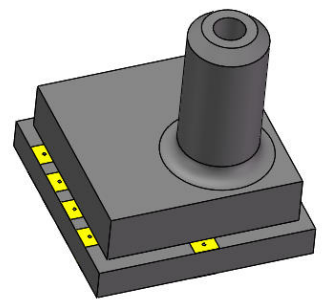




**BANNING**  
PRESSURE SENSOR  
BLWP5xxxXD-Q4



**BANNING**

## DESCRIPTION

BLWP5xxxXD-Q4 is a new integrated high precision pressure sensor with high reliability and good consistency. The sensitive pressure core adopts high performance MEMS pressure sensitive chip as the measuring element. Conditioning circuit adopts high-precision integrated special chip, internal integrated noise reduction and other modules, to achieve strong anti-interference sensor performance; Internal integration of high precision temperature sensor, using a unique algorithm to achieve sensor temperature compensation.

## CHARACTERISTICS

- Range: -40~0kPa, -20~0kPa, 0~20kPa, 0~40kPa, -40~40kPa, -20~20kPa, etc. (gauge pressure)
- High accuracy
- Integrated pressure sensor
- High stability
- Good consistency

## PREFORMANCE

Parameter	Minimum	Typical	Maximum	Unit	Note
Burst pressure	-	2	3	times	
Supply voltage	1.8	3.3	3.6	V	
Working current		1		mA	
Dormant current		20		nA	
ADC		24		bit	
Accuracy <sup>(1)</sup>		± 0.5		%FS	
Operating temperature	-20		60		
Storage temperature	-40		85		
Response time		5	30	ms	

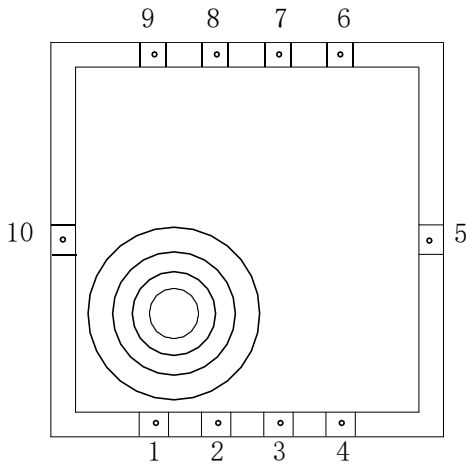
Unless otherwise specified, all values in this table are tested at 3.3Vdc voltage and 25 °C temperature

- (1) Output accuracy under clean gas test conditions within the operating temperature range ;

## APPLICATION

- Industrial control
- Medical monitoring
- Household appliances
- Fitness equipment
- Automotive Applications

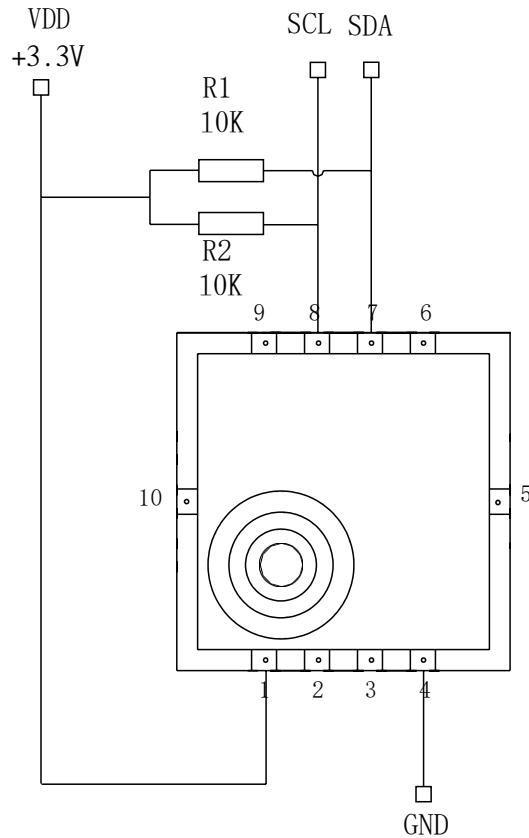
## PIN DEFINITION



Pin Definition (face view)

Pin number	Pin definition	Instructions
1	VDD	power supply+
4	GND	ground
7	SDA	Output
8	SCL	clock
9	EOC	Interrupt
2,3,5,6,10	NC	-

## CIRCUIT



Points to note :

- (1) The four signal terminals (VDD/GND/SDA/SCL) must be powered on and powered off at the same time. Avoid incomplete data transmission that may cause the sensor to enter the BUSY state. If the sensor is BUSY, it does not process any new commands and the product output is abnormal.
- (2) If the filtering capacitor C1 is considered between VDD and GND, the capacitor value is less than or equal to 100nf.
- (3) Within 30ms after the sensor is powered off, MCU prohibits data communication with the sensor.

