CS47L35

Smart Codec with Low Power Audio DSP

Featuring SoundClear® Software for Mid-Tier Smartphones with Voice Trigger

CIRRUS LOGIC®

Product Overview

The CS47L35 combines an advanced DSP feature set with a highly integrated audio codec to deliver the Cirrus Logic voice and audio experience for mid-tier smartphones. The CS47L35 features a 450 MIPS three-core audio signal processor with a high performance 4/3 channel, 24-bit high-fidelity codec embedded with SoundClear® software technology to support multiple concurrent audio functions including multi-microphone wideband noise reduction, speaker protection, acoustic echo cancelation (AEC), low power single and multi-trigger word detection and engine support, and advanced speech and media enhancement.

The DSP cores of the CS47L35 are supported by a fully flexible, all digital mixing and routing engine with sample rate converters that can be user defined. Up to six analog or four digital microphone inputs are supported and activity detection with interrupt is available. A stereo headphone driver provides ground-referenced output and noise levels as low as 1 μV RMS. A BTL earpiece output is featured along with a mono 2 W Class D speaker driver. A flexible control interface with sensor and accessory support can be configured for functions up to 16 GPIO pins and one I2C slave.

The CS47L35 can host a full suite of Cirrus Logic's SoundClear software to allow for expanded opportunities for product differentiation. SoundClear Control provides low power "always on, always listening" voice activation; SoundClear Voice provides "whenever, wherever" crystal clear communications; SoundClear Record captures a cleaner, clearer soundtrack; and SoundClear Playback delivers outstanding sound for an immersive audio experience.

Available Software Features*

Communications VOICE	SoundClear Voice • Up to 16 kHz processing • Up to 2-mic handset or speakerphone Tx NR & AEC • Speaker protection • Wind noise reduction	Make/receive calls with optimized voice quality based on use cases from a smartphone or tablet
Convenience CONTROL	SoundClear Control • Multi-trigger word detection • User defined trigger word detection • Extended audio buffer • Two-channel input, output	"Always on" listening 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 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 third party algorithms

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

System Features

450 MIPS, 450 MMAC multi-core DSP

- Enhanced DRE processing for 121 dB SNR
- Fixed function signal-processing functions
  - Dynamic range control, fully parametric EQs
  - Tone, noise, PWM, haptic control signal generators
- Multichannel asynchronous sample-rate conversion

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

- 120 dB SNR headphone playback (48 kHz)
- Event time stamp function
- Eight general purpose timers, including WDT functions

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, AIFn or SLIMbus

- Three low power, frequency locked loops (FLLs) support reference clocks down to 32 kHz
- Ultra low power consumption for "always on" functions
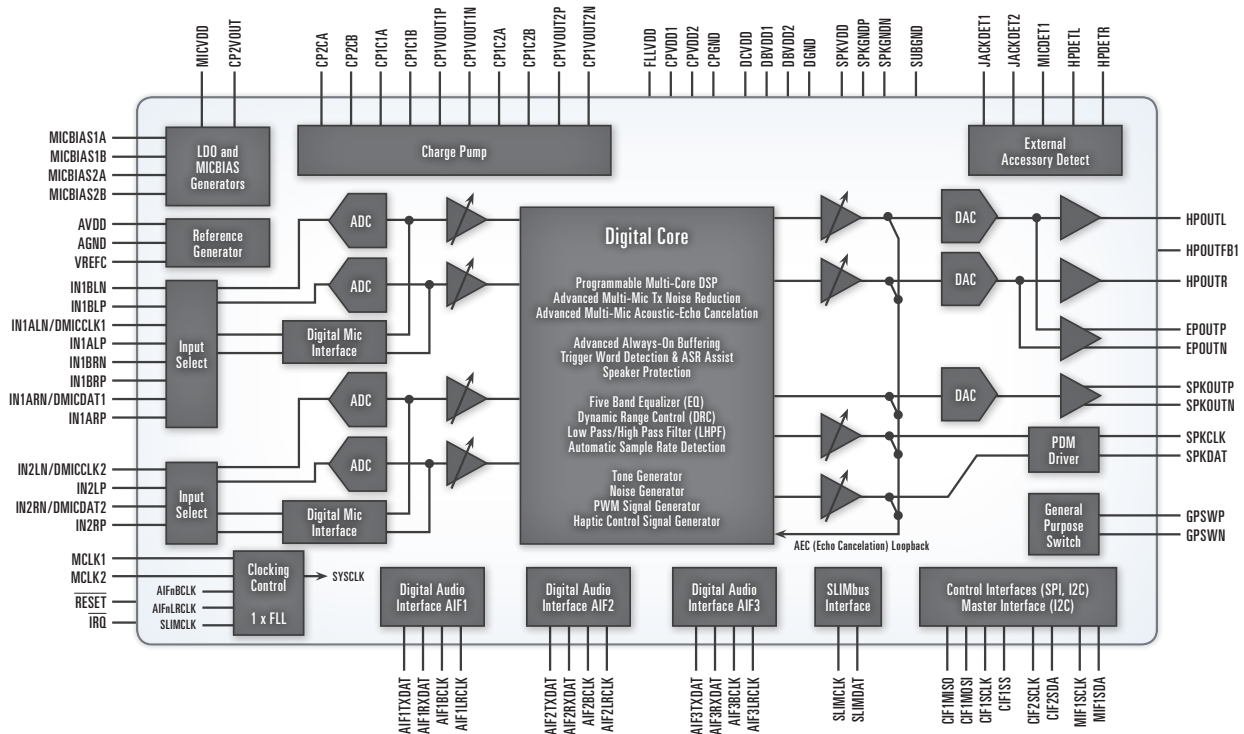
Advanced accessory detection functions

- Low power standby mode and configurable "wake up"

Compact WCSP package with 0.4 mm, 102-ball array

Target Applications

The CS47L35 is targeted at mid-tier smartphones, multimedia handsets and tablets enabled with speech recognition.

Typical Applications