Electroencephalography (EEG) Sensor Data Sheet

EEG 151015

SPECIFICATIONS

> **Gain:** 40000
> **Range:** ±41.25µV (with VCC = 3.3V)
> **Bandwidth:** 0.8-49Hz
> **Consumption:** ~3mA
> **Input Impedance:** >100GOhm
> **CMRR:** 100dB

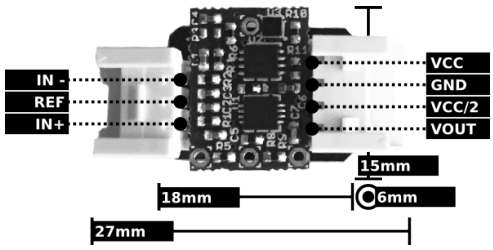

Fig. 1. Pin-out and physical dimensions.

FEATURES

> Single-channel sensor
> Bipolar differential measurement
> Pre-conditioned analog output
> Small form factor
> Raw data output
> Easy-to-use

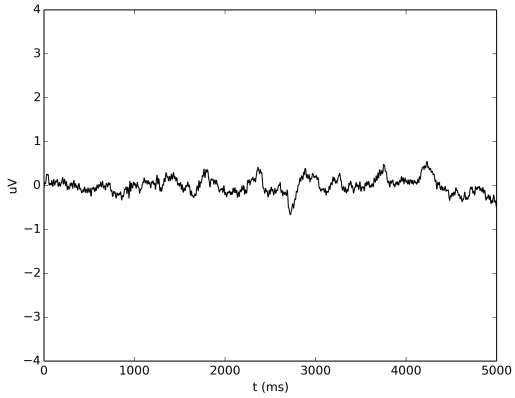

Fig. 2. Typical raw EEG data (acquired with BITalino).

APPLICATIONS

> Human-Computer Interaction
> Evoked potentials analysis
> Neurofeedback
> Sleep studies
> Neurophysiology studies
> Psychophysiology
> Biomedical devices prototyping

GENERAL DESCRIPTION

Our electroencephalography (EEG) sensor has been especially designed for both classic and localized EEG measurement. When a cap is too intrusive, only a limited number of channels are needed, or you'd like to synchronously record EEG and non-EEG biosignals, this is the perfect solution. The bipolar configuration, with two measurement electrodes detects the electrical potentials in the specific scalp region with respect to a reference electrode, which should be placed in a region of low muscular activity. The resulting signal is the amplified difference between these two signals, eliminating the common unwanted signals detected by the surfaces. Its convenient form factor enables a discrete placement in regions such as the forehead, occipital, and others.

Fig. 3. Example sensor placement for localized EEG.

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REV A

BEWARE: DIRECT OR INDIRECT COUPLING TO THE MAINS MAY RESULT IN SHOCKING HAZARD

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TRANSFER FUNCTION

[-41.25μV, 41.25μV]

$$EEG(V) = \frac{\left(\frac{ADC}{2^n} - \frac{1}{2}\right).VCC}{G_{EEG}}$$

$$EEG(\mu V) = EEG(V).1\times10^6$$

$VCC = 3.3V$ (operating voltage)
$G_{EEG} = 40000$ (sensor gain)

$EEG(V)$ – EEG value in Volt (V)
$EEG(\mu V)$ – EEG value in microvolt (μV)
ADC – Value sampled from the channel
n – Number of bits of the channel[1]

[1] The number of bits for each channel depends on the resolution of the Analog-to-Digital Converter (ADC); in BITalino the first four channels are sampled using 10-bit resolution ($n = 10$), while the last two are sampled using 6-bit ($n = 6$).