## 86BSD Digital Output





- Stainless steel with O-ring seal
- Pressure/temperature read-out
- Digital output
- ASIC calibrated
- Absolute, gage
- Cable/connector option
- Low power option
- 16mm diaphragm diameter

# RoHS

#### DESCRIPTION

The 86BSD is a small profile, media compatible, piezoresistive silicon pressure sensor packaged in a 316L stainless steel housing. This 14-bit digital output pressure sensor supports I<sup>2</sup>C and SPI interface protocols, may come in a 3.3 or 5.0Vdc supply voltage and is designed for o-ring mounting. The sensing package utilizes silicone oil to transfer pressure from the 316L stainless steel diaphragm to the sensing element.

The 86BSD is designed for high performance, low pressure applications. A custom ASIC is used for temperature compensation, offset correction, and provides a digital output of 10~90% or 5~95%.

For a similar sensor with stainless steel fittings, refer to the 85BSD digital output pressure sensor.

#### **FEATURES**

- Mountable with O-ring seal
- ±0.25% Accuracy
- ±1.0 Total Error Band
- Cable/connector option
- Low power option
- I<sup>2</sup>C or SPI Interface protocols

#### APPLICATIONS

- Level controls
- Tank level measurement
- Corrosive fluids and gas measurement systems
- Sealed systems
- Manifold pressure measurement
- Barometric pressure measurement
- Submersible depth monitoring

#### **STANDARD RANGES**

Range	psiG	psiA	Range	BarG	BarA
0 to 001	•		0 to .07	•	
0 to 002	•				
0 to 005	•		0 to .35	•	
0 to 015	•	•	0 to 001	•	•
0 to 030	•	•	0 to 002	•	•
0 to 050	•	•	0 to 005	•	•
0 to 100	•	•	0 to 007	•	•
0 to 150	•	•	0 to 010	•	•
0 to 200	•	•	0 to 014	•	•
0 to 300	•	•	0 to 020	•	•

### PERFORMANCE SPECIFICATIONS

Supply Voltage: 3.3Vdc					
PARAMETERS	MIN	TYP	МАХ	UNITS	NOTES
Zero Pressure Output (10% ~ 90%)		666		Count Hex	1
Zero Pressure Output (5% ~ 95%)		333		Count Hex	1
Full Scale Pressure Output (10% ~ 90%)		399A		Count Hex	1
Full Scale Pressure Output (5% ~ 95%)		3CCB		Count Hex	1
Accuracy	-0.25		0.25	%Span	2
Total Error Band	-1		1	%Span	3
Pressure Resolution	0.008			%Span	
Temperature Accuracy	-1.5		1.5	°C	4
Resolution – Temperature		0.1		°C	
Input Voltage Range	2.7	3.3	5.5	V	1
Supply Current		3		mA	
Insulation Resistance (50Vdc)	50			MΩ	5
Overpressure			2X	Rated	6
Burst Pressure			3X	Rated	7
Load Resistance (RL)	10			ΚΩ	
Long Term Stability (Offset & Span)		±0.5		%Span/Year	
Compensated Temperature (≤5psi)	0		50	°C	
Compensated Temperature (≥15psi)	-20		+85	°C	
Operating Temperature	-40		+125	°C	
Storage Temperature	-40		+125	°C	8
Output Pressure Resolution			14	Bits	
Output Temperature Resolution	8		11	Bits	
Start Time to Data Ready			8.4	ms	9
Output Type	10% to 90% or	5% to 95%			
Interface Type	I <sup>2</sup> C (ADDR, 0x2 I <sup>2</sup> C (ADDR, 0X3 I <sup>2</sup> C (ADDR, 0x4 SPI	28H) 36H) 46H)			
Media – Pressure	Liquids and gas	ses compatible w	vith 316/316L Stai	nless Steel	

