GZP6886A

Pressure Sensor

Analog Output

Datasheet

Version：V1.4

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Document Revision History

Revision	Describe	Date
V1.0	Initial release	2022.08.15
V1.1	Update address	2022.08.18
V1.2	Update package information	2022.11.18
V1.3	Template modification	2022.05.03
V1.4	Change the application circuit diagram	2023.09.27

1. Product Description

The GZP6886A pressure sensor is a compact MEMS pressure sensor designed particularly for a wide applications with various pressure range. It is composed of a silicon piezoresistive pressure sensing chip and a signal conditioning integrated circuit. The initial signal from the sensing chip is amplified, temperature compensated, calibrated and finally converted to a high level analog output voltage that is proportional to the applied pressure.

1.1 Features

- Multiple range includes 0 ~ 100kPa/15 ~ 700kPa
- Absolute pressure type
- 5V power supply optional
- Barbed nozzle with anti-drop structure
- Standard voltage output or proportional voltage output optional
- Suitable for non-corrosive gases or liquid

1.2 Application

- Medical applications include ventilators, oxygen concentrators, monitors, and nebulizers
- Air pumps, pressure switches, pneumatic control systems, and industrial equipment
- Fire extinguishers, altimeters, barometers, weather stations, navigation systems, and other instrumentation
- Small appliances, consumer electronics, sports and fitness equipment, firefighting equipment, and the Internet of things

2. Function Description

This product is made with advanced micro-electromechanical principles . The core technology is a MEMS pressure sensor chip based on the silicon piezoresistive effect and a high-performance signal conditioning AISC chip. The silicon micro-piezoresistive MEMS pressure sensor chip outputs a voltage signal proportional to the measured pressure through a Wheatstone bridge composed of four strain-sensitive resistors. The signal is amplified, temperature compensated and linearized by the ASIC chip to obtain an output voltage that is in a prescribed relationship with the applied pressure. The linearity and temperature compensation of the transfer function are realized by the digital processing circuit in the ASIC. Through the polynomial compensation algorithm and multi-point pressure calibration technology at multiple temperatures, high-precision pressure measurement is achieved within the full operating temperature range.

The transfer function of the pressure sensor is created by the following parameters:

- Minimum and maximum pressure ratings
- Voltage values at minimum and maximum rated pressure
- Clamping voltage

All parameters required for a complete calibration algorithm, such as offset, gain, temperature coefficients of offset and gain, and linearity parameters, are determined after calibration and stored in the E^2PROM inside the ASIC.

2.1 Block Diagram

The sensor functional block diagram is shown in Figure 1.

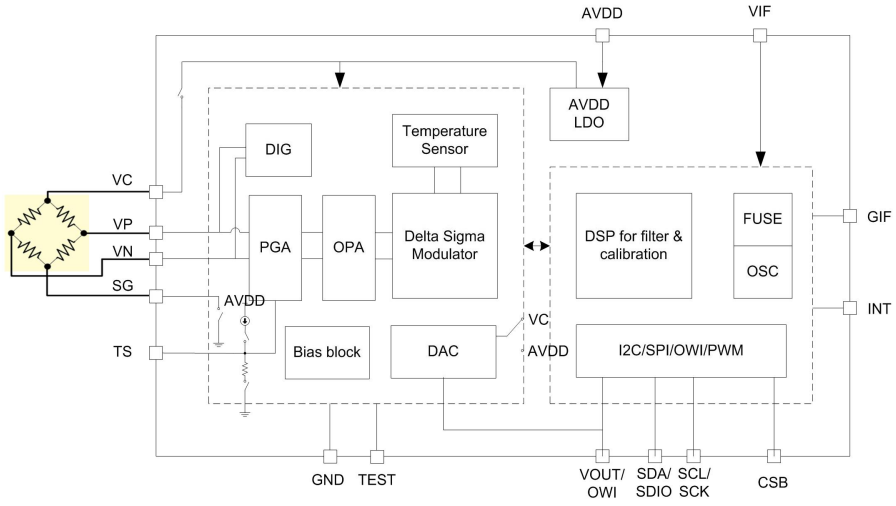

Fig.1 Block Diagram

2.2 Pin Definition

The pin diagram is shown in Figure 2.

