Electroencephalography (EEG) Sensor Data Sheet

SPECIFICATIONS
> Gain: 40000
> Range: ±41.25μV (with VCC = 3.3V)
> Bandwidth: 0.8-49Hz
> Consumption: ~3mA
> Input impedance: >100GOhm
> 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.

BEWARE: DIRECT OR INDIRECT COUPLING TO THE MAINS MAY RESULT IN SHOCKING HAZARD
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TRANSFER FUNCTION
[-41.25μV, 41.25μV]

\[ EEG(V) = \frac{(ADC - 1)}{2^n - 1} \times \frac{VCC}{G_{EEG}} \]

\[ EEG(\mu V) = EEG(V) \times 1 \times 10^6 \]

\[ VCC = 3.3V \text{ (operating voltage)} \]
\[ G_{EEG} = 40000 \text{ (sensor gain)} \]

\[ EEG(V) \] – 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 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 \((n = 6)\).