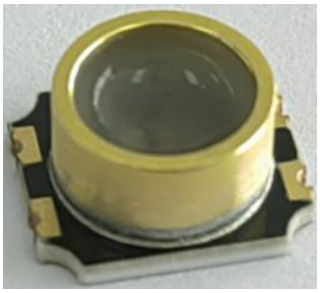
HBP1822A-P2 Series Pressure Sensor

Product Features

- Measuring range: 10kPa ~ 2000kPa (Optional), Absolute Pressure
- Piezoresistive pressure sensor
- Analogue output
- Supply voltage: 3.3 V or 5.0V
- PCB substrate package
- High integration and excellent reliability
- High accuracy with temperature compensated
- Operation temperature: -40 to +85°C
- Suitable for non-corrosive gases or liquids



Typical Applications

- Manifold Pressure Test
- Industrial Air Pressure Test
- Automotive Air Suspension Systems
- Depth Measurement

General Description

HBP1822A-P2 series product sensor is an absolute pressure sensor module independently developed by Haobang. The product is composed of pressure sensor chip, signal processing circuit, PCB substrate and metal ring. The product has high precision, good stability, wide temperature range and has two measurement functions of pressure and temperature. Each product is calibrated individually and the calibration coefficient is saved on the internal memory chip of the component. The deviation, sensitivity, temperature drift and nonlinear compensation of the product can be calibrated by the calibration coefficient.

The HBP1822A-P2 series sensors are small and compact in structure for easy installation and system integration. The product is widely used in the field of automobile tire pressure detection, industrial control and instrumentation. Figure 1 shows the schematic diagram of HBP1822A-P2 series products.

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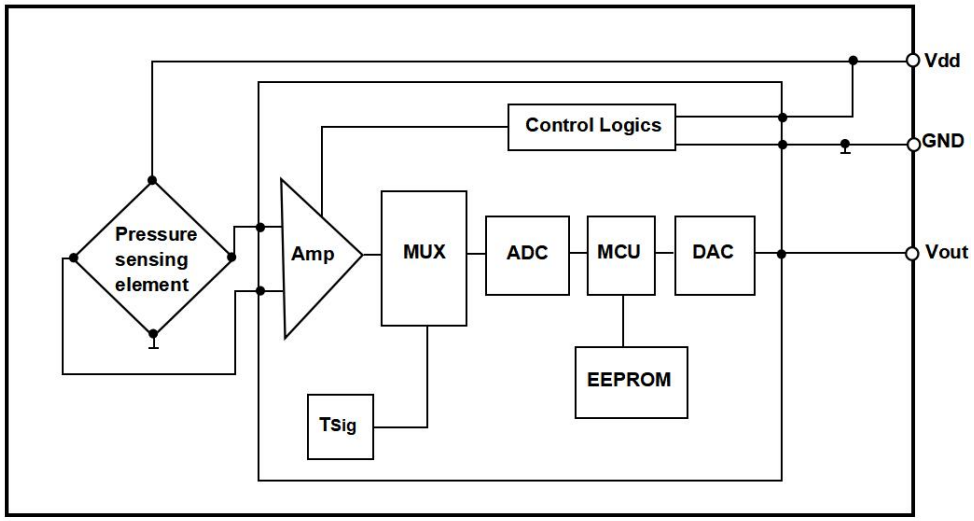

Figure 1: Product Block Diagram

Absolute maximum Ratings

Table 1: Absolute maximum rating of HBP1822A-P2

Parameter	Condition	Min.	Typ.	Max.	Units
Supply Voltage		-0.3		6.5	V
Digital terminal voltage	25°C	-0.3		Vdd+0.3	V
Overload pressure			2 times		Rated pressure
Burst pressure			3 times		Rated pressure
ESD	HBM		±2		kV
Storage temperature		-40		125	°C
Medium	Non-corrosive gas				

Notes: Stresses exceeding the 'absolute maximum rating' may cause permanent damage to the device. These are stress ratings only and do not imply that the functional operation of the sensor under these or any other conditions exceeds the conditions indicated under 'Recommended Operating Conditions'. Prolonged exposure to absolute maximum rated conditions may affect the reliability of the sensor.

