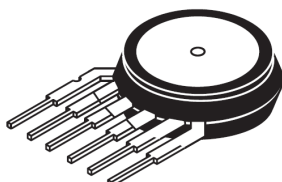


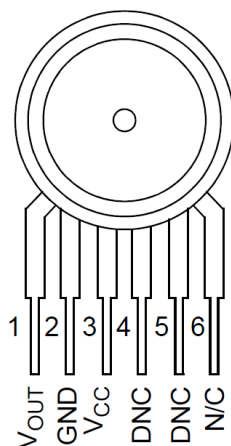
## 0 to 80 kPa, differential, integrated, pressure sensor

### Unibody package



**98ASB42793B**

### Top view



### Pinout

### Features

- 3.0% maximum error over 0 to 85 °C
- Ideally suited for microprocessor or microcontroller-based systems
- Temperature compensated from -40 to 105 °C
- Easy-to-use, durable epoxy unibody package

### Applications

- Differential pressure measurement up to 80 kPa

### Description

The MPX4080 series piezoresistive transducer is a state-of-the-art monolithic silicon pressure sensor designed for a wide range of applications, but particularly those employing a microcontroller or microprocessor with A/D inputs. This patented, single element transducer combines advanced micromachining techniques, thin-film metallization, and bipolar processing to provide an accurate, high level analog output signal that is proportional to the applied pressure.



## 1 Ordering information

| Device name     | Shipping | Package     | Ordering information |        |      |       | Pressure type |          | Device marking |
|-----------------|----------|-------------|----------------------|--------|------|-------|---------------|----------|----------------|
|                 |          |             | # of Ports           |        |      |       |               |          |                |
|                 |          |             | None                 | Single | Dual | Gauge | Differential  | Absolute |                |
| Unibody package |          |             |                      |        |      |       |               |          |                |
| MPX4080D        | Tray     | 98ASB42793B | •                    |        |      |       | •             |          | MPX4080        |

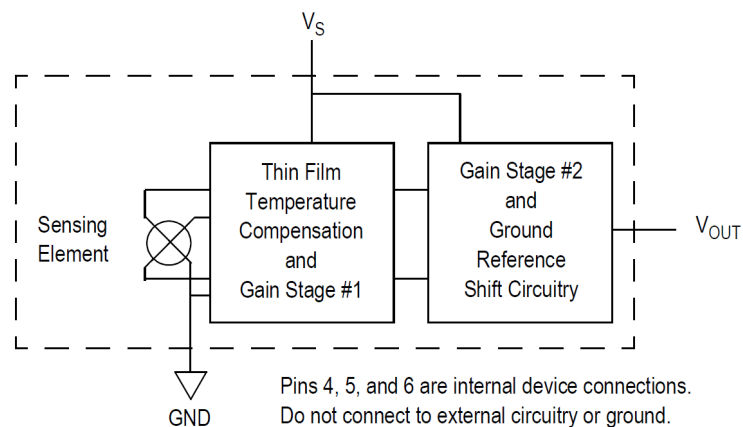
ST reserves the right to change the detail specifications as may be required to permit improvements in the design of its products.

## 2 General Description

### 2.1 Block diagram

Figure 1 shows a block diagram of the internal circuitry integrated on a pressure sensor chip in a unibody package.

**Figure 1. Integrated pressure sensor block diagram**



### 2.2 Pinout

**Figure 2. Device pinout (top view)**

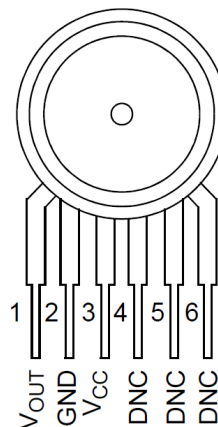


**Table 1. Pin functions**

| Pin | Name      | Function                                        |
|-----|-----------|-------------------------------------------------|
| 1   | $V_{OUT}$ | Output voltage                                  |
| 2   | GND       | Ground                                          |
| 3   | $V_S$     | Voltage supply                                  |
| 4   | DNC       | Do not connect to external circuitry or ground. |



| Pin | Name | Function                                        |
|-----|------|-------------------------------------------------|
| 5   | DNC  | Do not connect to external circuitry or ground. |
| 6   | DNC  | Do not connect to external circuitry or ground. |

