

General description

Pressure transducer HPSD 3000 is a pressure sensing device. Signal conditioning consists of complete temperature compensation and ASIC. High performance and accuracy enables use of this transducer in many applications. Programmable temperature compensation provides 0,5%FS 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 or liquids.

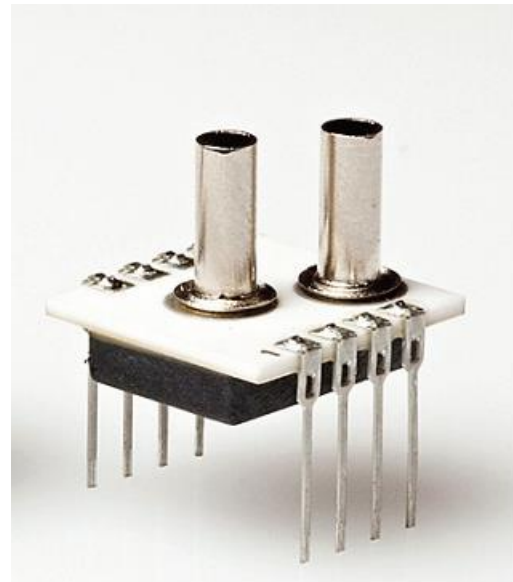
The model HPSD 3000 is designed for through hole PCB assembly with one or two pressure ports. The whole group consists for pressure ranges from **1 mbar to 7 bar**. Gage, differential and absolute versions are available for this group.

Features

- Single 5 V supply voltage
- **Total accuracy down to 0,5%FS** over 0 to 70°C, all effects included (maximum)
- Standard 0,5 – 4,5 V voltage output
- Up to 15 bits I2C output (pressure + temperature)
- High performance OEM applications
- Pressure ranges **from 1mbar to 7 bar**
- Gage, differential and absolute pressure configurations.

Applications

- HVAC
- Medical instrumentation
- Respirators
- Air flow monitoring
- Process control
- Pneumatics control



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Available types overview
T_{AMB}=25°C, V_{CC} = 5V unless otherwise noted.
Ultra low pressure range

| Pressure range | 1 mbar (100 Pa) | 2.5 mbar (250 Pa) | 5 mbar (500 Pa) |
|------------------------------|--|--|--|
| ID group | HPSD 3000-001M | HPSD 3000-2P5M | HPSD 3000-005M |
| Pressure types | differential/gage/ bidirectional differential | differential/gage/ bidirectional differential | differential/gage/ bidirectional differential |
| 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, Compensated: 0 to 70°C, Storage : -40 to 125°C | | |
| Over pressure ¹⁾ | 100 mbar | 100 mbar | 100 mbar |
| Burst pressure ²⁾ | 150 mbar | 150 mbar | 150 mbar |

Low pressure range

| Pressure range | 10 mbar (0,15 psi) | 20 mbar (0,3 psi) | 50 mbar (0,8 psi) | 100 mbar (1,5 psi) |
|------------------------------|--|---|---|---|
| ID group | HPSD 3000-010M | HPSD 3000-020M | HPSD 3000-050M | HPSD 3000-100M |
| Pressure types | differential/gage/ bidirectional differential | differential/gage/ bidirectional differential | differential/gage/ bidirectional differential | differential/gage/ bidirectional differential |
| 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 |
| Temperature ranges | Operating: -25 to 85°C, Compensated: 0 to 70°C, Storage : -40 to 125°C | | | |
| Over pressure ¹⁾ | 100 mbar | 200 mbar | 500 mbar | 1000 mbar |
| Burst pressure ²⁾ | 150 mbar | 300 mbar | 750 mbar | 1500 mbar |

High pressure range

| Pressure range | 350 mbar (5 psi) | 1 bar (15 psi) | 2 bar (30 psi) | 4 bar (60 psi) | 7 bar (100 psi) |
|------------------------------|---|--|--|--|--|
| ID group | HPSD 3000- 350M | HPSD 3000- 001B | HPSD 3000- 002B | HPSD 3000- 004B | HPSD 3000- 007B |
| Pressure types | differential/gage/ bidirectional differential | differential/gage/ bidirectional differential/ absolute | differential/gage/ bidirectional differential/ absolute | differential/gage/ bidirectional differential/ absolute | differential/gage/ bidirectional differential/ absolute |
| 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, Compensated: 0 to 70°C Storage : -40 to 125°C | | | | |
| Over pressure ¹⁾ | 1 bar | 3 bar | 6 bar | 8 bar | 14 bar |
| Burst pressure ²⁾ | 1,7 bar | 5 bar | 10 bar | 12 bar | 21 bar |

