*Datasheet*

May, 2017

# HPSD 2000 Pressure Transducer



## General description

Pressure transducer HPSD 2000 is a pressure sensing device. High performance and accuracy enables use of this transducer in many applications. The HPSD 2000 pressure transducers are constructed on 1 mm thick ceramic substrate attached inside standard metal 19 mm housing with O-ring groove. Input pressure is sensed with silicon piezoresistive bridge. Programmable temperature compensation provides 1% total error over 0 to 70°C temperature range. Operating from single 5 V supply, wide compensated temperature range and standard, ratiometric 0,5 to 4,5 V output provides OEM users maximum freedom for any type of application with dry air or non-corrosive gases and liquids.

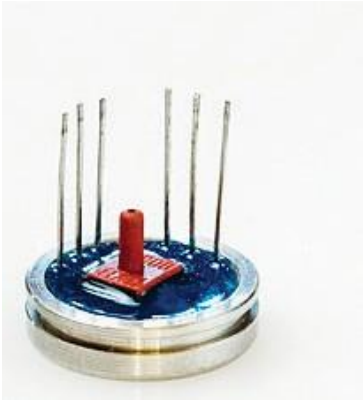
Whole family HPSD 2000 includes 20 mbar up to 7 bar pressure range.

## Features

- Single 5 V supply voltage
- Easy to use package
- Wide compensated range (0 to 70°C)
- Up to 15 bits I2C output (pressure + temperature)
- Standard 0,5 to 4,5 V voltage output
- Total accuracy down to **0.5%FS** over 0 to 70°C, all effects included (maximum)
- High performance OEM applications
- Integrated EMC protection
- Gage configuration

## Applications

- Industrial Process Control
- Pressure trasnducer
- Air flow monitoring
- Process control
- Leak detection





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## Types overview

$T_{AMB}$ = 25°C
$V_{CC}$ = 5 V, unless otherwise noted

### Low pressure range

| Pressure range | 20 mbar (0,3 psi) | 50 mbar (0,8 psi) | 100 mbar (1,5 psi) |
|---|---|---|---|
| ID group | HPSD 2000-020M | HPSD 2000-050M | HPSD 2000-100M |
| $V_{OUT}$ | 0,5 to 4,5 V | 0,5 to 4,5 V | 0,5 to 4,5 V |
| Temperature ranges | Operating: -25 to 85°C<br>Compensated: 0 to 70°C<br>Storage : -40 to 125°C | | |
| Over pressure | 200 mbar | 500 mbar | 1000 mbar |
| Burst pressure | 300 mbar | 750 mbar | 1500 mbar |

### High pressure range

| Pressure range | 350 mbar (5psi) | 1 bar (15psi) | 2 bar (30psi) | 4 bar (60psi) | -1 to 0 bar |
|---|---|---|---|---|---|
| ID group | HPSD 2000-350M | HPSD 2000-001B | HPSD 2000-002B | HPSD 2000-004B | HPSD 2000-000B |
| $V_{OUT}$ | 0,5 to 4,5 V | 0,5 to 4,5 V | 0,5 to 4,5 V | 0,5 to 4,5 V | 0,5 to 4,5 V |
| Temperature ranges | Operating: -25 to 85°C<br>Compensated: 0 to 70°C<br>Storage : -40 to 125°C | | | | |
| Over pressure | 1 bar | 3 bar | 6 bar | 8 bar | 3 bar |
| Burst pressure | 1.7 bar | 5 bar | 10 bar | 12 bar | 5 bar |



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## Performance characteristics

