Evelta SGP40 VOC Air Quality Sensor Breakout

User Manual

Overview

This breakout board is equipped with an SGP40, Sensirion's new digital VOC (volatile organic compounds) sensor designed for easy integration into air purifiers or demand-controlled ventilation, outputs via either an I2C or UART interface. In combination with Sensirion's powerful VOC Algorithm (part of the SGP40 VOC Index driver package), the sensor signal can be directly used to evaluate indoor air quality, e.g., for triggering the gradual fan control of an air treatment device. Both the SGP40 chip and VOC algorithm feature unrivalled robustness in the final application over their lifetimes. Pushing the multipixel and multi-hotplate approach to the next level of individual control of each sensing element, the SGP40 enables a drastic reduction in power consumption, making it suitable for battery-driven applications as well.

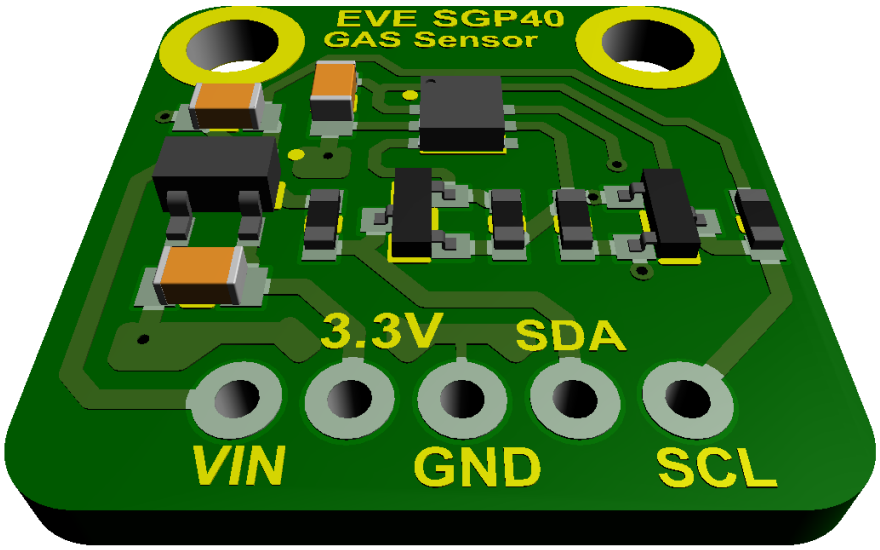
Sensirion's powerful VOC Algorithm (part of the SGP40 VOC Index driver package) analyzes VOC events detected by the SGP40 sensor and maps them to a VOC Index. This VOC Index provides a practical quantification of VOC events relative to each individual sensor's typical indoor environment. In this way, it behaves similarly to the human nose, which is highly susceptible to changes in odor, but it also detects VOC events that are not perceived by humans. The VOC Index indicates to what extent the indoor air quality has deteriorated or improved compared to the sensor's typical VOC environment.

