

USM-VOCG – compact UNITRONIC sensor module for air quality measurements (VOC)

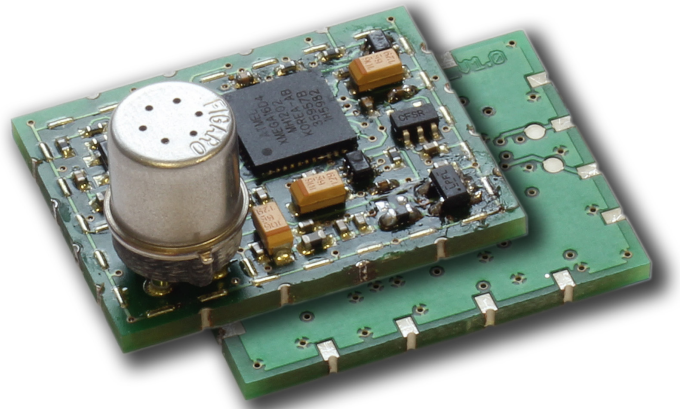
USM-VOCG - A sensor module, with which volatile organic compounds (VOC) in the air can be recognized very quickly and with very high accuracy thanks to a special sampling process.

The compact UNITRONIC Sensor Module VOC (USM-VOCG) is based on the innovative, highly stable TGS 2600 semiconductor sensor from Figaro. With the USM-VOCG it is not the ohmic resistance of the gas sensor that is analyzed, as is common practice, but the electrical charge shift in the sensor element. This method not only ensures a very quick response to changes, but also enables faster recovery times. In addition, the sensor, which reacts to different volatile substances such as carbon monoxide (CO), toluene and ethanol, features an almost twice as high resolution, especially at low concentration levels, compared to the conventional resistive measurement method.

Thanks to the Digital Sampling Process (DSP), specially developed by UNITRONIC for the USM-VOCG, the module is able to use the very short response times and measurement cycles of the gas sensor without any limitations and at the same time achieve a high level of accuracy in the measurement. Not only does the USM-VOCG react up to 20% quicker to the release of harmful gases compared with conventional resistive gas sensors, but also the true gas concentration in the air can be detected significantly earlier. For example, with the reference gas toluene 30 ppb (parts per billion) are already enough for an exact detection.

The module, measuring only 28mm x 22mm as SMD component part and designed for 5V supply voltage, can be easily integrated into customer's own circuits and applications thanks to an analog and a digital output (UART).

Upon request, UNITRONIC also offers customer-specific versions of the module, whereby both hardware and software can be adapted to the respective customer application.

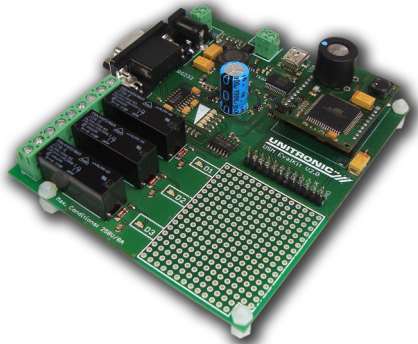


One example of a software and hardware adaption is the „ventilation on demand“ with this software a ventilator could be switched on only when there is a contamination of air or the humidity is over a preset value. In this application an additional temperature and humidity sensing element can be connected.

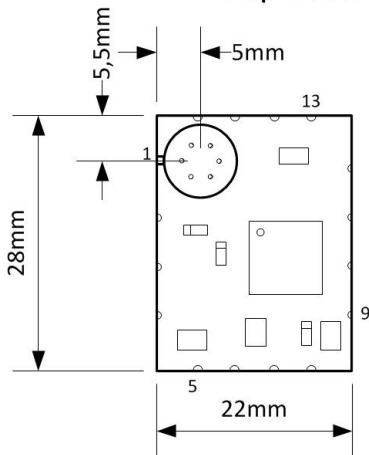
Features:

- Cost-effective
- Smallest dimensions
- SMD component part
- Low weight
- Detection of volatile organic compounds (VOC)
- Easy assembling
- Ultra-sensitive
- Long-term stable
- Customizations
- Interface for connecting external Temperature and Humidity sensor
- Base Level Shifting Algorithm

