

Four-Channel High Performance Microphone Array ADCs with Programmable Pre-amplifier and Class D PWM Out

Product Overview

The CX20810 is a high performance, analog front-end, high-definition voice capture IC for voice recognition, control, and conferencing applications. The device supports a microphone array with up to four synchronized ADCs and programmable pre-amplifiers. Each pre-amplifier has a dedicated micbias supply that eliminates crosstalk. The entire input path guarantees 106dB dynamic range, which allows the voice system to use the full performance of a high SNR microphone using low microphone boost to prevent microphone saturation. This path is critical for far field applications, and also ideal for compact speaker-phone designs where the microphone and speakers are in close proximity.

The CX20810 features high-resolution digital and analog gain control over a wide range, allowing a selection of optimal operating points for microphones with a wide range of sensitivity. The smooth gain ramping circuit allows dynamically adjusting microphone gain without introducing audible artifacts.

The CX20811 adds a mono digital PWM class D amplifier for ringer and audio playback functions. The class D amplifier output drives up to 1W-rms into a 4Ω load. The PWM output can be configured to support an external output stage amplifier for higher output power applications.

The CX20810 and CX20811 are the industry's first dedicated voice capture ICs that are designed to service the most demanding voice interactive applications.

Key Features

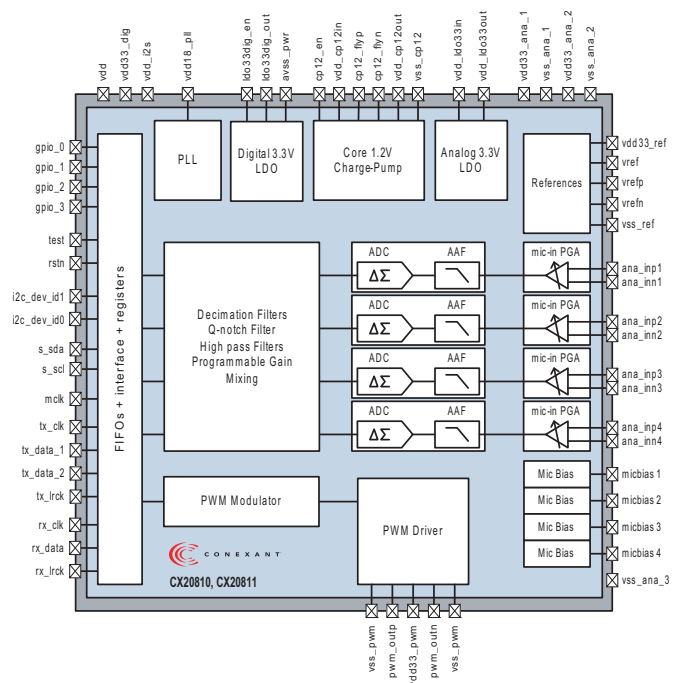
- Four high-performance ADCs with pre-amplifiers
- Microphone/line input support
- Dynamic range: 106dB at PGA gain = 0dB
- THD+n: -85dB measured at -1dBFS
- Supported audio sample rates of: 8kHz, 16kHz, 22.05kHz, 24kHz, 32kHz, 44.1kHz, 48kHz, 88.2kHz, and 96kHz
- ADCs channels mixer
- Four micbias voltages from 1.5V to 4V

- Digitally controlled gain adjustment:
 - Analog gain 0dB to 30dB with 0.5dB steps
 - Digital gain -74dB to 12dB with 0.125dB steps
 - Gain ramping minimizes audible artifacts when gain switching
- Integrated offset calibration to minimize the BOM
- Four programmable biquads to configure Q-notch, HPF, or other type of filters
- Integrated LDO allows single supply (3V~5.5V) to minimize the BOM
- Integrated charge pump for power management
- Consumes very low power; 0.02mW in sleep mode
- Digital class D PWM output up to 1W into 4Ω speakers on the CX20811

Applications

- Voice interactive products
- Voice capture systems
- In-vehicle infotainment

System Block Diagram



Additional Features

- Configurable low power and high performance modes
- Four-wire audio I²S/PCM output supports the four ADC's data, and also supports TDM
- Three-wire audio I²S/PCM input on the CX20811 that supports mono DACs
- I²S master and slave mode support
- Integrated PLL supports 900kHz up to 50MHz input clocks in master mode, and 256Fs in slave mode
- Two-wire I²C slave interface for external MCU

- Four general GPIOs
- Support of 1.8V and 3.3V digital I/Os
- CX20810: 48 QFN, 6x6
- CX20811: 60 QFN, 7x7

Ordering Information

Part Number	Description	Package
CX20810-11Z	Four-channel input only.	6x6mm QFN
CX20811-11Z	Four-channel input with playback digital PWM class D amplifier.	7x7mm QFN

Electrical Characteristics

T_A = 25 °C, AVDD = DVDD = 3.3 V, 1kHz signal, f_s = 48kHz, PGA gain = 0dB

Parameter	Minimum	Typical	Maximum	Unit	Comments
Recommended Operating Conditions					
Analog Voltage Supply (Input to LDO)	3.15	-	5.25	V	LDO and charge pump integrated.
Digital Core Power Supply	-	1.2	2	V	LDO and charge pump integrated.
Digital I/O Supply—3.3V	3.15	3.3	3.45	V	3.3V signaling levels.
Digital I/O Supply—1.8V	1.71	1.8	1.89	V	1.8V Signaling level.
Ground (AGND, PGND, DGND)	-	0	-	-	-
Microphone Input					
SNR (A-weighted)	-	106	-	dB	Microphone gain = 6dB (measured at -60dBFS input).
THD	-	-89	-	dB	Microphone gain = 0dB (measured at -1dBFS input).
Power Supply Rejection Ratio	-	90	-	dB	At 217Hz.
Mute Attenuation	80	-	-	dB	-
Input Resistance	8	-	500	kΩ	Input PGA gain setting dependent.
Micbias					
Bias Voltage	1.5	-	4	V	-
Bias Current	-	-	10	-	-
Noise in the Signal Bandwidth	-	-116	-	dBV	20kHz bandwidth.
PWM (CX20811 Only)					
Full-scale Output	-	2	-	V _{rms}	Scales with supply.
SNR (A-weighted)	-	89	-	dB	AVDD = 3.3V, 4Ω load.
THD+n	-	-53.1	-	dB	AVDD = 3.3V, 4Ω load.

www.conexant.com

Headquarters: 1901 Main Street, Suite 300 Irvine, CA,92614
 General Information: U.S. and Canada: 888-855-4562 | International: 1 + 949-483-3000

004-1011PBR00