

Solid State Pressure Sensor

PRELIMINARY
V0.1

Series – Model 86

FEATURES

- ✓ Slim SS housing
- ✓ Miniature Threaded
- ✓ Wet Media Applicable
- ✓ Analog or I²C Output
- ✓ Comprehensive Range



DESCRIPTION

The Series 86 is a miniature and robust pressure transducer with calibrated and temperature compensated output. It incorporates MEMS or ceramic sensing element which is specially designed for space tight environment where conventional transducer is not applicable.

Multi-order compensation for correction of offset, sensitivity, thermal errors and nonlinearity are accomplished in factory via an internal DSP running a correction algorithm with calibration coefficients stored in on-chip EEPROM.

The Series 86 outputs in either analog or digital suitable for a variety of MCU based applications in smart appliances which need to detect node pressure. Its PCB connector serves as an efficient connection for multi channel gas or fluid manifold integrated with circuit board.

Custom configuration is available upon request.

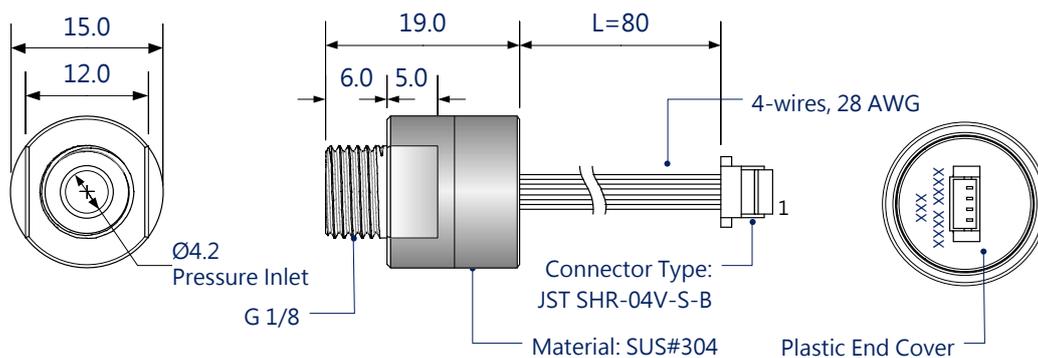
Specifications – Basic

Parameters	Min	Typ	Max	Unit
Temp - Operating ¹	-20		85	°C
Temp - Compensated ²	0		50	°C
Temp - Storage	-40		125	°C
Humidity ³	0		95	%RH
Over-pressure ^{4,6}	3x			FS
Burst Pressure ^{4,7}	6x			FS
Long-term Stability ⁵			1.0	%FS
ESD – HBM	-4		+4	kV
Vibration	20g, 10Hz to 2Hz			

NOTES:

1. -40 to 85 °C is available upon request.
2. Custom temperature compensation is available upon request.
3. Gas only, no condensation.
4. Range dependent. Refer to individual data sheet.
5. Zero stability to be tested with 120 hour hot storage at 85 °C , which is roughly equivalent to accelerated aging of the part for over a year at Room Temperature.
6. Over-pressure (OP): the maximum pressure that may be applied to the sensor without causing a change in performance with respect to the specifications.
7. Burst-pressure (BP): The maximum pressure that may be applied to the sensor without a catastrophic failure.

