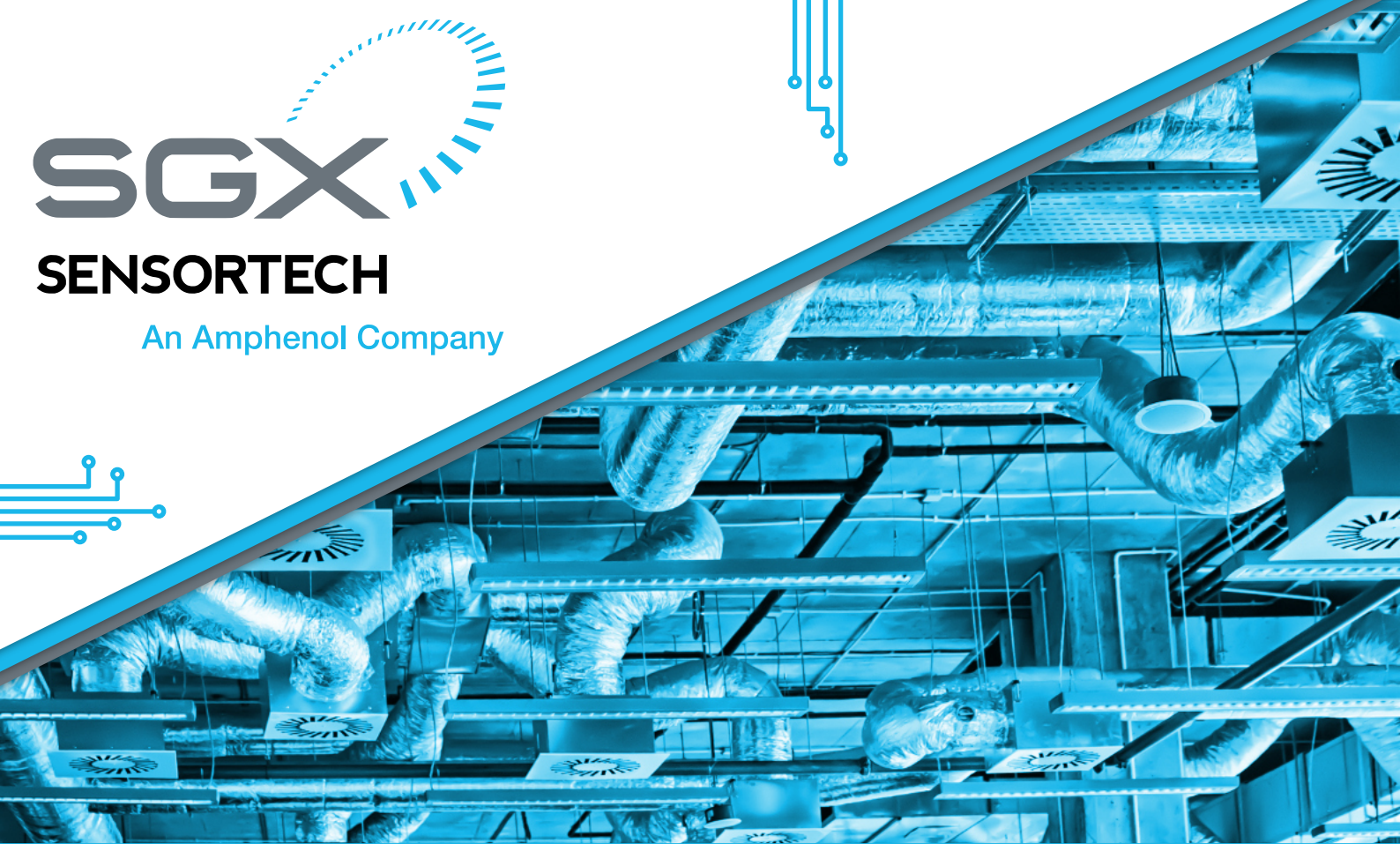




SGX

SENSORTECH

An Amphenol Company



MiCS-VZ-89TE

Integrated sensor board for
Indoor Air Quality monitoring

Datasheet

The **MiCS-VZ-89TE** combines state-of-the-art MOS sensor technology with intelligent detection algorithms to monitor tVOCs and CO₂ equivalent variations in confined spaces, e.g. meeting rooms or vehicle cabins. The dual signal output can be used to control ventilation on-demand, saving energy and reducing cost-of-ownership.



