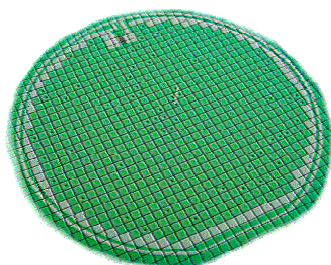


MS7801

PRESSURE SENSOR DIE (0-1 BAR)



- 0 to 100 kPa range (1 bar or 14.5PSI)
- Absolute/differential pressure sensors
- RoHS-compatible & Pb-free¹

DESCRIPTION

The sensor element of the MS7801 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 (MS7801A) carries a sealed vacuum reference cavity underneath the membrane whereas the differential sensor (MS7801D) has a hole in the Pyrex glass at the backside of the sensor.

FEATURES

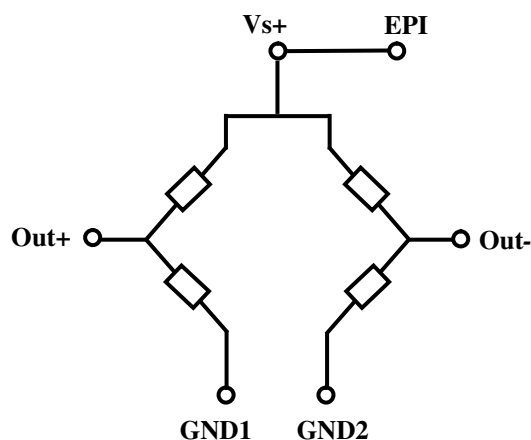
- Uncompensated pressure sensor die
- Output Span 150mV @ 5V
- Temperature Range -40°...+125 °C
- Linearity 0.05% (typical)
- Small Die Size 1.98 x 1.84mm
- Low Cost, High reliability