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Product Specifications

Table 2: Performance of HBP1822A-P2

Parameter	Min.	Typ.	Max.	Unit.	Remark
Supply voltage		3.3 or 5.0	5.5	V	Optional
Measurement range	10		2000	kPa	Optional
Null Point output		10%Vdd		V	Customizable
Full scale output		90%Vdd		V	Customizable
Accuracy		±1		%FS	Optional
Operating temperature	-40	0-60	85	°C	Optional,default typical values
Compensation temperature	0	0-60	85	°C	Optional,default typical values
long term stability		±0.5		%FS	One year

Notes: Unless otherwise stated, the data in the above table are tested under the following conditions: The measurement medium is air; Atmospheric pressure (101325±500) Pa; Temperature (25±2)°C; vibration 0.1g(1m/s2); Humidity (50%±10%) is RH; The voltage is (5.0±0.25)V DC.

Typical Transfer Function

Typical output transfer function of HBP1822A-P2 product series is shown in Equation (1), where the pressure range is P_{min} ~ P_{max}, corresponding to the sensor output range: 10%Vdd ~ 90%Vdd, corresponding to the output voltage range of 0.50V ~4.5V (Vdd = 5.0V).

The conversion relationship between sensor output and set pressure is:

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$$\mathrm{Vout} = \frac{80\%\mathrm{Vdd}}{(\mathrm{P_{max}} - \mathrm{P_{min}})}(\mathrm{P_{read}} - \mathrm{P_{min}}) + 10\%\mathrm{Vdd} \qquad (1)$$

where:

Vout is the output voltage，in unit V;

Vdd is the supply voltage, in unit V;

*$|P|_{max}$ is the maximum pressure value, in unit kPa；

$|P|_{min}$ is the minimum pressure value, in unit kPa；

$|P|_{read}$ is the pressure to be measured in kPa.

Figure2 is the relation curve between the sensor output and pressure setpoints. It is shown that the pressure sensor output is linear over its working range.