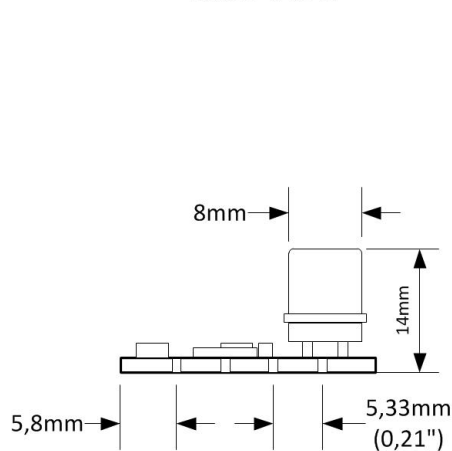
Technical Specification

Power Supply	5VDC
Outputs	UART 3 x digital 1 x analog I2C for external Temperature and Humidity sensor SPI (optional)
Sensor analysis	DSP
Dimension	28 x 22 mm
Temperature and Humidity sensing	Optional using external Temp&RH sensor
Software	Windows® visualization software
Base Level Shifting	For optimal adaption on the environment
Evaluation Kit	 <p> USM-VOCG EVAL 12 – 35VDC RS232-(F09) USB 2.0 3 galvanic isolated relays Analog output Development area where all needed signals could be measured </p>

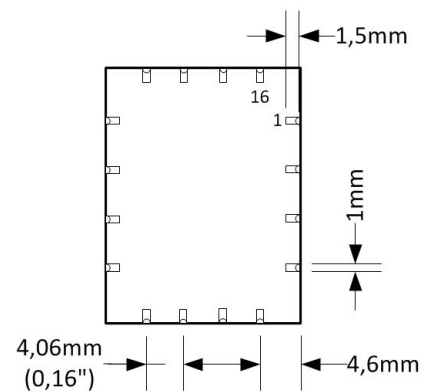
**USM-VOCG
Top View**



**USM-VOCG
Side View**



**USM-VOCG
Bottom View**



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UNITRONIC AG

VGSA - Virtual multifunction gas sensor array

Recognizes a large number of different gases with only one metal oxide sensor

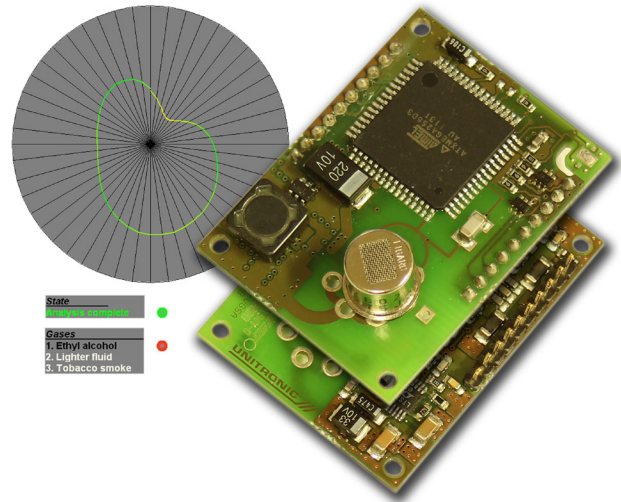
VGSAs - An „artificial nose“ that can recognize a large number of organic and inorganic compounds, fuel gases and complex mixtures such as tobacco smoke with only one conventional metal oxide sensor. This thus enables an especially cost-effective measurement and analysis of substances in the air.

Conventional sensor arrays are based on a large number of different gas sensors, which all react in their own way to the gas offered and provide a measured value. These individual measured values provide a characteristic fingerprint for each type of gas, which each module is taught by means of a teach-in process. This later enables the identification. The disadvantages of such multi-sensor arrays are that all sensors react differently to humidity, exhibit different long-term drift behavior and also sometimes show a memory effect to gases. This very often requires a repeated complex recalibration of the entire array.

All of these restrictions cease to exist with Unitronic's virtual multifunction gas sensor array (VGSA). The determination and analysis of various gases by means of a single cost-effective miniature gas sensor takes place here on the basis of an oxide semiconductor and a special high-sensitivity analysis method based on innovative algorithms and sophisticated electronics.

