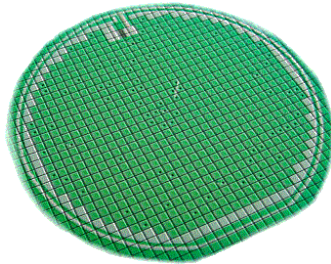


# MS7801 Pressure Sensor Die (0-1 bar)



- 0 to 100 kPa range (1 bar or 14.5 PSI)
- Absolute/differential pressure sensors

## DESCRIPTION

The sensor element of the MS7801 consists of a silicon micro-machined membrane. Implanted resistors make use of the piezo-resistive effect. The absolute pressure sensor employs a sealed vacuum reference cavity underneath the membrane. Borosilicate glass wafer used for this sealing has a thickness of 0.2 mm (MS7801-A\_0.2) or 0.5 mm (MS7801-A\_0.5). There are two gauge versions available: one with a drilled borosilicate glass (MS7801-D) and the other without borosilicate glass (MS7801-S).

## FEATURES

- Uncompensated pressure sensor die
- Output Span 150 mV @ 5 V
- Temperature Range -40 °C ... + 125 °C
- Linearity 0.05 % (typical)
- Small die size 1.96 x 2.10 mm<sup>2</sup> (MS7801-A)
- Low cost, high reliability

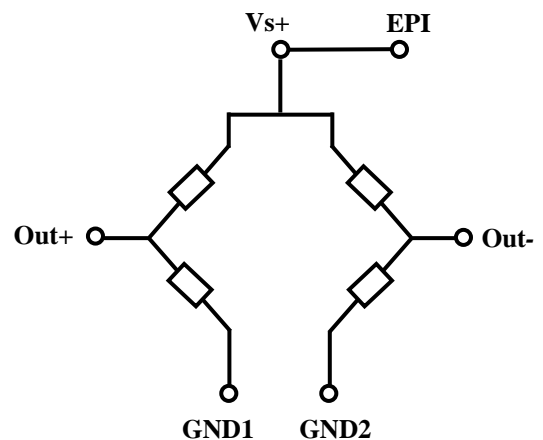
## APPLICATIONS

- For absolute or differential pressure sensor systems
- Barometers, Altimeters
- Variometers

## ELECTRICAL CONNECTIONS

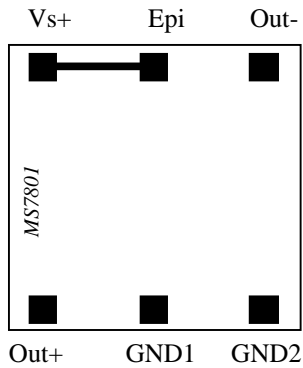
Positive output for pressure applied topside

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



# MS7801 Pressure Sensor Die (0-1 bar)

## BOND PAD CONFIGURATION



### Important remarks:

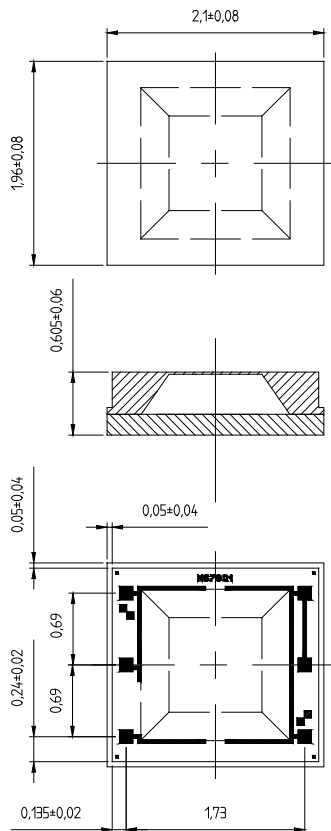
As the sensing elements are diffused resistances, the voltage applied on the ground pads (GND1 and GND2) has to be lower than the voltage applied on supply voltage pad (Vs+).

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

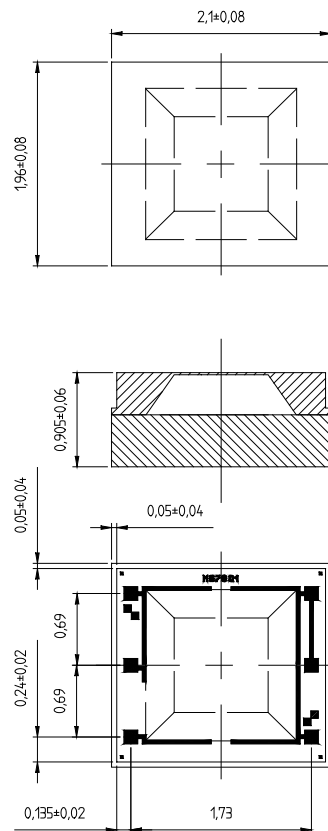
Gold ball bonding or aluminum wedge bonding can be used to wire-bond the sensor. The quality of the wire-bonding is equipment and process dependant. For this reason, it is strongly recommended that a thorough wire-bonding qualification is made by the end user if the sensor is going to be operated over an extended temperature range.

