



## The MiCS-VZ-89TE is an integrated sensor board for Indoor Air Quality monitoring.

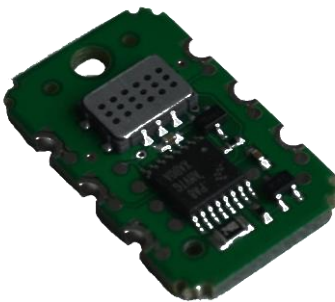
The MiCS-VZ-89TE combines state-of-the-art MOS sensor technology with intelligent detection algorithms to monitor tVOCs and CO<sub>2</sub> equivalent variations in confined spaces, e.g. meeting rooms or vehicle cabins. The dual signal output can be used to control ventilation on-demand, saving energy and reducing cost-of-ownership.

### 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 CO<sub>2</sub>(equiv)

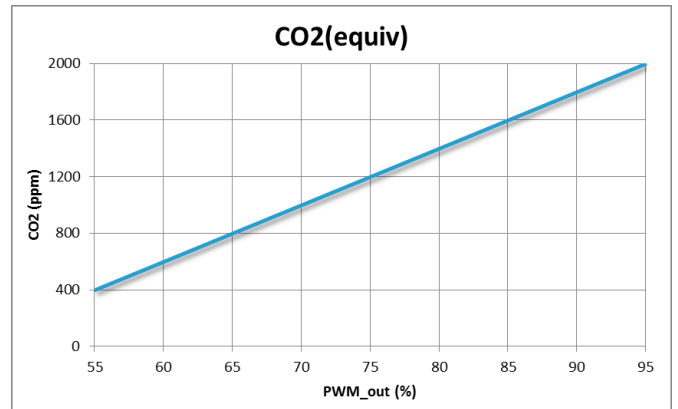


For more information please contact:

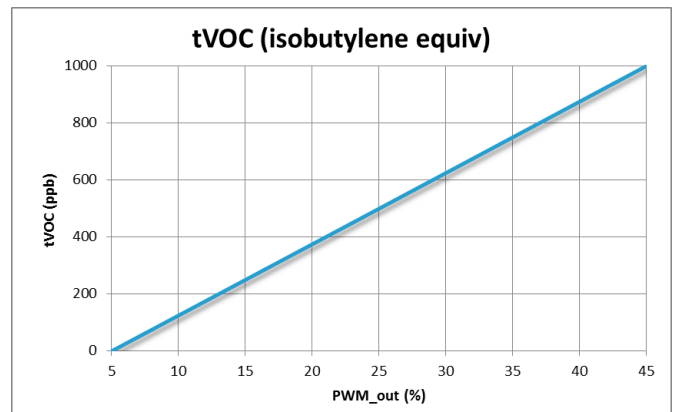
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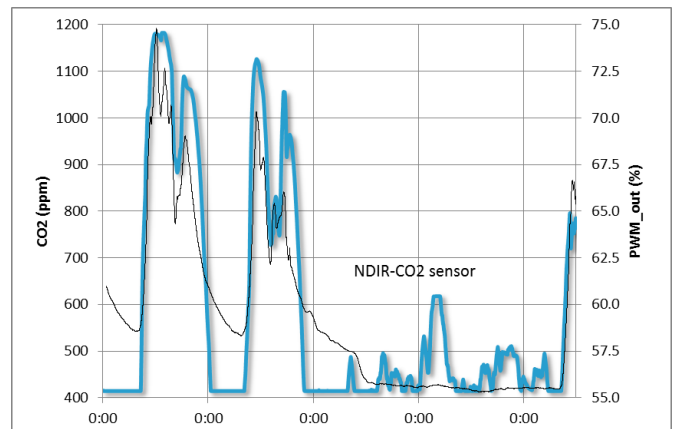
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Conversion from PWM output signal of MICS-VZ-89TE to equivalent Carbon Dioxide concentration in ppm



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



Comparison between MICS-VZ-89TE output signal and NDIR CO<sub>2</sub> 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

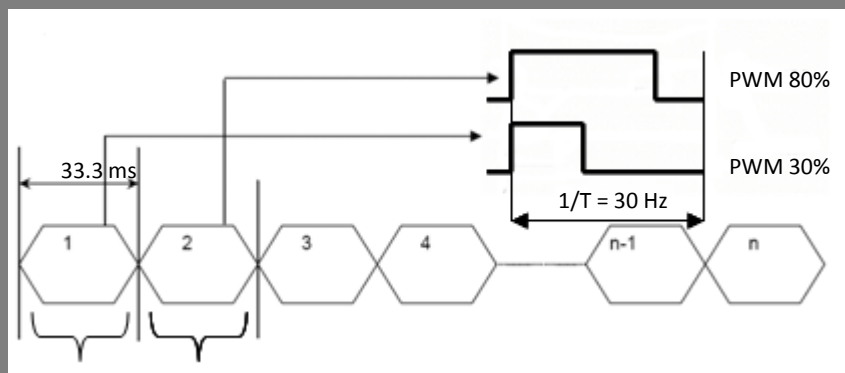
## MiCS-VZ-89TE – PWM Output

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 “CO<sub>2</sub> 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 <sub>2</sub> 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



tVOC from 5% to 45%  
CO<sub>2</sub> equ from 55% to 95%

## 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 [ $\Omega$ ] =  $10 * (D5 + (256 * D4) + (65536 * D3))$

D4: Data\_byte\_4: RS second byte

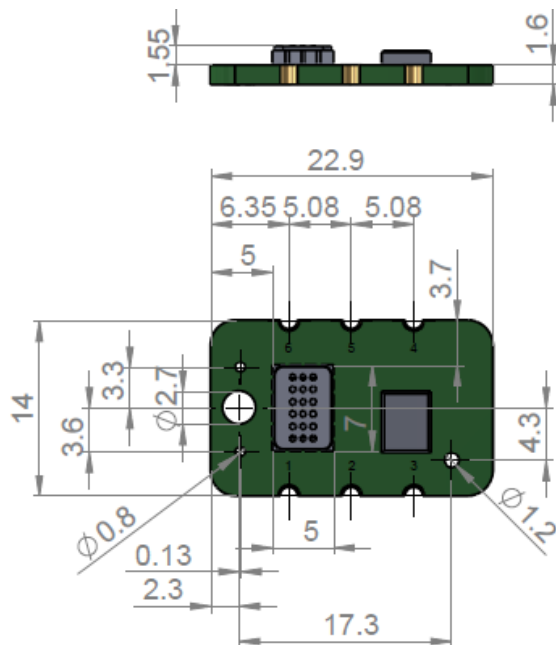
D5: Data\_byte\_5: RS third byte(LSB)

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

## For more information please contact:

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