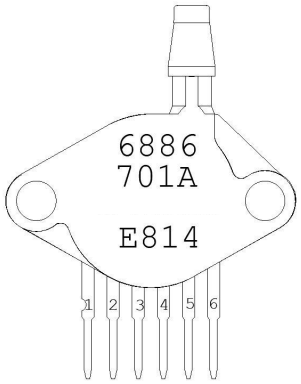

Fig.2 Pin Diagram

Tab.1 Pin correspondence

PIN No.	Description	Remark
1	Vout	Output positive
2	GND	Input negative
3	VDD	Input positive
4	NC	Floating pin
5	NC	Floating pin
6	NC	Floating pin

2.3 Pressure Function

The pressure sensor is calibrated at the factory and the output signal of the sensor has a linear transfer relationship with the applied pressure as shown below.

Pressure Transducer Transfer Function:

Vout = K*P+B, where.

Vout = signal output voltage (V)

P = actual pressure (kPa) P1 = lower pressure limit (kPa) P2 = upper pressure limit (kPa)

Vout1 = Lower pressure limit output (V) Vout2 = Upper pressure limit output (V)

K = (Vout2 - Vout1) / (P2 - P1)

B = (Vout1*P2- Vout2*P1) / (P2 - P1)

The transfer characteristics of the pressure sensor are shown in Figure 3 below:

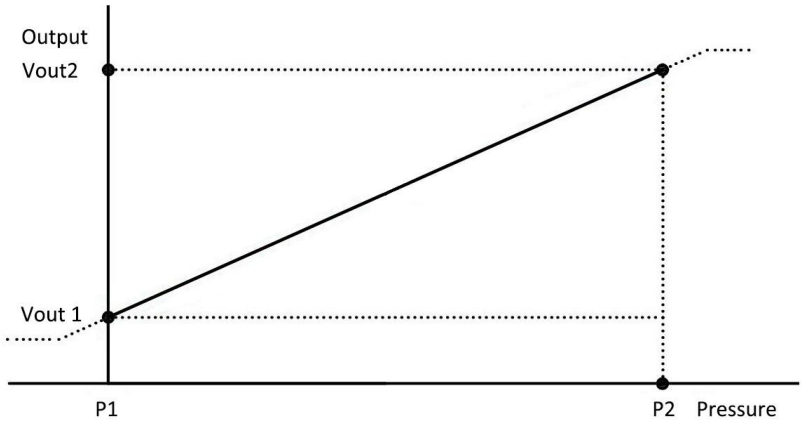

Fig.3 Voltage Output Curve

2.4 Accuracy

The accuracy of the GZP6895A pressure sensor consists of the error in its linearity, repeatability, and hysteresis. The value calculated with the transfer function is the specified and theoretical value of the sensor. The error of the sensor is equal to the difference between the actual output value of the sensor at the specified input pressure and the specified output value.

Overall Accuracy

Overall accuracy includes more error apart from the product's accuracy:

Pressure drift: The output deviation between the actual output voltage and the specified output voltage at zero and full scale over a specified pressure range.

Temperature effect: Output deviation between zero and full scale at different temperatures over a temperature range.

The overall accuracy is expressed in terms of error bands, and the data are shown in Figure. 4 and Table 2.

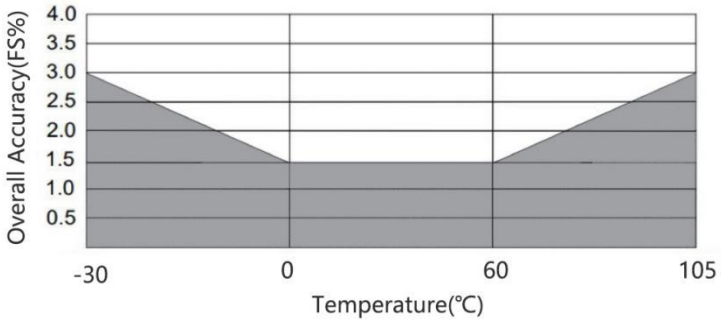

Fig.4 Relationship between overall accuracy and temperature

Tab.2 Overall Accuracy

Temperature (℃)	Overall Accuracy(Full Span)
-30~105	±3.0%
0~60	±1.5%

*Different pressure range may have different overall error, please consult Sencoch for more details.