## 3 Mechanical and Electrical Specifications

### 3.1 Maximum ratings

Table 2. Maximum ratings<sup>(1)</sup>

| Rating                | Symbol    | Value       | Unit |
|-----------------------|-----------|-------------|------|
| Maximum pressure      | $P_{max}$ | 400         | kPa  |
| Storage temperature   | $T_A$     | -40 to +105 | °C   |
| Operating temperature | $T_{stg}$ | -40 to +125 | °C   |

1. Exposure beyond the specified limits may cause permanent damage or degradation to the device.

### 3.2 Operating characteristics

**Table 3. Operating characteristics** ( $V_S = 5.1$  Vdc,  $T_A = 25$  °C unless otherwise noted,  $P_1 > P_2$ . Decoupling circuit shown in Figure 5 required to meet electrical specifications.)

| Characteristic                                                      | Symbol    | Min   | Typ   | Max   | Unit        |
|---------------------------------------------------------------------|-----------|-------|-------|-------|-------------|
| Pressure range <sup>(1)</sup>                                       | $P_{OP}$  | 0     | —     | 80    | kPa         |
| Supply voltage <sup>(2)</sup>                                       | $V_S$     | 4.85  | 5.1   | 5.35  | Vdc         |
| Supply current                                                      | $I_o$     | —     | 7.0   | 10    | mAdc        |
| Minimum pressure offset <sup>(3)</sup> (0 to 85 °C) @ $V_S = 5.1$ V | $V_{off}$ | 0.478 | 0.575 | 0.672 | Vdc         |
| Full-scale output <sup>(4)</sup> (0 to 85 °C) @ $V_S = 5.1$ V       | $V_{FSO}$ | 4.772 | 4.900 | 5.020 | Vdc         |
| Full-scale span <sup>(5)</sup> (0 to 85 °C) @ $V_S = 5.1$ V         | $V_{FSS}$ | —     | 4.325 | —     | Vdc         |
| Accuracy                                                            | —         | —     | —     | 3.0   | % $V_{FSS}$ |
| Sensitivity                                                         | V/P       | —     | 54    | —     | mV/kPa      |

- 1 kPa (kilo Pascal) equals 0.145 psi.
- Device is ratiometric within this specified excitation range.
- Offset ( $V_{off}$ ) is defined as the output voltage at the minimum rated pressure.
- Full-scale output ( $V_{FSO}$ ) is defined as the output voltage at the maximum or full-rated pressure.
- Full-scale span ( $V_{FSS}$ ) is defined as the algebraic difference between the output voltage at full-rated pressure and the output voltage at the minimum rated pressure.

## 4 On-chip Temperature Compensation and Calibration

Figure 3 shows the sensor output signal relative to differential pressure input. Typical, minimum, and maximum output curves are shown for operation over a temperature range of 0 ° to 85 °C using the decoupling circuit shown in Figure 5. The output will saturate outside of the specified pressure range.

Figure 4 illustrates the differential sensing chip in the basic chip carrier. A fluorosilicone gel isolates the die surface and wire bonds from the environment, while allowing the pressure signal to be transmitted to the sensor diaphragm.

The MPX4080D pressure sensor operating characteristics, internal reliability, and qualification tests are based on use of dry air as the pressure media. Media, other than dry air, may have adverse effects on sensor performance and long-term reliability. Contact the factory for information regarding media compatibility in your application.

Figure 5 shows the recommended decoupling circuit for interfacing the output of the integrated sensor to the A/D input of a microprocessor or microcontroller. Proper decoupling of the power supply is recommended.

