



**Eval Kit Manual**

# **CCS811**

**Standard Board**

**CCS811-LG\_EK\_ST**

## Content Guide

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## 1 Introduction

The document provides an overview of the CCS811 evaluation kit and covers the following topics: evaluation kit general description, software installation, board interface, test points, schematics, PCB layout and bill of materials (BOM).

## 2 General Description

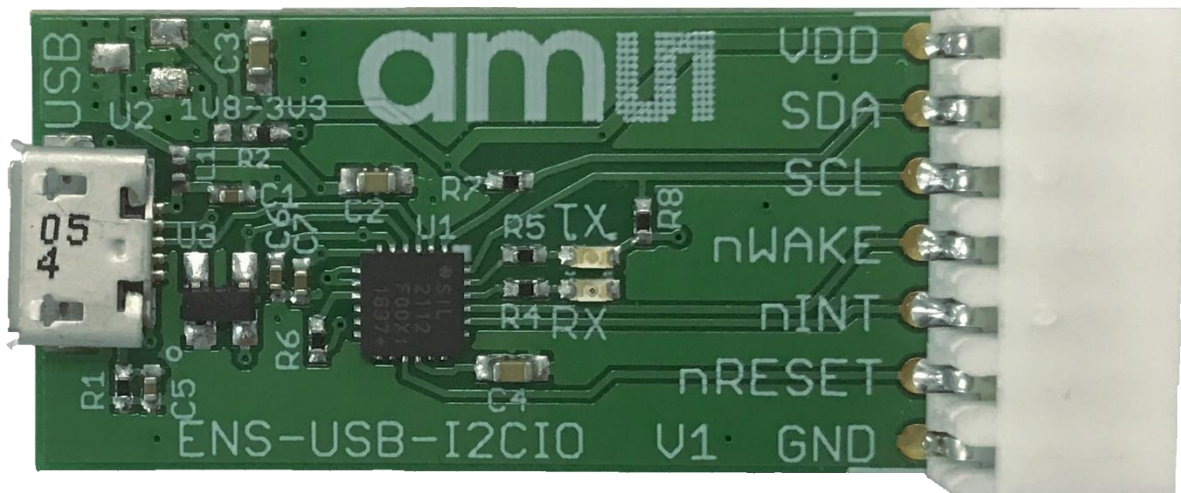
The CCS811 evaluation kit comes with the following components:

- ENS-USB-I2CIO : USB to I<sup>2</sup>C board
- ENS-CCS811-SB : CCS811 sensor board
- Thanks Card containing URL to download related software and documentation
- USB 2.0 A Male to Micro B cable

### 2.1 USB to I<sup>2</sup>C Board (ENS-USB-I2CIO)

The USB to I<sup>2</sup>C board refer to as ENS-USB-I2CIO, as shown in Figure 1, allows control and measurement of the CCS811 sensor board using the ENS Dashboard. By default the USB to I<sup>2</sup>C board provides a 3.3 V supply to the CCS811 sensor board.

**Figure 1 USB to I<sup>2</sup>C Board**



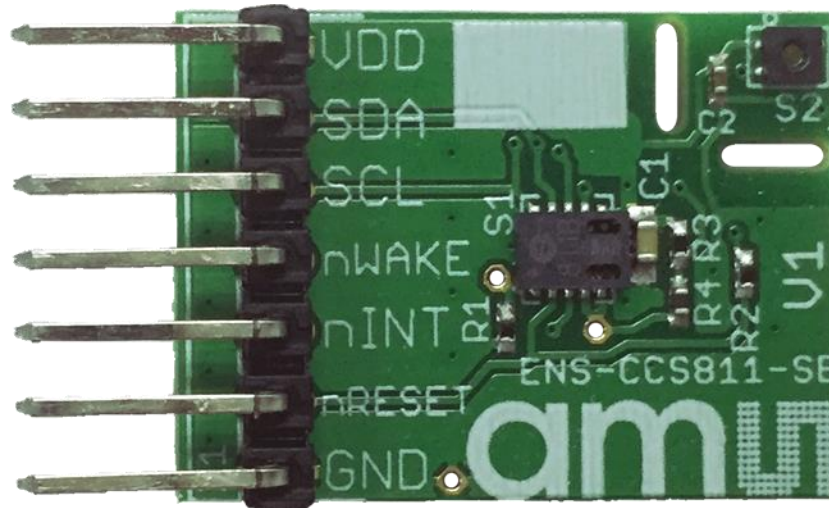
The USB to I<sup>2</sup>C board has the following key features:

- Silicon Labs CP2112 device which provides a simple solution for controlling I<sup>2</sup>C slave, the nWAKE and nRESET signals and monitors the nINT signal
- Board dimensions 42mm length x 18mm width
- Standard micro USB connector and board interface with power (VDD, GND) and I<sup>2</sup>C Signal (SCL, SDA).
- Supports Standard I<sup>2</sup>C mode (100 kHz) and Fast I<sup>2</sup>C mode (400 kHz)

## 2.2 CCS811 Sensor Board (ENS-CCS811-SB)

The CCS811 sensor board refer to as ENS-CCS811-SB, as shown in Figure 2, is an evaluation platform for the CCS811 device. It contains a CCS811 digital VOC gas sensor with an ENS210 relative humidity and temperature sensor and has I<sup>2</sup>C interface which is compatible with the USB to I<sup>2</sup>C board for USB connection to PC / laptop

**Figure 2 CCS811 Sensor Board**

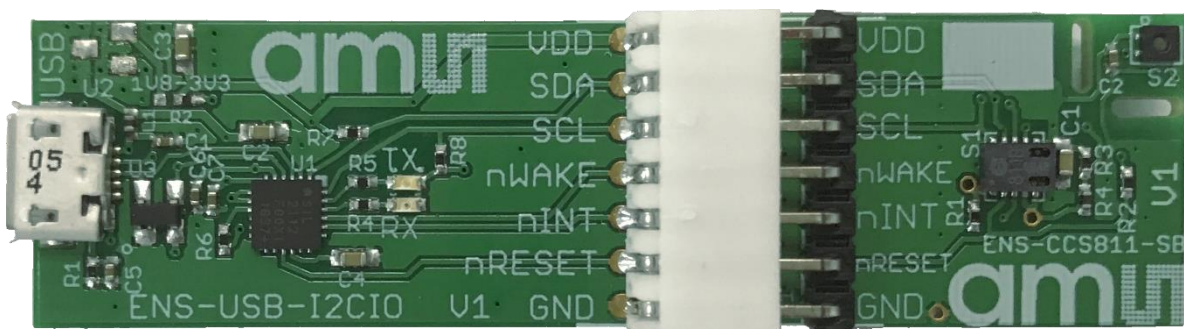


The sensor board has the following key features:

- CCS811 ultra-low power digital gas sensor for monitoring indoor air quality
- ENS210 relative humidity and temperature sensor with I<sup>2</sup>C Interface used to compensate for environmental changes
- Board dimensions 25mm length x 18mm width
- Board interface with power (VDD, GND) and I<sup>2</sup>C Signal (SCL, SDA).
- Sensor chips support standard I<sup>2</sup>C mode (100 kHz) and fast I<sup>2</sup>C mode (400 kHz)
- Sensor board supports 1.8 V to 3.6 V

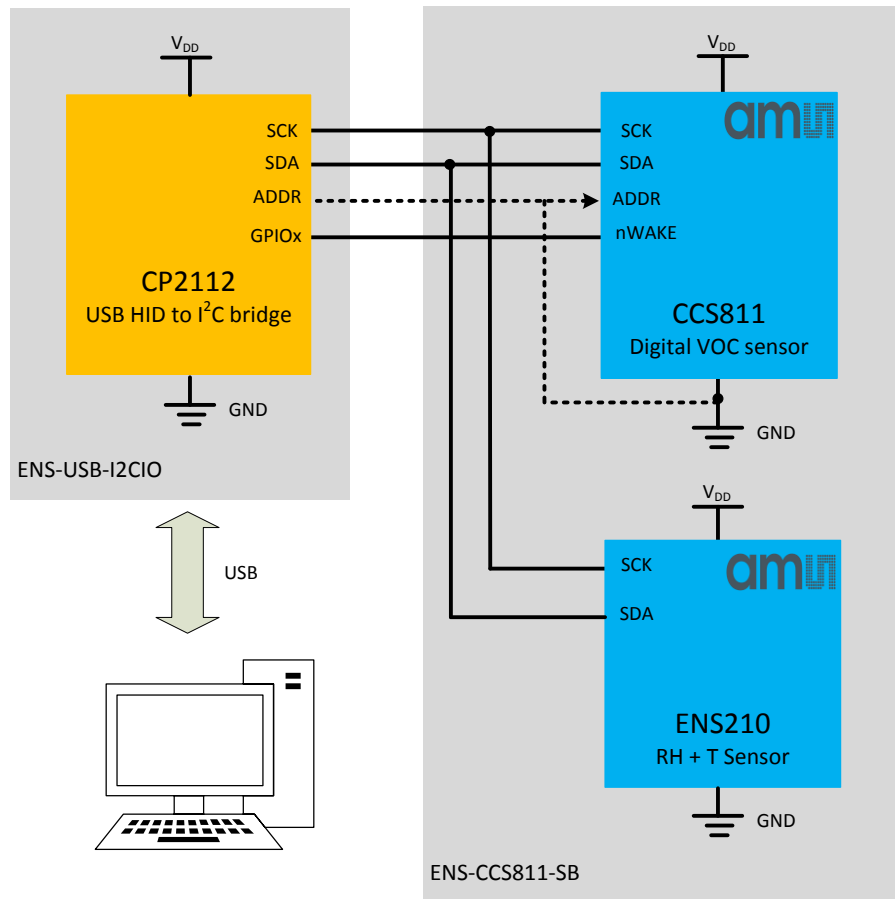
By plugging the CCS811 sensor board into the USB to I<sup>2</sup>C board as shown in Figure 3, direct connection to PC is enabled via USB.