The acquired sensor parameters contain complex gas-typical, long-term stable patterns and therefore present a sort of fingerprint for each gas. With help of the individual semiconductor sensors, this technology generates several individual sensor signals and therefore corresponds to a virtual sensor array. The type of gas is determined on the basis of the gas caused distortion of periodic temperature jumps. Semiconductor sensors have the characteristic of having different sensitivity reactions to gases at various temperatures. There is an optimum temperature of the sensor for each gas and this is utilized by the „artificial nose“ via an intelligent tempering.

Since the „artificial nose“ not only analyzes the ohmic resistance of a sensor, as is common practice, but rather the electrical charge shift caused by the target gas, the calculated signal is free of influences from humidity, drift of the absolute value and memory effects.

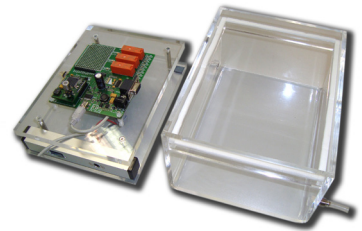


Fuel gases such as methane, propane and butane, organic compounds such as alcohol, benzene, propanol, ethanol, acetone, toluene, cyclohexane, hydrogen, formaldehyde and carbon monoxide, inorganic compounds such as ammonia, isoflurane, halothane, hydrogen sulfide, trichloroethylene and carbon tetrachloride, but also tobacco smoke and more can be measured with the VGSA. The universal sensor system is therefore not only suitable for a wide variety of applications in the food, bio and pharmaceutical industries, but also equally for a reliable and cost-effective air or fire monitoring.

Features:

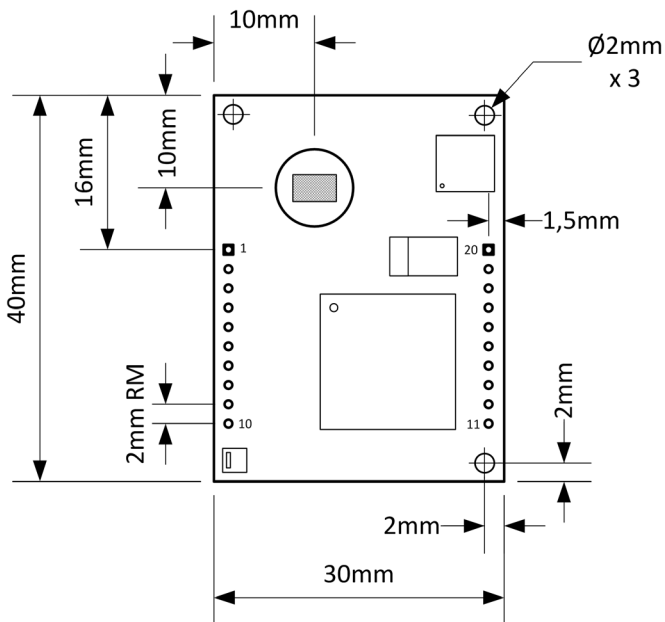
- Response time is much lower compared to a common multisensor array
- Higher sensitivity
- Very good reproducibility
- Quicker recovery after the presence of gas
- Much higher stability of the VGSA
- Because there is only one common semiconductor sensor in use we could reach a better pricing, smaller energy consumption and the calibration and maintenance intervals will drop enormously

Technical specifications:	
Power supply	10-12 VDC 500 mA (optional)
Outputs	UART 3x Digital 1x Analog Optional: - ZigBee - SPI - EnOcean
Sensor analysis	DSP (Digital Sampling Process)
Dimensions	30 x 40 mm
Temperature- and humidity sensing	Optional
Software	Windows® Software with teach in capabilities and visualization of the analysis
Evaluation Board	VGSA-EVAL 12-35 VDC RS232-(F09) USB 2.0 3 galvanic isolated relays Analog output Development area where all needed signals could be measured

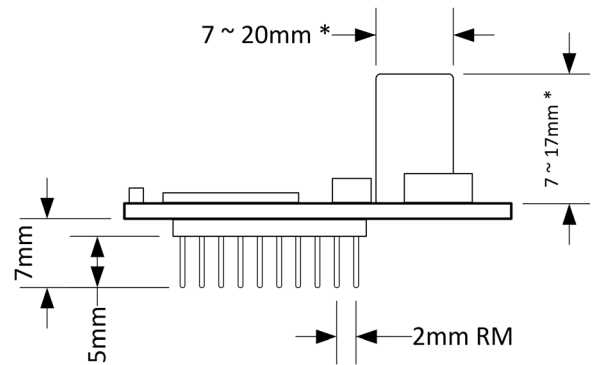


The system could be purchased calibrated to the required target gases. Customizations of dimension, target gas, concentrations, software and interfaces are possible.

