

# MS5201-XD (RoHS<sup>\*</sup>)

# SMD PRESSURE SENSOR



- 1 bar gage pressure range
- Uncompensated
- Piezoresistive silicon micromachined sensor
- Miniature surface mount 7.6 x 7.6 mm
- Low noise, high sensitivity, high linearity
- RoHS-compatible & Pb-free<sup>\*</sup>

## DESCRIPTION

The MS5201-XD is a gage type SMD pressure sensor, suitable for applications which require relative (gage) pressure measurements. The device consists of a silicon micromachined pressure sensor die mounted on a 7.6 x 7.6 mm ceramic carrier protected by a plastic cap with a port to connect plastic tube. The MS5201-XD can be delivered in a highly sensitive version giving a maximal output voltage or in a highly linear version giving a linear output voltage directly proportional to the applied pressure.

Full Scale Pressure	High Sensitivity Version		High Linearity Version	
	Product Code	Full Scale Span / Linearity	Product Code	Full Scale Span / Linearity
1 bar	MS5201-AD	240 mV / $\pm 0.2\%$ FS	MS5201-BD	150 mV / $\pm 0.05\%$ FS

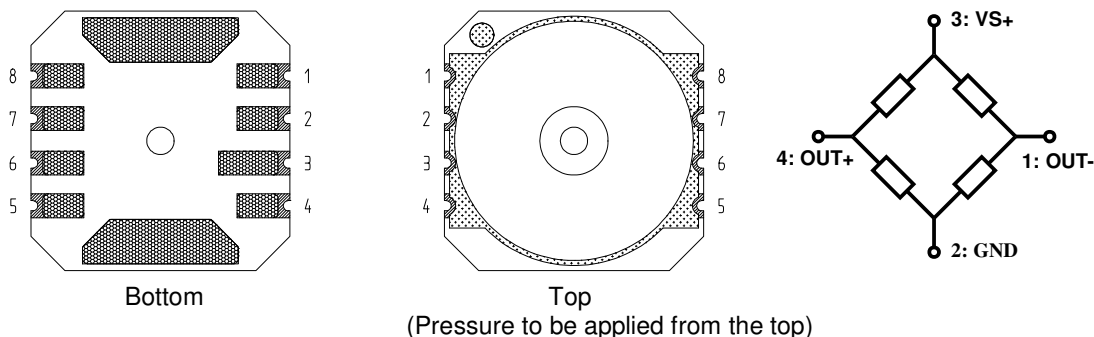
## FEATURES

- Low cost SMD ceramic package
- High reliability, low drift
- -40°C to +125 °C operation range
- Gel protection

## APPLICATION

- Medical instrumentation
- Pneumatic controls

## PIN CONFIGURATION



<sup>\*</sup> The European RoHS directive 2002/95/EC (Restriction of the use of certain Hazardous Substances in electrical and electronic equipment) bans the use of lead, mercury, cadmium, hexavalent chromium and polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE).

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**PIN DESCRIPTION**


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Pin Name	Pin No.	Function
OUT-	1	Negative output voltage of Wheatstone bridge
GND	2	Ground
VS+	3	Supply voltage of Wheatstone bridge
OUT+	4	Positive output voltage of Wheatstone bridge

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**ABSOLUTE MAXIMUM RATINGS**


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Parameter	Symbol	Conditions	Min	Max	Unit
Supply voltage	VS+	Ta = 25°C		20	V
Storage temperature	T <sub>s</sub>		-40	+125	°C
Overpressure	MS5201-AD MS5201-BD	P Ta = 25°C	- -	5 10	bar

## ELECTRICAL CHARACTERISTICS

(V<sub>S+</sub> = 5 V; T<sub>a</sub> = 25 °C)

