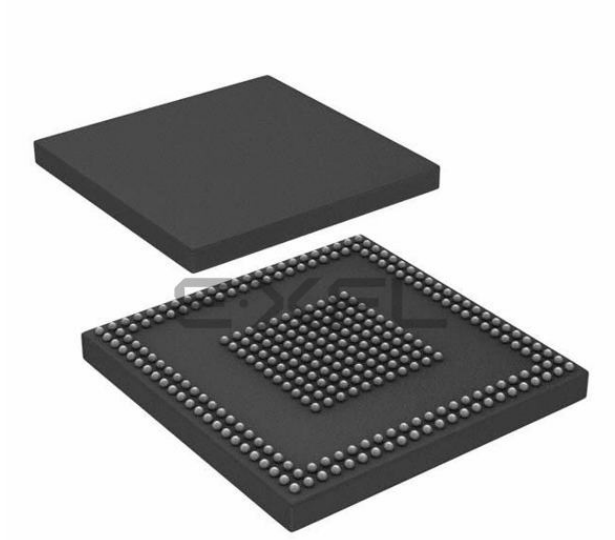

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Understanding Embedded - DSP (Digital Signal Processors)

Embedded - DSP (Digital Signal Processors) are specialized microprocessors designed to perform complex mathematical computations on digital signals in real-time. Unlike general-purpose processors, DSPs are optimized for high-speed numeric processing tasks, making them ideal for applications that require efficient and precise manipulation of digital data. These processors are fundamental in converting and processing signals in various forms, including audio, video, and communication signals, ensuring that data is accurately interpreted and utilized in embedded systems.

Applications of Embedded - DSP (Digital Signal Processors)

Details	
Product Status	Active
Type	Fixed Point
Interface	DMA, Ethernet, I²C, PPI, SPI, SPORT, UART, USB
Clock Rate	400MHz
Non-Volatile Memory	ROM (32kB)
On-Chip RAM	132kB
Voltage - I/O	1.8V, 2.5V, 3.3V
Voltage - Core	1.30V
Operating Temperature	0°C ~ 70°C (TA)
Mounting Type	Surface Mount
Package / Case	289-LFBGA, CSPBGA
Supplier Device Package	289-CSPBGA (12x12)
Purchase URL	https://www.e-xfl.com/product-detail/analog-devices/adsp-bf526kbcz-4c2

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REVISION HISTORY

3/10—Rev. 0 to Rev. A

Revised the following figures.
Recommended Application Circuit Using SPI Control 13
Recommended Application Circuit Using TWI Control .. 14

Added Sampling Rate = 48 kHz to all figures in
Converter Filter Response 30

Revised Ordering Guide 36

GENERAL DESCRIPTION

This document describes the differences between the ADSP-BF52xC and the ADSP-BF52x standard Blackfin® product. Please refer to the published ADSP-BF52x data sheet for general description and specifications. This document only describes the differences from that data sheet.

The ADSP-BF52xC processors add a low power, high quality stereo audio codec for portable digital audio applications with one set of stereo programmable gain amplifier (PGA) line inputs and one monaural microphone input. It features two 24-bit analog-to-digital converter (ADC) channels and two 24-bit digital-to-analog (DAC) converter channels.

The codec can operate as a master or a slave. It supports various master clock frequencies, including 12 MHz or 24 MHz for USB devices; standard 256 × f_S or 384 × f_S based rates, such as 12.288 MHz and 24.576 MHz; and many common audio sampling rates, such as 96 kHz, 88.2 kHz, 48 kHz, 44.1 kHz, 32 kHz, 24 kHz, 22.05 kHz, 16 kHz, 12 kHz, 11.025 kHz, and 8 kHz.

The codec can operate at power supplies as low as 1.8 V for the analog circuitry and as low as 1.8 V for the digital circuitry. The maximum voltage supply is 3.6 V for all supplies.

The codec software-programmable stereo output options provide the programmer with many application possibilities because the device can be used as a headphone driver or as a speaker driver. Its volume control functions provide a large range of gain control of the audio signal.

