GZP6859D

型压力传感器
Pressure Sensors

数字输出
Digital Output Lead Free Products
无铅产品

Product Specification
产品规格书

Version number: V1.3

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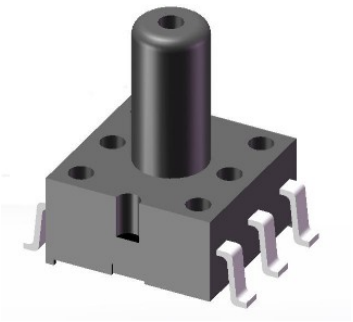
catalogs

文件修订历史

修订 Amendment	描述 Descriptive	日期 Date
V1.0	initial version	2020.12.21
V1.1	Add cover, table of contents	2021.11.05
V1.2	Add pin customization options	2022.03.11
V1.3	Adjustment of product categorization	2022.03.16

1.产品特点
Features

- Measuring range -100kPa...0～5kPa...200kPa
- piezometric
- SOP6 package
- Suitable for non-corrosive gases
- Supply Voltage: 2.5V to 5.5V
- IIC Communications



2.应用领域
Areas

- Electronic blood pressure monitor, respirator, oxygen concentrator, monitor, nebulizer and other medical fields
- Negative pressure measurement, pressure instrumentation, pneumatic components, etc.
- Massager, massage chair, air mattress bed and other sports and fitness equipment field
- Vacuum packaging machines, vacuum mixers, vacuum breakers, vacuum preservation boxes, vacuum pumps and other vacuum negative pressure areas
- In the field of home appliances such as washing machines, beer makers, coffee makers, vacuum cleaners, water purifiers, water heaters, etc.

3.概述
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The GZP6859D type pressure sensor is in SOP6 package form with an internal integrated high precision ADC chip, which digitally compensates for the offset, sensitivity, temperature drift and non-linearity of the sensor chip output, and produces a calibrated, temperature-compensated, standardized digital signal using the supply voltage as a reference.

Model GZP6859D pressure sensor is small in size and easy for customers to install. The products are widely used in medical electronics, automotive electronics, sports and fitness equipment and other fields.

4.性能指标
e indicators

Power supply: (5±0.25)V DC

Reference temperature: 25℃

Table 1.

sports event	numerical value	unit (of measure)
Precision*	±1	%Span
response time	2.5ms@OSR_P=1024X	ms
SDA/SCL pull-up resistor	4.7	K ohm
ESD HBM	4000	V
zero-point temperature drift	±0.03	%FS/°C
Full Range Temperature Drift	±0.03	%FS/°C
overload pressure	4× (range ≤60kPa)	Rated
	2.5 x (range > 60 kPa)	
destructive pressure	5× (range ≤60kPa)	
	3 x (range > 60 kPa)	
Compensation temperature	0 to 60 (customizable)	°C
operating temperature	-20 to 100	°C
storage temperature	-30 to 150	°C

* Accuracy is the output error in the range of 0 to 70°C, which consists of the linearity, repeatability, and hysteresis of the pressure, and its accuracy varies with different pressure ranges, so please consult customer service for more details.

5.电气特性
Electrical Characteristics

Table 2. Electrical Characteristics parameters

参数	minimum value 最小值	typical value 典型值	maximum values 最大值	unit (of measure) 单位	note 备注
Supply Voltage	2.5		5.5	V	
Standby Current		100		nA	
current consumption		5		uA	primary measurement
LDO Output	1.62	1.8	1.98	V	3.3V supply
	3.24	3.6	3.96	V	5V supply
PSRR		60		dB	
Output data resolution	24			Bits	LSB=(1/2^23)*VEXT
Built-in temperature sensor accuracy			±0.5	°C	@25°C
			±1	°C	-40 to °C
Temperature resolution	16			Bit	LSB= (1/256°C
Clock pulse frequency			400	KHz	I2C communication

6.外形结构 6. Outline structure (in millimeters)

