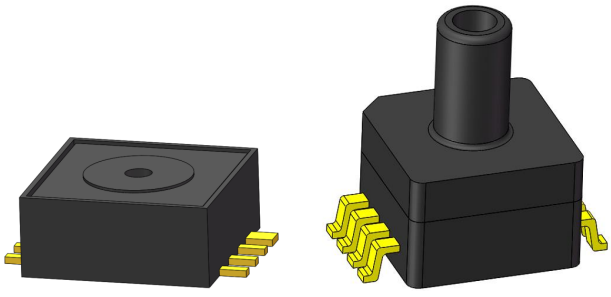
BANNING
PRESSURE SENSOR
BLWP6XXXAD



BANNING

DESCRIPTION

BLWP6XXXAD is a new type of integrated high precision digital output pressure sensor, with small size, high precision, high reliability. The sensor processing circuit is integrated in the internal noise reduction module to achieve strong anti-interference ability of the sensor performance; At the same time, the sensor integrates the high precision temperature sensor, and adopts the unique algorithm to realize the temperature compensation of the sensor.

This series of pressure sensor adopts SSOP8 package, which can be divided into two forms: with and without air nozzle, to broaden the application of products.

CHARACTERISTICS

- Pressure type: Absolute pressure
- Measuring range: 0~130kpa, 0kpa ~300kPa, 0~700kpa, 0kpa ~1700kPa, etc
- Accuracy 0.5%
- Integrated digital output pressure sensor
- High stability
- Operating temperature: -40~125℃

PREFORMANCE

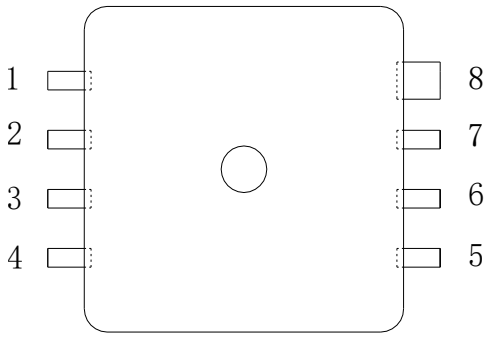
Parameter	Minimum	Typical	Maximum	Unit	Note
Supply voltage	1.68	3.3	3.6	Vdc	
Working curren		1		mA	
Current of sleep		20		nA	
ADC		24		bit	
Accuracy of accuracy		±0.5		%FS	VS = 5.0 Volts (25°C)
Start up time			2.5	ms	
Response time		5	30	ms	
Operating temperature	-40		+125	℃	
Temperature of storage	-55		+150	℃	

- If not specified, test conditions are 3.3V supply voltage and 25℃ ambient temperature

APPLICATION

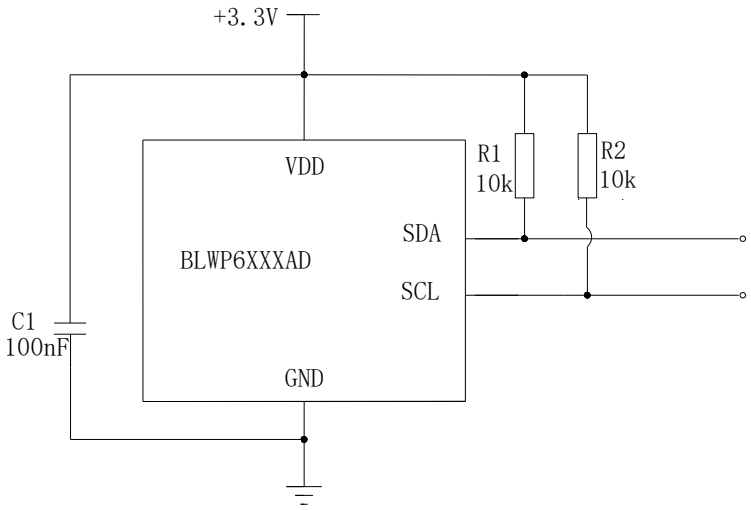
- Automotive Applications
- Industrial control
- Assisted GPS navigation
- Medical monitoring

PIN DEFINITION



Pin number	Pin definition	Instructions
1	VDD	power supply+
2	GND	ground
3	NC	-
4	EOC	Interrupt (Optional)
5	SCL	clock
6	SDA	Output
7	NC	-
8	NC	-

CIRCUIT



I2C INTERFACE

BLWP6XXXAD chip address description

A7	A6	A5	A4	A3	A2	A1	W/R
0	0	0	0	0	0	0	0/1

The address bit information of BLWP6XXXAD is shown in Table 3.1. A1~A7 are the address bits and W/R are the direction bits.

