

GAS 86xyB

May/2012



GAS 86xyB Digital Gas Sensor Platform

Micronas' multi-parametric sensor platform GAS 86xyB includes two CCFET (Capacitive-Coupled Field-Effect Transistor) gas detection devices, a temperature sensor, and a relative humidity sensor. Each sensor can be independently addressed via a digital serial peripheral interface (SPI). Temperature and relative humidity sensors are factory-calibrated and can be used for compensation of gas sensor signals but also as measurement devices.

The gas sensor is based on a conventional MOSFET (Metal Oxide Semiconductor Field-Effect Transistor) with its floating gate connected to an electrode capacitively coupled to a gas-sensitive layer on a suspended gate. Any gas-induced change of the sensitive layer's surface potential induces a modulation of the readout transistor that is detected by the integrated electronics.

The interaction between sensitive layer and ambient gas molecules is a reversible dynamic process taking place at room temperature, allowing unheated low-power operation for many gas species.

Technology

- ◆ Versatile, integrated digital gas sensor technology
- ◆ CCFET technology for gas detection
- ◆ No heating required for most target gases
- ◆ Fast detection of concentration changes of selected ambient trace gases
- ◆ Adjustable detection spectrum (by sensing layer and algorithms)
- ◆ Fabrication process embedded into Micronas' CMOS manufacturing technology
- ◆ Immunity against environmental interference, low cross-sensitivities

Features

- ◆ Robust against overdose exposure
- ◆ Low cross-sensitivities
- ◆ Two independent gas sensor units
- ◆ Integrated temperature sensor
- ◆ Integrated relative humidity sensor
- ◆ Electronic self-test capability
- ◆ Digital signal processing
- ◆ Integrated EEPROM
- ◆ Digital SPI interface
- ◆ Integrated heating option
- ◆ 2.7 to 3.6 V operating voltage

- ◆ Measurement ranges from approx. 100 ppb to 1% gas concentration (exact values vary by target gas)
- ◆ Target gases NO₂, NH₃, H₂, VOC (volatile organic compounds) and CO
- ◆ Operates from -40 °C up to 85 °C ambient temperature
- ◆ Operates from 5% up to 95% relative humidity
- ◆ Low current consumption (average operation <10 µA)
- ◆ Product life time >10 years
- ◆ Small 8×6 mm QFN sensor package with integrated PTFE particle filter

Generic Applications

GAS 86xyB is the optimal system solution for:

- ◆ Detection of concentration changes of ambient trace gases
- ◆ Upgrading temperature and relative humidity based applications with gas detection

Application Examples

- ◆ Early fire detection
- ◆ iAQ / AQS
- ◆ HVAC control
- ◆ Trace gas / gas leakage detection

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Demo Kit

For engineering purposes, Micronas offers an easy-to-use application kit:

- ◆ USB microcontroller interface board
- ◆ Direct USB connectivity
- ◆ LabVIEW™ graphical user interface
- ◆ No additional hardware required.
- ◆ One hardware for the entire GAS 86xyB product family



Fig. 1: GAS 86xyB demo kit

System Architecture

Each analog sensor output of the GAS 86xyB is sequentially multiplexed to an analog-to-digital converter. The digital measurement values can be read out and the HW setting of the sensors can be programmed via the SPI interface. A digital signal processing logic is responsible for the conditioning of the sensor signals. The sensors can be heated up with the integrated heater.

Information

- ◆ Explore the mySENS® technology: <http://www.micronas.com/mySENS>
- ◆ For more information about Micronas gas sensors please email: mySENS@micronas.com

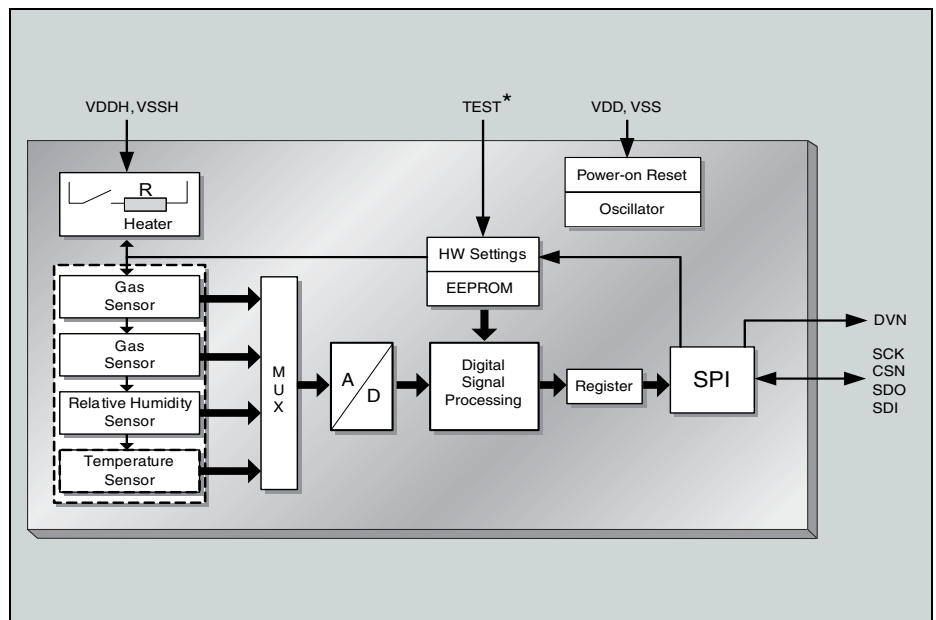


Fig. 2: Block diagram of the GAS 86xyB

*Built-in self-test capability comprises the complete measurement signal path. The self-test does not require the presence of a target gas.

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