

ExG sensing front end

A low-noise, low-power, multipurpose front end for EMG, EEG, and ECG applications

The ExG front end provides 20 low-power, low-noise configurable sensing channels that can simultaneously acquire and process EMG (electromyography), EEG (electroencephalography), and ECG (electrocardiography) signals.

Features

- Silicon proven in TSMC 55 nm LP process
- ExG front end
 - 20 ExG (i.e., EEG, ECG, EMG) differential sensing channels with configurable low-noise amplifiers and built-in programmable anti-aliasing filter
 - Input signal amplitude from 1 μV to 10 mV in a frequency range from sub-Hz to 10 kHz
 - 24 $\mu\text{W}/\text{channel}$
- Analog-to-digital converter
 - 12 bit SAR ADC with 100 μW consumption up to 1 Msps
- Dedicated digital controller
 - Data management unit for multi-purpose, multi-channel simultaneous ExG sensing
 - Lossless data compression

Supporting blocks

- Integrated power management unit
 - External supply from 2.5 V to 3.3 V
- On-chip RC oscillator
 - Calibration with external 32 kHz clock

ExG signals characteristics