- Write register address command: 00000000 (0x00)
- Read register address command: 00000001 (0x01)

I²C COMMUNICATION

Parameter	Symbol	BLWP6XXXAD
Frequency of clock	Fscl	0~400KHz
The bus idle time before a new send starts	tBUF	1.5 μ s
Initial signal holding time	tHD.STA	0.6 μ s
Initial signal establishment time	tSU.STA	0.6 μ s
Stop signal establishment time	tSU.STO	0.6 μ s
Data entry hold time	tHD.DAT	100ns
Data entry setup time	tSU.DAT	100ns
Clock low level period	tLOW	1.5ns
Clock high level cycle	tHIGH	0.6ns
SDA and SCL rise time	tR	30~500ns
SDA and SCL descent time	tF	30~500ns

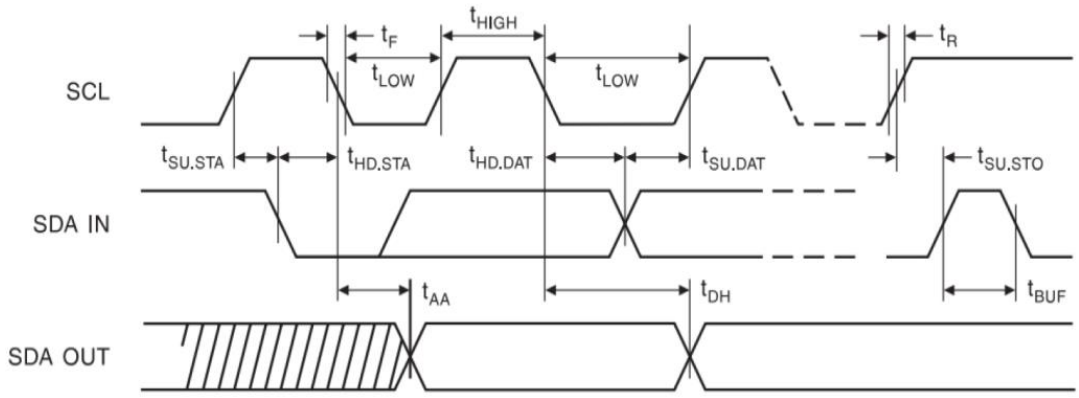


Figure 1.I²C communication sequence diagram

The host must first send the address of the chip in order to communicate with it. The slave address byte consists of seven address bits and a direction bit that determines whether the slave is to accept or send. The I²C address of the chip is 0000000, the chip write address is 0x00, and the chip read address is 0x01.

Figure 1. Timing diagram of register configuration for the host write chip. In Figure 3.3, (a) is the time sequence diagram required for reading the chip, and (b) the time sequence diagram for reading the pressure and temperature data of the chip. SlaveAddr: address of the slave and Command: address of the control command.