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

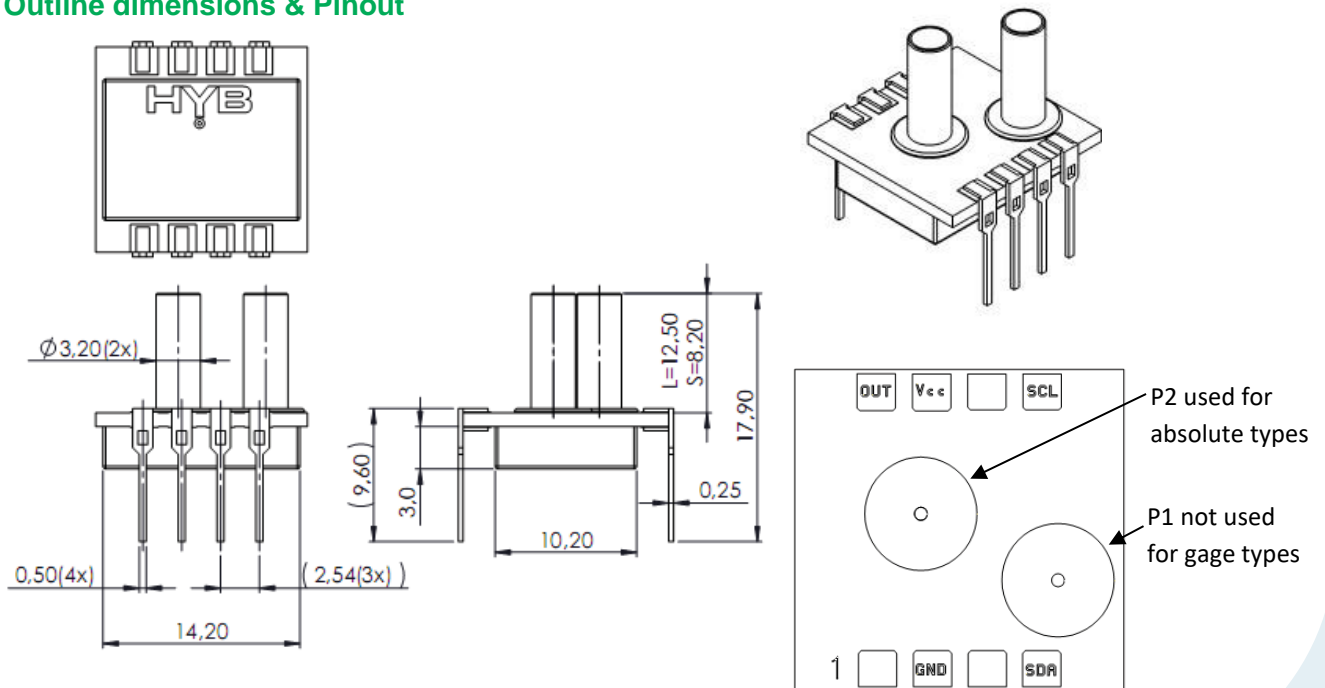
| Parameter | Symbol | Min. | Type | Max. | Unit |
|--|------------------|------------------------------------|-------|------|--------|
| Power supply | | | | | |
| Supply voltage | V _{CC} | 4,75 | | 5,25 | V |
| Current consumption | I _{CC} | | 4 | 6,5 | mA |
| Analog output (pressure) ³⁾ | | | | | |
| Offset voltage ⁴⁾ | V _O | | 0,50 | | V |
| Full scale output (FSO) ⁵⁾ | V _{FS} | | 4,50 | | V |
| Full scale span (FSS) ⁶⁾ | V _{FSS} | | 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 _{FSS} | | 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⁾ | | | | | |
| Ultra low pressure (1 to 10 mbar) | E _a | | 0,5 | ±1,5 | %FSO |
| Low pressure (20 to 100 mbar) | E _a | | 0,2 | ±1,0 | %FSO |
| Standard pressure (all other) | E _a | | 0,1 | ±0,3 | %FSO |
| Total accuracy (pressure) @ 0 to 70°C ⁹⁾ | | | | | |
| Ultra low pressure (1 to 10 mbar) | E _{ta} | | 1 | ±2 | %FSO |
| Low pressure (20 to 100 mbar) | E _{ta} | | 0,5 | ±1,5 | %FSO |
| Standard pressure (all other) | 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), 13)} | | | |
| Weight | W | | 3 | | 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: on pressure port P1: clean, dry and noncorrosive gases to silicon, RTV, ceramics Al₂O₃, Pyrex, LCP plastics, epoxy, solder, tin.
- 13) Media compatibility: on pressure port P2: noncorrosive gases or liquids to silicon, Pyrex, RTV, ceramics Al₂O₃, solder, tin.

Outline dimensions & Pinout



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Ordering guide

| Transducer type | Pressure range | Pressure type | Pressure direction | Pressure port | Pressure tube |
|-----------------|----------------|---------------|--------------------|---------------|---------------|
| HPSD 3000 | 001M | D | 0 | P | S |
| | 2P5M | G | B | N | L |
| | 005M | A | | | |
| | 010M | | | | |
| | 020M | | | | |
| | 050M | | | | |
| | 100M | | | | |
| | 350M | | | | |
| | 001B | | | | |
| | 002B | | | | |
| | 004B | | | | |
| | 007B | | | | |

| Pressure range | |
|----------------|----------|
| 001M | 1 mbar |
| 2P5M | 2.5 mbar |
| 005M | 5 mbar |
| 010M | 10 mbar |
| 020M | 20 mbar |
| 050M | 50 mbar |
| 100M | 100 mbar |
| 350M | 350 mbar |
| 001B | 1 bar |
| 002B | 2 bar |
| 004B | 4 bar |
| 007B | 7 bar |

| Pressure type | |
|---------------|------------------------|
| D | Differential |
| G | Gage |
| A | Absolute (for p≥1 bar) |

| Pressure tube | |
|---------------|---------------|
| S | SHORT (8.3mm) |
| L | LONG (12.5mm) |

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

| Pressure port | |
|---------------|-------------------------|
| P | Positive pressure on P1 |
| N | Positive pressure on P2 |

Other configurations possible on special request.

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