$T_{AMB}$ = 25°C
$V_{CC}$ = 5 V, unless otherwise noted

| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| **Power supply** | | | | | |
| Supply voltage | $V_{CC}$ | 4,75 | | 5,25 | V |
| Current consumption | $I_{CC}$ | | 4 | 6,5 | mA |
| **Analog output (pressure)** [3] | | | | | |
| Offset voltage [4] | $V_O$ | | 0,50 | | V |
| Full scale output (FSO) [5] | $V_{FS}$ | | 4,50 | | V |
| Full scale span (FSS) [6] | $V_{FSO}$ | | 4,00 | | V |
| Offset voltage (bidirectional devices) | $V_O$ | | 2,50 | | V |
| **Digital output (pressure), 15 bits** [3] | | | | | |
| Offset voltage [4] | $V_O$ | | 3277 | | counts |
| Full scale output (FSO) [5] | $V_{FS}$ | | 29491 | | counts |
| Full scale span (FSS) [6] | $V_{FSO}$ | | 26214 | | counts |
| Offset voltage (bidirectional devices) | $V_O$ | | 16384 | | counts |
| **Digital output (temperature), 15 bits** [7] | | | | | |
| Temperature output @ 0°C | $T_o$ | | 8192 | | counts |
| Temperature output @ 70°C | $T_s$ | | 24576 | | counts |
| **Accuracy (pressure) @ 25°C** [8] | | | | | |
| Low pressure (20 to 100 mbar FS devices) | $E_a$ | | 0,3 | ±0,5 | %FSO |
| Standard pressure | $E_a$ | | 0,2 | ±0,4 | %FSO |
| **Total accuracy (pressure) @ 0 to 70°C** [9] | | | | | |
| Low pressure (20 to 100 mbar FS devices) | $E_{ta}$ | | 0,5 | ±1 | %FSO |
| Standard pressure (all other devices) | $E_{ta}$ | | 0,3 | ±0,5 | %FSO |
| **Resolution** | | | | | |
| A/D converter | $D_i$ | | | 15 | bit |
| D/A converter | $D_O$ | | 11 | | bit |
| Response time | $E_{rt}$ | | 1,5 | | ms |
| Repeatability [10] | $E_r$ | | ±0,05 | | % FSO |
| Nonlinearity & pressure hysteresis (BFSL) [11] | $E_l$ | | ±0,1 | ±0,3 | % FSO |
| Load resistance | $R_L$ | 2 | | ∞ | k |
| Media compatibility | | See spec. note [12] | | | |
| Weight | W | | 9 | | g |



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## Specification notes

1) Over pressure is the maximum pressure which may be applied without causing damage to the sensing element.
2) Burst pressure is the maximum pressure which may be applied without causing leakage damage to the sensing element.
3) Analog output signal is ratiometric to power supply $V_{cc}$, digital signal is not ratiometric to the power supply.
4) Offset voltage is the voltage output at zero pressure.
5) Full scale output is the voltage output at full pressure range.
6) Full scale span is the algebraic difference between the output at full scale pressure range and offset.
7) Digital output signal (temperature) is not ratiometric to power supply $V_{cc}$. Temperature data are read directly on the sensing element.
8) Accuracy includes all effects (offset, span, nonlinearity, pressure hysteresis and repeatability) at room temperature and represents maximum deviation of transducer signal from ideal characteristic.
9) Total accuracy includes all effects (offset, span, nonlinearity, pressure hysteresis and repeatability) included with all temperature effects of offset and span. It describes overall error and represents maximum deviation of transducer signal from ideal characteristic in compensated temperature range from 0 to 70°C.
10) Repeatability is defined as typical deviation of the output signal after 10 pressure cycles.
11) Nonlinearity is defined as the BFSL (best fit straight line) across entire pressure range.
12) Media compatibility: clean, dry and noncorrosive gases and liquids to pyrex, silicon, RTV, ceramics $Al_2O_3$, epoxy, stainless steel.



