Low Power, 5 Electrode Electrocardiogram (ECG) Analog Front

Preliminary Technical Data

**FEATURES**

- Biopotential signals in; digitized signals out
- 5 acquisition (ECG) channels + 1 driven lead
- Parallel ICs for up to 10+ Electrode measurements
- AC and DC Leads Off Detection
- Internal Pace Detection Algorithm on 3 leads
- Support for users own pace
- Thoracic Impedance Measurement (internal/external path)
- Selectable Reference Lead
- Scalable Noise vs. Power Control, Power Down Modes
- Low Power Operation from: 11mW (one lead), 14mW (3 leads), 21mW (all electrodes)
- Lead or Electrode Data available
- Fast Overload Recovery
- Low or High speed Data Output Rates
- Serial interface SPI®-/QSPI™-/DSP-compatible
- 56 lead LFCSP package (9mm x9mm)
- 64 lead LQFP package (10mm x10mm Body size)

**APPLICATIONS**

- ECG: Monitor & Diagnostic
  - Bedside Patient Monitoring, Portable Telemetry, Holter, AED, Cardiac Defibrillators, Ambulatory Monitors, Pace Maker Programmer, Patient Transport, Stress testing,

**GENERAL DESCRIPTION**

The ADAS1000 measures electro cardiac (ECG) signals, thoracic impedance, pacing artifacts, lead on/off status and outputs this information in the form of a data frame supplying either Lead/Vector or Electrode data at programmable data rates. Its low power from 11mW and small size make it suitable for portable, battery powered applications. The high performance also makes it suitable for higher end diagnostic machines.

The ADAS1000 is designed to simplify the task of acquiring and ensuring quality ECG signals. Value-added cardiac post-processing is executed externally on a DSP, microprocessor or FPGA. Several digital output options ensure flexibility when monitoring and analyzing signals. The ADAS1000 provides a low power, small data acquisition system for biopotential applications.

**FUNCTIONAL BLOCK DIAGRAM**

Figure 1 Functional Block Diagram – ADAS1000 Full featured Model
GENERAL DESCRIPTION - CONTINUED

Auxiliary features that aid in better quality ECG signal acquisition include: multi-channel averaged driven lead, selectable reference drive, fast over load recovery, flexible respiration circuitry returning magnitude and phase information, internal pace detection algorithm operating on 3 leads and option of AC or DC leads off detection.

Since ECG systems span different applications, the ADAS1000 features a novel power/noise scaling architecture where the noise can be reduced at the expense of increasing power consumption. Signal acquisition channels may be shutdown to save power. Data rates can be reduced to save power.

To ease manufacturing tests, development, as well as offer holistic power-up testing, the ADAS1000 offers a suite of dc and ac test excitation via the CAL DAC, CRC redundancy testing in addition to read-back of all relevant register address space.

The ADAS1000 is a full featured 5 channel ECG including respiration and pace detection, while the ADAS1000-1 offers only ECG channels with no respiration or pace features. Similarly the ADAS1000-2 is a subset of the main device and is configured for gang purposes with only ECG channels enabled (no respiration, pace, RLD, etc). The input structure is a differential amplifier input thereby allowing the user a variety of configuration options to best suit their application.

The ADAS1000 variants are available in two package options, either a 56 lead LFCSP or a 64 lead LQFP package and are specified over -40°C to +85°C temperature range.
Figure 3. ADAS1000-1 Simplified Block Diagram

Figure 4. ADAS1000-2 Companion Simplified Block Diagram
OUTLINE DIMENSIONS

TBD
Exposed paddle will be on the top of package

Figure 5. 56 lead, 9mm x 9mm LFCSP

COMPLIANT TO JEDEC STANDARDS MS-026-BCD

ORDERING GUIDE

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Temperature Range</th>
<th>Package Description</th>
<th>Lead Finish</th>
<th>Package Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADAS1000XSTZ²</td>
<td>5 ECG Channels, Pace Algorithm, Respiration Circuit</td>
<td>-40°C to +85°C</td>
<td>64 lead LQFP</td>
<td>TBD</td>
<td>ST-64</td>
</tr>
<tr>
<td>ADAS1000BCPZ³</td>
<td>5 ECG Channels, Pace Algorithm, Respiration Circuit</td>
<td>-40°C to +85°C</td>
<td>64 lead LFCSP</td>
<td>TBD</td>
<td>CP-64</td>
</tr>
<tr>
<td>ADAS1000BSTZ</td>
<td>5 ECG Channels, Pace Algorithm, Respiration Circuit</td>
<td>-40°C to +85°C</td>
<td>64 lead LQFP</td>
<td>TBD</td>
<td>ST-64</td>
</tr>
<tr>
<td>ADAS1000-1BCPZ</td>
<td>5 ECG Channels</td>
<td>-40°C to +85°C</td>
<td>64 lead LFCSP</td>
<td>TBD</td>
<td>CP-64</td>
</tr>
<tr>
<td>ADAS1000-2BCPZ</td>
<td>Companion for Gang Mode</td>
<td>-40°C to +85°C</td>
<td>64 lead LFCSP</td>
<td>TBD</td>
<td>CP-64</td>
</tr>
<tr>
<td>ADAS1000-2BSTZ</td>
<td>Companion for Gang Mode</td>
<td>-40°C to +85°C</td>
<td>64 lead LQFP</td>
<td>TBD</td>
<td>ST-64</td>
</tr>
<tr>
<td>EVAL-ADAS1000EBZU2</td>
<td>Evaluation Kit – Sample model. This evaluation kit consists of ADAS1000 x 2 for up to 12 lead configuration. This evaluation board can be used to evaluate all variants.</td>
<td>-40°C to +85°C</td>
<td>64 lead LQFP</td>
<td>TBD</td>
<td></td>
</tr>
</tbody>
</table>

² Z = Pb-free part.
³ Initial samples available in this package only, “X” distinguishes unreleased
⁴ Final Release model