Dimensions

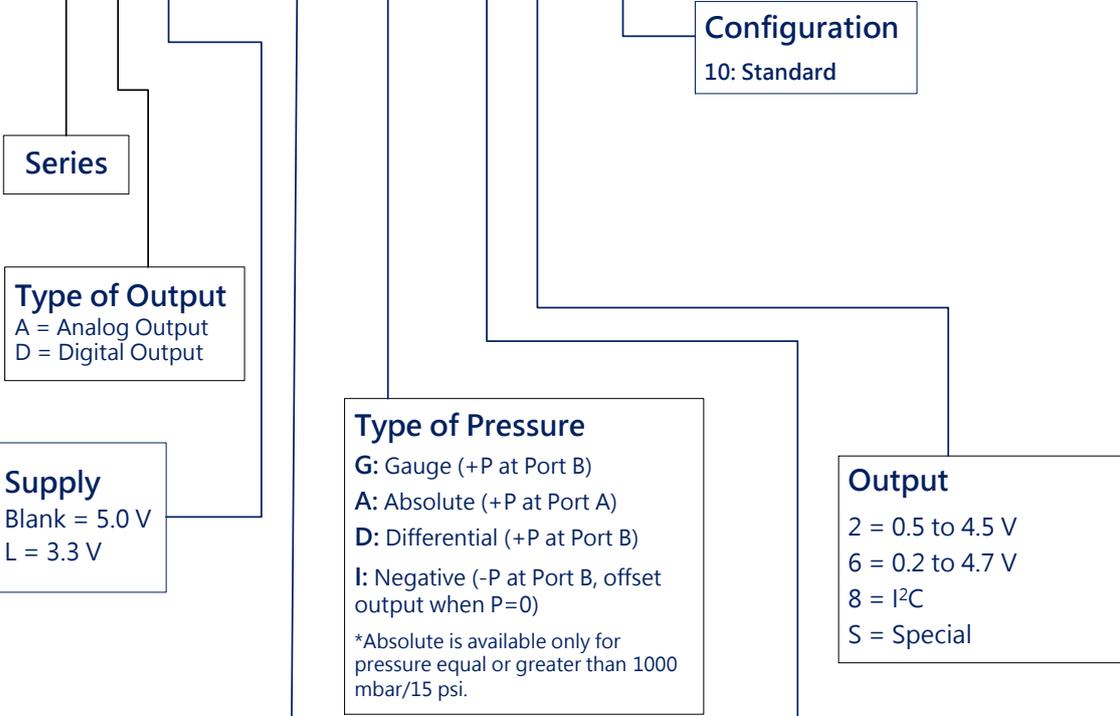


Shipping Package

Pizza style ESD box
 300 x 200 x 55 mm
 50 each in a box

Ordering Information

86 A L - XXXX G - 7 2 10



bar		mbar	
10	010K	100	101B
20	020K	200	201B
50	050K	500	501B
		1000	102B
		2000	202B
		4000	402B
		7000	702B

Port Type
5 = 1/8 NPT-27
7 = G 1/8

Wetted Material:
SUS#304, Viton,
Silicon, Glass,
Epoxy/RTV

Wetted Material:
SUS#304, Viton &
Ceramic

Specifications – Analog Output

Parameters	Min	Typ	Max	Unit
Supply (V_{DD}) – 3.3V ¹	2.75	3.3	3.6	V
Supply (V_{DD}) – 5.0V ¹	4.75	5.0	5.25	V
Operating Current ²		2.2	3.2	mA
Resolution - DAC ³		13	16	bits
Output (-P) ⁴		10%		V_{DD}
Output (Zero) ⁴		50%		V_{DD}
Output (+P) ⁴		90%		V_{DD}
Accuracy ⁵		±0.5		%FS
Overall Error ⁶		± 2.5		%FS
Update Rate ⁷		1.2		kHz
Start-up Time ⁸			2.3	ms

NOTES:

1. 3.3V or 5.0V supply should be ordered separately. Other supply voltage from 2.75 to 5.5V is available upon request. With external JFET, supply voltage from 5 to 48V can be applied providing a special configuration should be ordered.
2. Continuously running measurement sequence is executed at 5V.
3. Higher resolution longer step response settling time. Dithering is available upon request and can be switched on or off.
4. V_{DD} -ratiometric voltage. For vented gauge pressure, zero is 10%. Absolute voltage output (0/1V, 0/5V) is also available upon request.
5. Combines errors at 25°C after reflow mounting and auto-zero. Pressure range dependent.
6. The maximum deviation in output from a Best Fit Straight Line (BFSL) fitted to the output measured over the pressure range and compensated temperature.. Combines errors of NOL, hysteresis, and repeatability. Pressure range dependent.
7. Single measurement duration in 16-bit with SSC on-chip temperature sensor. Resolution dependent.
8. V_{DD} ramps up to activate Digital data to ADC plus DAC settling time.
9. Recommended operating condition with external resistive load 1k Ω and capacitive load 10nF as low-pass filtering configuration at analog output for output bandwidth from 1kHz to 5kHz.

