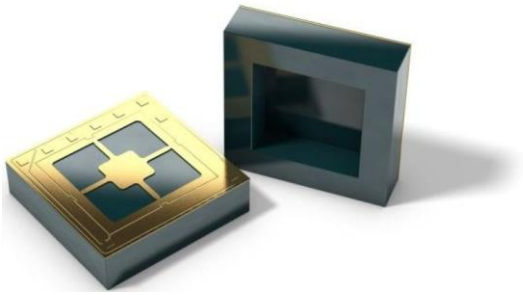
Measuring ultra-low pressures with the SM95G pressure die

***AMSYS GmbH & Co. KG**, Mainz, April 2021 – When it comes to low pressure measurements and reduced space in always smaller devices combined with high volumes, pressure dies can be the perfect match. Smaller than housed SOIC or DIL pressure sensors, AMSYS also offers the pure silicon-based micromechanical pressure sensing elements (MEMS) for cost sensitive projects. MEMS have long since replaced mechanical sensors with elastic membranes and have proven themselves millions of times over, for example in ventilation technology (HVAC) as well as in medical and automotive technology.*



The low pressure SM95G die features a rigid MEMS center and maximized diaphragm area with an edge length of only 2.1 mm.

For over 20 years, AMSYS has distributed pressure sensing elements from Silicon Microstructures, Inc. (SMI). The complete range is offered for all pressure types and ranges. A distinction is made between differential/relative and absolute pressure sensing elements. The latter are also available for harsh operating conditions with the SM97A being the successor of the SM98A for 150 and 300 psi (10 and 20 bar).

Very low differential pressures of less than 0.15 psi to 1.5 psi (10 mbar – 100 mbar), on the other hand, can be measured with the SM95G (also known as SM9520A). An increased sensitivity has been obtained by microstructuring the silicon wafer to form an integrated rigid membrane center for each pressure die. Through additional masking and etching during the manufacturing process, it is possible to structure the membrane in relief on the back and to reinforce its center. This gives the bottom side of the membrane a symmetrical surface thickening. The lateral dimensions, the thickness and the flatness of this thickening are critical variables that have to be controlled and optimized at great expense.
This bending-resistant center results in greater diaphragm deflection at the edges when pressure is applied. Together with adjusted positions of the piezoresistors, the SM95G has a maximum sensitivity of up to 300 mV/psi with highest linearity (±0.1%).

The range of measuring cells at AMSYS is completed by the differential pressure dies SM30D (successor of the SM30G) and SM30G-Pt for medium pressures between 5 and 30 psi (350 mbar and 2 bar, respectively) and the ultra-compact absolute pressure die SM5108E for 30, 60 and 100 psi (2, 4 and 7 bar).

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Metadata

Title

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Main Characteristics

- 0 – 0.15 psi (10 mbar), 0 – 0.6 psi (40 mbar) and 0 – 1.5 psi (100 mbar) differential pressure
- sensitivity of typ. 45mV (0.15 psi), 90 mV (0.6 psi) and 95 mV (1.5 psi) at 5 V_{dd}
- linearity of ±0.1% (pressurized from top) and ±0.2% (from bottom)
- footprint only 2,1 x 2,1 mm²

Company

AMSYS GmbH & Co. KG is a medium-sized company based in Germany and has focused on the field of sensor technology since its foundation. As a distributor for sensors, AMSYS is one of the specialists in pressure measurement technology on the German-speaking market.

AMSYS' product range extends from piezoresistive pressure sensing elements, simple SMD mountable transducers, amplified/unamplified and matched OEM sensors, PCB modules, to ready-to-use pressure transmitters.

AMSYS offers sensors and pressure cells in the pressure range from 1.25 mbar up to 800 bar. In addition to a wide variety of pressure sensor types, AMSYS also offers OEM humidity sensors, temperature and inclination sensors, and wireless Bluetooth solutions.

Due to the technical competence of the employees and the good contact to the suppliers, customer-specific modifications of the standard products can also be offered, which allows individual problem solutions. Further information can be found at www.amsys.de.

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