

## DA7211

### Ultra low power 1.8V stereo audio codec with True-GND headphone driver

The DA7211 is a high definition audio codec in a 3x3mm footprint with integrated true-ground capless headphone driver suitable for a variety of low power, digital portable audio products.

Featuring a high efficiency but powerful 40mW/channel headphone amplifier the device may be operated from a single 1.8V supply to simplify interfacing to digital processors. Total device consumption is only 2.5mW which helps extend music playback time for battery operated equipment. The fully integrated fractional PLL has been power-optimised designed to support a wide range of input and output frequencies.

Internal suppression circuits help maintain audio synchronisation in the presence of system noise on the external clock.

Six analogue input pins allow multiple audio sources to be internally mixed, eliminating the need for external switches. Both single-ended and fully-differential line and microphone inputs are supported with built-in variable gain amplifiers to optimize dynamic range prior to digitisation. This provides hardware support for ambient noise cancellation.

DA7211 provides two volume controlled differential/single-ended stereo line out drivers and ground centered stereo amplifiers to directly drive standard 3-wire 16ohm headphones. For example the dc-coupled, dedicated pop-free drivers may be connected to stereo headphones, stereo speaker or mono line out, simultaneously and without external switches.

All filtering functions are performed digitally including 5-band EQ and a digital input AGC with programmable attack and decay parameters. A configurable signal processing engine allows various audio enhancements and effects i.e. acoustic filtering, transducer equalisation, wind noise suppression and 3D sound.

The multi-slot I2S/PCM interface supports all common sample rates between 8-96kHz in master or slave mode operation.



*Available in 3x3mm WL-CSP36, 0.5mm ball pitch*



## Features

- ▶ High performance audio codec with integrated PLL
- ▶ True-GND capless Class G 40mW headphone driver with integrated charge pump
- ▶ Single supply operation: 1.8 – 2.5V
- ▶ Flexible clocking capability to minimise master clock circuit board routing
- ▶ Pop & Click suppression circuitry
- ▶ Multi mode audio routing, mixing & volume control
- ▶ DSP 5 Band EQ, Input ALC, programmable noise and acoustic enhancement filters
- ▶ 2-wire software control

## Power Saving Highlights

- ▶ Low power Multi-bit DAC/ADC
- ▶ Stereo Playback/Record: 2.5mW & 3.5mW @ 1.8V
- ▶ Class G Headphone driver
- ▶ 1.8V operation from external DC/DC

## Audio Performance highlights

- ▶ 24bit/96kHz Max Sample rate
- ▶ Stereo 5uV balanced Microphone amplifiers and low noise bias
- ▶ Low distortion differential outputs 40mW 16Ω headphone driver

## Digital Processing highlights

- ▶ 5-band EQ
- ▶ Independent volume control
- ▶ Fully digital ALC
- ▶ Programmable acoustic filters for audio enhancements and 3D effects
- ▶ Wind Noise Suppression

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## Key Parameters

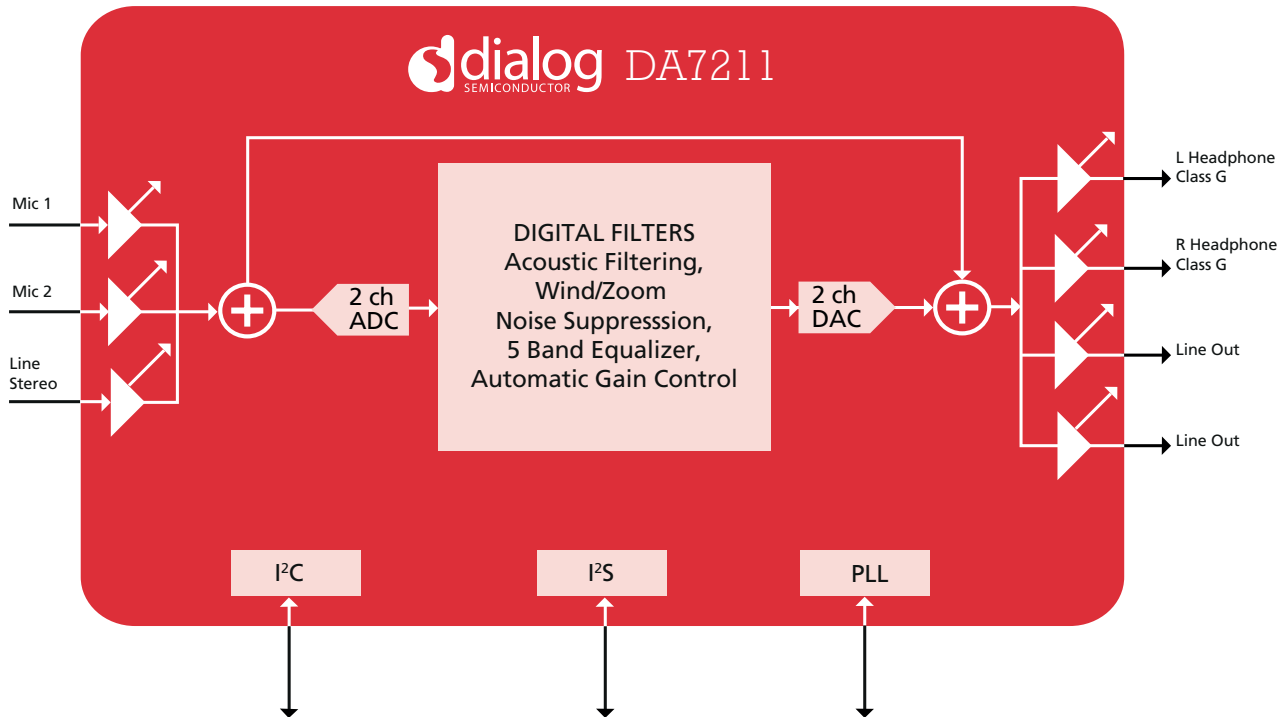
- ▶ Stereo Playback/Record: 2.5mW & 3.5mW @ 1.8V (into stereo headphone load including PLL consumption)
- ▶ Audio performance@ 2.5V
  - DAC: 100dB/-85db THD
  - ADC: 96db SNR/-89dB THD
- ▶ Sample rates up to 96kHz supported via multi-slot I2S/PCM interface
- ▶ Stereo fully-differential microphone amplifiers with 5uV input noise and bias

## Board Area highlights

- ▶ Small 3x3mm footprint
- ▶ Capless headphone driver eliminates
- ▶ Large AC coupling capacitors



## Block Diagram



## Target Applications

- ▶ Personal Media Players
- ▶ Portable Consumer Devices, such as Digital Radio
- ▶ Music Handsets
- ▶ Personal Navigation Devices

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