

## FEATURES

### AFE for ECG measurement

- 5 ECG acquisition channels and 1 driven reference
- Flexible front-end arrangement allows right arm electrode or WCT referenced
- Dedicated per channel  $\Sigma$ - $\Delta$  ADC
- 50 mV typical calibration signal for gain correction

### Digital 50 Hz or 60 Hz mains power line filtering

### Flexible pacemaker detection capability

- Digital detection algorithm on selectable 3 of 5 ECG channels
- Programmable threshold levels
- Dedicated high sample rate SAR ADCs

### Lead-off or lead fail detection

- DC lead-off detection on ECG and RLD\_OUT
- Programmable polarity, current, and threshold levels

### AC lead quality measurement

- Programmable polarity current

### Reference electrode drive

- Flexible redirection to other electrodes if RLD lead failure

### Respiration measurement using impedance pneumography

### High precision voltage references

### Shield drive amplifier

### Parallel ICs for larger lead count configurations

### Communication

- SPI
- 8 user programmable GPIOs

### Power

#### Low power architecture

- Single channel ECG power: 3.04 mW
- 3 channel ECG power: 4.95 mW
- 5 channel ECG power: 7.64 mW

- Operates from 2 or 3 voltage rails: 5 V, 1.8 V, or 1.2 V
- POR

### Packages and temperature range

- Operating temperature range:  $-10^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$
- Package: 65-ball, 5.6 mm  $\times$  6.2 mm WLCSP

- Supports medical standards: IEC 60601-2-25 Ed. 2.0 2011, IEC 60601-2-27 Ed. 3.0 2011, and IEC 60601-2-47 Ed. 2.0 2012

## APPLICATIONS

### Portable and line powered ECG monitor and diagnostic measurement

### Battery powered ECG equipment

For up to date information on the production release timelines, contact your local [Analog Devices, Inc., sales representatives](#) or send an email to [ADAS1021@analog.com](mailto:ADAS1021@analog.com).

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## SIMPLIFIED FUNCTIONAL BLOCK DIAGRAM

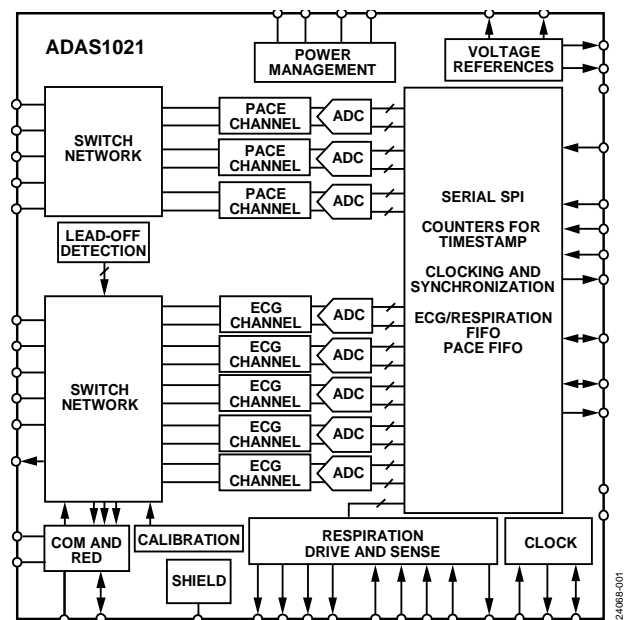


Figure 1.

## GENERAL DESCRIPTION

The ADAS1021 is a highly integrated, analog front end (AFE) designed for measurement of patient biopotential information. The primary measurement performed is electrocardiogram (ECG) activity, where the ADAS1021 employs dedicated  $\Sigma$ - $\Delta$  analog-to-digital converters (ADCs) per channel to acquire and digitize on a lead basis. The signal acquisition is architected to support low noise, diagnostic level measurement in the presence of a variety of interferers.

The ADAS1021 also includes three dedicated successive approximation register (SAR) ADCs to digitize the high frequency pacemaker content that is analyzed by the on-chip pacemaker detection algorithm.

A dedicated and flexible impedance measurement block captures impedance variation during patient respiration and is available on multiple leads.

The ADAS1021 has a number of complementary features supporting ECG measurement: driven reference for common-mode rejection and lead-off detection that identifies if an electrode connection is degrading or has fallen off. The product also includes a shield drive amplifier to bias the shield of the cable.

**NOTES**