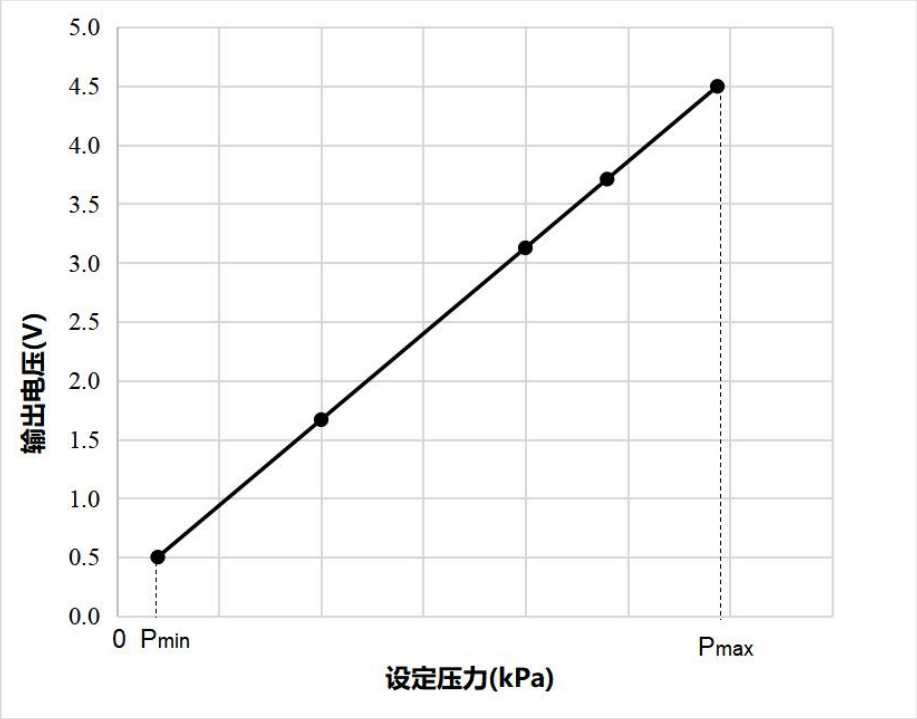

Figure 2: Pressure output vs. pressure set points

Typical Application Circuit

Please refer to the typical application circuit for application shown in Figure3.

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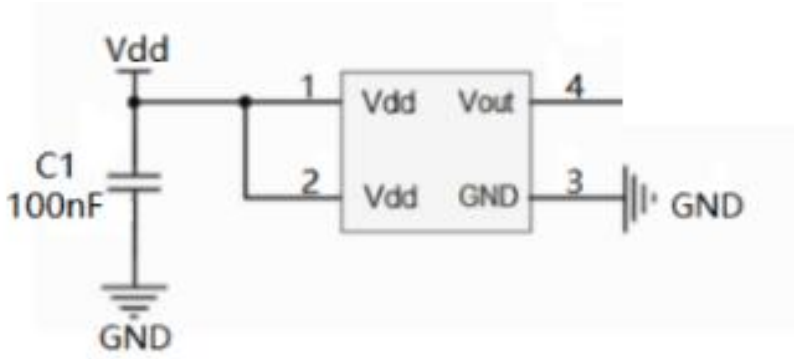
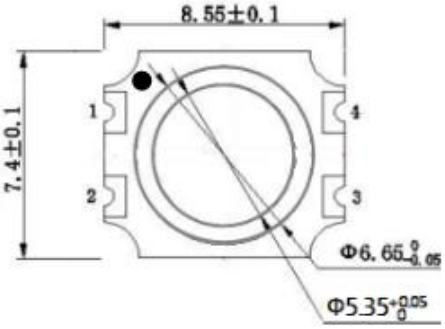


Figure 3: Typical Application Circuit

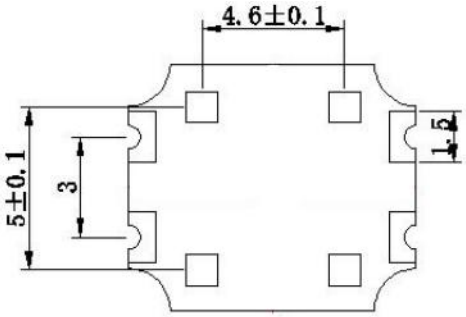
Package Dimensions

The product mechanical drawing is shown in Figure4 below. All dimensions are in millimeter unit.

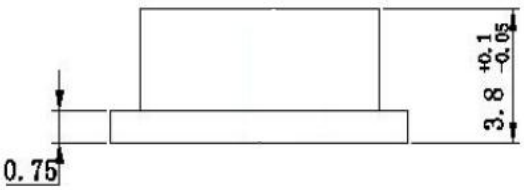
For the unmarked dimensional tolerances are ±0.1mm.



(a) Top view



(b) Bottom View



(c) Side view

Figure 4: Mechanical Drawing

Pin Definition and Function Description

Please refer to Figure5 for the Pins definition and Table3 for the Pins description.