Quality, Safety, Responsibility

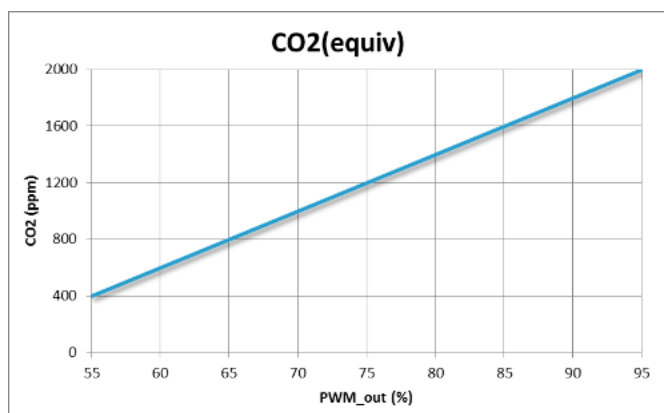
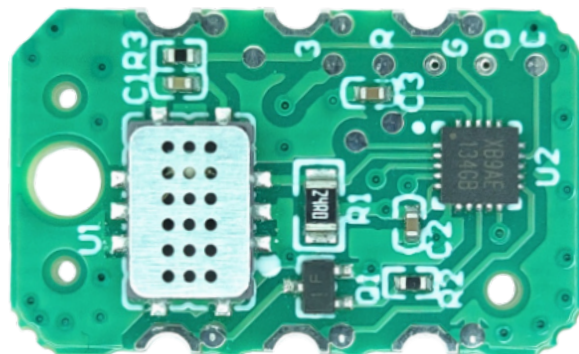
Functional specifications

Features

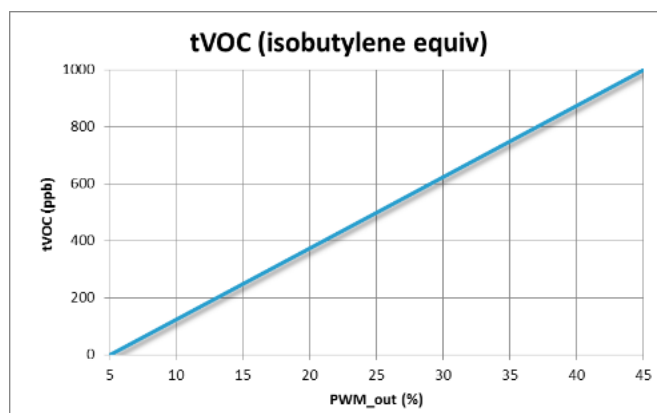
- Calibration-free
- Low power
- Wide VOCs detection range
- High sensitivity
- High resistance to shocks and vibrations

Detectable gases

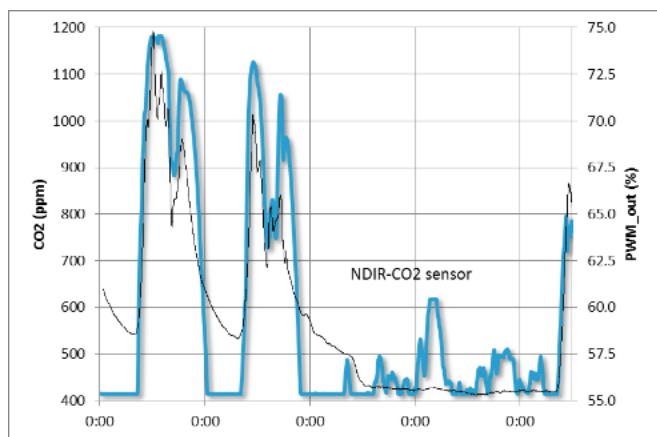
- Volatile Organic Compounds VOCs
- Equivalent Carbon Dioxide CO₂ (equiv)



Conversion from PWM output signal of **MICS-VZ-89TE** to equivalent Carbon Dioxide concentration in ppm



Conversion from PWM output signal of **MICS-VZ-89TE** to equivalent tVOC concentration in ppb



Comparison between **MICS-VZ-89TE** output signal and NDIR CO₂ sensor signal over a duration of 4 consecutive days (Thu – Sun)

Performance

Detection Method	Semiconductor gas sensor, detecting a wide range of VOCs
Monitoring Range	400-2000 ppm equivalent CO2 0-1000 ppb isobutylene equivalent tVOCs
PWM Output	Pin 1 : TTL output 30Hz +/-1%, Range 5...95%, duty cycle 3.3V Use a pull-up resistance between Pin 1 and Pin 6 Pull-up value: typ. 10kOhms for 3.3V operation
I2C Output	Pin 2 and 4 : Pull-up of 4.7 kOhms on master SDA and SCL
Response Time	Equivalent to conventional NDIR-CO2 sensors < 5 seconds for tVOC
Refresh Output Frequency	1 Hz

Operation

Supply Voltage	3.3V DC regulated +/-5%
Operating Power	125 mW
Warm-up Time	15 min
Operating Temperature	0°C to 50°C
Operating Humidity	0%RH to 95%RH (non condensing)
Storage Temperature	-40°C to 80°C
Storage Humidity	0%RH to 95%RH (non condensing)

IMPORTANT PRECAUTIONS

Read the following instructions carefully before using the indoor air quality sensor described in this document to avoid erroneous readings and to prevent the device from permanent damage.