**Figure 3 CCS811 Sensor Board with USB to I<sup>2</sup>C board**



A block diagram of the CCS811-LG\_EK\_ST which illustrates the end-to-end connection between the PC via USB to I<sup>2</sup>C board (ENS-USB-I2CIO) and CCS811 sensor board (ENS-CCS811-SB) is shown in Figure 4 below.

**Figure 4 Block Diagram of CCS811-LG\_EK\_ST**



Relative humidity and temperature data from ENS210 can be read on the I<sup>2</sup>C bus and this information can be written to CCS811 to compensate for temperature and humidity changes for indoor air quality monitoring.

### 3 Software Installation

Quick steps:

- Connect CCS811 sensor board (ENS-CCS811-SB) into USB to I<sup>2</sup>C board (ENS-USB-I2CIO)
- Connect USB to I<sup>2</sup>C board (ENS-USB-I2CIO) via USB cable to Windows PC
- Install Windows PC ENS dashboard application available at <http://ens.ams.com/>

The ENS Dashboard application setup wizard will be launched and guide you through the installation, please refer to the ENS Dashboard user manual.

## 4 Board Interface and Test Points

### 4.1 Board Interface

The signal labels and pin designators for the interface are shown in Figure 5.

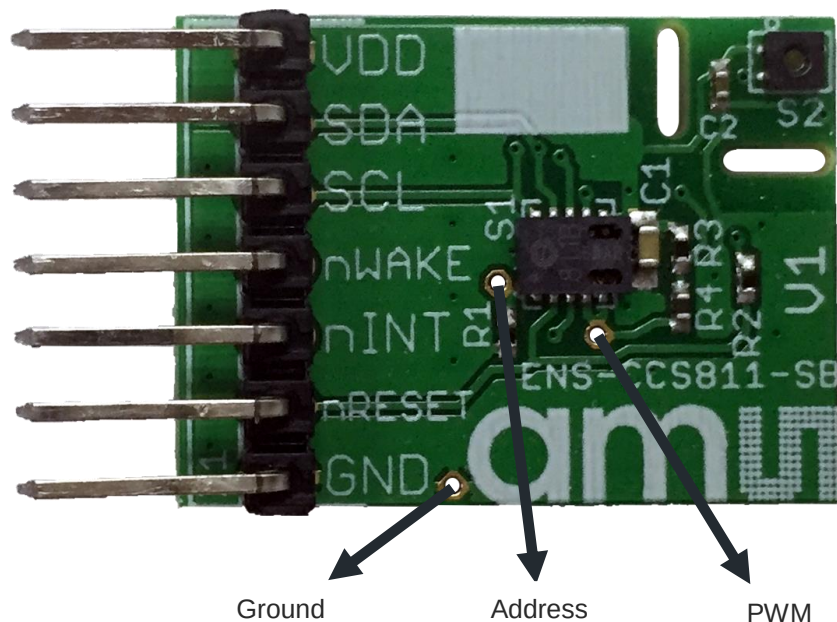
**Figure 5 Board Interface**

| in (s) | Label  | Description                        |
|--------|--------|------------------------------------|
| 1      | VDD    | Supply voltage                     |
| 2      | SDA    | I <sup>2</sup> C data              |
| 3      | SCL    | I <sup>2</sup> C clock             |
| 4      | nWAKE  | Wake up pin. Active low            |
| 5      | nINT   | Optional interrupt pin. Active low |
| 6      | nRESET | Optional reset pin. Active low     |
| 7      | GND    | Ground                             |

### 4.2 Test Points

There are 3 test points for I<sup>2</sup>C address, GND and PWM as shown below on the CCS811 sensor board (ENS-CCS811-SB).