3. Technical Specifications

Measured at a power supply of (5±0.25)V DC and a temperature of 25°C

3.1 Maximum Ratings

The maximum rated parameters of the sensor are shown in Table 3.

Tab.3 The maximum rated parameters of the sensor

Parameter	Minimum	Typical	Maximum	Unit	Remark
Maximum voltage			6.5	V	
Output current load			5	mA	
ESD Protection		±2		KV	
Operating temperature	-30		105	℃	
Storage temperature	-40		125	℃	

*Long exposure at the specified limits may cause degradation to the device.

3.2 Performance Indicators

The sensor performance indicators are shown in Table 4.

Tab.4 Sensor performance indicators

Parameter	Value	Unit
Pressure range	0 ~ 100/15 ~ 700	kPa
Output signal	0.2-4.7 (Customizable)	V
Accuracy	±1	%Span
Overload pressure	2× (Range ≤ 350kPa)	Rated
	1.5× (Range>350kPa)	
Burst pressure	3× (Range ≤ 350kPa)	
	2× (Range>350kPa)	
Compensation temperature	0 ~ 60 (Customizable)	℃

1. The 0.2~4.7V output voltage is based on 5V power supply or optional 0.2~2.7V output based on 3.3V power supply. The output can be customized to other voltage range by order.
2. The different pressure range may have different accuracy, overload and burst pressure , please consult Sencoch for more details.

3.3 Electrical Characteristics

The electrical characteristics of the sensor are shown in Table 5.

Tab.5 The electrical characteristics

Parameter	Minimum	Typical Value	Maximum	Unit	Remark
Supply voltage	3.3	5	5.5	V	
Working current @25℃		1700		uA	
Filter capacitor		100		nF	
PSRR		60		dB	
Output current load			5	mA	
Input common mode signal rejection ratio	80	110		dB	
Short circuit current limiting	15	20	25	mA	
Upper clamp voltage	3/4		1	VDD	
Lower clamping voltage	0		1/4	VDD	

4. Application Circuit

Figure 5 is for the recommended application circuit of the chip.

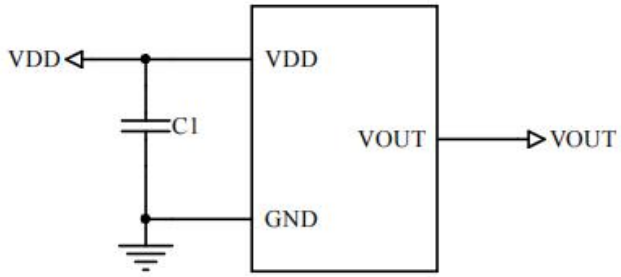

Fig.5 Application circuit

Notice:

- The recommended value of C1 is 100nF. Please confirm the electrical definition before assembly.
- Do not have any electrical connection to the NC pin, otherwise it may cause product failure.
- Provide anti-static protection during welding
- Overload voltage (6.5Vdc) may burn out the circuit chip
- This product has no reverse connection protection, please pay attention to the power polarity during assembly

5. Appearance and Structure

The sensor dimensions refer to Figure 6. (Error ±0.1mm if not specified)