USM-VGSA
Top View



USM-VGSA
Side View



* height and width are dependent on the used sensor element

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USCSM - Wireless solar-powered CO sensor module

USCSM – A wireless-based, solar-powered sensor module for continuous monitoring of the carbon monoxide (CO) concentration in various buildings and in industrial applications.

The core of the „Unitronic Solar CO Sensor Module“ (USCSM) is an innovative electrochemical carbon monoxide sensor in the shape of a standard AA battery, developed by Figaro - which meets both DIN EN 50 291 (Electrical apparatus for the detection of carbon monoxide in domestic premises) and Association of German Engineers (Verein Deutscher Ingenieure - VDI) guideline VDI 2053 (Air treatment systems for car parks) - and a STM 300 programmable, bidirectional wireless sensor module for 315 MHz or 868 MHz from EnOcean.

The main sensor element operates without an external voltage supply - its energy supply is provided with the help of an electrochemical process. Thanks to the ultra low power consumption of the EnOcean wireless sensor module and the solar cells integrated on the USCSM module, the carbon monoxide detector can thus be operated anywhere worldwide, fully independently of additional energy sources, wherever there are adequate light conditions for at least some of the time.

The detection range of the USCSM is from 20 ppm to 1000 ppm. A measurement is carried out every 20 seconds in normal ambient air and the wireless module transmits a presence message every hour with current values of the CO concentration and of the supply voltage. An operating time of up to 60 hours in darkness is achieved with these measurement and transmission cycles. When, during the CO concentration in the ambient air rises, the number of measurement and transmission cycles automatically increases, the current value of the supply voltage enables a continuous analysis of the anticipated remaining operating time. In this case, early visual or audible warning ensures a high level of safety.

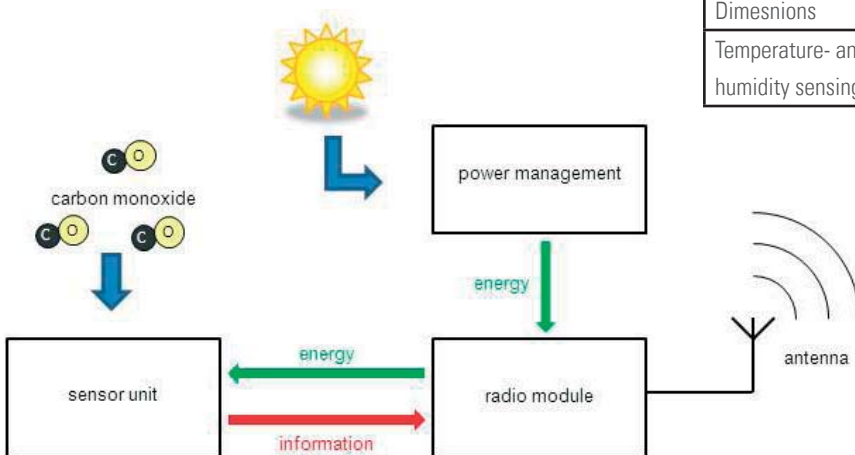


Features:

- Cost-efficient
- Smallest dimensions
- Low weight
- Autarkic
- Ultra-sensitive
- Long term stable
- Measurement range 20ppm – 1000ppm
- Works up to 60 hours in darkness
- Customizations possible
(Dimensions, target gases, software and interfaces)

Technical specifications:

Power supply	Solar cell
Outputs	EnOcean Radio (EEP conformed profile) ZigBee (optional)
Sensor analysis	ADC
Dimesnions	55 x 24 x 22 mm
Temperature- and humidity sensing	optional



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