SGP40 Benefits

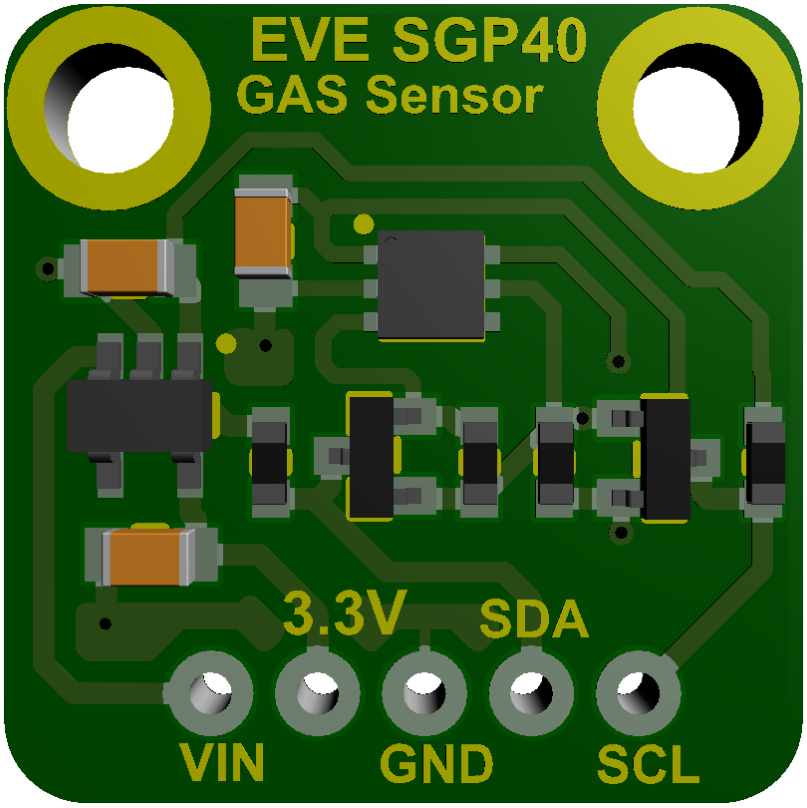
- Excellent longevity of > 10 years - Reliable sensor hardware
- VOC Index driver - No signal processing programming by customer required
- On-chip humidity compensation - Optimal performance in various environments
- Low heat emission - Enhanced precision of RH&T readings, less backgrounds
- High sensitivity to almost all VOCs - Broadband sensor that reacts well to typical VOCs
- Average power consumption down to 2.6 mA/6 mW - Suitable for battery-powered devices
- Digital I2C interface - Best performance-to-price ratio

Board Features

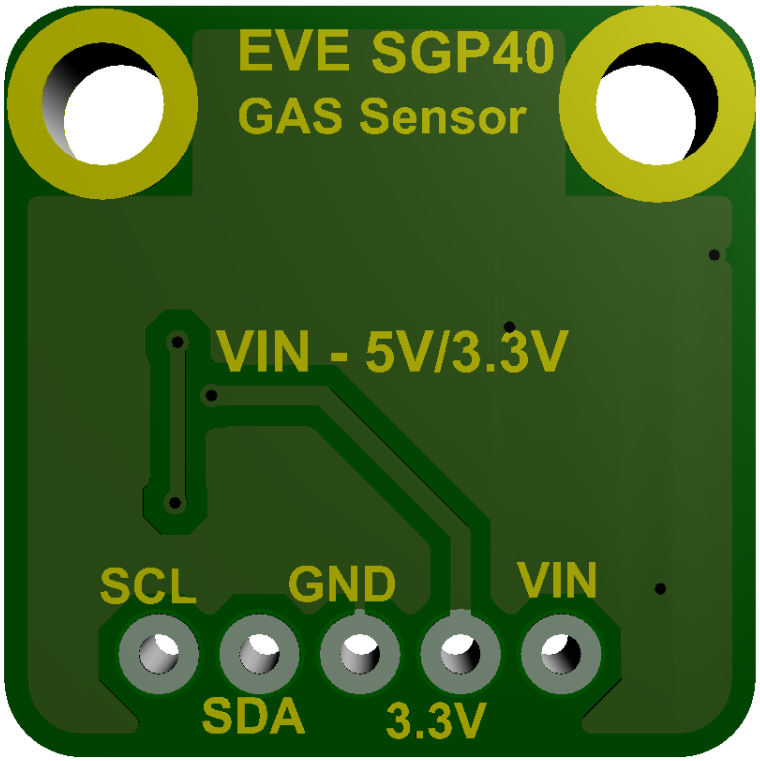
- Interface - I²C
- Supply voltage - 3.3 / 5 V
- Current consumption - 2.6 to 3.5 mA
- Measurement range - 0 to 1,000 ppm of ethanol equivalents
- Sensor output - Digital 16-bit raw signal
- Processed output - Digital VOC Index signal
- Response time - < 10 s (tau 63 %)
- Limit of detection - < 0.05 ppm of ethanol equivalents or < 10% of concentration setpoint
- Switch-on time - < 60 s
- Dimensions: 19 x 19 mm