#### Notes

- 1. Measured at vacuum for absolute(A), ambient for gage(G) and sealed gage(S). Output is not ratiometric to supply voltage.
- 2. Accuracy: combined linearity, hysteresis and repeatability.
- 3. Total Error Band: includes calibration errors and temperature effects over the compensated range. See Figure 3.
- 4. The deviation from a best fit straight line (BFSL) fitted to the output measured over the compensated temperature range. For errors beyond the compensated temperature range, See Figure 2.
- 5. Between case and sensing element.
- 6. 2X or 400psi, whichever is less. The maximum pressure that can be applied to a transducer without changing the transducer's performance or accuracy.
- 7. 3X or 600psi, whichever is less. The maximum pressure that can be applied to a transducer without rupture of either the sensing element or transducer.
- 8. Maximum temperature range for product with standard cable and connector is -20°C to +105°C.
- 9. Start time to data ready is the time to get valid data after POR (Power on Reset). The time to get subsequent valid data is then specified by the response time specification.

### DIMENSIONS



### **BLOCK DIAGRAM**



I2C INTERFACE PRRAMETERS

PARAMETERS	SYMBOL	MIN	TYP	MAX	UNITS
SCLK CLOCK FREQUENCY	FSCL	100		400	KHz
START CONDITION HOLD TIME RELATIVE TO SCL EDGE	tHDSTA	0.1			us
MINIMUM SCL CLOCK LOW WIDTH @1	tL⊡W	0.6			us
MINIMUM SCL CLOCK HIGH WIDTH @1	tHIGH	0.6			us
START CONDITION SETUP TIME RELATIVE TO SCL EDGE	tSUSTA	0.1			us
DATA HOLD TIME ON SDA RELATIVE TO SCL EDGE	tHDDAT	0			us
DATA SETUP TIME ON SDA RELATIVE TO SCL EDGE	tSUDAT	0.1			us
STOP CONDITION SETUP TIME ON SCL	tSUSTO	0.1			us
BUS FREE TIME BETWEEN STOP AND START CONDITION	tBUS	2			us

#### SPI INTERFACE PARAMETERS

PARAMETERS	SYMBOL	MIN	TYP	MAX	UNITS
SCLK CLUCK FREQUENCY	FSCL	50		800	KHz
SS DROP TO FIRST CLOCK EDGE	tHDSS	2.5			uS
MINIMUM SCL CLOCK LOW WIDTH @1	tLOW	0.6			uS
MINIMUM SCL CLOCK HIGH WIDTH @1	tHIGH	0.6			uS
CLOCK EDGE TO DATA TRANSITION	tCLKD	0		0.1	uS
RISE DF SS RELATIVE TO LAST CLOCK EDGE	tSUSS	0.1			uS
BUS FREE TIME BETWEEN RISE AND FALL OF SS	tBUS	2			uS

@1 COMBINED LOW AND HIGH WIDTHS MUST EQUAL OR EXCEED MINIMUM SCL PERIOD.

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### **TEMPERATURE/PRESSURE ACCURACY**







Fig 3

### PRESSURE TRANSFER FUNCTIONS





Fig 4

Sensor Dutput at Significant Percentages

% Output	Digital Counts (decimal)	Digital Counts (hex)
0	0	0 X 0000
5	819	0 X 0333
10	1638	0 X 0666
50	8192	0 X 2000
90	14746	0 X 399A
95	15563	O X 3CCB
100	16383	0 X 3FFF

### **TEMPERATURE TRANSFER FUNCTIONS**

Temperature Transfer Functions



Fig 5

Temperature Dutput vs Counts

Output °C	Digital Counts (decimal)	Digital Counts (hex)
-50	0	0 X 0000
0	512	0 X 0200
10	614	0 X 0266
25	767	0 X 02FF
40	921	0 X 0399
85	1381	0 X 0565
150	2047	0 X 07FF

### **ORDERING INFORMATION**

# 86B S D 015P A - 3 A I C L



#### 联系方式



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