RoHS

MS5212-HM

High Endurance SMD Pressure Sensor

SPECIFICATIONS

- **1, and 12 bar absolute pressure range**
- **Uncompensated**
- **Piezoresistive silicon micromachined sensor**
- **Surface mount 7.6 x 7.6 mm**
- **Low-noise, high-sensitivity, high-linearity**
- **High Endurance**

The MS52XX SMD pressure sensor series is designed for pressure systems with the highest demands on resolution and accuracy. The MS5212-HM is a 12bar High-Linearity version dedicated for high-endurance applications: The device consists of a silicon micromachined pressure sensor die mounted on a 7.6 x 7.6 mm ceramic carrier protected by a metal cap.

Full scale pressure	High Linearity Version		
	Product code	Full scale span	Linearity
12 bar	MS5212-HM	150 mV	±0.05 % FS

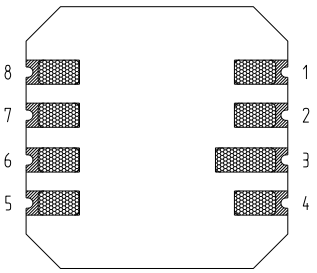
FEATURES

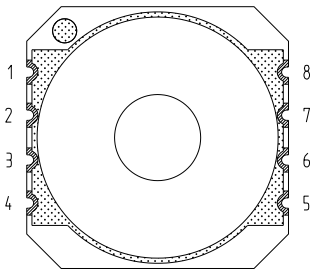
- Low-cost SMD ceramic package
- High-reliability, low-drift
- -40 °C to +125 °C operation range
- Optional: Gel protection against humidity and water
- High Endurance pad technology

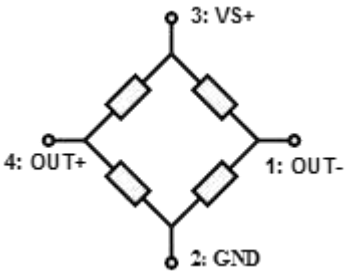
APPLICATIONS

- Absolute pressure sensor systems
- High resolution altimeters, variometers
- Barometers
- Engine controls
- Tire pressure
- Diver's computers

PIN CONFIGURATION







PIN DESCRIPTION

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

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Conditions	Min	Max	Unit
Supply voltage	VS+	Ta = 25 °C	-	20	V
Storage temperature	T_S		-40	+125	°C
Overpressure	P	Ta = 25 °C	-	30	bar

ELECTRICAL CHARACTERISTICS

HIGH LINEARITY

Parameter	Min	Typ	Max	Unit	Notes
Operating pressure range	0	-	12	bar	
Full-scale span (FS)	120	150	180	mV	
Sensitivity	10	12.5	15	mV/bar	
Linearity		±0.15	±0.20	% FS	1, 6
Operating temperature range	-40	-	125	°C	
Zero pressure offset	-40	0	40	mV	
Pressure hysteresis	-	-	±0.20	% FS	2, 6
Temperature hysteresis	-	0.3	0.8	% FS	3, 6
Repeatability	-	-	±0.20	% FS	4, 6, 7
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 end-point straight line from 25°C to 60°C.
6) Not 100% tested.
7) Max. 0.3% FS.

APPLICATION INFORMATION

GENERAL

The MS5212-HM is a miniaturized absolute pressure sensor series that 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 MS5212-HM consists of a micromachined silicone membrane with borosilicate glass wafer-bonded under vacuum to the back-side for reference pressure. Implanted resistors make use of the piezo-resistive effect to sense pressure applied to the membrane. The sensor is mounted in a special process allowing best-offset stability making the part suitable for direct PCB assembly. The pad metallization is adapted for applications that have chemical aggressions on the sensor.

Typical applications for this miniaturized pressure sensor MS5212-HM are in automotive and industrial applications, consumer electronics, diving computer and pneumatics.

LIGHT SENSITIVITY

The MS5212-HM is sensitive to sunlight, especially to infrared light sources. This is due to the strong photo effect of silicon. As the effect is reversible there will be no damage, but the user has to take care that in the final product the sensor must not be exposed to direct light during operation. This can be achieved for instance by placing mechanical shielding with holes in such way that light cannot go through.

CONNECTION TO PCB

The package outline of the module allows the use of a flexible PCB to connect it. This can be important for applications in watches and other special devices, 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 MS5212-HM ceramic substrate with glue or Globtop epoxy resin as material.

