

MS7812

PRESSURE SENSOR DIE (0-12 BAR)



- 0 to 1200 kPa range (1 bar or 174 PSI)
- Absolute/differential pressure sensors
- RoHS-compatible & Pb-free¹

DESCRIPTION

The sensor element of the MS7812 consists of a silicon micro-machined membrane with a Pyrex glass mounted under vacuum. Implanted resistors make use of the piezo-resistive effect. The absolute pressure sensor (MS7812-A) carries a sealed vacuum reference cavity underneath the membrane whereas the differential sensor (MS7812-D) has a whole in the Pyrex glass at the backside of the sensor.

FEATURES

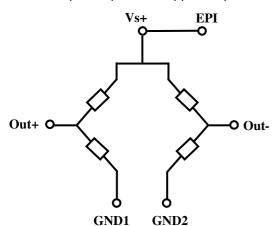
- Uncompensated pressure sensor die
- Output Span 150mV @ 5V
- Temperature Range -40°...+125℃
- Linearity 0.05% (typical)
- Small Die Size 2.00 x 1.86mm
- Low Cost, High reliability

APPLICATION

- For absolute or differential pressure sensor systems
- Engine controls
- Dive computers

ELECTRICAL CONNECTIONS

Positive output for pressure applied topside



Vs+: Supply voltage of Wheatstone bridge

Epi: Connection of epitaxial layer (membrane)

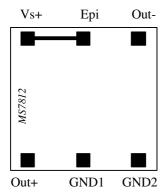
Out-: Negative output
Out+: Positive output

GND1 : Ground GND2 : Ground

¹ 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



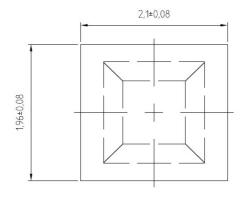
Important remarks:

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+).

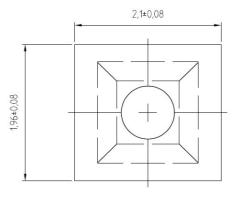
The epitaxial layer is connected to the Vs+ pin on the die

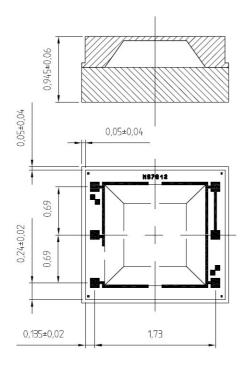
LAYOUT

MS7812A

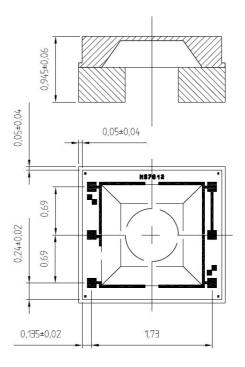


MS7812D





Bondable area = $100 \times 100 \mu m$



Bondable area = 100 x 100 μm



FULL SCALE PRESSURE

| kPa | bar | mbar | PSI | atm | mm Hg | m H ₂ O | Inches H ₂ O |
|------|-----|-------|-----|------|-------|--------------------|-------------------------|
| 1200 | 12 | 12000 | 174 | 11.8 | 9001 | 122 | 4818 |

ABSOLUTE MAXIMUM RATINGS

| Parameter | Symbol | Conditions | Min | Max | Unit |
|---------------------|--------|------------|-----|------|------|
| Supply voltage | VS+ | Ta = 25 °C | | 20 | V |
| Storage temperature | Ts | | -40 | +125 | °C |
| Pressure overload | | | | 30 | Bar |

ELECTRICAL CHARACTERISTICS

(Reference conditions: Supply Voltage VS+ = 5 Vdc; Ambient Temperature Ta = 23 °C)

| Parameter | Min | Тур | Max | Unit | Notes |
|---|--------------------------|------------------|--------------------------|------------------------|-------|
| Operating Pressure Range | 0 | - | 12 | bar | |
| Bridge Resistance | 3.0 | 3.4 | 3.8 | kΩ | |
| Full-scale span (FS) | 120 | 150 | 180 | mV | |
| Zero Pressure Offset | -40 | 0 | 40 | mV | |
| Linearity | - | ± 0.05 | ± 0.3 | % FS | 1 |
| Hysteresis | | 0.05 | ± 0.15 | % FS | 2 |
| Temperature Coefficient of Resistance Span Offset | + 2400 - 1500 - 80 | + 2800 - 1900 | + 3300 - 2300 + 80 | ppm/℃ ppm/℃ μV/℃ | 3 |
| Temperature Hysteresis | | 0.3 | 0.8 | % FS | 4 |

NOTES

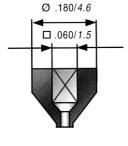
- 1) Deviation from endpoint straight line from 0 bar to 12 bar at one half full-scale pressure.
- 2) Maximum difference in output at any pressure within the operating pressure range.
- 3) Slope of the endpoint straight line from $25 \,^{\circ}$ C to $60 \,^{\circ}$ C.
- 4) Maximum difference in offset after one thermal cycle from -40 $^{\circ}$ C to +125 $^{\circ}$ C.

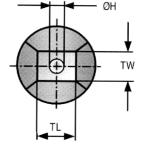


PICKING TOOLS

The MS7812 sensors have a sensitive membrane (0.5 x 0.5 mm) the top surface of the sensor dice has an outer of diameter is: 1.62 x 1.48 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 where done with some tools of SPT, see SPT drawing and references bellow).

| SPT references | RTR-A1-060x060 |
|---------------------|-----------------------------|
| External dimension | TL & TW: 0.06 inch /1.52 mm |
| Internal dimensions | ØH: 0.035 inch / 0.89 mm |





Type A

ORDERING INFORMATION

| Product Code | Product | ArtNr. | |
|--------------|---------------------------------------|-----------|--|
| MS7812-A | 1200 kPa Absolute Pressure Sensor | 781225021 | |
| MS7812-D | 1200 kPa Differential Pressure Sensor | 781225121 | |

The MS7812 dice are supplied sawn on blue foil, mounted on plastic rings

FACTORY CONTACTS

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