Datasheet

Pressure Transducer HPSD 3100

General description

Pressure transducer HPSD 3100 is a pressure sensing device. Signal conditioning consists of complete temperature compensation and ASIC. High performance and accuracy enable the use of this transducer in many applications. Programmable temperature compensation provides 0,5%FS total error over the 0 to 70°C temperature range. Operating from a single power supply (from 3 to 5,5 V), a wide compensated temperature range and standard ratiometric output provide OEM users maximum freedom for any type of application with dry air or non-corrosive gases or liquids.

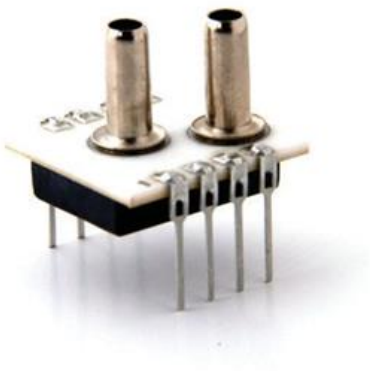
The model HPSD 3100 is designed for through hole PCB assembly with one or two pressure ports. The whole group consists for pressure ranges from **1 mbar to 7 bar**. Gage, differential and absolute versions are available for this group.

Features

- Supply voltage from 3 to 5,5 V
- **Total accuracy down to 0,5%FS** over 0 to 70°C, all effects included (maximum)
- Ratiometric voltage output (10% to 90% of supply voltage)
- I2C digital output (OWI or SPI on request)
- Up to 16 bits of digital output (pressure + temperature)
- High performance OEM applications
- Pressure ranges **from 1 mbar 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, Vcc = from 3 to 5,5 V (unless otherwise stated)

Ultra low pressure range

Pressure range	1 mbar (0-1 mbar, ±1 mbar)	2,5 mbar (0-2,5 mbar, ±2,5 mbar)	5 mbar (0-5 mbar, ±5 mbar)
ID group	HPSD 3100 -001M	HPSD 3100 -2P5M	HPSD 3100 -005M
Pressure types	differential/gage/ bidirectional differential	differential/gage/ bidirectional differential	differential/gage/ bidirectional differential
V_{OUT}	10 to 90% of V_{CC}	10 to 90% of V_{CC}	10 to 90% of V_{CC}
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 3100 -010M	HPSD 3100 -020M	HPSD 3100 -050M	HPSD 3100 -100M
Pressure types	differential/gage/ bidirectional differential	differential/gage/ bidirectional differential	differential/gage/ bidirectional differential	differential/gage/ bidirectional differential
V_{OUT}	10 to 90% of V_{CC}	10 to 90% of V_{CC}	10 to 90% of V_{CC}	10 to 90% of V_{CC}
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 3100 -350M	HPSD 3100 -001B	HPSD 3100 -002B	HPSD 3100 -004B	HPSD 3100 -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}	10 to 90% of V_{CC}	10 to 90% of V_{CC}	10 to 90% of V_{CC}	10 to 90% of V_{CC}	10 to 90% of V_{CC}
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

Performance characteristics

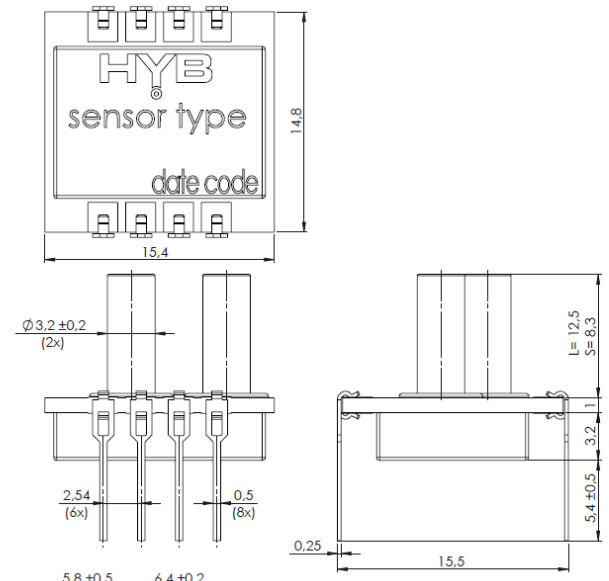
T_{AMB}=25°C (unless otherwise noted)

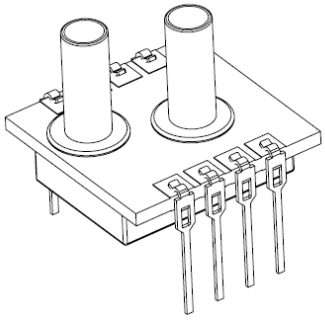
Parameter	Symbol	Min.	Type	Max.	Unit
Power supply					
Supply voltage	V_{CC}	3		5,5	V
Current consumption	I_{CC}		4,6	5,5	mA
Analog output (pressure) [3]					
Offset voltage [4]	V_O		10		%
Full scale output (FSO) [5]	V_{FSO}		90		%
Full scale span (FSS) [6]	V_{FSS}		80		%
Offset voltage (bidirectional devices)	V_O		50		%
Digital output (pressure), 15 bits [3]					
Offset voltage [4]	V_O		3277		counts
Full scale output (FSO) [5]	V_{FSO}		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			16	bit
D/A converter	D_O		16		bit
Response time [10]	E_{rt}		1,3		ms
Repeatability [11]	E_r		±0,05		% FSO
Nonlinearity & pressure hysteresis (BFSL) [12]	E_l		±0,1	±0,3	% FSO
Load resistance	R_L	2		∞	kΩ
Media compatibility		see spec. note [13], [14]			
Weight	W		3		g

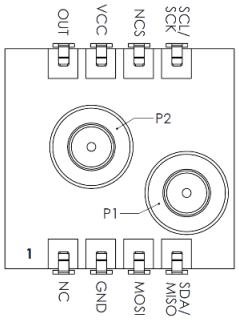
Specification notes

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) Response time depends on preset A/D resolution, sample rate, and filter setting.
11) Repeatability is defined as typical deviation of the output signal after 10 pressure cycles.
12) Nonlinearity is defined as the BFSL (best fit straight line) across entire pressure range.
13) Media compatibility: on pressure port P1: clean, dry and noncorrosive gases to silicon, RTV, ceramics Al2O3, Pyrex, LCP plastics, epoxy, solder, tin.
14) Media compatibility: on pressure port P2: noncorrosive gases or liquids to silicon, Pyrex, RTV, ceramics Al2O3, solder, tin.

Outline dimensions & Pinout







Notes:
- P2 not used for absolute types
- P1 not used for gage types

Pin	Name	Function
1	NC	Not connected
2	GND	Ground
3	MOSI	Data (SPI)
4	SDA/MISO	Data (I2C, SPI)
5	SCL/SCK	Clock (I2C, SPI)
6	NCS	Chip Select (SPI)
7	VCC	Power supply
8	OUT	Ratiometric Analog Output or OWI I/O

Ordering guide

Transducer type	Pressure range	Pressure type	Pressure direction	Pressure port	Pressure tube	Communication
HPSD 3100	1P0M	D	0	P	S	R
	2P5M	G	B	N	L	Y
	5P0M	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 pn≥1bar)

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

Pressure tube	
S	SHORT (8,3 mm)
L	LONG (12,5 mm)

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

Communication	
R	I^2C
Y	SPI

Other configurations possible on request.

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