Electrodermal Activity (EDA) Sensor Data Sheet

EDA 151015

SPECIFICATIONS

> **Gain:** 2
> **Range:** 0-1MOhm (with VCC = 3.3V)
> **Bandwidth:** 0-3Hz
> **Consumption:** ~2mA
> **Electrodes:** 2

FEATURES

> Skin resistance measurement
> Pre-conditioned analog output
> High signal-to-noise ratio
> Small form factor
> Raw data output
> Easy-to-use

APPLICATIONS

> Arousal detection
> Human-Computer Interaction
> Emotional cartography
> Affective computing
> Physiology studies
> Psychophysiology
> Relaxation biofeedback
> Biomedical devices prototyping

GENERAL DESCRIPTION

Sweat glands secretion is a process that allows our body to regulate its temperature, but it is also associated the sympathetic nervous system activity. Whenever we become aroused (e.g. nervous) or relaxed, that state is partially translated into the sweat production or inhibition at the glands on our hands palms and feet. This changes the resistance of our skin; Electrodermal Activity (EDA) monitoring enables the translation of these resistance changes into numerical values, allowing its use in a wide array of applications. Known uses of this sensor include emotional mapping, the polygraph test (aka lie detector), and also stress / relaxation biofeedback.

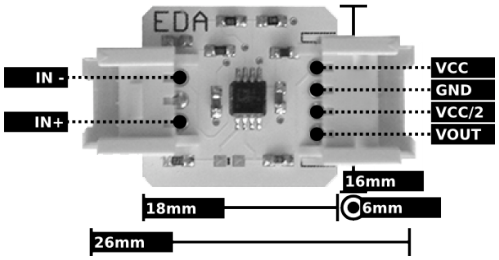

Fig. 1. Pin-out and physical dimensions.

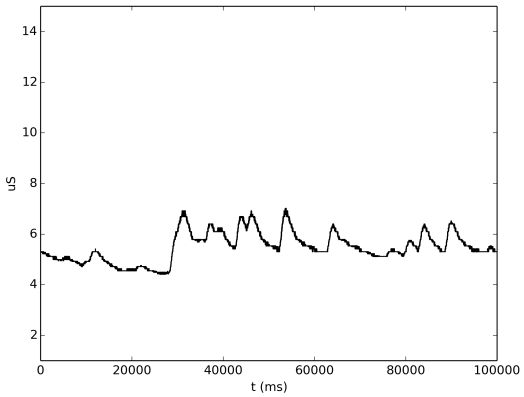

Fig. 2. Typical raw EDA data (acquired with BITalino).

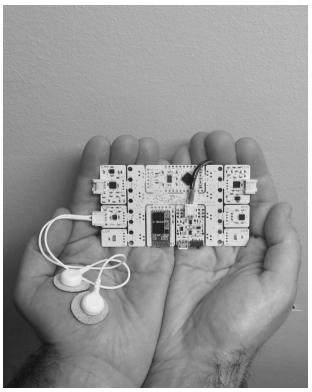

Fig. 3. Example electrode placement.

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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

[$1\mu S$, $\infty\mu S$]

$$R(MOhm) = 1 - \frac{ADC}{2^n}$$

$$EDA(\mu S) = \frac{1}{R(MOhm)}$$

$R(MOhm)$ – Sensor resistance value mega-Ohm ($MOhm$)
$EDA(\mu S)$ – EDA value in micro-Siemens (μS)
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 ($n = 6$).