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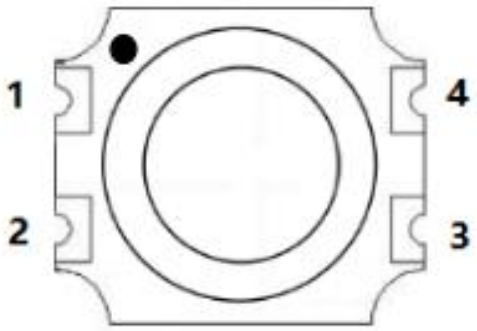

Figure 5: Pins Definition

Table 3: Pin definition and description

Pin	Symbol	Definition
1	Vdd	Power supply
2	Vdd	Power supply
3	GND	Ground
4	Vout	Voltage output

Notes:

1) Please do not connect any electrical signal to NC Pins which may cause the failure for some functions.
2) Take ESD protection during welding.
3) Overload voltage (6.5VDC) may burn the circuit chip, please add 0.1uf capacitor between Vdd and GND
4) This product has no reverse connection protection, please pay attention to the polarity of power supply when assembling.

Recommended Reflow Curve

Please refer to Figure6 for the recommended reflow curve and Table4 for the reflow parameters.

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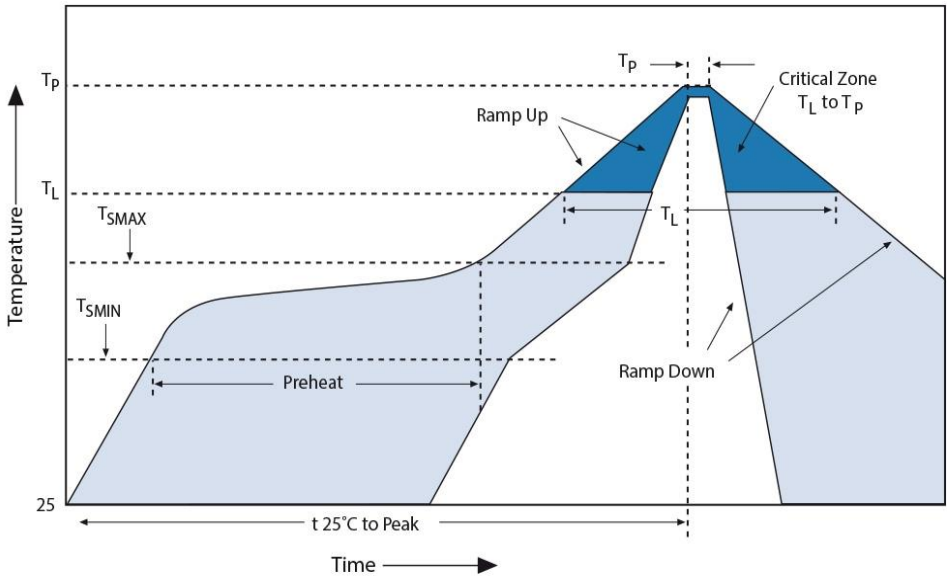

Figure 6: Recommended reflow curve

Table 4: Reflow Parameters Description

Curve Feature	Lead free
Mean heating rate (T_{SMAX} to T_P)	3°C/s the fastest
Min temperature of preheating area (T_{SMIN})	150°C
Max temperature of preheating area (T_{SMAX})	200°C
T_{SMIN} to T_{SMAX} (t_S)	60~180 s
Reflux zone temperature (T_L)	217°C
Reflux zone time (t_L)	60~150s
Peak temp. (T_P)	260°C
Peak temp.+/-5°Ckeeping time(t_P)	20~40 s
Drop speed (T_P to T_{SMAX})	6°C/s the fastest
Time from 25°C to peak temperature	Max 8 min

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Notes:

1) It is not allowed to fall into dust on sensor chip to avoid any damage on the product.
2) Do not allow to clean the circuit board after reflow welding, because the line general cleaning agent or detergent may damage the product. Do not expose the product to ultrasonic handling or cleaning.
3) It is recommended that the reflow welding times not exceed 3 times.

Products Selection Information

The HBP1822A-P2 product order information is shown in Figure7.

