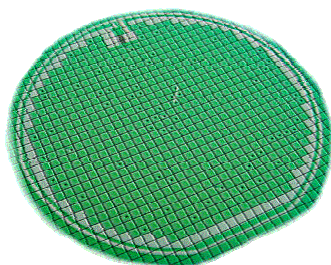


## MS7310D LOW PRESSURE SENSOR DIE (0 to 10 kPa)



- 0 to 10 kPa (100 mbar or 1.45 PSI)
- Uncompensated differential pressure sensor die
- Piezoresistive silicon micromachined sensor
- High output signal 110 mV
- Small size
- RoHS-compatible & Pb-free<sup>1</sup>

### DESCRIPTION

The MS7310D pressure sensor die is designed for low pressure sensor systems with the highest demands on resolution and accuracy. Its sensor element consists of a silicon micro-machined membrane bonded on a Pyrex™ glass support. The sensor signal is proportional to the pressure difference between back and front side of the membrane. The pressure is sensed by four implanted piezoresistors, giving a large output signal.

### FEATURES

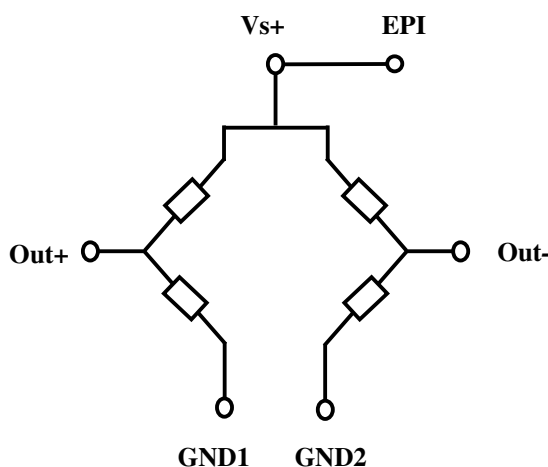
- Uncompensated differential pressure sensor die
- Output span 110 mV @ 5 V
- Temperature range -40 °C to +125 °C
- Typical linearity 0.35% (10kPa) or 0.1% (2kPa)
- Die size 2.45 mm x 2.45 mm
- Low cost, high reliability, low drift
- High pressure burst capability (600 kPa)

### APPLICATION

- Washing machines
- Level indicators
- Industrial controls
- Leak detection

### ELECTRICAL CONNECTIONS

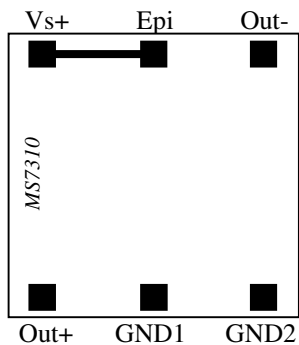
Positive output for pressure applied topside



- Vs+ : Supply voltage of Wheatstone bridge
- Epi : Connection of epitaxial layer (membrane)
- Out- : Negative output
- Out+ : Positive output
- GND1 : Ground
- GND2 : Ground

<sup>1</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).