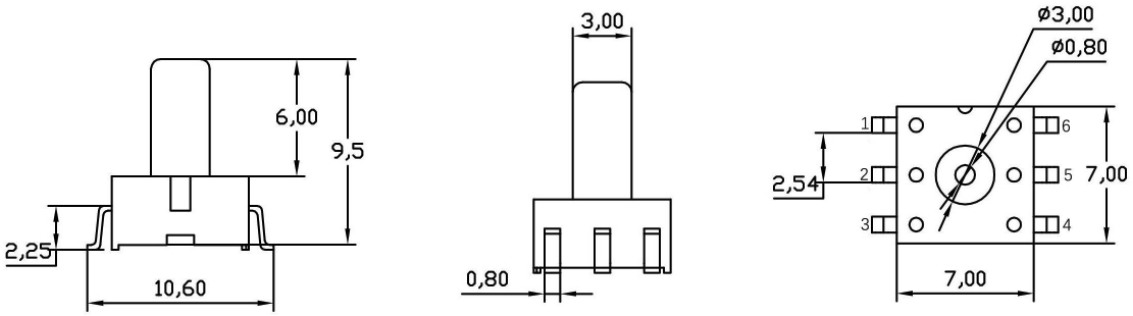


Figure 1.

7.电气连接 7. Electrical connections

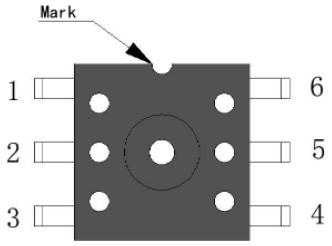


Table 3.

1	2	3	4	5	6
NC	VDD	NC	SDA	SCL	GND

注意 Attention:

1. Check electrical definitions before assembly
2. Do not make any electrical connections to the NC pin, as this may cause the product to malfunction.
3. Good protection against static electricity during the welding process
4. Overload voltage (6.5Vdc) may burn circuit chips
5. Add a 0.1uf capacitor between VDD and GND.
6. This product does not have reverse connection protection, please pay attention to the power polarity when assembly

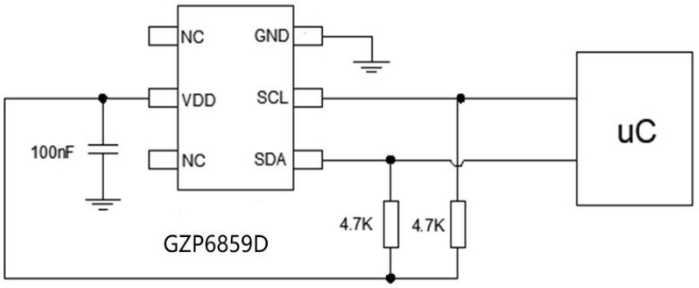


Figure 2.

8.I²C 通讯协议 communication protocol

The I²C bus uses SCL and SDA as signal lines, both of which are connected to VDD via pull-up resistors (4.7K typical), and both of which are held high when not communicating.The I²C device address is 0x6D.

■ Electrical Characteristics of I(2)C Communication Pins Table 4.

indicate	parameters	conditional	minimum value	maximum values	unit (of measure)
fscl	clock frequency			400	KHz
tLOW	Clock Low Pulse Hold Time		1.3		us
tHIGH	Clock High Pulse Hold Time		0.6		us
tSUDAT	SDA build-up time		0.1		us
tHDDAT	SDA Hold Time		0.0		us
tSUSTA	Build-up time at each start		0.6		us
tHDSTA	Start condition hold time		0.6		us
tSUSTO	Stop condition establishment time		0.6		us
tBUF	Time between communications		1.3		us