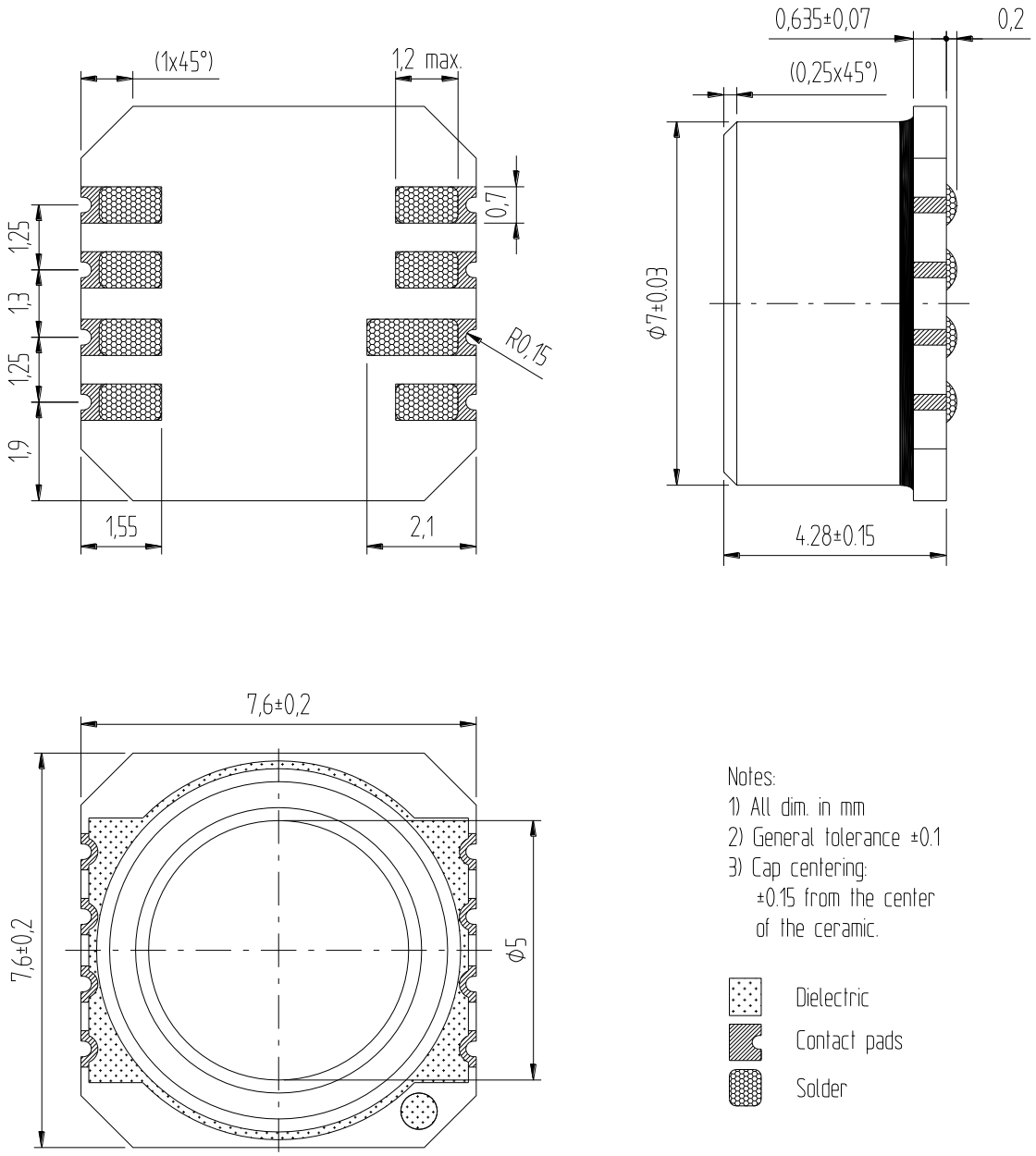
SOLDERING

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

CLEANING

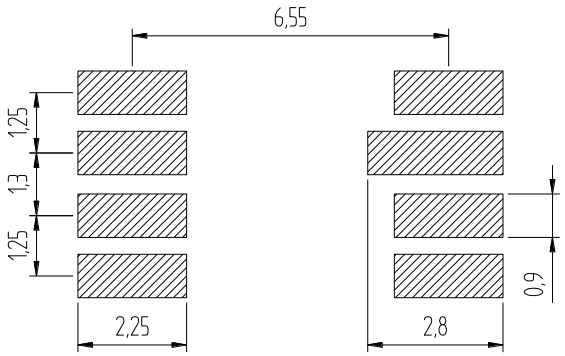
The MS5212-HM has been manufactured under cleanroom conditions. Each device has been inspected for the homogeneity and the cleanness of the silicone gel. It is therefore recommended to assemble the sensor under class 10’000 or better conditions. Should this not be possible, it is recommended to protect 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 may damage the sensor.**