# I<sup>2</sup>C INTERFACE

BLWP5xxxXD-Q4 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 BLWP5xxxXD-Q4 is shown in Table 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)

# I<sup>2</sup>C COMMUNICATION

Parameter	Symbol	Condition	Minimum	Typical	Maximum	Unit
Frequency of clock	Fscl	Pull-up=10k	0		400	KHz
The bus idle time before a new send starts	tBUF		1.5			μs
Initial signal holding time	tHD.STA		0.6			μs
Initial signal establishment time	tSU.STA		0.6			μs
Stop signal establishment time	tSU.STO		0.6			μs
Data entry hold time	tHD.DAT		100			ns
Data entry setup time	tSU.DAT		100			ns
Clock low level period	tLOW		1.5			ns
Clock high level cycle	tHIGH		0.6			ns
SDA and SCL rise time	tR		30		500	ns
SDA and SCL descent time	tF		30		500	ns

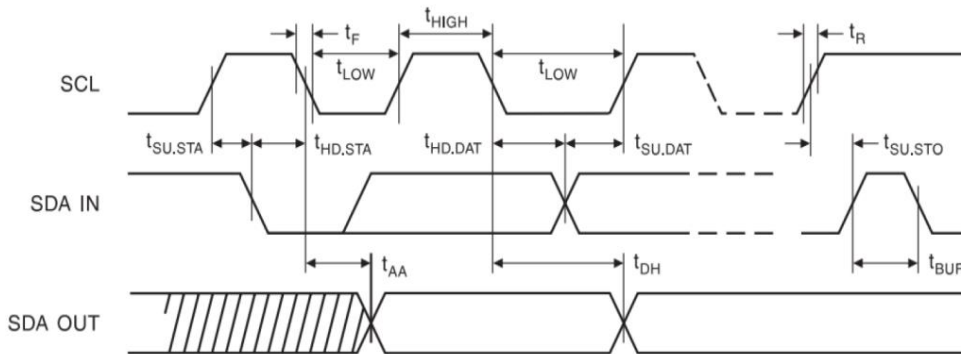


Figure 1. I<sup>2</sup>C communication sequence diagram

## I<sup>2</sup>C Read and write sequence

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 I<sup>2</sup>C 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, (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.