SGP40 Breakout Board

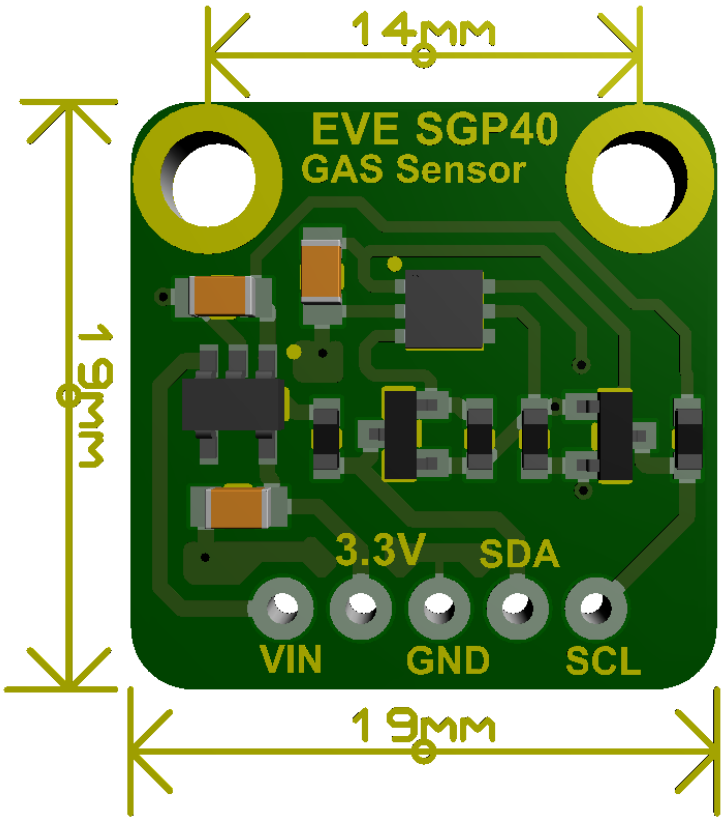


Front Side



Back Side

Dimensions



Pinouts

Vin - this is the power pin. Since the sensor chip uses 3 VDC for logic, we have included a voltage regulator on board that will take 3-5VDC and safely convert it down. To power the board, give it the same power as the logic level of your microcontroller - e.g. for a 5V micro like Arduino, use 5V

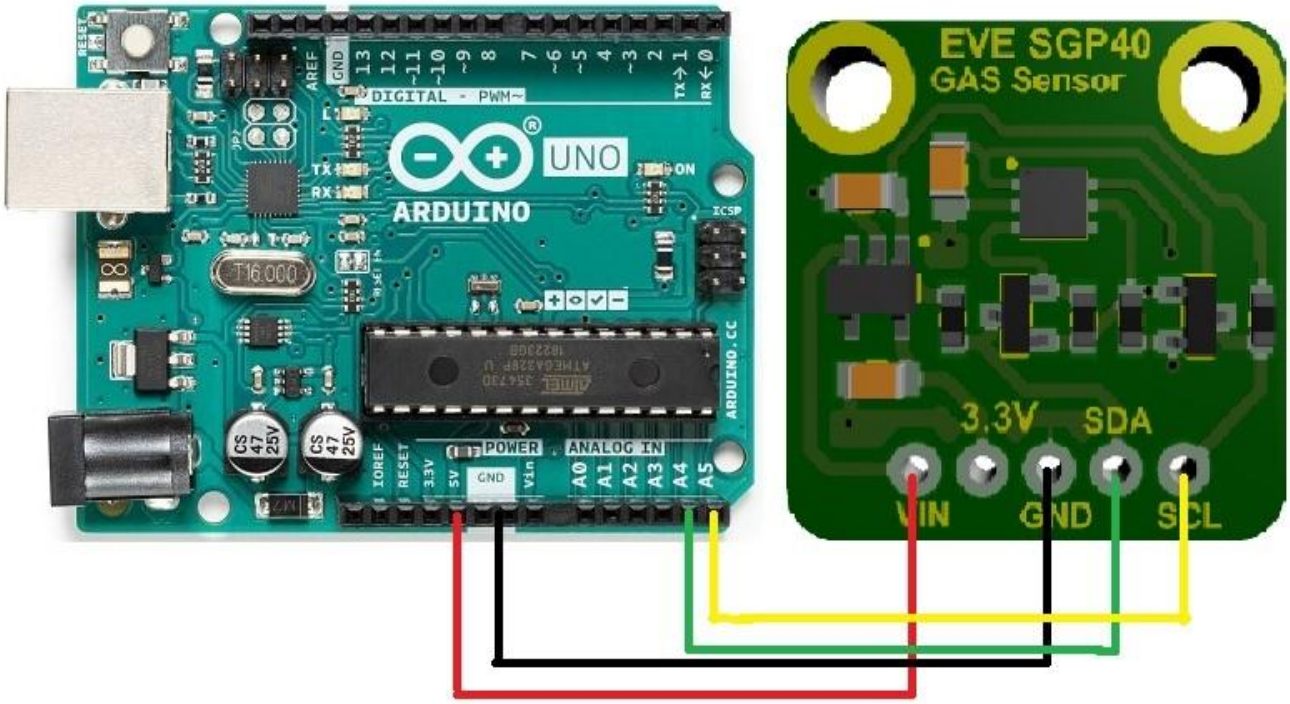
3.3V - this is the 3.3V output from the voltage regulator, you can grab up to 100mA from this if you like