**Figure 3. Output versus pressure differential**

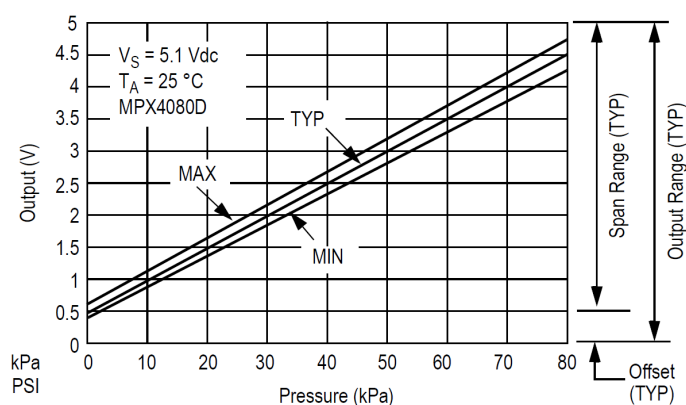


**Figure 4. Cross-sectional diagrams (not-to-scale)**

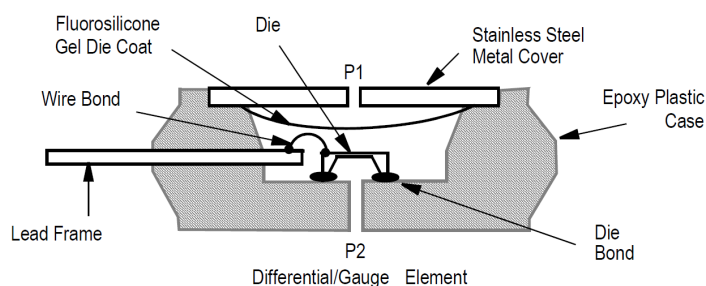
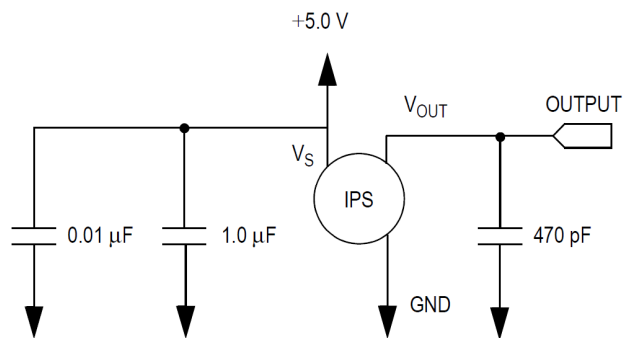


**Figure 5. Recommended power supply decoupling and output filtering [1]**

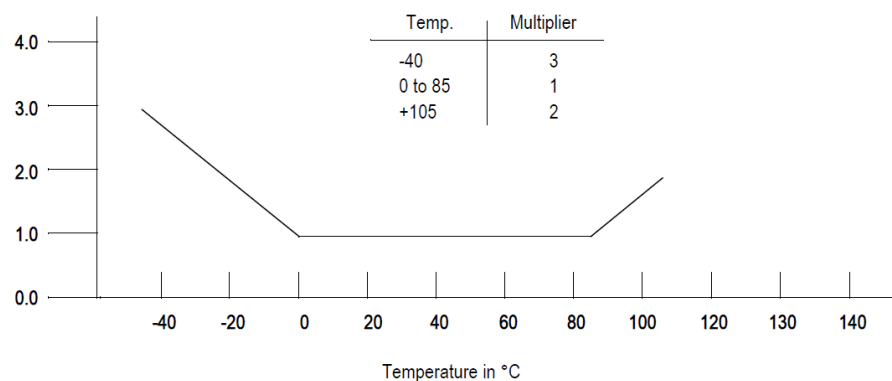


[1] For additional output filtering, please refer to application note AN1646.