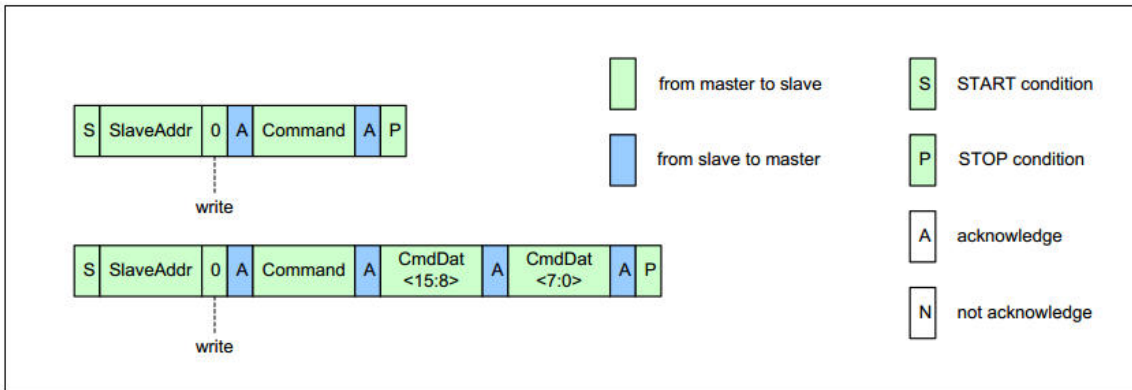


Figure 2. I<sup>2</sup>C command request

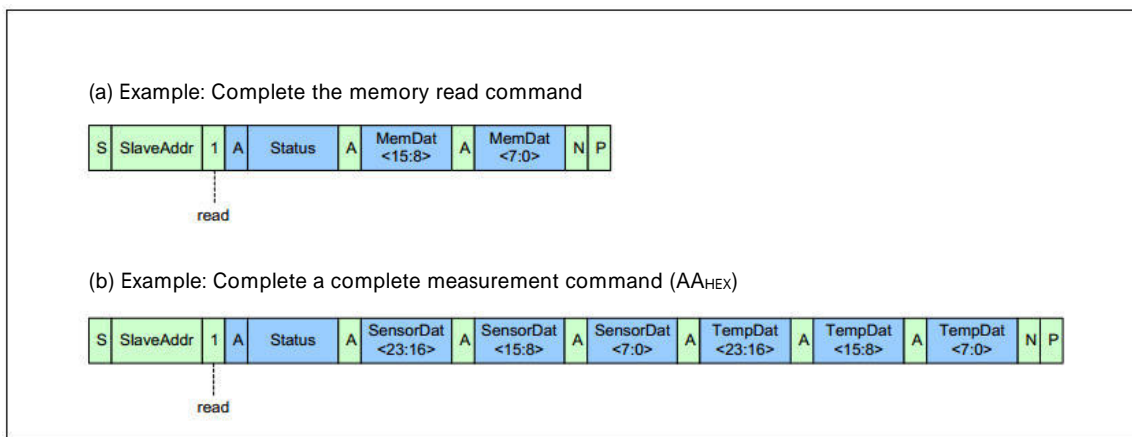


Figure 3. I<sup>2</sup>C reads data

## 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:

$$P(\text{pa}) = \left( \frac{P_{\text{MAX}} - P_{\text{MIN}}}{2^{14}} \right) * P1 + P_{\text{MIN}}$$

- P -- product pressure output value, unit pa;
- P1 -- IIC data of the pressure at the pressure point;
- Pmax -- the upper pressure limit of the product, unit pa;
- Pmin -- Lower pressure limit of the product, unit pa;

Name	Bit	Describe
Pressure	[23:10] pressure	Pressure detection (read only)
	[09:00] reserve	Reserved, always 0 (read only)

Table 1. describes the pressure registers

Type	PMIN( pa )	PMAX( pa )
BLWP5010GD-Q4	-1000	+1500
BLWP5010GD-N-Q4	-11000	+1500
BLWP5010DD-Q4	-11000	+2600
BLWP5020GD-Q4	-1000	+2600
BLWP5020GD-N-Q4	-21000	+6000
BLWP5020DD-Q4	-21000	+6000
BLWP5040GD-Q4	-1000	+10500
BLWP5040GD-N-Q4	-41000	+10500
BLWP5040DD-Q4	-41000	+20500
BLWP5100GD-Q4	-10000	+20500
BLWP5100GD-N-Q4	-110000	+41000
BLWP5100DD-Q4	-110000	+41000

Table 2. Product model and parameter mapping table

## TEMPERATURE REGISTER

The temperature is calculated by the following formula :

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

- T -- product temperature output value, unit ;
- T1 -- IIC data of the temperature at this temperature point;

Name	Bit	Describe
Temperature	[23:08] temperature	temperature detection (read only)
	[07:00] reserve	temperature, always 0 (read only)

Table 3. Description of the temperature register

## BLWP5xxxXD-Q4 chip read and write operations

### ( 1 ) Configuration register

- Start I<sup>2</sup>C;
- 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<sup>2</sup>C communication, delay ( 30), chip acquisition conversion data.

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

- Start I<sup>2</sup>C;
- 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 I<sup>2</sup>C communication.
- Save and process data.