APPLICATION

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

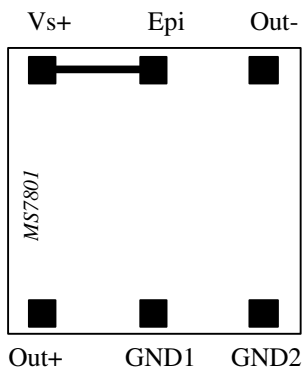
ELECTRICAL CONNECTIONS

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

PAD OUT

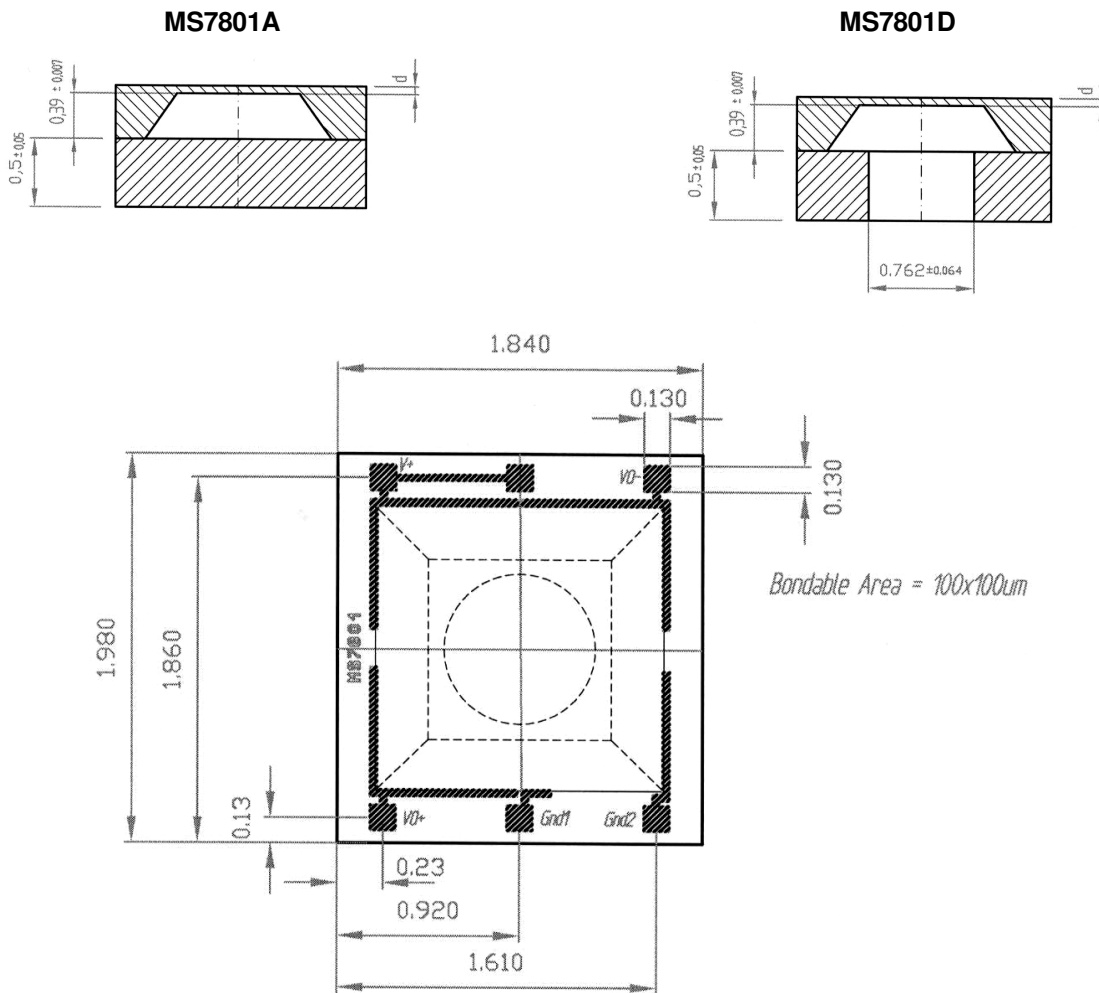


Important remarks:

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 | m H ₂ O | Inches H ₂ O |
|-----|-----|------|------|-------|-------|--------------------|-------------------------|
| 100 | 1 | 1000 | 14.5 | 0.987 | 750 | 10.197 | 401 |

ABSOLUTE MAXIMUM RATINGS

| Parameter | Symbol | Conditions | Min | Max | Unit |
|---------------------|----------------|------------|-----|------|------|
| Supply voltage | VS+ | Ta = 25 °C | | 20 | V |
| Storage temperature | T _S | | -40 | +150 | °C |
| Pressure overload | | | | 5 | Bar |

ELECTRICAL CHARACTERISTICS

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

| Parameter | Min | Typ | Max | Unit | Notes |
|---|--------------------------|------------------|--------------------------|---------------------------|-------|
| Operating Pressure Range | 0 | | 1 | Bar | |
| Operating Temperature Range | -40 | | 125 | °C | |
| 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 | ± 0.2 | % FS | 1 |
| Temperature Coefficient of Resistance Span Offset | + 2400 - 1500 - 80 | + 2800 - 1900 | + 3300 - 2300 + 80 | ppm/°C ppm/°C μV/°C | 2 |
| Pressure Hysteresis | | ± 0.05 | ± 0.15 | % FS | 3 |
| Repeatability | | ± 0.05 | ± 0.15 | % FS | 4 |
| Temperature Hysteresis | | | 0.3 | % FS | 5 |

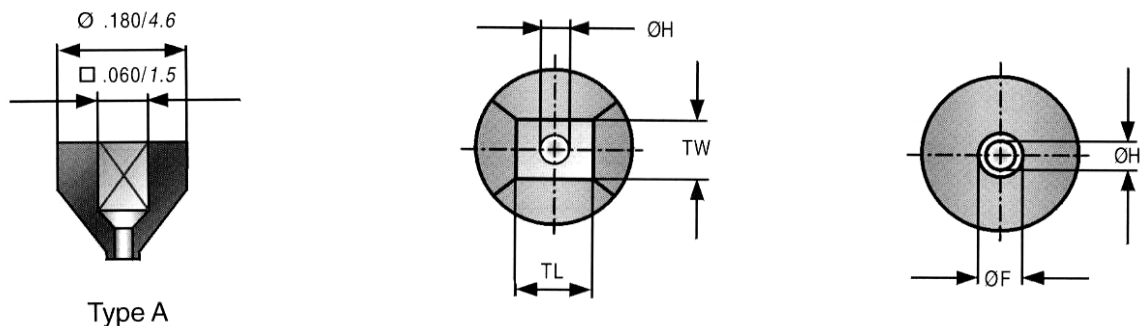
NOTES

- 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 °C to 60 °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 °C.
- 4) Same as 3) after 10 pressure cycles
- 5) Maximum difference in offset after one thermal cycle from -40 °C to +125 °C.

PICKING TOOLS

The MS7801 sensors have a sensitive membrane (0.9 x 0.9 mm) the sensor dice outer diameter is: 1.98 x 1.84 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 below).

| | | |
|---------------------|------------------------------|--------------------------|
| SPT references | RTR-A1-060x060 | CTR-A1-080 |
| External dimension | TL & TW: 0.06 inch / 1.52 mm | ∅F: 0.08 inch / 2.03 mm |
| Internal dimensions | ∅H: 0.035 inch / 0.89 mm | ∅H: 0.035 inch / 0.89 mm |



ORDERING INFORMATION

| Product Code | Type | Product | Art.-Nr. |
|--------------|--------------|---|-----------|
| MS7801-A | Absolute | 1 bar Pressure Sensors sawn on b/f | 780125021 |
| MS7801-A_0.2 | Absolute | 1 bar Pressure Sensors 0.2 mm Pyrex sawn on b/f | 780125022 |
| MS7801-D | Differential | 1 bar Pressure Sensors sawn on b/f | 780125121 |

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