**Figure 6. Transfer function**

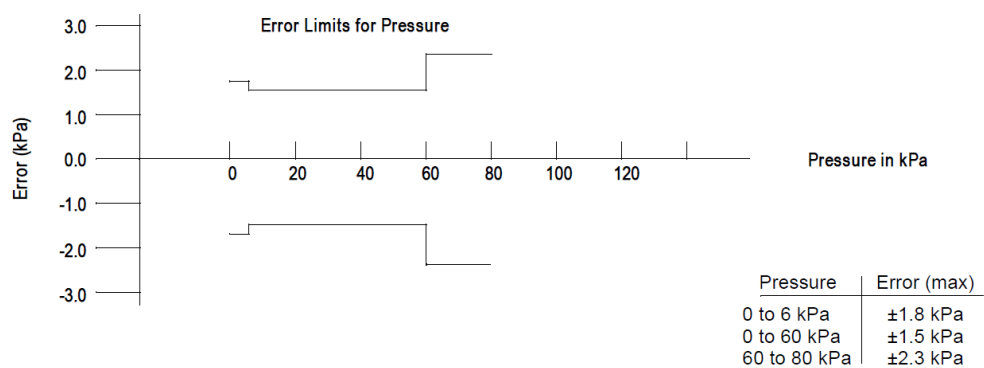
**Nominal Transfer Value:**  $V_{OUT} = V_S (P \times 0.01059 + 0.11280)$   
 $\pm (\text{Pressure Error} \times \text{Temp. Mult.} \times 0.01059 \times V_S)$   
 $V_S = 5.1 \text{ V} \pm 0.25 V_{DC}$

**Figure 7. Temperature error multiplier**



NOTE: The Temperature Multiplier is a linear response from 0 to -40 °C and from 85 to 105 °C.

**Figure 8. Pressure error band**



## 5 Package Information

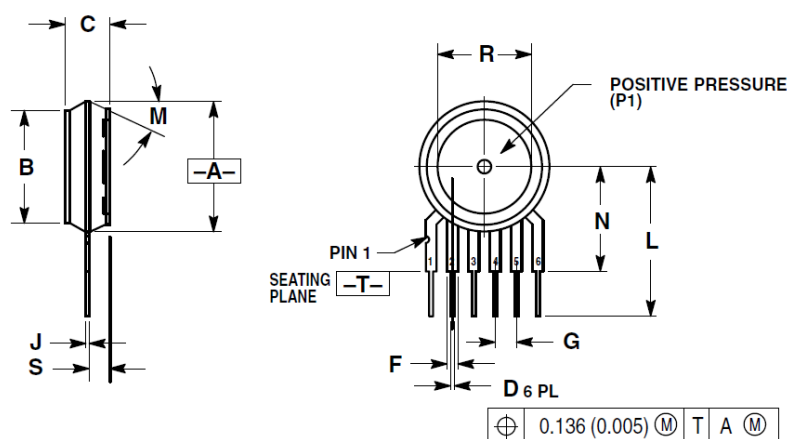
### 5.1 Pressure (P1)/Vacuum (P2) side identification

ST designates the two sides of the pressure sensor as the Pressure (P1) side and the Vacuum (P2) side. The Pressure (P1) side is the side containing fluorosilicone gel which protects the die from harsh media. The pressure sensor is designed to operate with positive differential pressure applied,  $P1 > P2$ .

The Pressure (P1) side is identified by the stainless steel cap.

### 5.2 Package dimensions

**Figure 9. Case 98ASB42796B, 6-lead unibody package**



**NOTES:**

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION -A- IS INCLUSIVE OF THE MOLD STOP RING. MOLD STOP RING NOT TO EXCEED 16.00 (0.630).

| DIM | INCHES    |       | MILLIMETERS |       |
|-----|-----------|-------|-------------|-------|
|     | MIN       | MAX   | MIN         | MAX   |
| A   | 0.595     | 0.630 | 15.11       | 16.00 |
| B   | 0.514     | 0.534 | 13.06       | 13.56 |
| C   | 0.200     | 0.220 | 5.08        | 5.59  |
| D   | 0.027     | 0.033 | 0.68        | 0.84  |
| F   | 0.048     | 0.064 | 1.22        | 1.63  |
| G   | 0.100 BSC |       | 2.54 BSC    |       |
| J   | 0.014     | 0.016 | 0.36        | 0.40  |
| L   | 0.695     | 0.725 | 17.65       | 18.42 |
| M   | 30° NOM   |       | 30° NOM     |       |
| N   | 0.475     | 0.495 | 12.07       | 12.57 |
| R   | 0.430     | 0.450 | 10.92       | 11.43 |
| S   | 0.090     | 0.105 | 2.29        | 2.66  |

## Revision history

**Table 2. Document revision history**

| Date        | Revision | Changes                                          |
|-------------|----------|--------------------------------------------------|
| 24-Jun-2026 | 1        | Initial release from ST, rebranded NXP document. |

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