

Reference Design SVM40

Indoor Air Quality Sensor for VOC Measurements

- Sensor module equipped with SGP40 and SHT40
- On-board microcontroller for signal processing
- I²C and UART interface with digital output signals
- USB-UART cable, jumper wire cable set
- Power supply 3.0–5.5 V



Table of Contents

1 Design Criteria.....3

2 Mechanical Drawing.....3

3 Assembly Drawing.....4

4 Design Layer5

5 Schematic6

6 Bill of Materials7

1 Design Criteria

Main components of the SVM40 are Sensirion's humidity and temperature sensor SHT40, Sensirion's VOC sensor SGP40, an LDO regulator, a microcontroller, and a 6-pin connector (of which 1 pin is used as interface selector and 1 pin is not used). The microcontroller is used for signal processing by Sensirion's VOC Algorithm to provide the VOC Index and additionally humidity and temperature signals. It is important to thermally decouple the SHT40 sensor from the other main components to enable optimal measurements of both humidity and temperature signals. This is achieved by placing the SHT40 sensor as far as possible from the other components and by introducing slits in the PCB (see *SHTxx and STSxx Design Guide* for more information). Additionally, the firmware allows to compensate both signals for temperature offsets which are due to design-in. To provide the possibility of conformal coating, the distance between SGP40, which should not be coated, and the remaining electronic parts should be sufficient in order not to affect the sensor performance (see *Handling and Assembly Instructions for SGPxx Gas Sensors* for more details).

2 Mechanical Drawing

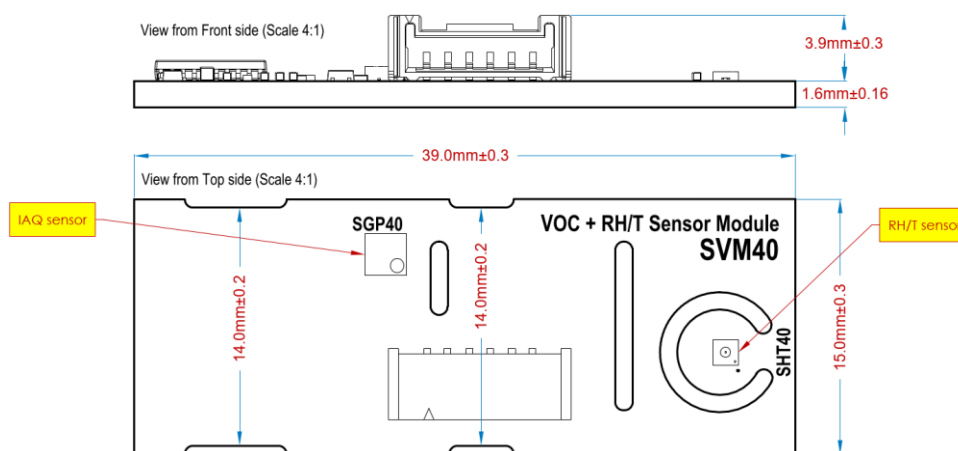


Figure 1 Mechanical drawing of the SVM40 reference design.

3 Assembly Drawing

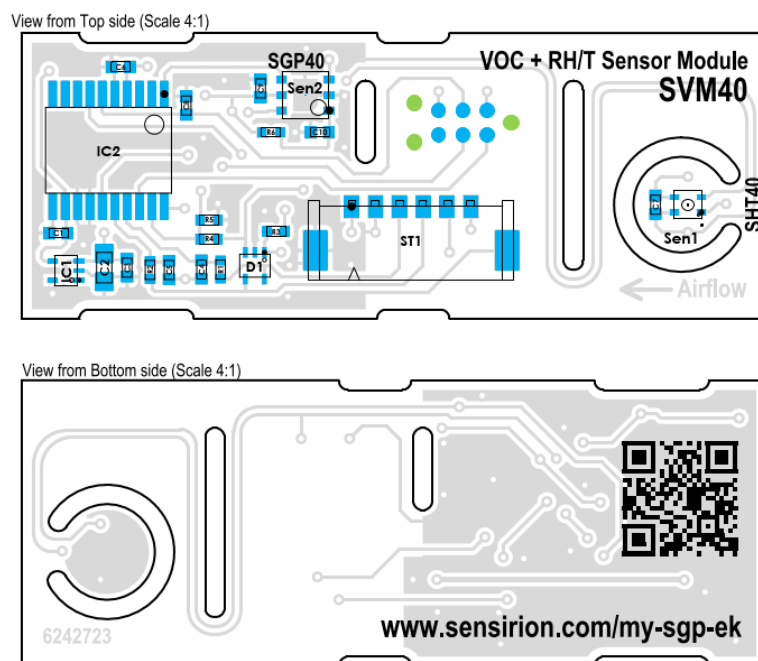


Figure 2 Assembly drawing of the SVM40 reference design.

