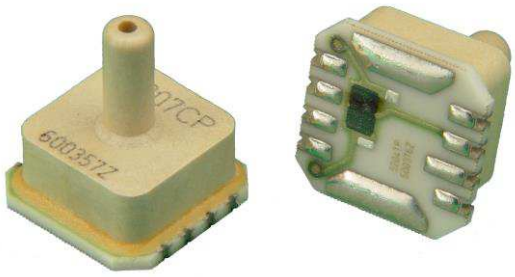


MS52XX-C&T

SMD Pressure Sensor

SPECIFICATIONS

- **1, 4, and 7 bar absolute pressure range**
- **Piezoresistive silicon micromachined sensor**
- **Surface mount 6.2 x 6.4 mm**
- **LCP plastic cap for easy connection**
- **Uncompensated**
- **Optional trimmed offset**
- **Low noise, high sensitivity, high linearity**

The MS52xxC&T SMD pressure sensor series is designed for industrial pressure sensor systems with highest demands on resolution, accuracy and reliability. The device consists of a silicon micromachined pressure sensor die mounted on a 6.2 x 6.4 mm ceramic carrier protected by a plastic cap. The MS52xxC&T SMD can be delivered with many different sensitivities and linearities. When you have a need, please feel free to ask us.

Full scale pressure	Untrimmed offset			Trimmed offset		
	Product code	Full scale span	Linearity	Product code	Full scale span	Offset at 1013 mbar
1 bar	MS5201-CP	240 mV	±0.15 % FS	MS5201-TP	On request	On request
4 bar	MS5204-CP	225 mV	±0.15 % FS	MS5204-TP	225 mV	17 mV
7 bar	MS5207-CP	392 mV	±0.15 % FS			

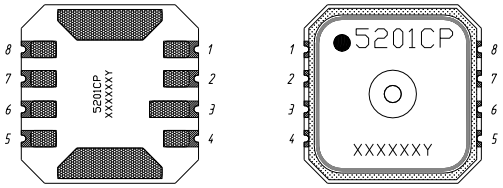
FEATURES

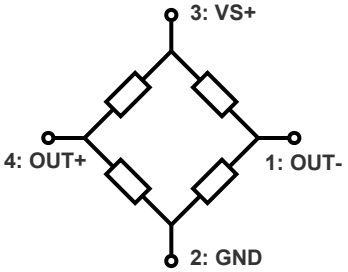
- Low cost SMD ceramic package
- Small size
- High reliability, low drift
- -40 °C to +125 °C operation range
- Trimmed offset available
- Simple to interface with nozzle port

APPLICATIONS

- Absolute pressure sensor systems
- High resolution altimeters, variometers
- Barometers
- Engine controls
- Industrial applications

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	Notes
Supply voltage	VS+	Ta = 25 °C	-	20	V	
Storage temperature	T_S		-40	+125	°C	
Overpressure MS5201-CP MS5204-TP MS5207-CP	P	Ta = 25 °C		5 21 21	bar	1

NOTES

1) The MS52xx-C&T is aimed for air pressure applications. There is no gel protection on the silicon sensing element.

ELECTRICAL CHARACTERISTICS

UNTRIMMED VERSIONS

(Vs+ = 5 V; Ta = 25 °C)

	Parameter	Min	Typ	Max	Unit	Notes
MS5201-CP	Operating pressure range	0	-	1	Bar	
	Full-scale span (FS)	190	240	290	mV	
	Sensitivity	190	240	290	mV/bar	
	Linearity	-	±0.15	±0.4	% FS	1, 6
MS5207-CP	Operating pressure range	0	-	7	Bar	
	Full-scale span (FS)	322	392	462	mV	
	Sensitivity	46	56	66	mV/bar	
	Linearity	-	±0.15	±0.4	% FS	1, 6
All ranges	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
	Bridge resistance	3.0	3.4	3.8	kΩ	
	Temperature coefficient of resistance Temperature coefficient of span Temperature coefficient of offset	+2'400 -1'500 -80	2'900 -1'900 -	+3'300 -2'300 +80	ppm/°C ppm/°C µV/°C	5, 6 5, 6 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.

ELECTRICAL CHARACTERISTICS (CONT.)

TRIMMED VERSION

(Vs+ = 5 V; Ta = 25 °C)

	Parameter	Min	Typ	Max	Unit	Notes
MS5204-TP	Operating pressure range	0	-	4	Bar	
	Full-scale span (FS)	200	225	250	mV	
	Sensitivity		56		mV/bar	
	Linearity		±0.15	±0.4	% FS	1, 6
	Operating temperature range	-40	-	125	°C	
	Pressure offset at 1013 mbar	15	17	19	mV	
	Pressure hysteresis	-	-	±0.20	% FS	2, 6
	Temperature hysteresis	-	0.3	0.8	% FS	3, 6
	Repeatability	-	-	±0.20	% FS	4, 6
	Bridge resistance	3.0	3.4	3.8	kΩ	
	Temperature coefficient of resistance Temperature coefficient of span Temperature coefficient of offset	+2'400 -1'500 -80	2'900 -1'900 -	+3'300 -2'300 +80	ppm/°C ppm/°C µV/°C	5, 6 5, 6 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.

APPLICATION INFORMATION

GENERAL

The MS52xxC&T is a miniaturized absolute 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 MS52xxC&T consists of a micromachined silicone membrane with borosilicate glass wafer-bonded under vacuum to the backside 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.