CODEC DESCRIPTION

The ADSP-BF52xC codec contains a central clock source, called the codec master clock (CODEC_MCLK) that produces a reference clock for all internal audio data processing and synchronization. When using an external clock source to drive the CODEC_MCLK pin, care should be taken to select a clock source with less than 50 ps of jitter. Without careful generation of the CODEC_MCLK signal, the digital audio quality will suffer.

To enable the codec to generate the central reference clock in a system, connect a crystal oscillator between the XTI/CODEC_MCLK input pin and the XTO output pin.

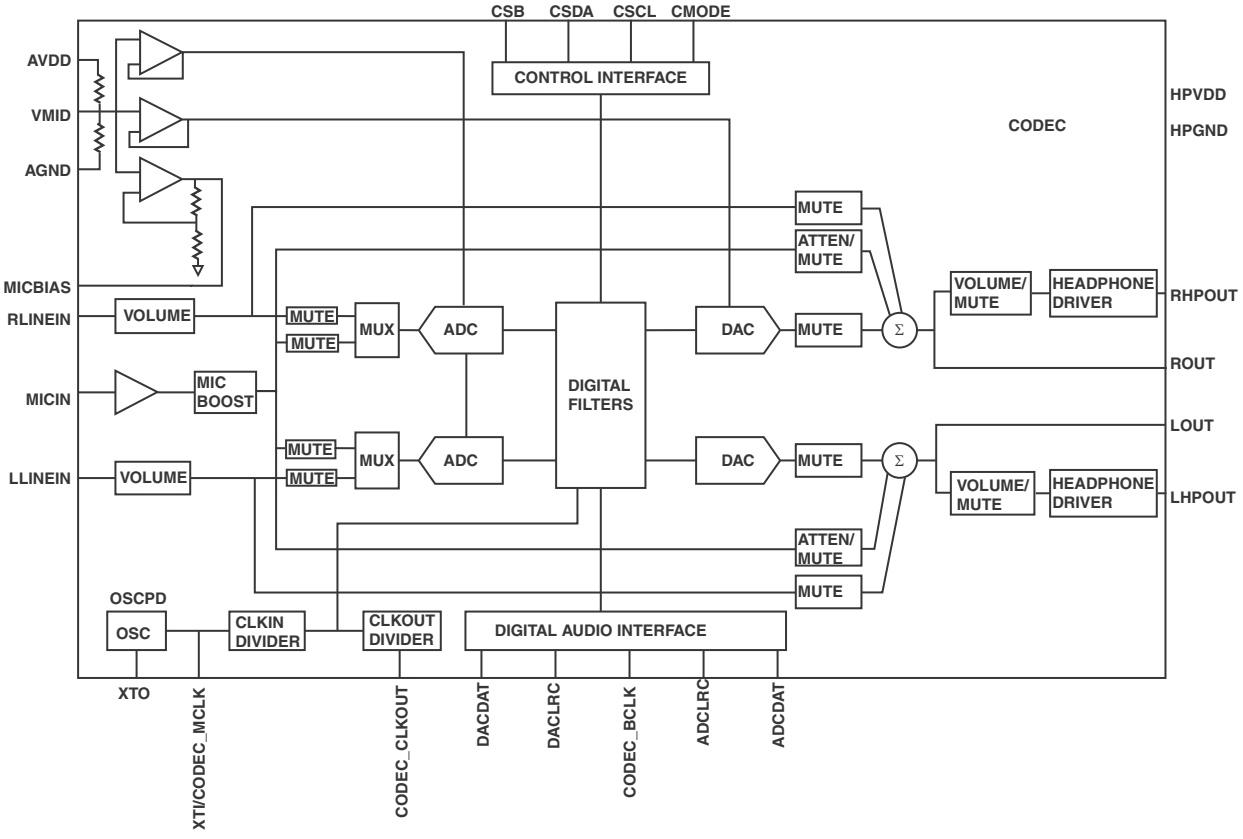

Figure 1. Codec Block Diagram