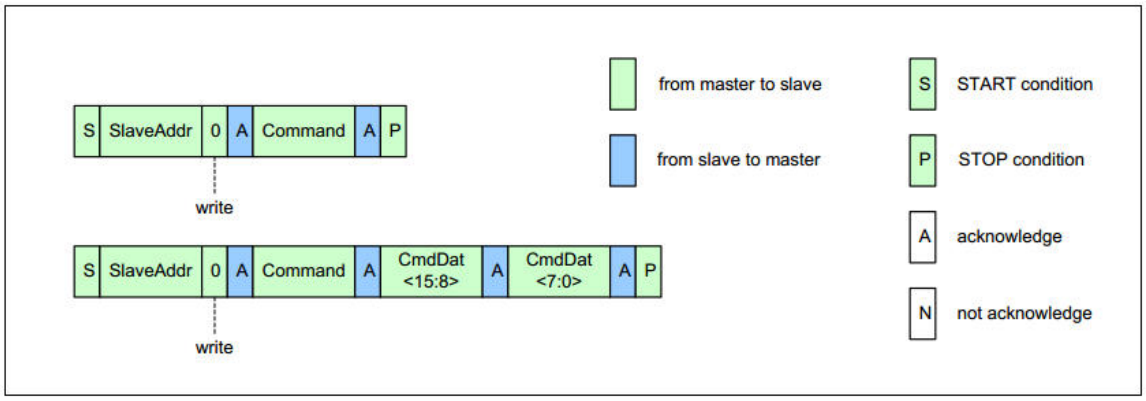


Figure 2. I²C command request

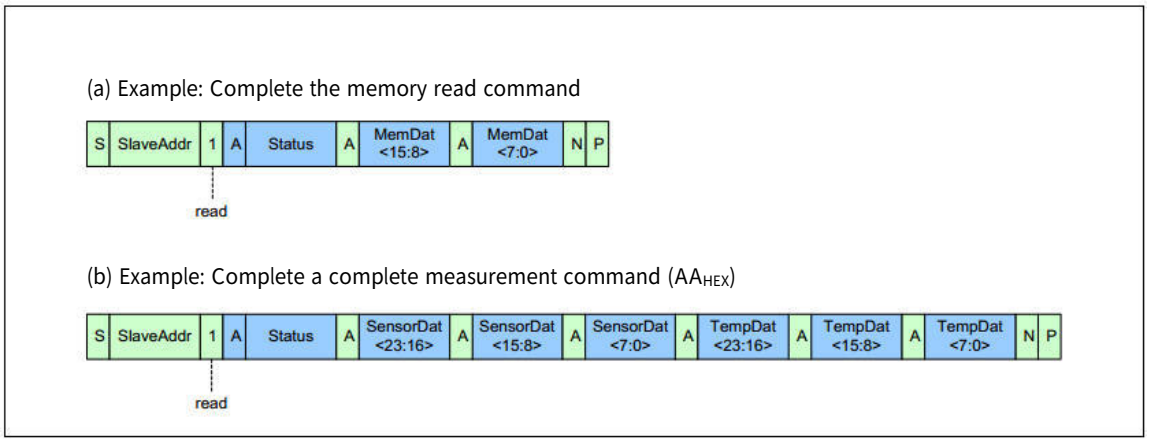


Figure 3. I²C reads data

OUTPUT DESCRIPTION

Pressure register

The pressure register is a 24-bit register stored in binary form, and the pressure result is an 18-bit value. The pressure is calculated by the following formula:

$$\mathbf{P(pa)} = \left(\frac{\mathbf{PMAX - PMIN}}{\mathbf{2^{18}}}\right) * \mathbf{P1 + PMIN}$$

(P -- pressure value collected; P1 - the value of the collected I2C)

Name	Bit	Describe
Pressure	[23:06] pressure	Pressure detection (read only)
	[05:00] reserve	Reserved, always 0 (read only)

Table 1. describes the pressure registers

Type	PMIN（pa）	PMAX（pa）
BLWP6130AD	0	150000
BLWP6300AD	0	310000
BLWP6700AD	0	710000
BLWP61400AD	0	1500000

Table 2. Product model and parameter mapping table

TEMPERATURE REGISTER

The temperature register is a 24-bit register stored in binary form, and the temperature result is a 16-bit value. The temperature is calculated by the following formula

$$\mathbf{T}(℃) = \left(\frac{\mathbf{85 + 40}}{\mathbf{2^{16}}}\right) * \mathbf{T1 - 40}$$

(T -- temperature value collected; T1 - The value of the collected I2C)

Name	Bit	Describe
Temperature	[23:06] temperature	temperature detection (read only)
	[05:00] reserve	temperature, always 0 (read only)

Table 3. Description of the temperature register

BLWP6XXXAD chip read and write operations

（1）Configuration register

- Start I2C;
- Send write register address command 0x00, wait for a response;
- Write the configuration register address 0XAA to the chip and wait for the response;
- Send the two-byte parameters 0X00 and 0X80 to the chip and wait for a response.
- Turn off I^2C communication, delay (≥5ms), chip acquisition conversion data.

(2) Write the address of the data and ask the chip for data

- Start I^2C;
- Send the read register address command 0x01 and wait for the response.
- Receiving chip output data state, read three bytes of pressure data, three bytes of temperature data;
- Disable I2C communication.
- Save and process data.

LSSOP8 Installation

The surface mount layout is a key part of the overall design. Use the correct liner geometry to ensure safe and reliable welding connections to avoid Bridges and short circuits between weld points.