- The sensor must not be exposed to **high concentrations** of organic solvents, ammonia, silicone vapour or cigarette- smoke in order to avoid poisoning the sensitive layer.
- The sensor should be protected against water and dust projections.
- SGX strongly recommends using ESD protection equipment to handle the sensor.
- For any additional questions, contact SGX Sensortech

MiCS-VZ-89TE - Power-on Self-Test

Parameter	Criteria	Failed Diagnostic Indicator
Sensor Resistance Range	Range Check	PWM < 5 % at Power ON
Sensor Operating Power	Range Check	PWM < 5 % at Power ON

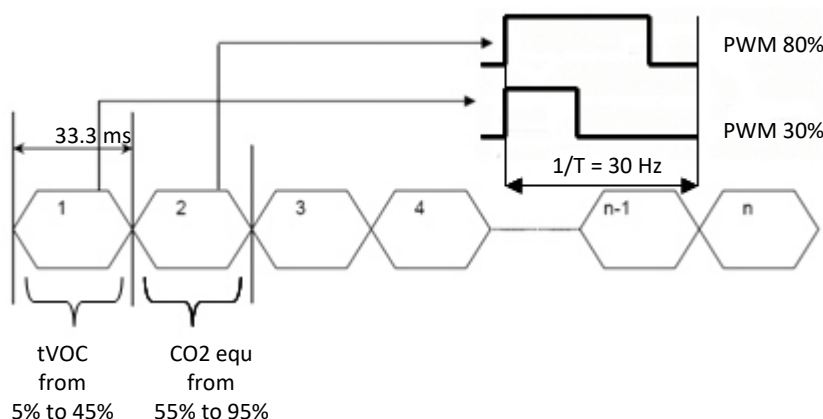
MiCS-VZ-89TE - Power-on Self-Test

After Power-on self-test (2 seconds), the device will provide either a single “Failed Diagnostic Level” in case of sensor failure of the sensor or PWM multiplexed output indicating “CO₂_equivalent_Level” and “VOC_isobutylene_equivalent_Level” referred to the isobutylene sensitivity unit.

A simple manner to test the reactivity and sensitivity of gas sensor is to expose to alcohol bottleneck for example

CO ₂ equ [ppm]	PWM Output [%]
400	55
1027	70.7
1654	86.4
2000	95

VOC (isobutylene) [ppb]	PWM Output [%]
0	5
200	13
500	25
1000	45



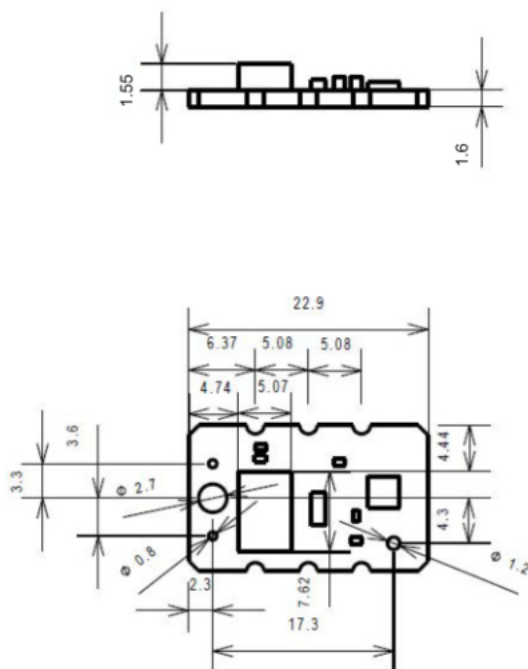
MiCS-VZ-89TE Output

Out of this initial period, the device will have the I2C data CO₂ equivalent [ppm] and tVOC equivalent referred to the isobutylene sensitivity unit [ppb].

- D1: Data_byte_1: tVOC: [13...242] -> tVOC [ppb] = (D1-13) * (1000/229)
- D2: Data_byte_2: CO₂_equ: [13...242] -> CO₂_equ [ppm] = (D2 -13) * (1600/229) + 400
- D3: Data_byte_3: RS first byte(MSB) -> Resistor value [W] = 10*(D5+ (256*D4) + (65536*D3))
- D4: Data_byte_4: RS second byte
- D5: Data_byte_5: RS third byte(LSB)
- D6: Status
- D7: CRC

Package outline dimensions

The MiCS-VZ-89TE is available as PCB and can be mounted with a M2.5 screw in appliances.
Connections are made with soldering on card edge (cut via connector)



Pin Connection VZ-89TE

6: + 3.3V	5: NC	4: SDA
1: PWM OUT	2: SCL	3: GND

DISCLAIMER:

SGX Europe Sp. z o.o. reserves the right to change design features and specifications without prior notification. We do not accept any legal responsibility for customer applications of our sensors. SGX Europe Sp. z o.o. accepts no liability for any consequential losses, injury or damage resulting from the use of this document, the information contained within or from any omissions or errors herein. This document does not constitute an offer for sale and the data contained is for guidance only and may not be taken as warranty. Any use of the given data must be assessed and determined by the user thereof to be in accordance with federal, state and local laws and regulations. All specifications outlined are subject to change without notice.

SGX Europe Sp. z o.o. sensors are designed to operate in a wide range of harsh environments and conditions. However, it is important that exposure to high concentrations of solvent vapours is to be avoided, both during storage, fitting into instruments and operation. When using sensors on printed circuit boards (PCBs), degreasing agents should be used prior to the sensor being fitted. SGX Europe Sp. z o.o. makes every effort to ensure the reliability of its products. Where life safety is a performance requirement of the product, we recommend that all sensors and instruments using these sensors are checked for response to gas before use.

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