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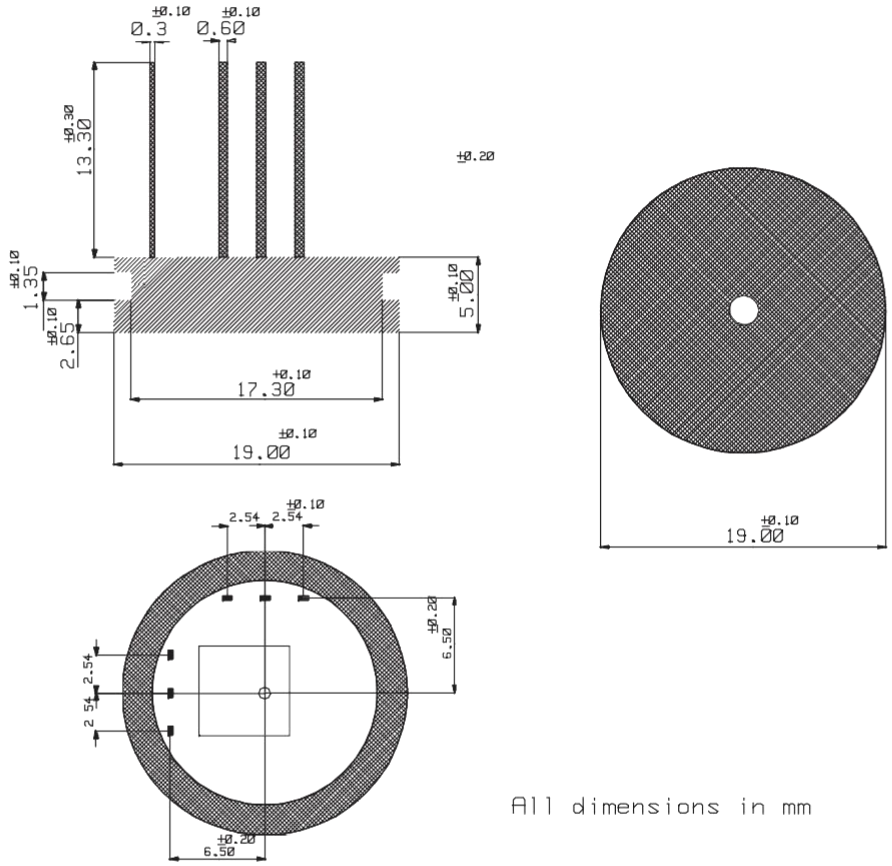
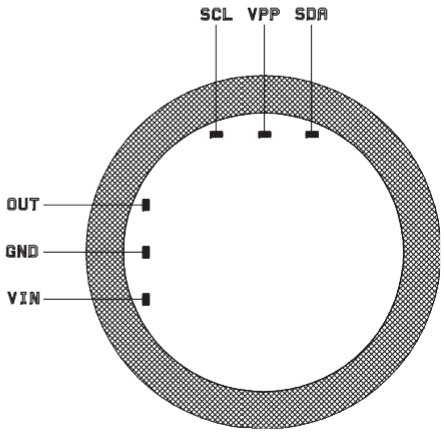
# HPSD 2000 Pressure Transducer

## Outline dimensions




All dimensions in mm

## Pinout



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## Ordering guide

| Transducer type | Pressure range | Pressure type | Pressure direction |
|---|---|---|---|
| HPSD 2000 | 020M | G | 0 |
| | 050M | | B |
| | 100M | | |
| | 350M | | |
| | 001B | | |
| | 002B | | |
| | 004B | | |
| | 007B | | |
| | 000B | | |

| Pressure range | |
|---|---|
| 020M | 20 mbar |
| 050M | 50 mbar |
| 100M | 100 mbar |
| 350M | 350 mbar |
| 001B | 1 bar |
| 002B | 2 bar |
| 004B | 4 bar |
| 007B | 7 bar |
| 000B | -1 to 0 bar |

| Pressure type | |
|---|---|
| G | Gage |

| Pressure direction | |
|---|---|
| 0 | 0 to press. range |
| B | -press range to +press. range (bidirectional) |

Other configurations possible on special request.



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