GND - common ground for power and logic.

SCL - I2C clock pin, connect to your microcontrollers I2C clock line. Can use 3V or 5V logic.

SDA - I2C data pin, connected to your microcontrollers I2C data line. Can use 3V or 5V logic.

Arduino I2C Connection Diagram

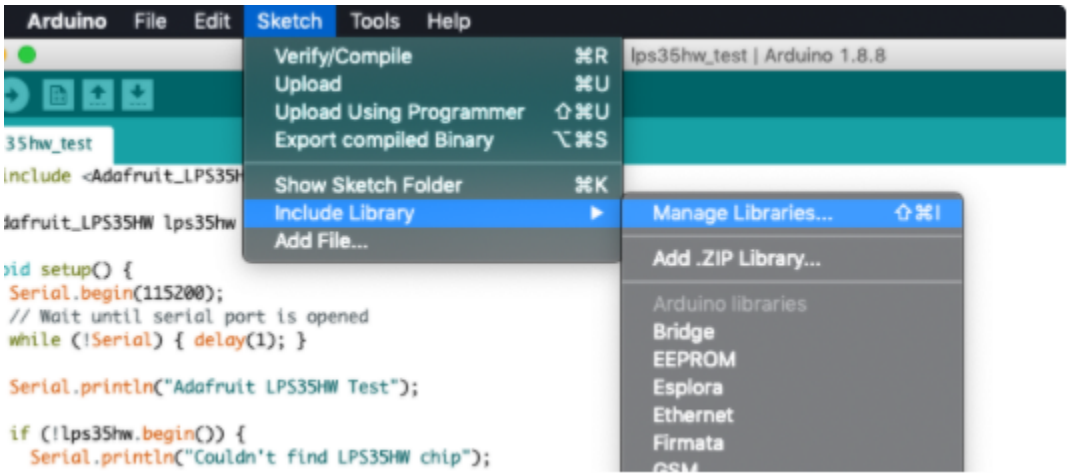


Arduino Pin	Board Pin
5 V	Vin
GND	GND
A4	SDA
A5	SCL

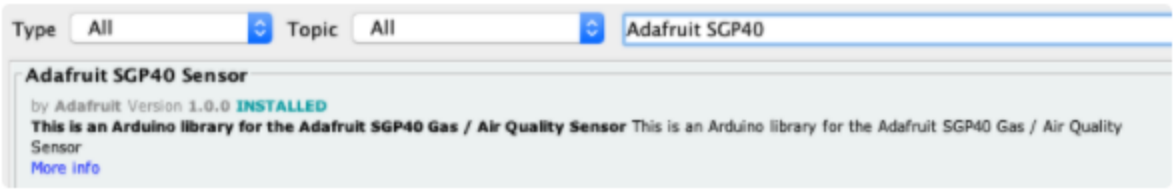
I2C Wiring
The default I2C address for the SGP40 is 0x59.
Use this wiring if you want to connect via I2C interface.