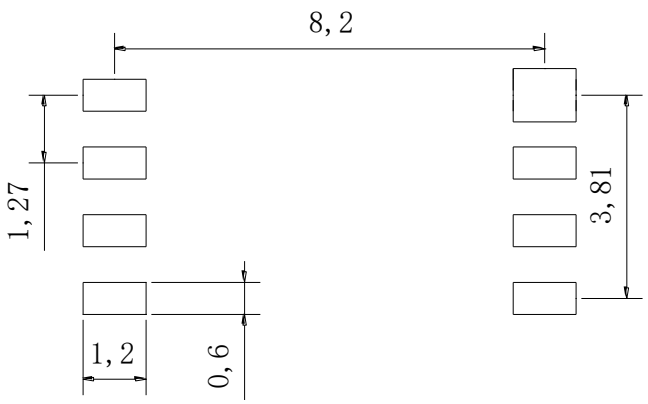


Table 3. Description of the temperature register

DIMENSIONS（mm)

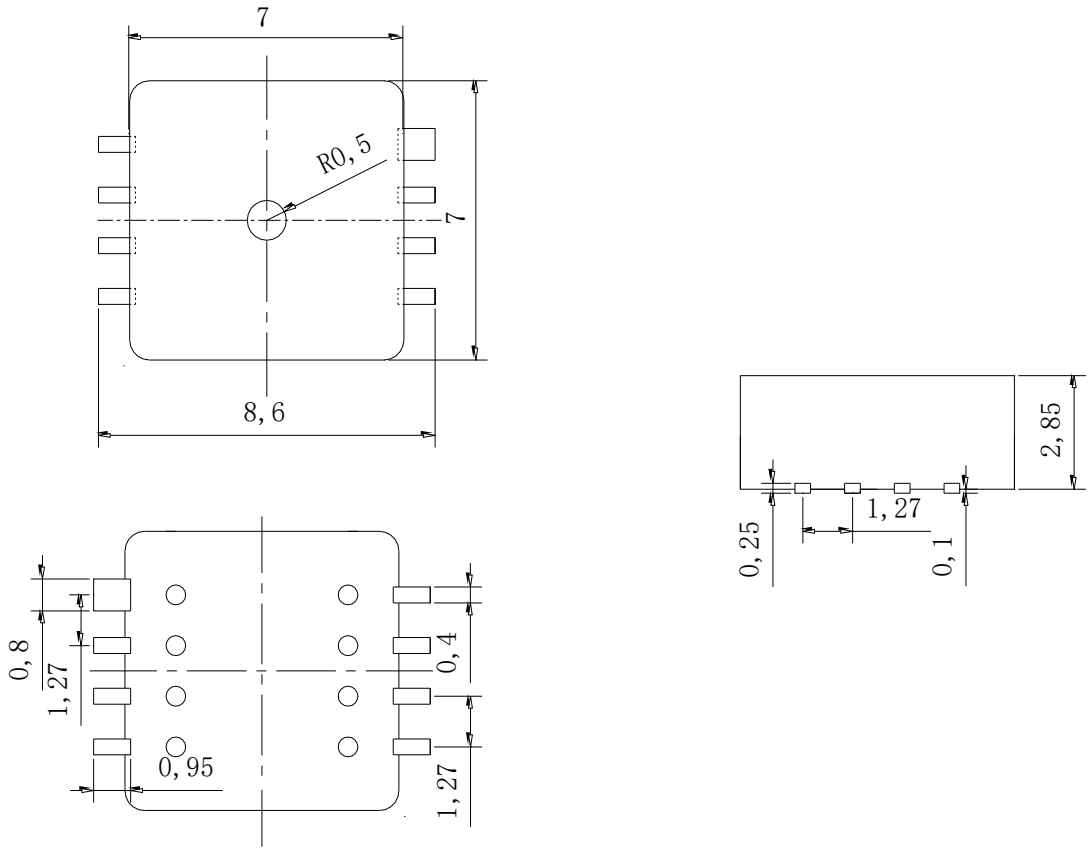


Figure 4.Package size drawing (without air nozzle)

SSOP8 Installation

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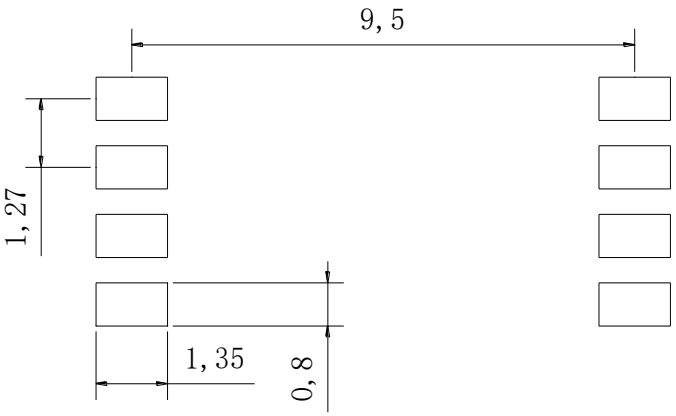