■ I²C Timing Diagram

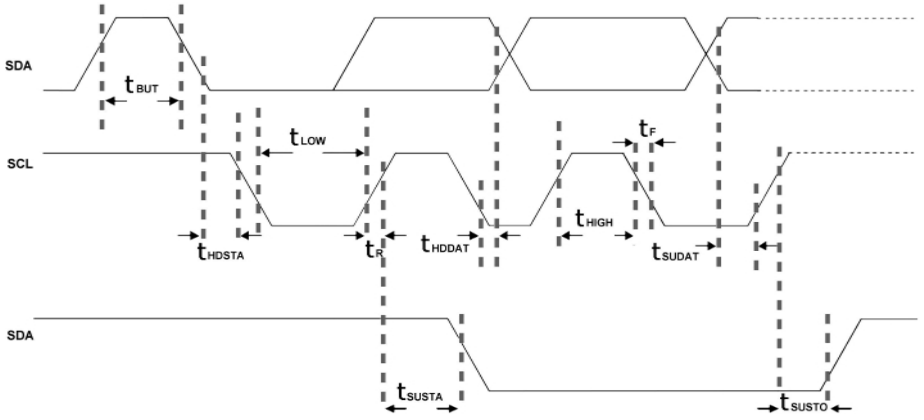


Figure 3. I²C Timing Chart

The I²C communication protocol has special start (S) and stop (P) conditions. When SCL goes high, the falling edge of SDA signals the start of the data transfer. the I²C master device sends the slave device's address (7 bits) and the read/write control bits in turn. When the slave device recognizes the address, it generates an answer signal and pulls SDA low on the ninth cycle. After receiving the slave device's answer, the master device continues to send the 8-bit register address and continues to send or read data after receiving the answer. SCL goes high and a rising edge action occurs in SDA to mark the end of communication I²C. In addition to the start and end flags, a rising edge action occurs when the master device sends the slave device's address (7 bits) and read/write control bits in turn. In addition to the start and end flags, the data transmitted by the SDA must remain stable when SCL is high. When SCL is low, the value transmitted by SDA can be changed.All data transmission in I²C communication is in 8-bit base unit, and an answer signal is required after every 8-bit data transmission to keep the transmission going.

■ I²C Protocol

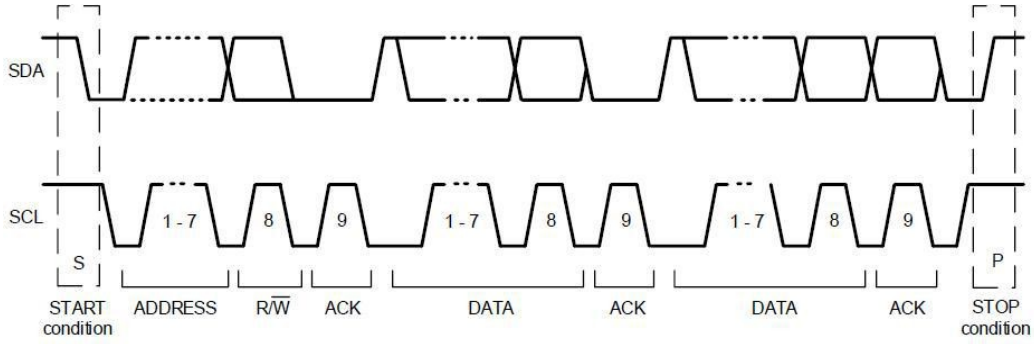


Figure 4.

9.寄存器描述

Description

Table 5. Register Descriptions

地址	描述	R/W	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0	默认值
0x06	DATA_MSB	R	Data out<23:16>								0x00
0x07	DATA_CSB	R	Data out<15:8>								0x00
0x08	DATA_LSB	R	Data out<7:0>								0x00
0x09	TEMP_MSB	R	Temp out<15:8>								0x00
0x0A	TEMP_LSB	R	Temp out<7:0>								0x00
0x30	CMD	RW	Sleep_time<7:4>				SCO	Measurement_ctrl<2:0>			0x00
0xA5	Sys_config	RW	Aout_config<7:4>				LDO_config	Unipolar	Data_out_control	Diag_on	OTP
0xA6	P_config	RW		Input Swap	Gain_P<5:3>			OSR_P<2:0>			OTP

Reg0x06-Reg0x08 Pressure Data Register

Reg0x09-Reg0x0A Temperature Data Register

Reg0x30 (测量命令寄存器) (Measurement command register)

Measurement_control<2:0>(working mode)

000,Single temperature acquisition mode.