4 Design Layer

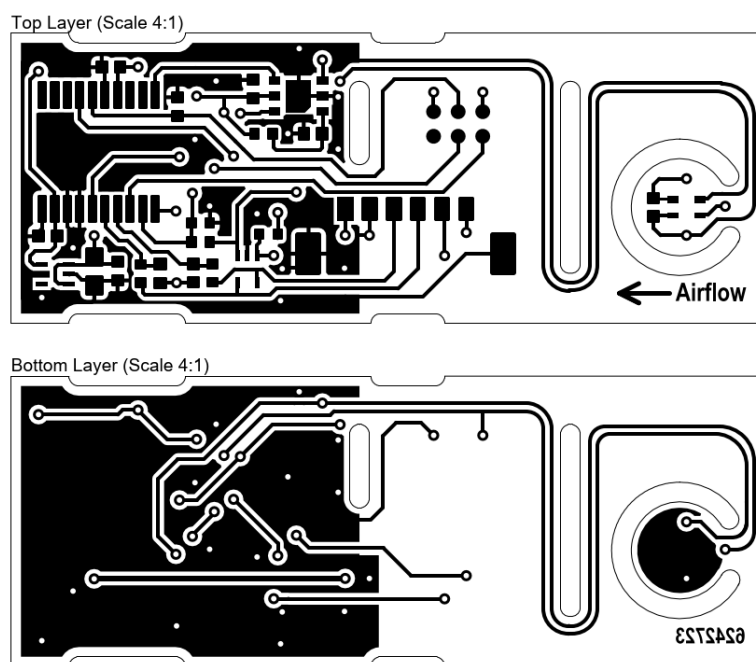


Figure 3 Design Layer of the SVM40 reference design.