Table 4. Description of the temperature register

DIMENSIONS（mm）

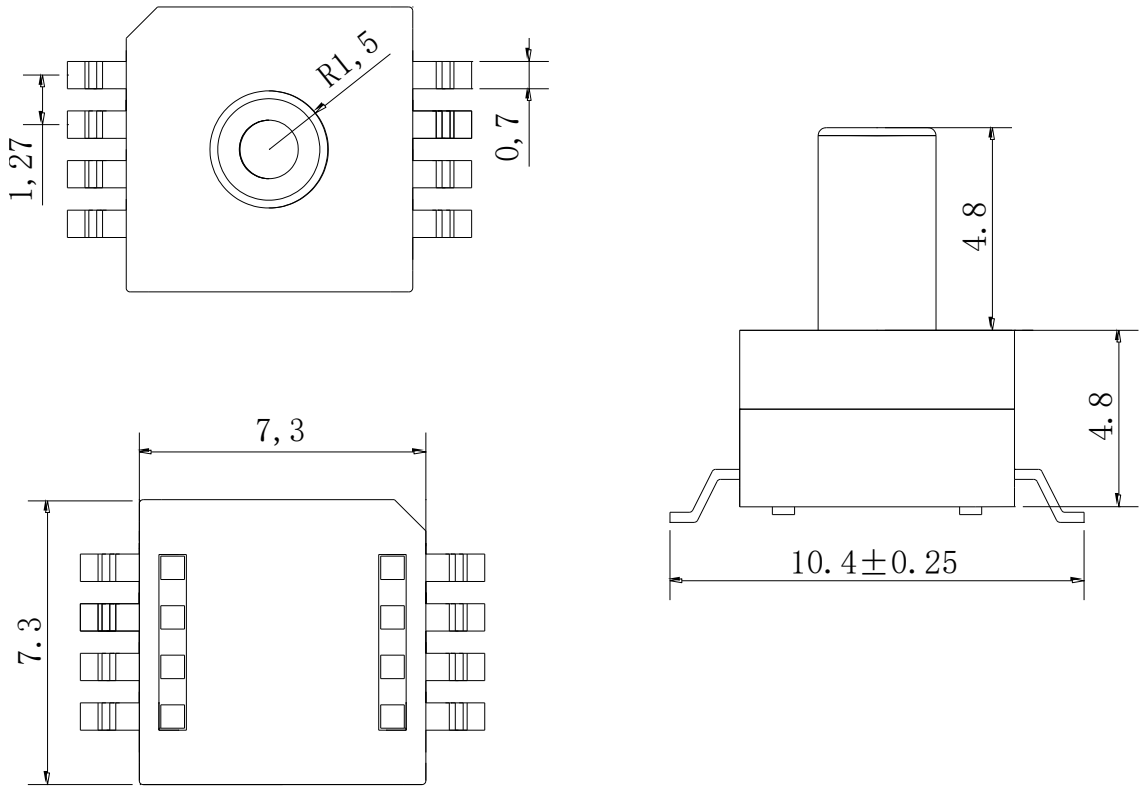

Figure 5.Package size drawing (without air nozzle)

SELECTION

Series	Range selection	Pressure type	Output signal	-	Form of encapsulation
BLWP	6XXX：0~1700kpa	A：Absolute	D:I²C digital output		A: No air nozzle; B: With air nozzle; AE: No air nozzle, EOC; BE: With air nozzle, EOC

FOR EXAMPLE： BLWP6130AD-A

The series is BLWP, range is 0～130kPa, pressure type is absolute pressure, output signal is I²C digital output encapsulation form is no air nozzle

DISCLAIMER

⚠ Warning

LIFE OR PROPERTY RISK

- Please ensure that this product has been designed as part of whole system and already considered related risks, make sure the product has the correct ratings and is designed based on the entire system. It must not be used when applications related to serious life or property damage risks.

Failure to follow this instruction can result in death or serious injury.

⚠ Warning

PERSONAL INJURY

- DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

Failure to follow this instruction can result in death or serious injury.

⚠ Warning

MISUSE OF DOCUMENTATION

- The information presented in this product sheet is for reference only. Do not use this document as a product installation guide.
- Complete installation, operation, and maintenance information is provided in the instructions supplied with each product.

Failure to follow this instruction can result in death or serious injury.

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