001, Single Transducer Pressure Signal Acquisition Mode. (Temperature readings are required prior to using this mode to obtain temperature calibration coefficients, otherwise readings will not be accurate)

010,Combined acquisition mode (one temperature acquisition followed immediately by one sensor pressure signal acquisition).

011,Sleep mode (periodic execution of a combination of acquisition modes at intervals determined by 'sleep_time')

Sleep_time<7:4>: 0001:62.5ms, 0010:125ms ... 1111: 1s, 0000: meaningless.

(valid only in sleep mode of operation)

Sco: data acquisition completion flag bit. 1, start data acquisition; 0, end of acquisition (except sleep operation mode).

Reg0xA5

Aout_config<7:4>: analog output configuration (recommended to keep the default configuration) LDO_config: internal LDO configuration. 0, configured to 1.8V; 1, configured to 3.6V

Unipolar: 0, ADC raw data is output in signed number format; 1: ADC raw data is output in unsigned format. (valid only if 'Data_out_control'=1)

Data_out_control: 0, output calibration data; 1, output ADC raw data (default configuration is 0) Diag_on: 0, turn off diagnostic function; 1, turn on diagnostic function (default on)

Reg0xA6

Input Swap: Swaps the polarity of differential signals within the sensor.

Gain_P<5:3>: PGA gain when acquiring sensor signals, 000: Gain=1X. 001: Gain=2X. 010: Gain=4X. 011: Gain=8X. 100: Gain=16X. 101: Gain=32X. 110: Gain=64X. 111: Gain=128X.

OSR_P<2:0>: Oversampling when acquiring sensor signals, 000:1024X, 001:2048X, 010:4096X, 011:8192X,100:256X, 101:512X, 110:16384X, 111:32768X.

10.工作模式说明:

working modes:

10.1.组合数据采集模式

Combined Data Acquisition Mode

Set 'measurement_control'=010 and 'sco'=1 to enter combined data acquisition mode.

After the chip is powered on, one temperature data acquisition and one sensor data acquisition will be performed successively, and when finished, it will return to standby mode and automatically set 'sco' to 0. In the combined acquisition mode, 'Data_out_control' register must be set to 0, and the calibrated temperature data will be stored in 0x09~0x0A register and the pressure data will be stored in 0x06~0x08 register. In the combined acquisition mode, the "Data_out_control" register must be set to 0. The calibrated temperature data is stored in the 0x09~0x0A registers and the pressure data is stored in the 0x06~0x08 registers.

10.2.休眠数据采集模式

Sleep Data Acquisition Mode

Set 'measurement_control'=011 and 'sco'=1 to enter sleep data acquisition mode. After the chip is powered on, one temperature data acquisition and one sensor data acquisition will be performed at certain time intervals set by 'sleep_time', ranging from 62.5ms to 1s. The acquisition will not stop unless 'sco' is set to 0 manually. The acquisition will not stop unless 'sco' is manually set to 0. In sleep data acquisition mode 'Data_out_control' must be set to 0. The calibrated temperature data is stored in 0x09~0x0A registers and the pressure data is stored in 0x06~0x08 registers.

■ Combined mode read data operates in the following command sequence:

1) Send command 0x0A to register 0x30 for one temperature acquisition and one pressure data acquisition.

2) Read 0x30 register address, if Sco bit is 0, it means acquisition is finished, and you can read data. Or wait for 10ms delay.