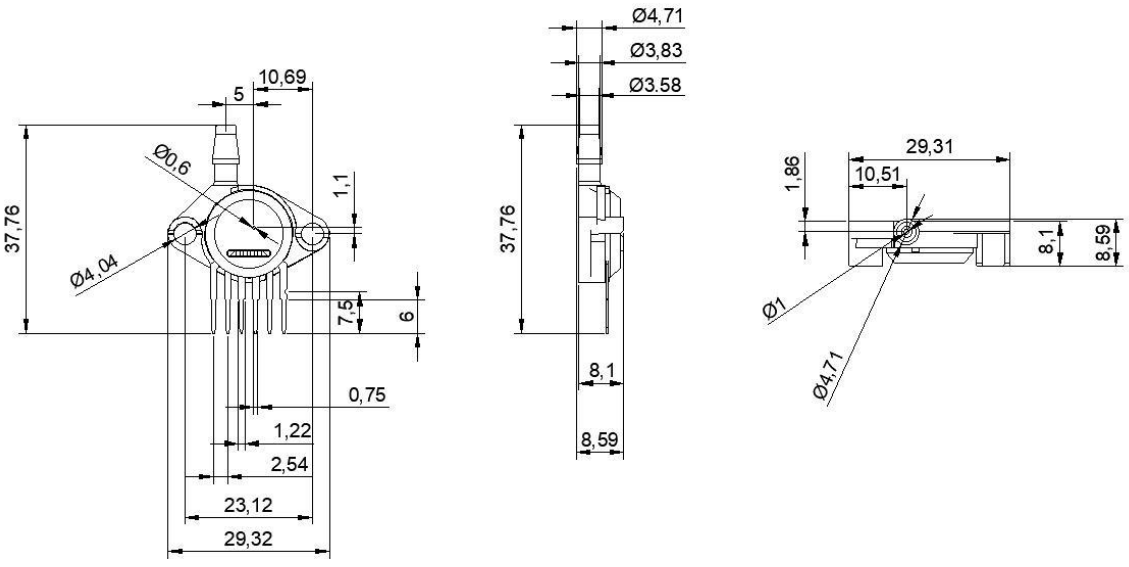

Fig.6 Sensor Dimensions

Recommended footprint as Figure 7.

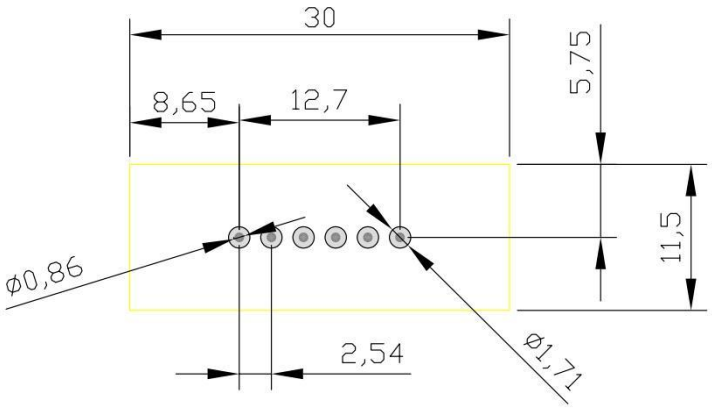

Fig.7 Recommended Footprint

6. Order Guide

GZP 6886A 15700KPA 50 H B02 WX

Tab.6 Selection Guide

GZP	Pressure Sensor Series
6886	Product Series
A	Output type A: Analog output D: IIC output
15700KPA	Pressure range: 15700 means the minimum pressure (15) and the maximum pressure (700) Pressure unit: KP: KPa MP :MPa PS: PSi BA:Bar Pressure Type: A: Absolute Therefore, 15700KPA means the absolute pressure of 15KPA to 700KPA
50	Power supply 50: 5 Vdc; 33 : 3.3Vdc
H	Output K: 0.5~4.5 V Z : 0.2~2.7V H:0.2~4.7V E: Proportional voltage output (please note the output voltage range after the model number) T: Custom output (please note the output voltage range after the model number)
B02	Packing method B02: Tray
WX	Company interior code

7. Model Example

Tab.7 Model example

Pressure Range	**Part Number**
0 ~ 100KPa	GZP6886A00100KPA50H B02 WX
15 ~ 700KPa	GZP6886A15700KPA50H B02 WX

1. Above model example is for order information only, contact Sencoch for production and stock status.
2. For more customized ranges and special parameter part numbers, please consult Sencoch or agents.