- Connect board VIN (red wire) to Arduino 5V if you are running a 5V Arduino (Uno, etc.). If your Arduino is 3V, connect to that instead.
- Connect board GND (black wire) to Arduino GND
- Connect board SCL (yellow wire) to Arduino SCL
- Connect board SDA (blue wire) to Arduino SDA

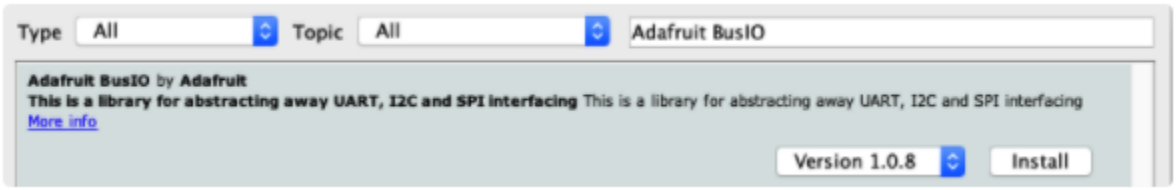
Library Installation
You can install the Adafruit SGP40 library for Arduino using the Library Manager in the Arduino IDE.



Click the Manage Libraries ... menu item, search for Adafruit SGP40 , and select the Adafruit SGP40 library:

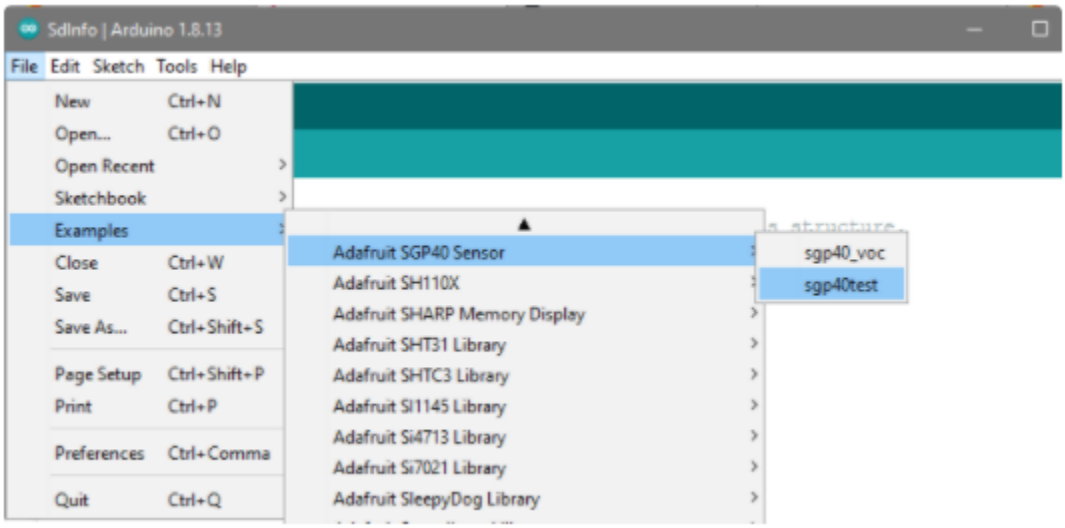


Follow the same process for the Adafruit BusIO library.



Finally follow the same process for the Adafruit SHT4X Library.

Load Basic Example
Open up File -> Examples -> Adafruit SGP40 -> sgp40test



After opening the demo file, upload to your Arduino wired up to the sensor. Once you upload the code, you will see the Raw measurement values being printed when you open the Serial Monitor (Tools->Serial Monitor) at 115200 baud, similar to this:

```
SGP40 test
Found SGP40 serial #023B3B4D
Measurement: 27351
Measurement: 27390
Measurement: 27439
```