3) Read the address data of registers 0x06, 0x07 and 0x08 to form a 24-bit AD value (pressure data AD value), and read the address data of registers 0x09 and 0x0A to form a 16-bit AD value (temperature data AD value).

4) Convert to actual pressure and temperature values according to the following formula:

· The highest bit is "0" for positive pressure/temperature:

Pressure= Pressure_ADC/k; Temperature= Temp._ADC/256;

· The highest bit is "1" for negative pressure/temperature:

Pressure= (Pressure_ADC-16777216)/k; Temperature= (Temp._ADC-65536)/256;

Notes:

1) The calibrated output of the sensor can be considered as the current actual pressure value (±1%Span)

2) Sensor calibrated output: unit Pa (default), to display other units, enter the appropriate coefficients in the conversion formula for conversion;

3) For the selection of the k value in the above pressure ADC conversion formula, refer to the following table:

Table 6. Maximum measurement point P versus value of coefficient k

Maximum measuring point P value range	k-value
131<P≤262	32
65<P≤131	64
32<P≤65	128
16＜P≤32	256
8＜P≤16	512
4≤P≤8	1024
2≤P＜4	2048
1≤P<2	4096
P＜1	8192

P takes the maximum value (absolute value) of the measurement point, for example, measuring -20~40kpa, P takes 40, because 32＜40≤65, so the k value is 128; another example, measuring range -100~50kpa, P takes 100, because 65＜P≤131, so the k value is 64.

11.选型指南
Selection Guide

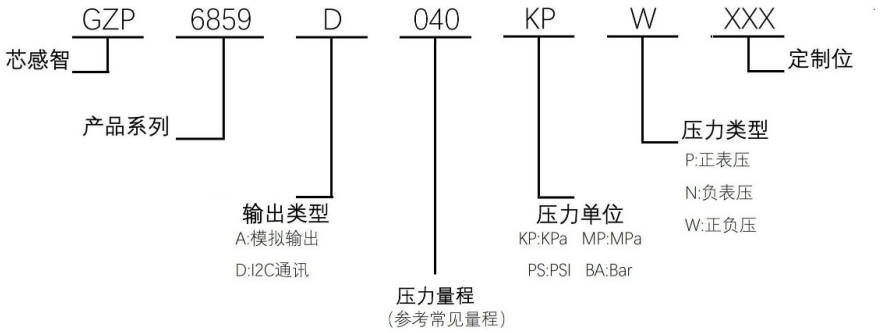


Figure 5. Selection Guide

12.常用量程
Common range

Table 7.

压力量程（kPa）Pressure range (kPa)	型号 model number
0～5	GZP6859D005KPP
0～10	GZP6859D010KPP
0～20	GZP6859D020KPP
0～40	GZP6859D040KPP
0～100	GZP6859D101KPP
0～200	GZP6859D201KPP
-100～0	GZP6859D101KPN
-40～0	GZP6859D040KPN
-2.5～2.5	GZP6859D2.5KPW
-10～10	GZP6859D010KPW
-100～100	GZP6859D101KPW
-100～200	GZP6859D201KPW
For more customized ranges and parameters, please consult our customer service or agents.	

13.选型提示
Tips

1. When selecting a model, please note that the measured medium should be compatible with the part of the product that comes into contact with the medium.
2. If you have special requirements for the performance parameters and functions of the products, please contact us.

14 使用注意事项 use

14.1 焊接 Welded

Since this product is a small structure with low heat capacity, please minimize the influence of heat from outside. Otherwise, the product may be damaged due to thermal deformation, causing a change in characteristics. Please use non-corrosive rosin type flux. Please be careful not to allow flux to penetrate into the product as it is exposed to the elements.

1) hand solder

· Use a soldering iron with a head temperature of 260～ 300 °C (30 W) and work within 5 seconds.

· Please note that the output may change when a load is applied to the terminals for soldering.

· Keep the tip of the soldering iron clean.

