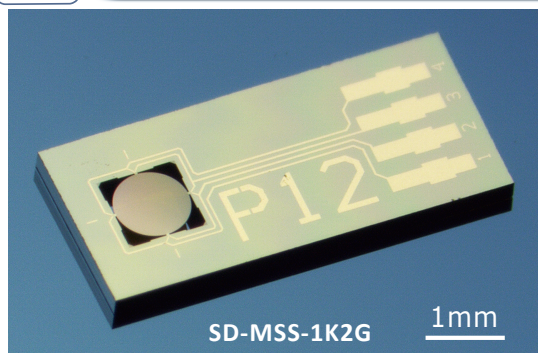


## Membrane-type Surface-stress Sensor (MSS)

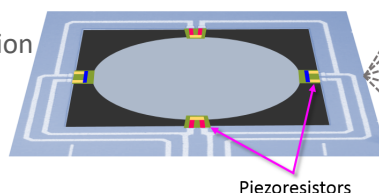
- **What is the MSS?** The MSS is a non-packaged MEMS sensor, a silicon membrane platform supported with four beams on which piezoresistors are embedded, sensitive to a deformation of the membrane caused by *e.g.*, an applied force.

### FOR GAS/ODOR SENSING

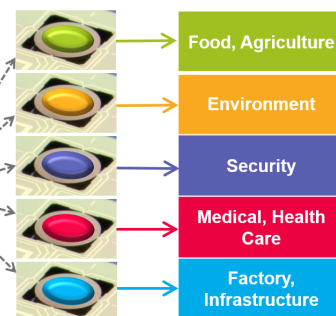


The MSS has a great potential as a core component for electronic (artificial) nose systems utilized in *e.g.*, medical, food, environment, safety and security fields.

Use of multiple sensor chips with different receptor layers enhances reliability of measurement.



Piezoresistors

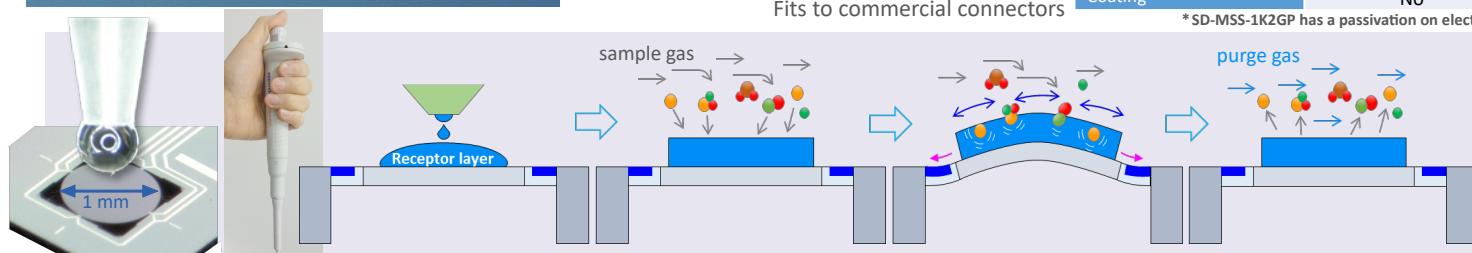


A receptor layer determines the sensitivity and the specificity of the individual sensor.

Code	SD - MSS - 1K2G SD - MSS - 1K2GP*
Membrane size [μm]	1000 round
Membrane thickness [μm]	2.8 (typical)
Chip dimensions [mm]	5.5 x 2.5 x 0.3
Resistance value [kΩ]	2 – 6
Electric configuration	Full bridge, 4 pads 0.5 mm pitch
Coating	No

\*SD-MSS-1K2GP has a passivation on electrodes.

Fits to commercial connectors

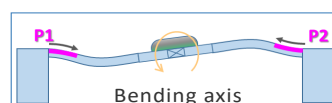


- **How to apply the MSS for gas/odor sensing:** Initially, the membrane is coated with a receptor layer sensitive to *e.g.*, volatile organic compounds (VOCs). Different tools such as inkjet spotter, spray coater, or manually with micropipette can be employed. A typical sensing operation is to alternatively flow sample and purge gases. Upon absorbing VOCs, the receptor layer yields surface stress and deforms the membrane. In the following step, the absorbed gas molecules are blown away and the membrane recovers the initial state. To repeat these steps, a specific output curve is obtained and used for data analysis.

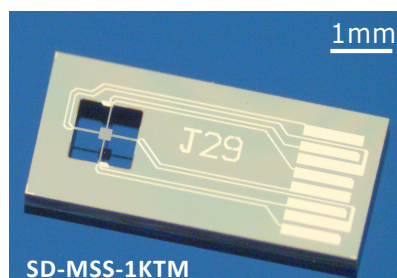
### FOR TORQUE MAGNETOMETRY

- **Torque magnetometry in DC/Pulsed Field, force sensing:**

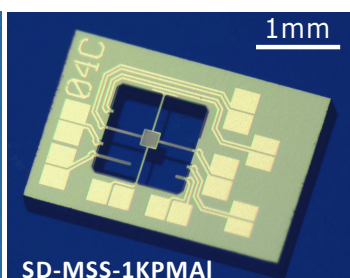
The three MSS types are specially designed for assessment of various materials like organic conductors, magnetic and superconductor materials in static/pulsed-field torque magnetometry. Two piezoresistive cantilevers and a coil are additionally integrated in SD-MSS-1KPMAl and SD-MSS-1KPMaU.



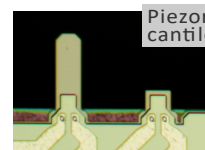
Bending axis



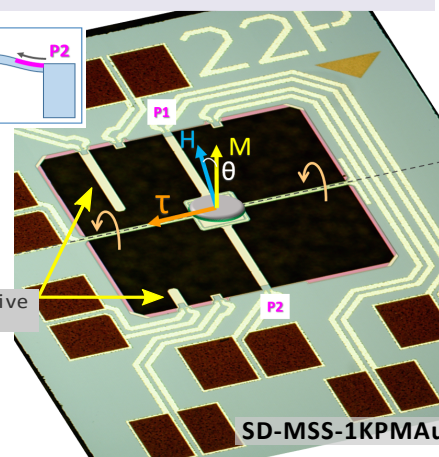
SD-MSS-1KTM



SD-MSS-1KPMAl



Piezoresistive cantilever



SD-MSS-1KPMaU

Code	SD-MSS-1KTM	SD-MSS-1KPMAl	SD-MSS-1KPMaU
Membrane size [μm]	200 square	200 square with coil	
Membrane thickness [μm]	2.8 (typical)		
Chip dimensions [mm]	5.5 x 2.5 x 0.3	3.0 x 2.0 x 0.3	
Resistance value [kΩ]	0.3 – 1.2		
Electric configuration	Separated, 8 pads 0.25 (0.5) mm pitch	Aluminum pads for wire bonding or gluing	Gold pads for wire bonding or gluing
Piezoresistive cantilever	No	120 μm, 400 μm	