PS25012A3, PS25012B3
Application Boards for EPIC sensor PS25203

Features

- Ultra high input resistance, typically $5x10^{10}$ Ω.
- Frequency response (-3dB) 200mHz to 20kHz.
- Wide operating voltage from 4.0 to 8.0V.
- Operating temperature range 0 to 50ºC.
- 200pF load drive capability.
- Ground referenced output.
- DC signal rejection.
- Dual sensor board allows differential operation.

Applications

- Electrophysiological signal detection.
  - ECG/EOG/EMG/EEG
- Electric field and potential sensing.
  - Movement sensing

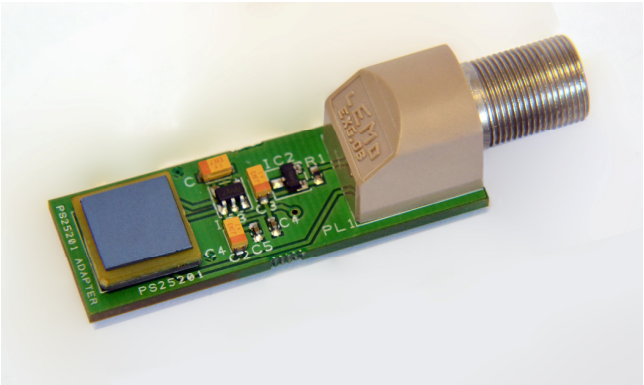

Figure 1: PS25012A3 single channel board carrying a single PS25203 sensor

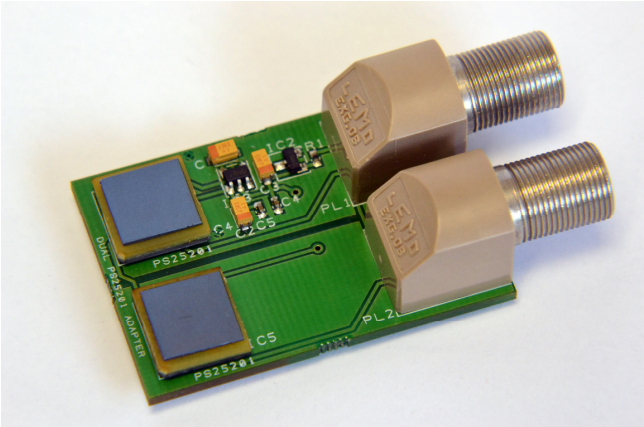

Figure 2: PS25012B3 dual channel board carrying two PS25203 sensors

Description

The PS25012A3 and PS25012B3 are single and dual channel application boards for the demonstration of the Plessey PS25203 electric potential sensor.

The PS25203 electric potential sensors on these boards allow the measurement of a wide range of electric potential sources from electrophysiological signals through to spatial electric field. The sensors incorporate a DC block feature that allows the DC component of an applied signal to be rejected while maintaining good low frequency response. The electrode surface of the detector is passivated with a thin dielectric that allows the direct application to a test surface. In the case of contact with skin there is no need for electrically conductive gel.

The PS25203 sensor demonstrated on these boards is an integrated assembly designed for surface mount assembly on a motherboard.

The application boards provide the regulated +2.5V and generated -2.5V supplies that are used to operate the sensor. This allows the boards to demonstrate the sensors from a wide, single sided, power supply voltage while the output of the sensor can cover the range ±2.1V. The boards are connected by a high reliability five pin connector.

Two single channel PS25012A3 boards or a dual channel PS25012B3 board may be used to generate a differential signal. A typical example is shown in Figure 3 below:

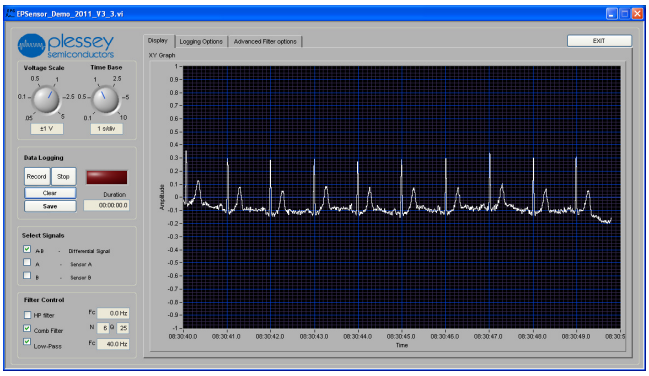

Figure 3: Differential signal from two sensors in contact with the skin showing ECG type characteristics

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Plessey Semiconductors Ltd.
Design & Technology Centre, Delta 500, Delta Business Park, Great Western Way, Swindon, UK SN5 7XE
Tel: +44 1793 518000 Fax: +44 1793 518030 Web: www.plesseysemi.com

Electrical Characteristics

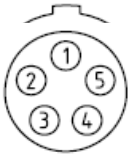
These electrical characteristics apply to the PS25012A3 and PS25012B3 application boards that carry the PS25203 sensors. The electrical characteristics (@25ºC) are guaranteed by either production test or by design and characterisation. They apply within the specified supply voltage unless otherwise stated.

Characteristics	Value			Units	Conditions/Notes
	Min.	Typ.	Max.		
Supply voltage	4.0		8.0	V	
Supply current; PS25012A3	2.7		10.0	mA	Each PS25203 sensor consumes 2.0mA (typ). The additional current is consumed by the app'n board.
Supply current; PS25012B3	5.4		20.0	mA	
Input resistance (Rin)		50		GΩ	
Input capacitance		10		pF	
Voltage Gain (Av)		10			
Coupling capacitance		250		pF	Sensor to skin
Lower -3dB point		0.20		Hz	
Upper -3dB point		20.0		kHz	
Noise		tbd			

Electrical Connector

The PS25012A3 and PS25012B3 application boards are fitted with one or two five pin sockets. The connectivity of these sockets is shown below:

Pin 1 Output
Pin 2 Gnd
Pin 3 Supply
Pin 4 Gnd
Pin 5 Not used



The supply and ground connections of the two sockets on the dual channel PS25012B3 board are connected in parallel so that the board will be active with either one or both connectors in use. However, when both sockets are powered the supplied voltages must be identical.

Auxiliary Components

PS25000A — Control and Interface Box; 50Hz.
This box provides power for one or two sensors. It incorporates switchable low pass and 50Hz notch filters. The box contains an amplifier with switchable gain of either x1 or x10. The box also generates a differential signal from two sensors. The box incorporates a data acquisition card that provides the data from the sensors via a USB cable to a computer. The box is powered by the USB connection. A soft scope is provided with this box for display of the signals on a computer.

PS25001A — Control and Interface Box; 60Hz.
This box is identical to the PS25000A except that the switchable notch filter is preset to reject 60Hz.

PS25013 — Adapter cable.
This 1.5m long cable connects the sockets of the PS25012A3 and PS25012B3 application boards to the PS25000A or PS25001A Control and Interface Box.

For further information about this and other products, please visit: www.plesseysemiconductors.com

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