## DIMENSIONS ( mm )

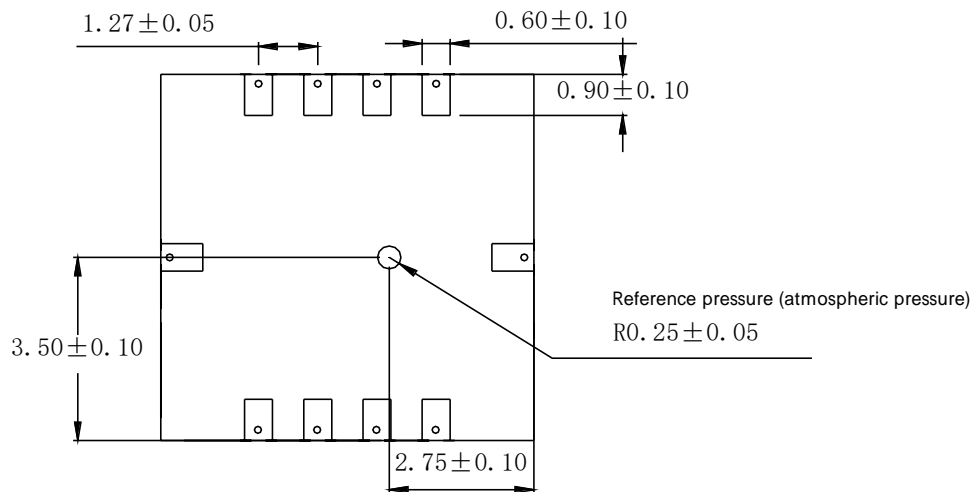


Figure 4 Bottom view

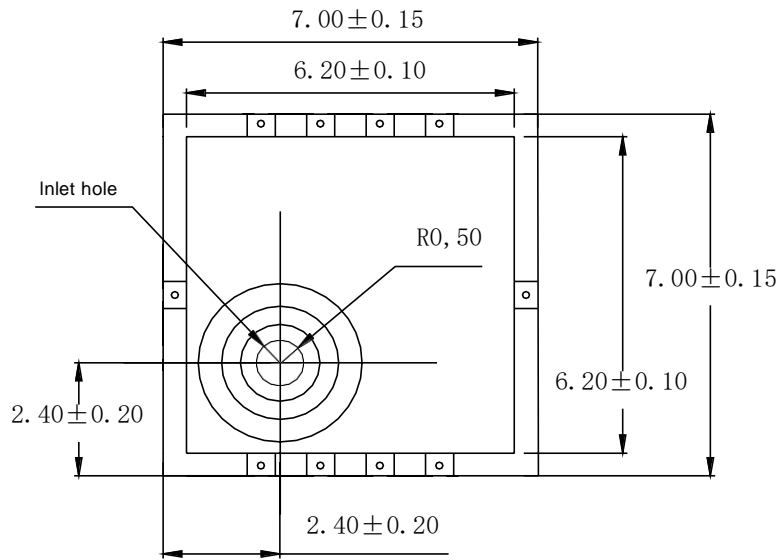


Figure 5 Top view

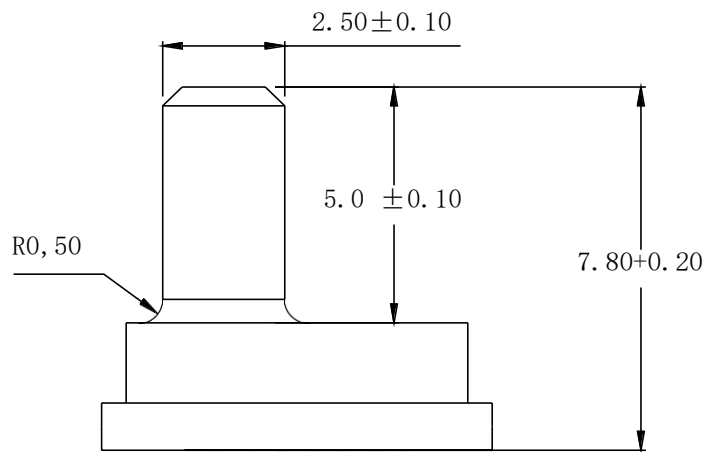


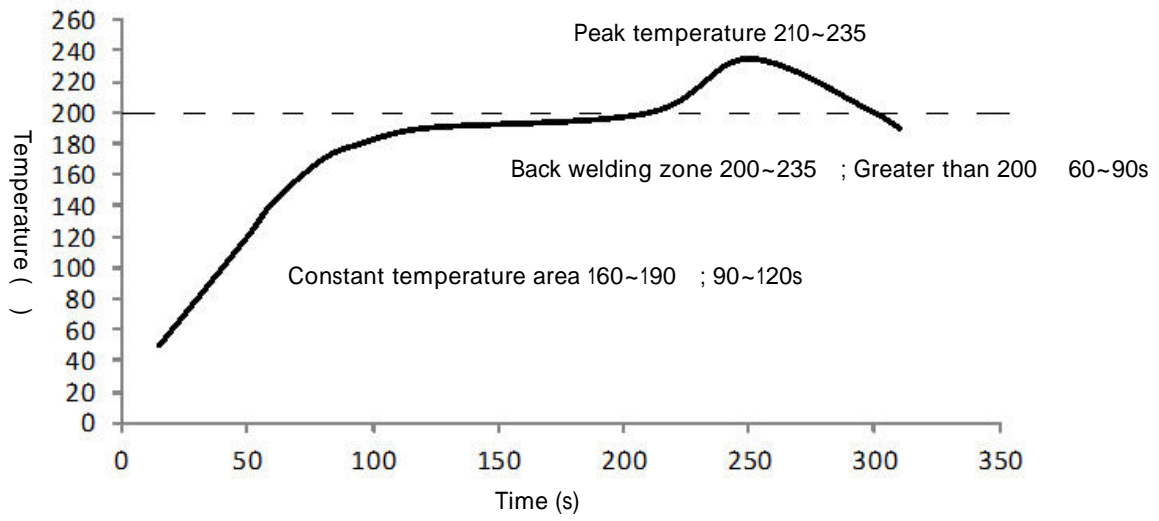
Figure 6 Side view



# PRECAUTIONS FOR USE

## Requirements for reflow welding

The maximum welding temperature of BLWLP5xxxXD series is not higher than 235 , which can be set by referring to Figure.



## Gas path requirements

It is recommended to use silicone hose as the air inlet pipe for BLWP5xxxXD-Q4 series products.

Rigid PVC pipes are not recommended.

# 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.

## Warranty/Remedy

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