## LAYOUT (ABSOLUTE SENSORS)

MS7801-A\_0.2



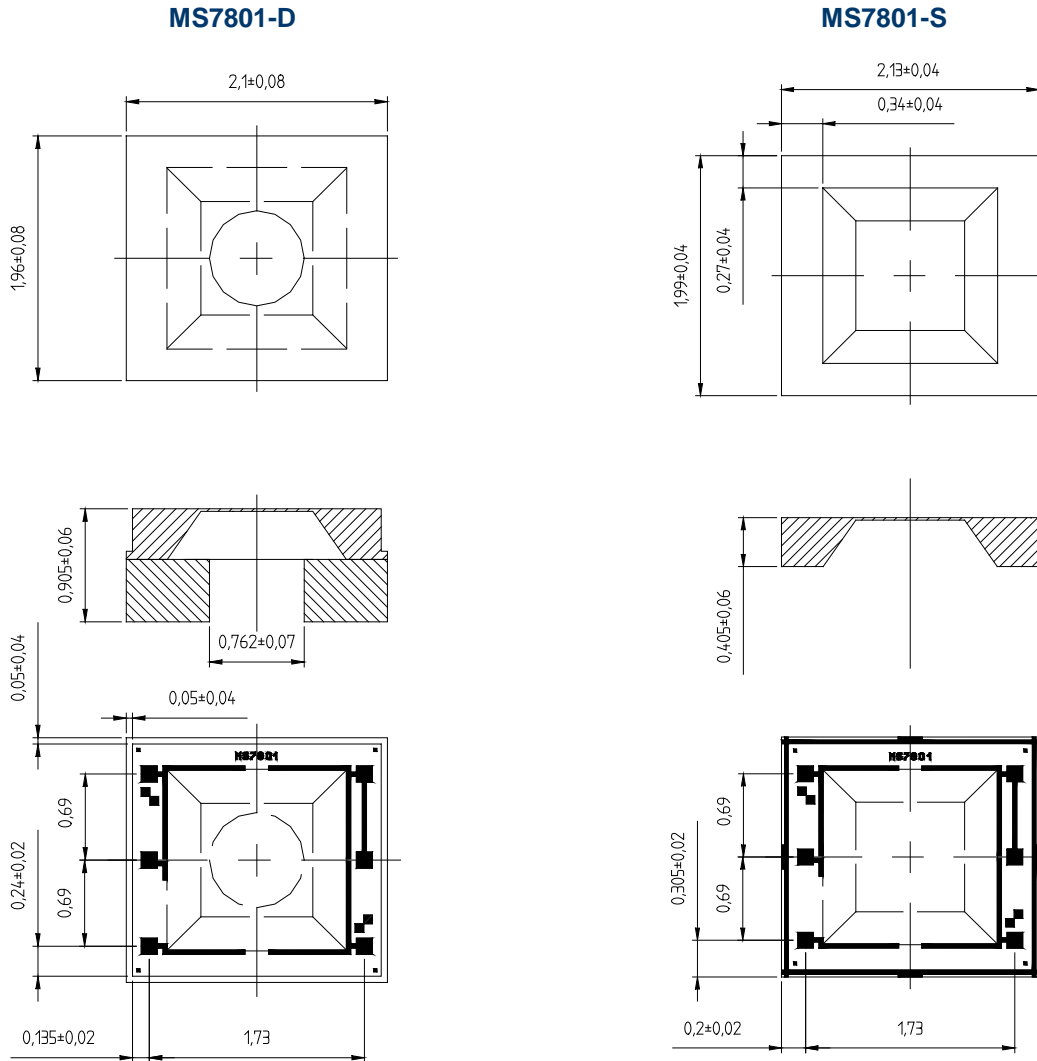
MS7801-A\_0.5



Pad opening in *passivation* is 100  $\mu$ m

# MS7801 Pressure Sensor Die (0-1 bar)

## LAYOUT (GAUGE SENSORS)



Pad opening in passivation is 100  $\mu$ m

## FULL SCALE PRESSURE

kPa	bar	mbar	PSI	atm	mm Hg	m H <sub>2</sub> O	Inches H <sub>2</sub> O
100	1	1000	14.5	0.987	750	10.197	401

## ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Conditions	Min	Max	Unit
Supply voltage	V <sub>s+</sub>	T <sub>a</sub> = 25 °C		20	V
Storage temperature	T <sub>s</sub>		-40	+150	°C