	Parameter	Min	Typ	Max	Unit	Notes
MS5201-AD High Sensitivity	Operating pressure range	0	-	1	bar g	
	Full-scale span (FS)	190	240	290	mV	
	Sensitivity	190	240	290	mV/bar	
	Linearity	-	±0.15	±0.4	% FS	1, 6
MS5201-BD High Linearity	Operating pressure range	0	-	1	bar g	
	Full-scale span (FS)	120	150	180	mV	
	Sensitivity	120	150	180	mV/bar	
	Linearity	-	±0.05	±0.2	% FS	1
All Types	Operating temperature range	-40	-	125	°C	
	Zero pressure offset	-40	0	40	mV	
	Pressure hysteresis	-	±0.05	±0.15	% FS	2, 6
	Temperature hysteresis	-	-	0.3	% FS	3, 6
	Repeatability	-	±0.05	±0.15	% FS	4, 6
	Bridge resistance	3.0	3.4	3.8	kΩ	
	Temperature coefficient of resistance	+2'400	2'900	+3'300	ppm/°C	5, 6
Temperature coefficient of span	-1'500	-1'900	-2'300	ppm/°C	5, 6	
Temperature coefficient of offset	-80		+80	μV/°C	5, 6	

### NOTES

- 1) Deviation at one half full-scale pressure from the least squares best line fit over pressure range.
- 2) Maximum difference of output voltage after 1 pressure cycle at any pressure within the operating pressure range.
- 3) Maximum difference in offset after one thermal cycle from -40 °C to +125 °C.
- 4) Same as 2) after 10 pressure cycles.
- 5) Slope of the endpoint straight line from 25 °C to 60 °C.
- 6) Not 100% tested.

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## APPLICATION INFORMATION

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### GENERAL

The MS5201-XD is a miniaturised gage pressure sensor series which has been designed for surface mounting applications. Its main advantages are the high reliability of the semiconductor sensor and a design which makes it suitable for applications requiring small-scale and cost-efficient solutions.

The sensor element of the MS5201-XD consists of a silicon micromachined membrane with a Pyrex glass and a backside vent hole. Implanted resistors make use of the piezo-resistive effect. The sensor is mounted in a special process allowing best-offset stability making the part suitable for direct PCB assembly.

Typical applications for this miniaturised pressure sensor MS5201-XD are blood pressure monitors or vacuum measurement equipment.

### CONNECTION TO PCB

The package outline of the module allows the use of a flexible PCB to connect it. This can be important for certain applications, and will also reduce mechanical stress on the device.

For applications subjected to mechanical shock, it is recommended to enhance the mechanical reliability of the solder junctions by covering the rim or the corners of MS5201-XD ceramic substrate with glue or Globtop-like material.

### SOLDERING

Please refer to the application note AN808 for all soldering issues.

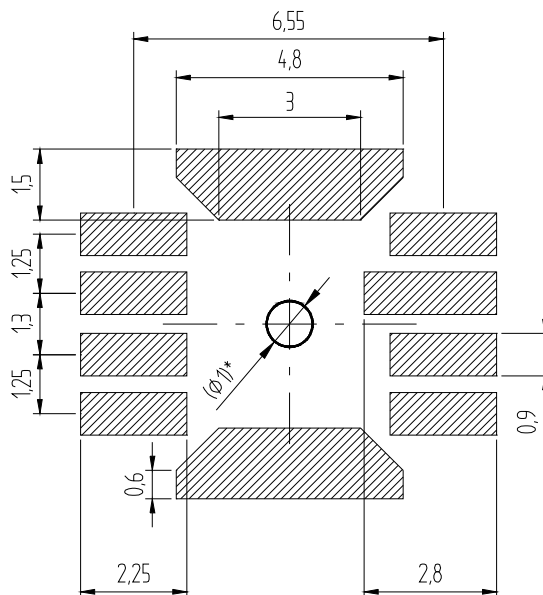
### CLEANING

The MS5201-XD has been manufactured under cleanroom conditions. Each device has been inspected for the homogeneity and the cleanness of the silicone gel. It is therefore recommended to assemble the sensor under class 10'000 or better conditions. Should this not be possible, it is recommended to protect the sensor opening during assembly from entering particles and dust. To avoid cleaning of the PCB, solder paste of type "no-clean" shall be used. **Cleaning might damage the sensor.**



## RECOMMENDED PAD LAYOUT

Recommended pad layout for soldering of the MS5201-XD on a printed circuit board



\*Recommended vent hole diameter

## ORDERING INFORMATION

Product Code	Product	Art.-Nr.	Package	Comment
MS5201-AD	Pressure sensor 1 bar High sensitivity	325201001	SMD hybrid with solder bumps, plastic cap, drop of gel on sensor, no gel protection of the bonding wires	
MS5201-BD	Pressure sensor 1 bar High linearity	325201003		

## FACTORY CONTACTS

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