PN: SS-BME280#I2C SKU: ITBP-6002

s-Sense by itbrainpower.net

BME280 I2C sensor breakout

Equipped with **BME280** - high performance combined digital sensor with humidity, pressure and temperature measurement based on proven sensing principles and having low power consumption. BME280 sensor it's manufactured by Bosch Sensortec.

BME280 breakout features:

- *I2C interface, 3.3-5V auto* [default, the I2C reference voltage follows the power in voltage],
- *I2C reference voltage* option via solder jumper [Eg.: power at *5V and I2C at 3.3V*; *power and I2C at 2.2V*],
- *alternative sensor I2C addresses* via solder jumpers,
- power in with voltages between 3.3-5V [default],
- big soldering pads on 2.54 mm [0.1"] pitch for standard row header / connector,
- very light and slim - 13x27mm, around 2grams,
- compatible with Arduino [all 3.3V and 5V], xyz-mIoT shields, Raspberry PI [all versions] and other SBC / MCU Arduino [Beagle Bone, Teensy, ...]
- Arduino C, Raspberry PI [Python] software support.

BME280 sensor features:

- ambient range for operation -40 ~ +85C, 0%-100% r.H., 300-1100hPa
- humidity accuracy +-3%
- absolute temperature (0-65C) accuracy +-1C
- absolute pressure accuracy max. +-1.7hPa

BME280 datasheet:
https://itbrainpower.net/downloadables/BST-BME280-DS002-1509607.pdf

BME280* breakout

temperature, humidity and pressure - environmental sensor

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* BME280 digital sensor provided by Bosch Sensortec

Designed and manufactured in EU by R&D Software Solutions.

BME280 breakout :: INTERFACES, PADS and SOLDER JUMPERS

I2C and POWERING INTERFACE

In the left edge of the top PCB side, top to bottom:
1. Vin - POWER IN 3.3V / 5V (default) *
2. 3V3 - <u>Vdd</u> - LDO output (default) / LDO bypass IN **
3. SDA - I2C SDA [default, pulled up at Vin]***
4. SCL - I2C SCL [default, pullup up at Vin]***
5. GND - POWER and I2C GROUND

* Default, the I2C reference voltage follow the Vin voltage. If your board (Arduino/other) it's 5V compliant, connect +5V to Vin. Similar, for 3.3V compliant board (RPI/Arduino) connect 3.3V source to Vin.

** 3.3V voltage it's available on <u>Vdd</u> PAD, if Vin it's connected to 5V. Bypass LDO - see schema and read docs.

*** Default, the I2C reference voltage follows the Vin voltage! Read bellow about I2C reference voltage and *s1* solder jumper.
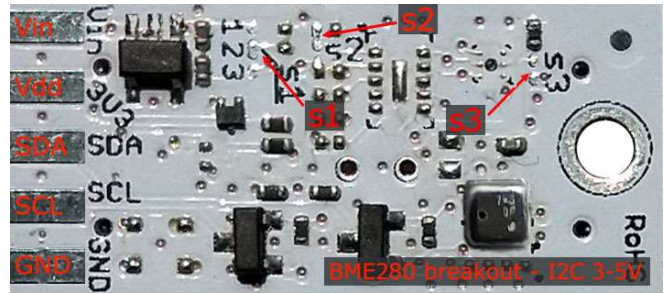

Image 1 – sensor top side

SOLDER JUMPERS

s1 : I2C reference [Vin or 3V3-bypass], default Vin *

s2 : RESERVED

s3 : BME280 I2C address [0x76/0x77], default 0x76 *

* Read about s1 and s2 functionality bellow.

SIGNALS INTERFACE and MARKING

In the left edge of the bottom PCB side, top to bottom:
6. RESERVED
7. RESERVED
8. RESERVED
9. RESERVED
nc. NOT CONNECTED

* Taking a look at how-to posts and inside software examples may be quite helpful.
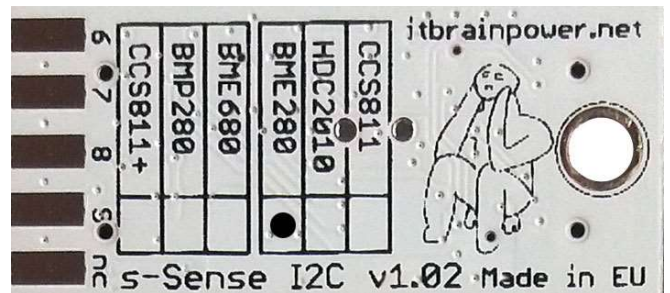*** Default HIGH level.

Image 2 – sensor bottom side

Observe the sensor breakout marking on PCB board (here, BME280 sensor it's marked as populated).

BME280 breakout :: Arduino / Raspberry PI basic interfacing

BME280 breakout	Arduino 5V [Eg.: UNO]	Arduino 3.3V [Eg.: Zero]	RPI [B/B+/II/3/3+/Zero/Zero W]
Vin PAD*	5V	3.3V	PIN1 (3.3V)
Vdd PAD (3V3)*	-	-	-
SDA PAD	SDA	SDA	PIN3 (SDA)
SCL PAD	SCL	SCL	PIN5 (SCL)
GND PAD	GND	GND	PIN9 (GND)

* here, power in default mode (sensor & MCU power and I2C at same voltage!!). For alternate mode see solder jumper description bellow.

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BME280 breakout :: solder jumpers description; power scenarios

s1* - I2C reference voltage selector - shipped with circuit 1-2 closed and circuit 2-3 open (default mode).

In **default mode**, the I2C reference voltage follows the voltage applied to Vin! Default mode use cases:
    - shield/MCU it's 5V compatible ==> connect Vin at 5V; the I2C reference it's 5V!
    - SBC/shield/MCU it's 3.3V compatible ==>connect Vin at 3.3V; the I2C reference it's 3.3V!.

Alternate mode - I2C reference voltage follows the Vdd voltage! - modify *s1* as: 1-2 circuit open, 2-3 circuit closed [carefully interrupt/cut the circuit line between pads 1 and 2, and solder over pads 2 and 3].

Alternate mode scenarios:
    - apply 3.6-7V to Vin. The I2C reference voltage it's set at 3.3V! Also, at Vdd pad (LDO output) 3.3V (up to 100mA) it's available for third part powering (anyway, try to keep the sunk current as low as possible, in order to avoid thermal errors).
    - keep Vin not connected. Apply 2.8 or 3.3V to Vdd (the LDO it's bypassed). The I2C reference voltage it's set at voltage applied to Vdd pad!

s2 - RESERVED

s3 – **BME280 I2C address** - default circuit open, BME280 having 0x76 as I2C address. Solder over *s3* pads [circuit closed] in order to select the alternate I2C address [0x77].

* Consult s-Sense block schema for more information. See projects/how to section.

BME280 breakout :: ARDUINO & RaspberryPI software

https://itbrainpower.net/downloads.php#s-Sense

BME280 breakout :: ARDUINO & RaspberryPI documentation

https://itbrainpower.net/downloads.php#s-Sense_documentation

BME280 breakout :: projects and how to

https://itbrainpower.net/projects

BME280 breakout :: part number / SKU

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