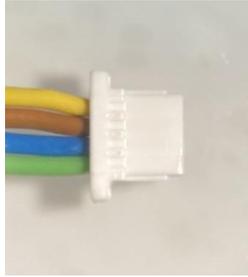
Specifications – Digital Output

Parameters	Min	Typ	Max	Unit
Supply (V_{DD}) – 3.3V ¹	2.75	3.3	3.6	V
Supply (V_{DD}) – 5.0V ¹	4.75	5.0	5.25	V
Operating Current ²		2.2	3.2	mA
Stand-by Current ³		0.8	1.5	uA
Resolution - ADC	12	16	24	bits
Output (-P) ⁴	1638 (dec) / 666 (hex)			
Output (Zero) ⁴	8192 (dec) / 7FFF (hex)			
Output (+P) ⁴	14745 (dec) / 399F (hex)			
Accuracy ⁵		±0.5		%FS
Overall Error ⁶		± 2.5		%FS
Update Rate ⁷		1.2		kHz
Start-up Time ⁸			2	ms
Wake-up Time ⁹		2	10	us
Input High Level ¹⁰	0.7		1.0	V_{DD}
Input Low Level ¹⁰	0		0.3	V_{DD}
Interface Clock – I ² C	0.1		3.4	MHz

NOTES:

1. 3.3V or 5.0V supply should be ordered separately. Other supply voltage from 2.75 to 5.5V is available upon request. With external JFET, supply voltage from 5 to 48V can be applied providing a special configuration should be ordered.
2. 5V supply and analog output referenced. Current consumption are varied according to supply, response rate and resolution chosen. Normally sensing element is not always excited. Mean current consumption for one complete measurement cycle would be lower than the rated value.
3. Stand-by is for digital output only. Sensor automatically enters into Sleep mode after command execution for minimum current consumption, whereas the interface is still listening and accepts commands.
4. Unsigned integer. Resolution dependent and custom is applicable. For vented gauge, zero is 1638(dec) 666 (hex).
5. Combines errors at 25°C after reflow mounting and auto-zero. Pressure range dependent.
6. The maximum deviation in output from a Best Fit Straight Line (BFSL) fitted to the output measured over the pressure range and compensated temperature. Combines errors of NOL, hysteresis, and repeatability. Pressure range dependent.
7. Single measurement duration in 14-bit with SSC on-chip temperature sensor. Resolution dependent.
8. V_{DD} ramps up to activate Interface Communication.
9. Referenced to external supply voltage V_{DD}

Electrical Connection



Connector Type:
JST SHR-04V-S-B

Analog Output

Pin #	Description	Color
1	OUT	Green
2	GND	Blue
3	VDD	Brown
4	N.C.	Yellow

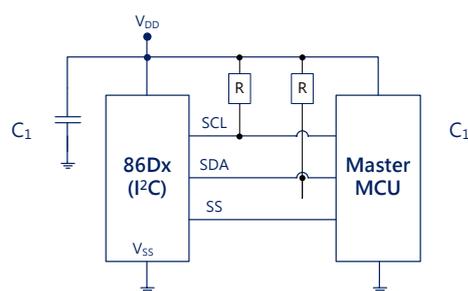
Digital Output

Pin #	Description	Color
1	SDA	Green
2	GND	Blue
3	VDD	Brown
4	SCL	Yellow

NOTE:

N.C. pins must be left floating

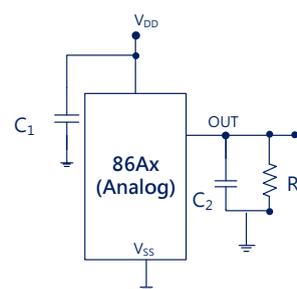
Application Circuit



I²C

$$R = 4.7k$$

$$C_1 = 0.1\mu$$



Analog

$$R_1 = 1k$$

$$C_2 = 10nF$$

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