# MS7801 Pressure Sensor Die (0-1 bar)

Pressure overload				5	bar
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## ELECTRICAL CHARACTERISTICS

(Reference conditions: Supply voltage  $V_{s+} = 5 \text{ Vdc}$ ; Ambient Temperature  $T_a = 25^\circ\text{C}$ )

Parameter	Min	Typ	Max	Unit	Notes
Operating Pressure Range	0		1	bar	
Operating Temperature Range	-40		125	$^\circ\text{C}$	
Bridge Resistance	3.0	3.4	3.8	$\text{k}\Omega$	
Full-scale span (FS)	120	150	180	mV	
Zero Pressure Offset	-40	0	40	mV	
Linearity		$\pm 0.05$	$\pm 0.20$	% FS	1
Temperature Coefficient of Resistance	+2400	+ 2800	+ 3300	ppm/ $^\circ\text{C}$	2
Span	-1500	- 1900	- 2300	ppm/ $^\circ\text{C}$	
Offset	-80		+ 80	$\mu\text{V}/^\circ\text{C}$	
Pressure Hysteresis		$\pm 0.05$	$\pm 0.15$	% FS	3
Repeatability		$\pm 0.05$	$\pm 0.15$	% FS	4
Temperature Hysteresis			0.3	% FS	5

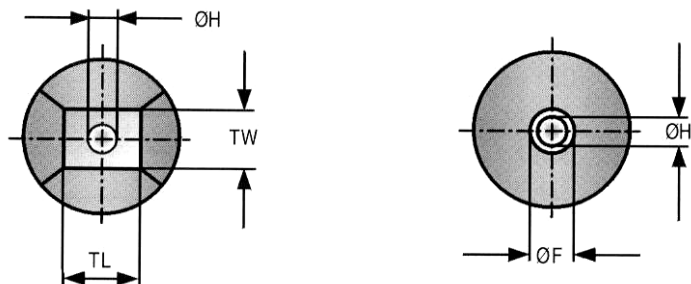
## NOTES

- 1) Deviation at one half full-scale pressure from the least squares best line fit over pressure range (0 to 1 bar).
- 2) Slope of the endpoint straight line from  $25^\circ\text{C}$  to  $60^\circ\text{C}$ .
- 3) Output deviation at any pressure within the specified range, when this pressure is cycled to and from the minimum or maximum rated pressure, at  $25^\circ\text{C}$ .
- 4) Same as 3) after 10 pressure cycles.
- 5) Maximum difference in offset after one thermal cycle from  $-40^\circ\text{C}$  to  $+125^\circ\text{C}$ .

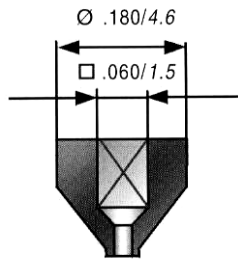
## PICKING TOOLS

The MS7801 sensors have a sensitive membrane size of  $0.9 \times 0.9 \text{ mm}$  and outer dimensions of  $2.10 \times 1.96 \text{ mm}$  (MS7801-A\_0.2, MS7801-A\_0.5 and MS7801-D) and  $2.13 \times 1.99 \text{ mm}$  (MS7801-S). The pick and place tool has to be of a soft material such 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 tests have been made with specific SPT tools, see SPT drawing and references below. Ensure that the ejection pins do not touch the membrane for gauge versions.

SPT references	RTR-A1-060x060	CTR-A1-080
External dimension	TL & TW: 0.06 inch / 1.52 mm	$\varnothing\text{F}$ : 0.08 inch / 2.03 mm
Internal dimensions	$\varnothing\text{H}$ : 0.035 inch / 0.89 mm	$\varnothing\text{H}$ : 0.035 inch / 0.89 mm



## MS7801 Pressure Sensor Die (0-1 bar)



Type A

### ORDERING INFORMATION

Product code	Type	Product	Art.-Nr.
MS7801-A_0.2	Absolute	1 bar Pressure Sensors 0.2 mm borosilicate glass sawn on b/f	780125022
MS7801-A_0.5	Absolute	1 bar Pressure Sensors 0.5 mm borosilicate glass sawn on b/f	780125021
MS7801-D	Differential	1 bar Pressure Sensors sawn on b/f	780125121
MS7801-S	Differential	1 bar Pressure Sensors no borosilicate glass sawn on b/f	780125221

The MS7801 dice are supplied sawn on blue foil, mounted on plastic rings.

### 联系方式



深圳市亿为测控电子有限公司  
Shenzhen Bill-Well Measurement & Control Electronics Co., Ltd.

广东省深圳市南山区创业路怡海广场东座2407 邮编：518000

电话：+86 755 2641 9890 传真：+86 755 2641 9680

电子邮箱：sales@bill-well.com