Typical applications for this miniaturized pressure sensor MS52xxC&T are altitude measurements and the measurement of atmospheric reference pressure in medical and industrial equipment as well as in automotive and household applications, consumer electronics and pneumatics.

Full scale pressure	**Untrimmed Versions**	**Trimmed Versions**
1 bar	Variometer, Altimeter, Barometer	-
4 bar	-	Engine control, Industrial Applications, Pressure monitoring systems
7 bar	Electronic scale	-

LIGHT SENSITIVITY

The MS52xxC&T 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 cannot be exposed to direct light during operation. This can be achieved for instance by placing mechanical parts with holes in such that light cannot pass.

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 MS52xxC&T ceramic substrate with glue or Globtop-like material.

SOLDERING

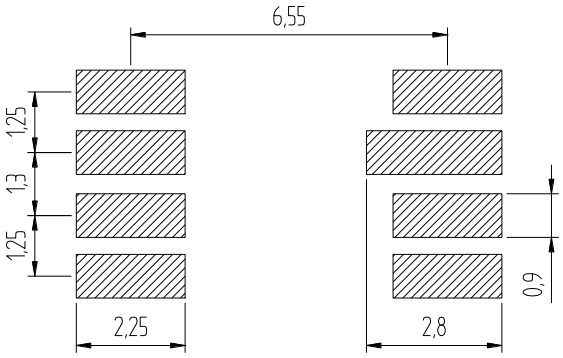
Please refer to the application note AN808 for all soldering issues.

CLEANING

The MS54XX has been manufactured under cleanroom conditions. Each device has been inspected for cleanness. 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 MS52xx on a printed circuit board



PACKAGE OUTLINES

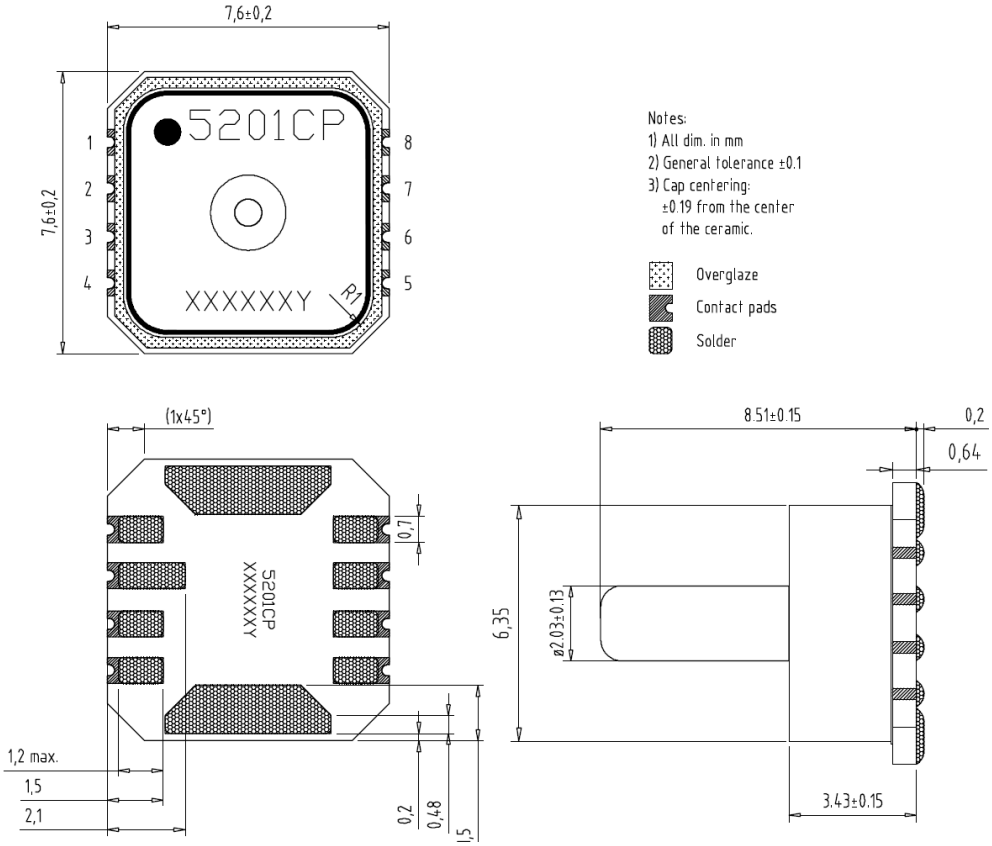


Fig. 1: Device package outlines of MS52xx-C&T

ORDERING INFORMATION

Product code	Product	Art. No
MS5201-CP	SMD Pressure sensor, 1 bar, untrimmed	325201004-00
MS5204-TP	SMD Pressure sensor, 4 bar, trimmed	325204000-00
MS5207-CP	SMD Pressure sensor, 7 bar, untrimmed	325207000-00

NORTH AMERICA
Measurement Specialties, Inc.,
a TE Connectivity company
Tel: 800-522-6752
Email: customercare.frmt@te.com

EUROPE
Measurement Specialties (Europe), Ltd.,
a TE Connectivity Company
Tel: 800-440-5100
Email: customercare.bevx@te.com

ASIA
Measurement Specialties (China) Ltd.,
a TE Connectivity company
Tel: 0400-820-6015
Email: customercare.shzn@te.com

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