PACKAGE OUTLINES



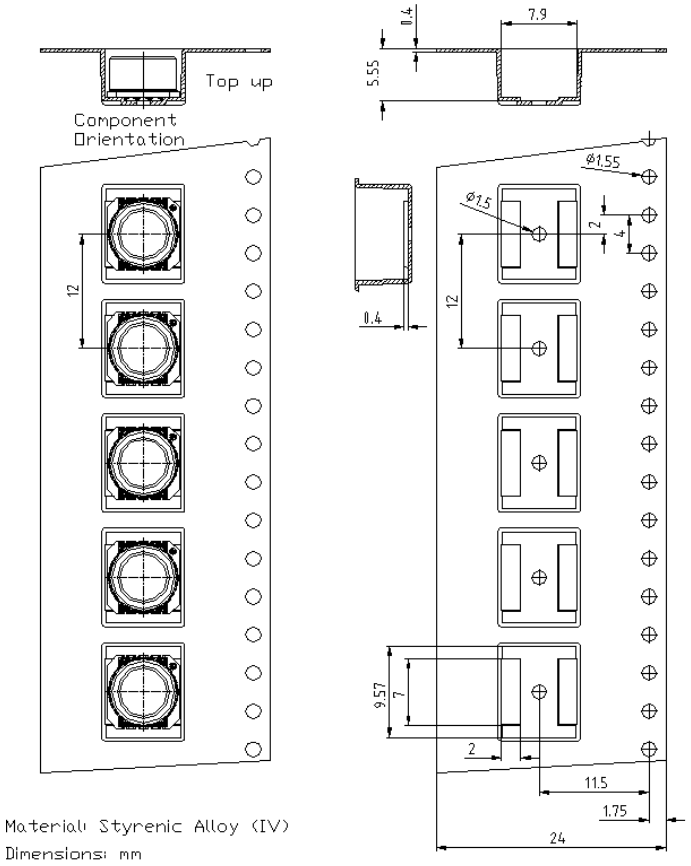
Device package outlines of **MS5212-HM** (Stainless steel cap, with or without gel protection of bonding wires)

RECOMMENDED PAD LAYOUT



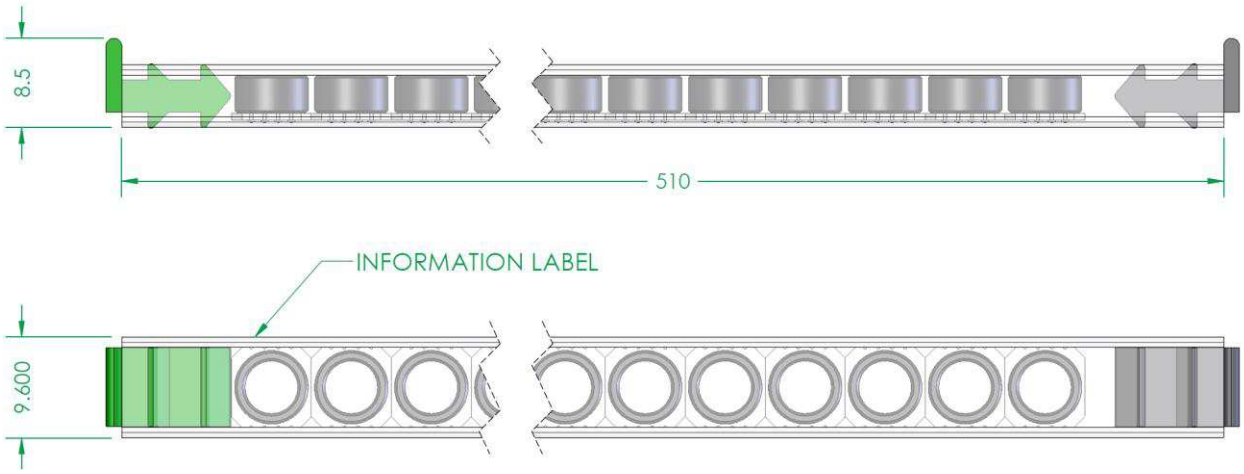
Recommended pad layout for soldering of the MS5212-HM on a printed circuit board

SHIPPING PACKAGE



Tape and reel

SHIPPING PACKAGE (CONT.)



Tube

ORDERING INFORMATION

Product code	Product	Art. No	Package	Comments	Delivery form
MS5212-HM white gel HE	Pressure sensor 12 bar, High linearity, High Endurance	325212020-00	SMD hybrid with solder bumps, Stainless steel cap, Gel protection	Sensor dedicated for High-Endurance applications	Tube
MS5212-HM white gel HE T&R	Pressure sensor 12 bar, High linearity, High Endurance T&R	325212020-50			Tape and reel