CS47L24

Ultra Compact, Low Power Smart Codec with Dual Core DSP

CIRRUS LOGIC®

Featuring SoundClear® Software for Wearable, Smart Home and Mobile Applications

Product Overview

The CS47L24 combines an advanced 300 MIPS dual core DSP with a high performance audio hub codec embedded with SoundClear® software technology to add "voice" to mobile, wearable and smart home devices. SoundClear Control enables "always on" voice with the option of local command and control — all at power levels that are kind on battery life.

This highly integrated IC features a variety of power efficient, fixed function, audio-processing blocks supported by a fully flexible, all digital mixing and routing engine with sample rate converters to provide design flexibility across a variety of platforms. The power, clocking and output driver architectures of the CS47L24 are designed to maximize battery life for voice, music and standby modes using 1.8 V and 1.2 V external supplies. A separate MICVDD input can be supported for microphone operation above 1.8 V, while an additional supply is needed to drive the Class D speakers (typically direct connection to 4.2 V battery).

Housed in a compact 63-ball WCSP package, the CS47L24 can support up to four digital microphone inputs with available microphone activity detection with interrupt. The IC is designed with three digital audio interfaces, each supporting a wide range of standard audio sample rates and serial interface formats. Automatic sample rate detection enables seamless wideband/narrowband voice call handover. The headphone/line output driver provides stereo ground referenced or mono BTL output with 121 dB SNR. Noise levels can be as low as 0.8 µVRMS to offer hi-fi quality line or headphone output. A mono Class D output driver is incorporated to support up to 2 W audio output. All inputs, outputs and system interfaces are capable of functioning concurrently.

The CS47L24 is enabled with enhanced DRE (eDRE) software and additional software packages can be chosen according to the requirements of the target application. Need to enable a phone call? By running SoundClear Voice on the CS47L24, the phone can support uplink noise suppression in parallel with echo cancelation allowing the device to offer much better intelligibility on the receiver side without annoying echoes that force users to listen from mute. Add in a headphone output and a 2 W speaker and the CS47L24 is an entire audio and voice subsystem on a single chip.

Available Software Features*

Communications VOICE	SoundClear Voice • Up to 16 kHz processing • 2-mic Tx NR & AEC • Omni-directional use case support	Make/receive calls with optimized voice quality based on use cases from a wearable device
Convenience CONTROL	SoundClear Control • Multi-trigger word support • Seamless trigger to command • User defined triggers	"Always on" listening wearable devices with minimal power consumption range
Capture CAPTURE	SoundClear Record • Up to 48 kHz processing • 2~4 Concurrent MIC input processing • Wind/mic/focus/background noise reduction	Capture vivid noise-free audio when and where needed
Content PLAYBACK	SoundClear Playback • Master Hi-Fi • Speaker protection • Multi-band compressor	Enjoy 192 kHz, 24-bit high resolution audio playback; support for branded 3rd party algorithms

*Software features and pricing vary based on specific use application. Contact a local Cirrus Logic sales representative for further information.

System Features

300 MIPS, 300 MMAC dual core DSP

- Enhanced DRE processing (eDRE) for 121 dB SNR
- Fixed function signal processing
  - Dynamic range control, fully parametric EQs
  - Tone, noise, PWM, haptic control signal generators
- Multi-channel asynchronous sample-rate conversion

Integrated multi-channel 24-bit hi-fi audio hub codec

- 121 dB SNR headphone playback (48 kHz)

Four digital microphone inputs (two stereo interfaces)

Stereo headphone/earpiece/line output driver

- 33 mW into 32 Ω load at 1% THD+N

Mono 2 W Class D speaker output driver

Three full digital audio interfaces

- Standard sample rates from 8 kHz up to 192 kHz
- TDM support on all AIFs

Flexible clocking, derived from MCLKn or AIFn

Two low power, frequency locked loops (FLLs) support reference clocks down to 32 kHz

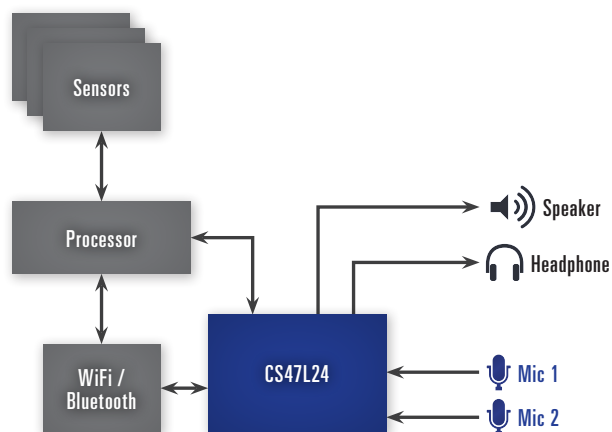Compact WCSP package with 0.4 mm, 63-ball array

Evaluation board available

Target Applications

The CS47L24 is targeted at smart home devices and wearable applications, such as smart watches and glasswear. Mobile audio applications include smartphones, multimedia handsets and those enabled with speech recognition.
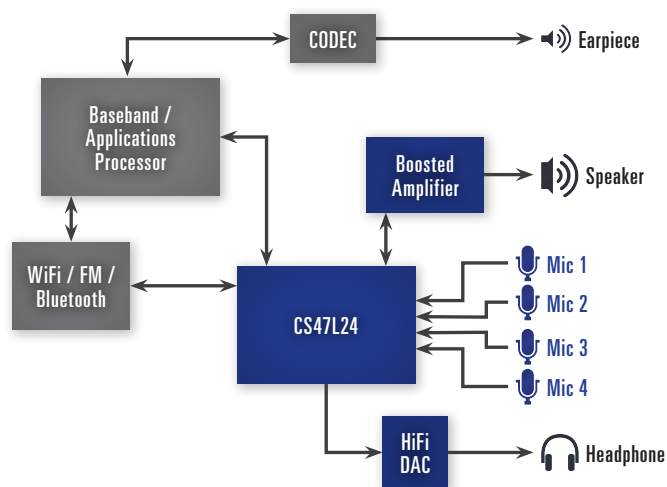
Typical Applications

Wearables, Smart Home Devices

Features

- "Always on" voice trigger
- ASR Enhance™
- Noise reduction and echo cancelation
- Industry leading low power
- Complete audio path solution

Mobile Companion DSP

Features

- Best user experience on smartphones and tablets
- "Always on" voice and ASR Enhance
- Noise reduction and echo cancelation
- Industry leading low power
- Complete audio path solution