5 Schematic

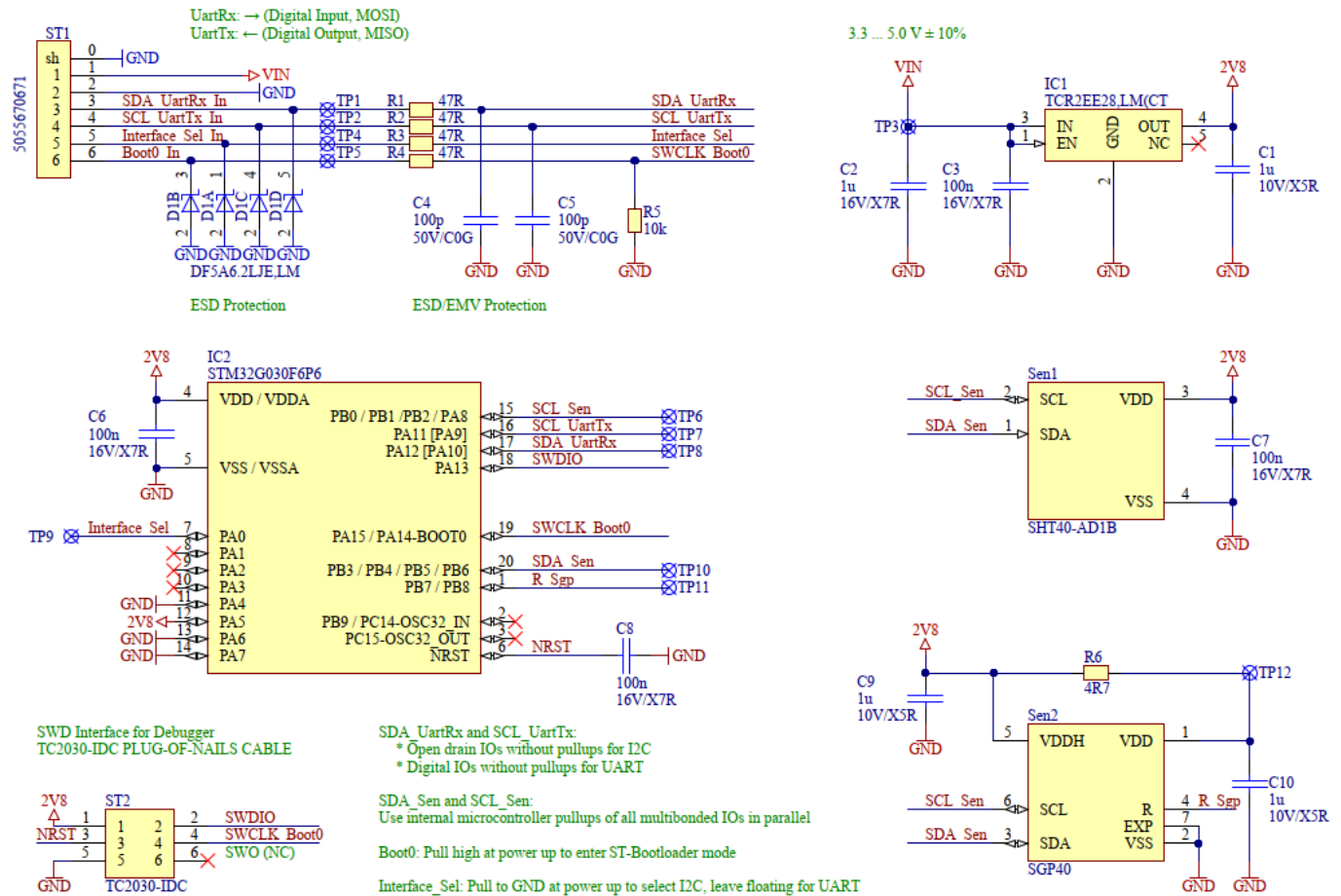


Figure 4 Schematic of the SVM40 reference design.

6 Bill of Materials

Part ¹	Description	Details	Footprint	Manufacturer	Manufacturer part number	Quantity
C1, C9, C10	capacitors	1u, 10V/X5R	C_0402	supplier suggested	supplier suggested	3
C2	capacitor	1u, 16V/X7R	C_0603	supplier suggested	supplier suggested	1
C3, C6, C7, C8	capacitors	100n, 16V/X7R	C_0402	supplier suggested	supplier suggested	4
C4, C5	capacitors	100p, 50V/C0G	C_0402	supplier suggested	supplier suggested	2
D1	TVS diode	–	SOT553	Toshiba	DF5A6.2LJE,LM	1
IC1	LDO regulator	–	SOT553	Toshiba	TCR2EE28,LM(CT	1
IC2	microcontroller	–	TSSOP65P640X120-20N	STMicroelectronics	STM32G030F6P6	1
R1, R2, R3, R4	resistors	47R, 1 %	R_0402	supplier suggested	supplier suggested	4
R5	resistor	10k, 1 %	R_0402	supplier suggested	supplier suggested	1
R6	resistor	4R7, 1 %	R_0402	supplier suggested	supplier suggested	1
Sen1	humidity and temperature sensor	–	SHT4x-xD1	Sensirion	SHT40-AD1B-R3	1
Sen2	VOC sensor	–	SGPx4x	Sensirion	SGP40-D-R4	1
ST1	connector	–	MOLEX_5055670671	Molex	505567-0671	1

Table 1 Bill of materials for the SVM40 reference design.

¹ Parts as designated in **Figure 4**.

Revision History

Date	Version	Page(s)	Changes
January, 2021	1.0	All	Initial release

Headquarters and Subsidiaries

Sensirion AG

Laubisruestr. 50
CH-8712 Staefa ZH
Switzerland

phone: +41 44 306 40 00
fax: +41 44 306 40 30
info@sensirion.com
www.sensirion.com

Sensirion Taiwan Co. Ltd

phone: +886 3 5506701
info@sensirion.com
www.sensirion.com

Sensirion Inc., USA

phone: +1 312 690 5858
info-us@sensirion.com
www.sensirion.com

Sensirion Japan Co. Ltd.

phone: +81 3 3444 4940
info-jp@sensirion.com
www.sensirion.com/jp

Sensirion Korea Co. Ltd.

phone: +82 31 337 7700~3
info-kr@sensirion.com
www.sensirion.com/kr

Sensirion China Co. Ltd.

phone: +86 755 8252 1501
info-cn@sensirion.com
www.sensirion.com/cn

To find your local representative, please visit www.sensirion.com/distributors