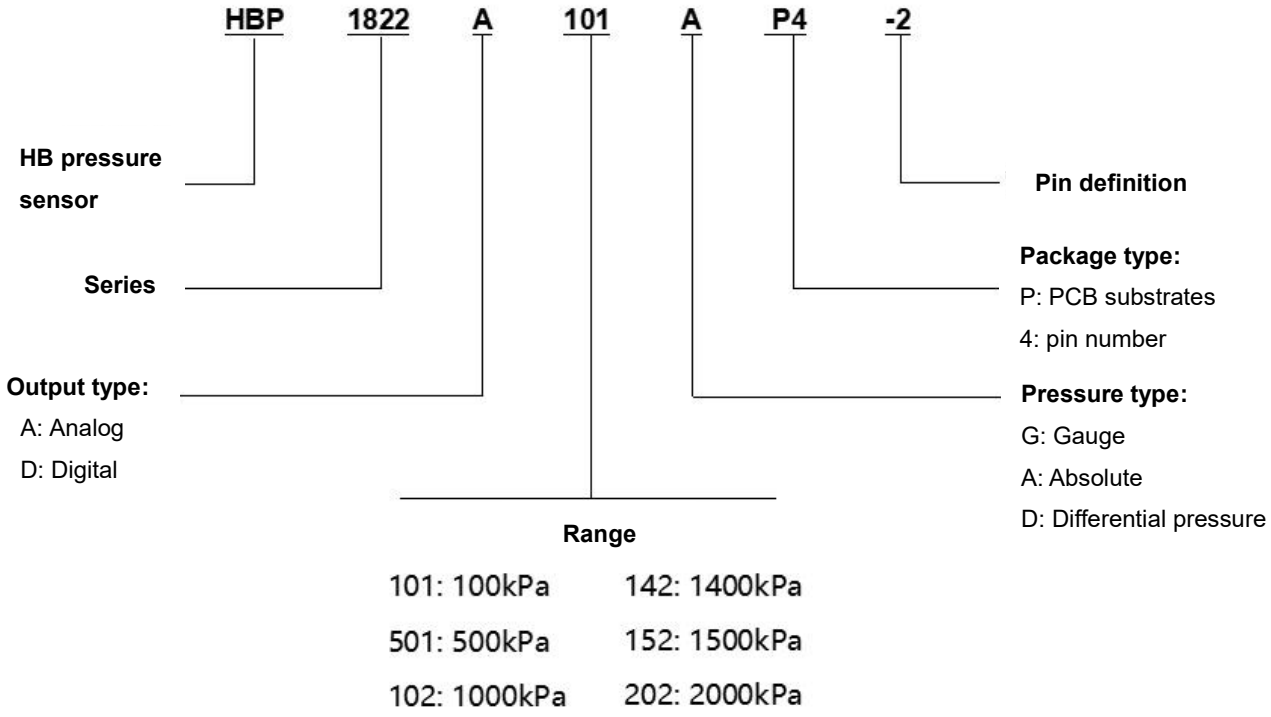

Figure 7: Schematic of Product Naming Rules

***Notes:**

1) Some products do not include all ranges mentioned above. For more product information, please contact info@haobang-smt.com.
2) Pressure conversion: 10kPa=100hPa=100mBar≈75mmHg≈1020mmH2O≈1.45PSI

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Table 5: Regular range list

Range (kPa)	Model
10 ~ 200	HBP1822A201AP4-2
10 ~ 500	HBP1822A501AP4-2
10 ~ 700	HBP1822A701AP4-2
10 ~ 1000	HBP1822A102AP4-2
10 ~ 1400	HBP1822A142AP4-2
10 ~ 2000	HBP1822A202AP4-2

Customized services

Haobang is oriented to customer needs, providing customers with flexible customization solutions to meet different needs. The effective customization services include but not limited to the most cost-effective sensor chips and modules with different ranges, packaging sizes, and application ranges. For more information, please contact info@haobang-smt.com.

Document history

Table 6: Document History and Modification

Revision	Description	Date
1.0	Initial	2022 Oct
1.1	Package Type Splitting	2025 Feb

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