# AFE presents as industry’s lowest power, smallest, single-lead for heart-rate monitors

Analog Devices introduced a low-power, single-lead, heart-rate monitor analog front end (AFE) for a wide range of vital sign monitoring applications. The AD8232 AFE is 50 percent smaller and uses up to 20 percent less power than competing solutions, according to the company. The resulting power, size and level of integration enable designers to develop heart rate and cardiac monitor devices for use outside of critical-care settings in areas such as personal health management and remote health monitoring. This AFE was designed specifically to meet the ECG signal conditioning requirements of emerging fitness, portable/wearable monitoring and remote health monitoring equipment. The flexible analog filtering configuration of the AD8232 incorporates a two-pole, high-pass filter that is tightly coupled with the IC’s instrumentation amplifier architecture, and an uncommitted operational (gain) amplifier that enables the user to employ multi-pole low pass filtering techniques to remove line noise and other interference. By performing large-gain and high-pass signal conditioning in a single stage in the analog domain, the AD8232 can accommodate electrode DC offsets while operating on a single supply voltage without sacrificing performance or signal quality. With an analog output, the AD8232 can be paired with either a discrete A/D converter or a microcontroller with an embedded A/D converter, which provides system designers with the flexibility to deliver a new level of value and performance for fitness and healthcare monitoring.

In addition to the instrumentation and gain amplifier, the AD8232 heart-rate monitor AFE incorporates a reference buffer, right leg drive circuit and shutdown function. The AD8232 also includes user-selectable (AC or DC) leads-off detect

circuitry that monitors when an electrode is disconnected from the patient or user, providing an alert to the system. This new heart-rate monitor AFE offers an innovative fast-restore mode that quickly and automatically recovers the cardiac signal in the event a user temporarily loses contact with an electrode during exercise, or other activity, greatly improving the quality of the end-user experience.

AD8232 Heart Rate Monitor Key Features

- Supply current: 180 µA
- 4-mm x 4-mm, 20-pin LFCSP package
- 2-pole adjustable high-pass filter
- 3-pole adjustable low-pass filter and gain amplifier
- AC/DC Leads-off detection and fast-restore mode
- Noise: 20-µVp-p (0.5 Hz to 40 Hz)
- Common-mode rejection ratio: 80 dB (DC to 60 Hz)
- Integrated Right Leg Drive
- 2.0 to 3.5V supply voltage range
- Shutdown function

**Analog Devices**
800-262-5643, www.analog.com [1]

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**Links:**
[1] http://www.analog.com