8. Instruction for Use

8.1 Soldering

Since this product has a small structure with low heat capacity, please minimize the influence of heat from the outside. Otherwise, it may be damaged due to thermal deformation and cause changes in characteristics. Please use non-corrosive rosin type flux. In addition, since the product is exposed to the outside, please be careful not to allow flux to penetrate into the inside.

(1) Manual soldering

- Use a soldering iron with a head temperature between 260 and 300°C (30 W) and perform the work within 5 seconds.
- Please note that the output may change when soldering with a load applied to the terminals.
- Please keep the soldering iron tip clean.

(2) Reflow soldering (SMD terminal type)

- The recommended reflow oven temperature setting conditions are shown:

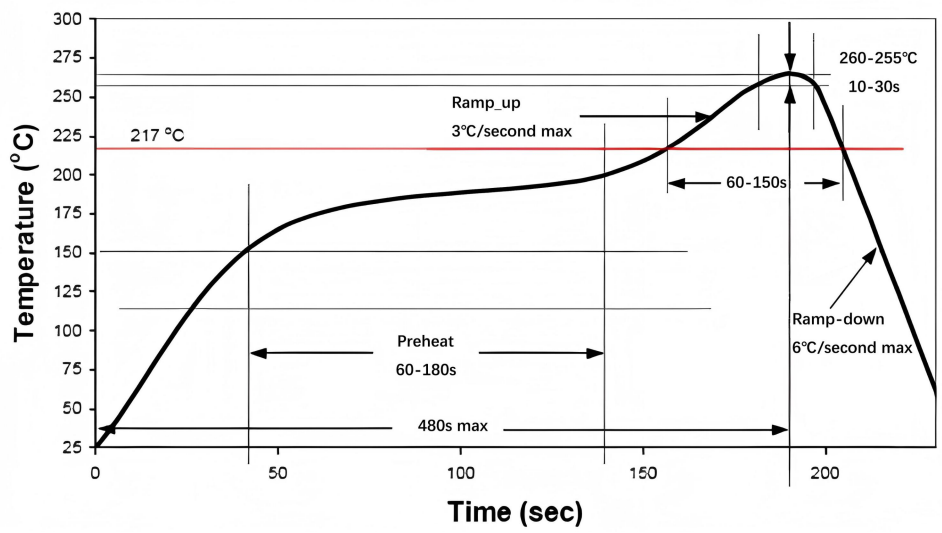

Fig.8 Remelting temperature setting conditions

(3) The warping of the printed circuit board relative to the entire sensor should be kept below 0.05mm. Please manage this.

(4) After installing the sensor, be careful not to generate stress on the solder joint when cutting and bending the substrate.

(5) Since the sensor terminals are exposed, contact with metal pieces or other objects may cause abnormal output. Be careful not to touch the terminals with metal pieces or your hands.

(6) When applying coating to prevent insulation degradation of the substrate after soldering, be careful not to allow chemicals to adhere to the sensor.

8.2 Cleaning Requirements

(1) Since the product is open type, please be careful not to allow cleaning fluid to enter the interior.

(2) Please avoid using ultrasonic cleaning as it may cause product failure.

8.3 Storage and Transportation

(1) This product is not drip-proof, so do not use it in places where it may be splashed with water.

(2) Do not use in an environment where condensation occurs. In addition, if moisture attached to the sensor chip freezes, it may cause fluctuations in sensor output or damage.

(3) Due to the structure of the pressure sensor chip, the output will fluctuate when it is exposed to light. Especially when applying pressure through a transparent cover, etc., please avoid light from reaching the sensor chip.

(4) Normally packaged pressure sensors can be transported by ordinary transportation vehicles. Please note: The product must be protected from moisture, shock, sunburn and pressure during transportation.

8.4 Other Precautions

(1) If the installation method is incorrect, it may cause an accident, so please be careful.