**Figure 6 CCS811 Sensor Board Test Points**



## 5 Schematic, PCB Layout and Bill of Materials

The schematic design, PCB layout and bill of materials (BOM) for CCS811-LG\_EK\_ST is documented in the following sections.

### 5.1 Schematic Design

The schematic design for USB to I<sup>2</sup>C board (ENS-USB-I2CIO) and the CCS811 sensor board (ENS-CCS811-SB) is documented at the end of the document.

### 5.2 Bill of Materials (BOM)

The bill of materials (BOM) for the USB to I<sup>2</sup>C board (ENS-USB-I2CIO) and CCS811 sensor board (ENS-CCS811-SB) are shown in the following sections.

#### 5.2.1 USB to I<sup>2</sup>C Board (ENS-USB-I2CIO)

Figure 7 Bill of Materials (BOM) for the USB to I<sup>2</sup>C Board

| Label      | Description                               | Part Number        | Manufacturer         |
|------------|-------------------------------------------|--------------------|----------------------|
| U1         | IC - USB to I <sup>2</sup> C bridge QFN24 | CP2112             | Silicon labs         |
| U3         | ESD Protection Device SOT-14              | SP0503BAHTG        | LITTLEFUSE           |
| R1         | 330K Resistor 0402                        | CRG0402J330K       | TE CONNECTIVITY      |
| R2         | 0R Jumper Resistor 0402                   | ERJ-2GE0R00X       | PANASONIC ELECTRONIC |
| R4, R5     | 1K Resistor 0402                          | ASC0402-1K0FT10    | WELWYN               |
| R6, R7, R8 | 4K7 Resistor 0402                         | CRG0402F4K7        | TE CONNECTIVITY      |
| L1         | Inductor 0402-N                           | 742843122          | WURTH ELEKTRONIK     |
| C1,C6,C7   | 100nF Capacitor 0402                      | MC0402X104K100CT   | MULTICOMP            |
| C2, C3, C4 | 4.7uF Capacitor 0402                      | GRM188R61A475KE15D | Murata               |
| C5         | 10nF Capacitor 0402-N                     | MCCA000077         | MULTICOMP            |
| LED1-TX    | Chip LED 0603                             | 150060GS75000      | WURTH ELEKTRONIK     |
| LED2-RX    | Chip LED 0603                             | 150060YS75000      | WURTH ELEKTRONIK     |
| USB        | USB_MICROBOUT                             | 47346-0001         | Molex                |
| X1         | Board-To-Board Connector                  | 38-00-1337         | Molex                |

#### 5.2.2 CCS811 Sensor Board (ENS-CCS811-SB)

Figure 8 Bill of Materials (BOM) for the CCS811 sensor Board

| Label | Description                                                  | Part Number  | Manufacturer |
|-------|--------------------------------------------------------------|--------------|--------------|
| S1    | CCS811B Digital gas sensor for indoor air quality monitoring | CCS811B-JOPR | ams AG       |

| Label   | Description                                                              | Part Number        | Manufacturer |
|---------|--------------------------------------------------------------------------|--------------------|--------------|
| S2      | Relative Humidity and Temperature Sensor with I <sup>2</sup> C Interface | ENS210-LQFM        | ams AG       |
| X1      | Connector 7pin 2.54mm                                                    | 22-28-6070         | Molex        |
| C1      | 100nF Capacitor 0402                                                     | MC0402X104K100CT   | MULTICOMP    |
| C2      | 4.7uF Capacitor 0402                                                     | GRM188R61A475KE15D | Murata       |
| R1      | 100K $\Omega$ Resistor 0402                                              | MCWR04X1003FTL     | MULTICOMP    |
| R2(8-4) | 100k $\Omega$ NTC Thermistor 0402-N                                      | NCP15WF104F03RC    | Murata       |

## 6 Summary

This document describes the CCS811 evaluation kit about what it is and how to use it from the user point of view.



## 7 Ordering & Contact Information

| Ordering Code   | Description                    |
|-----------------|--------------------------------|
| CCS811-LG_EK_ST | CCS811 Eval Kit Standard Board |

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9      **Revision Information**

| Changes from previous version to current revision 1-01 (2017-Jan-16) | Page |
|----------------------------------------------------------------------|------|
| Minor updates only                                                   |      |

**Note:** Page numbers for the previous version may differ from page numbers in the current revision.  
Correction of typographical errors is not explicitly mentioned.