## PAD OUT

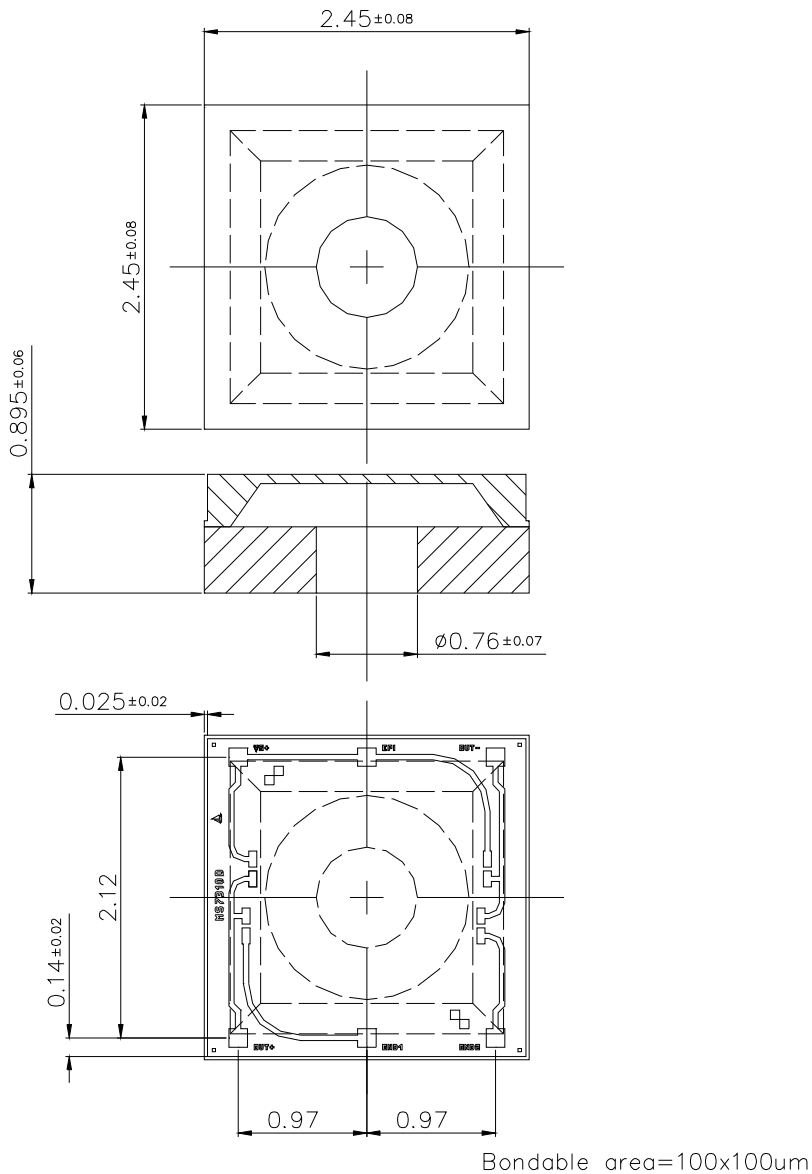


### Important remarks:

As the sensing elements are diffused resistances, the voltage applied on the ground pads (GND1 and GND2) has to be lower than the voltage applied on supply voltage pad (Vs+).

The epitaxial layer is connected to the Vs+ pin on the die

## LAYOUT



## FULL SCALE PRESSURE

kPa	bar	mbar	PSI	atm	mm Hg	mm H <sub>2</sub> O	Inches H <sub>2</sub> O
10	0.1	100	1.45	0.0987	75.01	1019.7	40.1

## ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Conditions	Min	Max	Unit
Supply voltage	VS+	Ta = 25 °C		12	V
Storage temperature	T <sub>s</sub>		-40	+150	°C
Pressure overload				600	kPa

## ELECTRICAL CHARACTERISTICS

(Reference conditions: Supply Voltage VS+ = 5 Vdc; Ambient Temperature Ta = 25 °C)

Parameter	Min	Typ	Max	Unit	Notes
Operating Pressure Range	0	-	10	kPa	
Operating Temperature Range	-40		+125	°C	
Bridge Resistance	3000		3800	Ω	
Zero Pressure Offset	-40	0	40	mV	
Span (Full scale range)					
10 kPa	85	110	130	mV	
5 kPa	43	55	65	mV	
2 kPa	17	22	26	mV	
Linearity (Full scale range)					
10 kPa		±0.35	±0.5	%FS	1
5 kPa		±0.25	±0.4	%FS	2
2 kPa		±0.1	±0.2	%FS	3
Temperature Coefficient of Resistance	+ 2500	+ 2900	+ 3400	ppm/°C	4
Span	- 1600	- 1900	- 2200	ppm/°C	
Offset	-80	-40	0	μV/°C	
Pressure hysteresis	-0.1		0.1	% FS	5
Repeatability	-0.1		0.1	% FS	6
Temperature hysteresis	-0.15		0.15	% FS	7
Position sensitivity	0		0.15	% FS	8
Response time		1.0		ms	9
Warm-up time		1		s	10

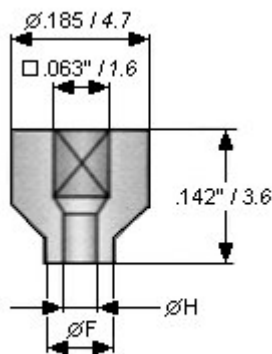
### NOTES

- 1) Deviation at one half full-scale pressure from least squares best line fit over pressure range 0 to 10 kPa.
- 2) Deviation at 2.5 kPa from least squares best line fit over pressure range 0 to 5 kPa.
- 3) Deviation at 1 kPa from least squares best line fit over pressure range 0 to 2 kPa.
- 4) Slope of the endpoint straight line from 25 °C to 60 °C.
- 5) Output deviation at any pressure within the specified range, when this pressure is cycled to and from the minimum or maximum rated pressure, at 25 °C.
- 6) Same as 5) after 10 pressure cycles.
- 7) Maximum difference in offset after one thermal cycle from -40 °C to 125 °C.
- 8) Maximum difference in output at any pressure within the specified pressure range between the sensor being in upright position and in upside-down position.
- 9) 10% to 90% signal rise time for a 0 to 10 kPa pressure step change.
- 10) Time to reach an offset accuracy of 0.2% after switching on a supply voltage of 5V.

## PICKING TOOLS

The MS7310D sensors have a sensitive membrane (1.5x1.5 mm) the sensor dice outer diameter is: 2.45x2.45 mm. The pick and place tool has to be of a soft material as rubber (Hardness 78-97 Shore A). Its external size must fit the sensor and the vacuum cavity must be as large as the membrane itself. Successful test were done with a tool of SPT (see SPT drawing and references below).

SPT reference	PCTR-A-100
External dimension	∅F: 0.1 inch / 2.54 mm
Internal dimension	∅H: 0.08 inch / 2.04 mm



PCTR/FCTR-A

## ORDERING INFORMATION

Product Code	Product	Art.-Nr.
MS7310D	10 kPa Differential Low Pressure Sensor	731025121

The MS7310D dice are supplied sawn on blue foil, mounted on plastic rings

## FACTORY CONTACTS

### NOTICE

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