(2) Avoid using the product in a manner that applies high-frequency vibrations, such as ultrasonic waves.

(3) only pressure medium that can be used directly is non-corrosive gas or liquid. Other media, especially corrosive media or media containing foreign matter, may cause malfunction and damage. Therefore, please avoid using it in the above environment.

(4) A pressure sensor chip is located inside the pressure inlet. Inserting a needle or other foreign object into the pressure inlet can damage the chip and clog the inlet, so please avoid such an operation.

(5) Regarding the operating pressure, please use it within the rated pressure range. Using it outside the range may cause damage.

(6) Since static electricity may cause damage, please be careful to ground charged objects on the table and operators when using it to allow the surrounding static electricity to discharge safely.

If you have any questions, please feel free to ask.

9. Packaging Information

The information of the material box is shown in Figure 9 (in millimeters). The quantity of each material box is 45 PCS.

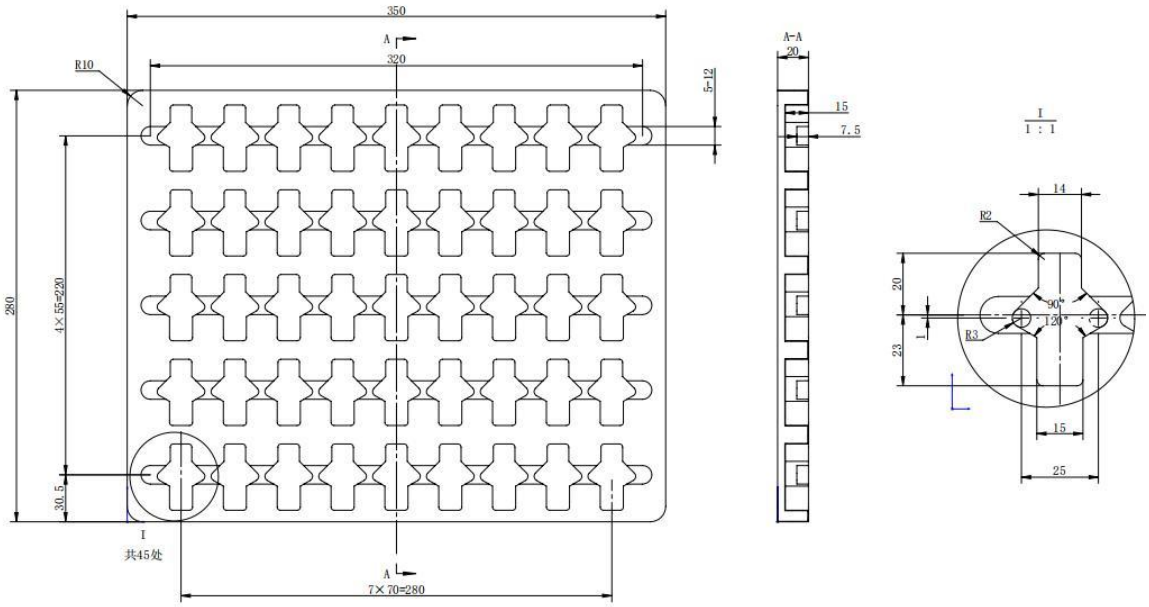

Fig.9 Information of the material box

Safety Precautions

This product is made of semiconductor components for general electronic equipment (communication equipment, measuring equipment, working machinery, etc.). Products using these semiconductor components may malfunction and fail due to external interference and surges, so please confirm the performance and quality under actual use. To be on the safe side, please perform safety design on the device (setting of protection circuits such as fuses and circuit breakers, multiple devices, etc.) so that life, body, property, etc. will not be harmed in the event of a malfunction. To prevent injuries and accidents, please be sure to comply with the following matters:

·The driving current and voltage should be used below the rated values.

Please wire according to the electrical definition . In particular, reverse connection of the power supply may cause accidents due to circuit damage such as heat, smoke, and fire, so please be careful.

·Be careful when fixing the product and connecting the pressure inlet .

Warranty and Disclaimer

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