

# Electroencephalography (EEG) Sensor Data Sheet

EEG 151015

## SPECIFICATIONS

- > **Gain:** 40000
- > **Range:**  $\pm 41.25\mu\text{V}$  (with  $V_{CC} = 3.3\text{V}$ )
- > **Bandwidth:** 0.8-49Hz
- > **Consumption:**  $\sim 3\text{mA}$
- > **Input Impedance:**  $> 100\text{G}\Omega$
- > **CMRR:** 100dB

## FEATURES

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

## 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.

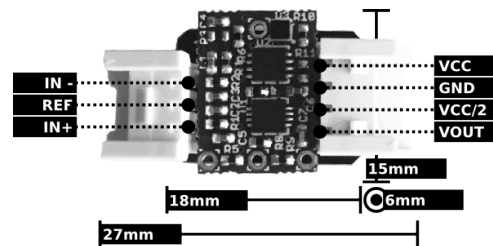


Fig. 1. Pin-out and physical dimensions.

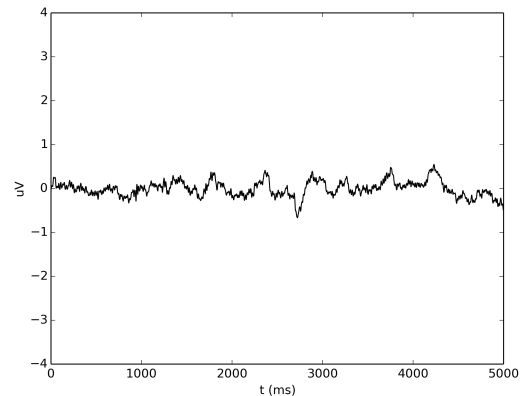


Fig. 2. Typical raw EEG data (acquired with BITalino).

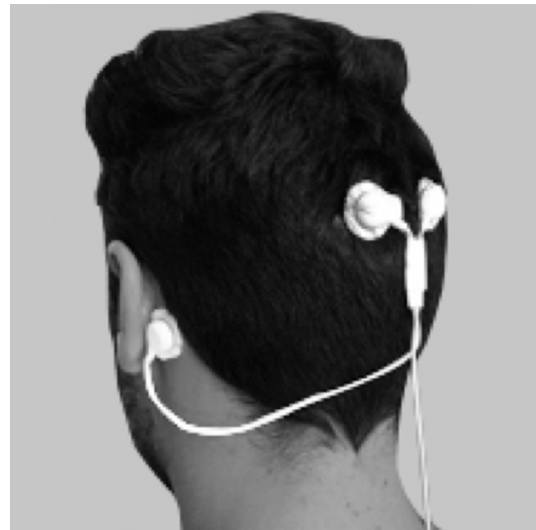


Fig. 3. Example sensor placement for localized EEG.

# bitalino

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# Electroencephalography (EEG)

## Sensor Data Sheet

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### **TRANSFER FUNCTION**

[-41.25 $\mu$ V, 41.25 $\mu$ V]

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

$$EEG(\mu V) = EEG(V) \cdot 1 \times 10^6$$

$VCC = 3.3V$  (operating voltage)

$G_{EEG} = 40000$  (sensor gain)

$EEG(V)$  – EEG value in Volt ( $V$ )

$EEG(\mu V)$  – EEG value in microvolt ( $\mu V$ )

$ADC$  – Value sampled from the channel

$n$  – Number of bits of the channel<sup>1</sup>

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<sup>1</sup> 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 ( $n = 6$ ).