hybsens®

DS DW5100/A

Preliminary Datasheet

July, 2010

HPSDW 5100 Pressure Transducer - Switch

General description

The HPSDW 5100 is pressure transducer and switch at the same time in a miniature metal housing for industrial applications. Input pressure is sensed with silicon piezoresistive bridge. Measured pressure is transformed into standard output voltage range from 0.5 to 4.5 V or other. A switching output is integrated in transducer, which can be externally adjusted with potentiometer and switching level seen with LED indicator. Temperature compensation and calibration is performed by programmable digital signal conditioner. Wide supply range 7 to 40 V, standard 0.5 to 4.5 V voltage output, digital output and switching output provides users maximum freedom for any type of application with dry air or non-corrosive gases and liquids.

Small size and robust M8 threaded housing is very convenient for applications with limited space. Total length is less than 40 mm with standard M8 electrical connector.

The whole group consists of pressure ranges from 20 mbar to 7 bar. Gage pressure configuration available for this group.

Features

- Wide supply voltage range 7 to 40 V
- Wide compensated range (0 to 70°C)
- Total accuracy down to 1% over 0 to 70°C, all effects included (maximum)
- Standard 0.5 to 4.5 V analog output
- Switching output with led indicator
- Overcurrent and overvoltage protection
- Overload and short circuit protection
- Integrated EMC protection
- High performance OEM applications
- Standard M8 output connector
- Gage pressure configurations

Applications

- Pressure switch
- Industrial process control
- Transducer voltage transducer
- Air flow monitoring
- Process control
- Leak detection
- Pneumatic controls

RoHS COMPLIANT

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Types overview

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

Low pressure range

Pressure range	20 mbar (0.15psi)	50 mbar (0.3psi)	100 mbar (0.8psi)	350 mbar (5psi)
ID group	HPSDW 5100-020M	HPSDW 5100-050M	HPSDW 5100-100M	HPSDW 5100-350M
Pressure types	gage bidirectional gage	gage bidirectional gage	gage bidirectional gage	gage bidirectional gage
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)]	200 mbar	500 mbar	1 bar	1 bar
Burst pressure [2)]	300 mbar	750 mbar	1.5 mbar	1.7 bar

High pressure range

Pressure range	1 bar (15psi)	2 bar (30psi)	4 bar (60psi)	7 bar (100psi)	0 bar (vacuum)
ID group	HPSDW 5100-001B	HPSDW 5100-002B	HPSDW 5100-004B	HPSDW 5100-007B	HPSDW 5100-000B
Pressure types	gage bidirectional gage	gage bidirectional gage	gage bidirectional gage	gage bidirectional gage	gage bidirectional gage
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)]	3 bar	6 bar	8 bar	14 bar	3 bar
Burst pressure [2)]	5 bar	10 bar	12 bar	21 bar	5 bar

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Performance characteristics

T_{AMB} = 25°C
V_{CC} = 5 V, 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_{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			±1.5	%FSO
Standard pressure	E_a			±0.8	%FSO
Total accuracy (pressure) @ 0 to 70°C [9]					
Low pressure (20 to 100 mbar FS devices)	E_{ta}			±2	%FSO
Standard pressure (all other devices)	E_{ta}			±1	%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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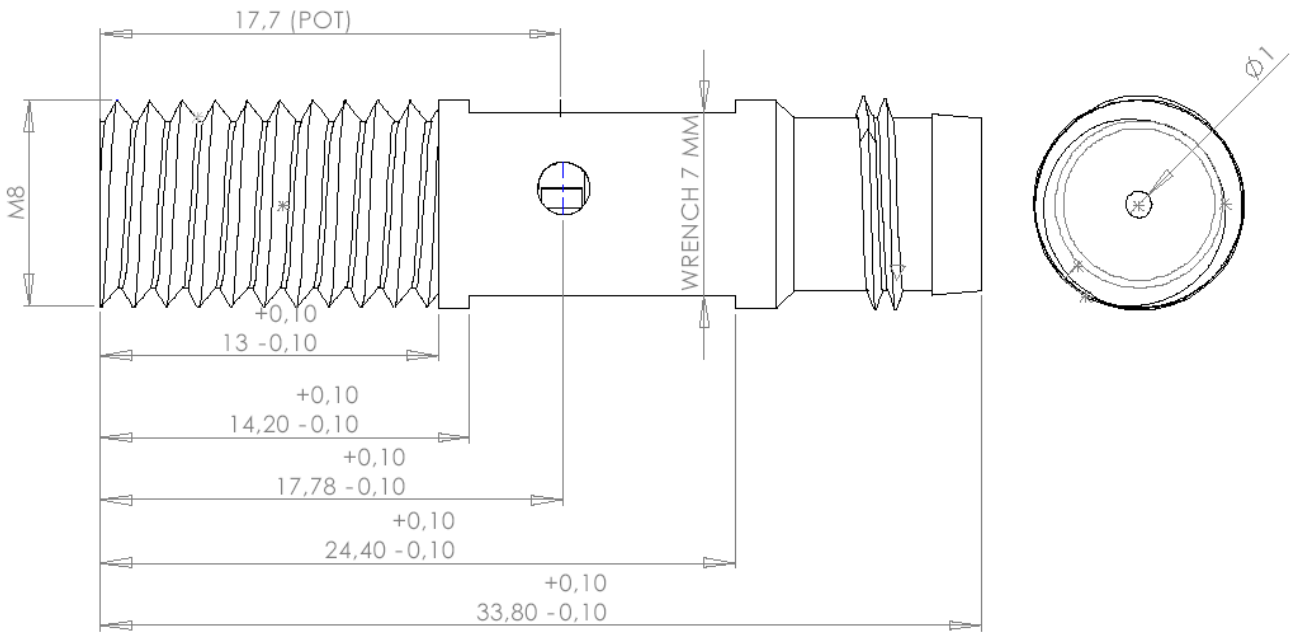
Specification notes

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 silicon, RTV, ceramics Al_2O_3, epoxy, nickel.

Outline dimensions



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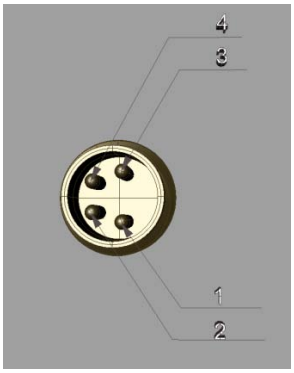
Pinout



ANALOG VERSION:

1	Out (switching)
2	GND
3	V_{cc}
4	Out (analog)

Ordering guide

Transducer type	Pressure range	Pressure type	Direction
HPSDW 5100	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	vacuum

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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