2) DIP soldering (DIP terminal type)

· Work is performed within 5 seconds in a DIP solder bath at a temperature of 260°C or less.

· Avoid DIP soldering because thermal deformation may occur when mounting on a substrate with a small thermal capacity.

3) Reflow soldering (SMD terminal type)

The recommended temperature settings for the reflow oven are as follows

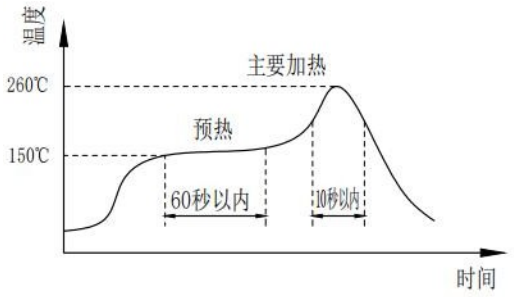


Figure 6. Reflow Soldering

· Refer to the printed circuit board recommended specification drawing for printed circuit board alignment.

· Since self-calibration is not possible, carefully align the terminals with the alignment.

· The set temperature is the value measured on the printed circuit board near the terminal.

· Since the pressure port end may dissolve and deform at high temperatures due to equipment and conditions, be sure to check the test under actual mounting conditions.

4) Correction of welding section

· Please complete the amendment in one go.

· When correcting overlap soldering, use a soldering iron with a smooth head shape and do not apply additional flux.

· Regarding the temperature of the head of the soldering iron, use a soldering iron that is below the temperature specified in the specifications.

5) Excessive force applied to the terminals may cause deformation and damage solderability, so avoid dropping the product or using it in a complicated manner.

6) The warpage of the printed board should be kept below 0.05mm with respect to the whole sensor, and this should be managed.

7) When cutting and bending the substrate after mounting the sensor, be careful not to cause stress on the welded part.

8) Since the terminals of the sensor are exposed, touching the terminals with a metal plate or the like may cause an output abnormality. Be careful not to touch the terminals with a metal plate or your hand.

9) After soldering, when applying coating to prevent deterioration of the insulation of the substrate, be careful not to attach chemicals to the sensor.

14.2. 清洗要求 Cleaning requirements

1) Since the product is an open type, please be careful not to allow cleaning solution to penetrate the interior.

2) Avoid using ultrasonic waves for cleaning as they may cause product malfunction.

14.3. 存储和运输 Storage and transportation

1) This product has a non-drip-proof construction, so do not use it in places where water may be splashed.

2) Do not use in an environment that generates condensation. In addition, freezing of moisture attached to the sensor chip may cause changes or damage to the sensor output.

3) When the chip of the pressure sensor is exposed to light in its structure, the output may change. In particular, when applying pressure through a transparent cover or the like, avoid exposing the sensor chip to light.

4) Pressure sensors in normal packaging can be shipped by common conveyor. Please note: The product is protected from moisture, shock, sunburn and pressure during transportation.

14.4. 其他使用注意事项 Other Use

1) Please be aware that accidents can occur if the installation method is incorrect.

2) Do not use the product in a way that applies high-frequency vibration such as ultrasonic waves.

3) The only pressure medium that can be used directly is air. Other media, especially corrosive gases (organic solvent gases, sulfurous acid gases, hydrogen sulfide gases, etc.), and foreign materials may cause malfunctions and breakage, so avoid use in such environments.

4) There is a pressure sensor chip inside the pressure inlet. If a foreign object such as a needle is inserted into the pressure inlet, the chip may be damaged and the inlet may become clogged, so avoid doing so. Also, avoid blocking the atmospheric inlet during use. 5) Use within the rated pressure range. Use outside the rated pressure range may cause damage.

6) Please be careful when using this product as it may be damaged by static electricity:
Please ground the table with energized objects, and the operator to allow for a safe discharge of static electricity in the surrounding area.

7） Depending on the pressure used, please pay due attention to the fixing and casing of the product, the fixing and selection of the introduction tube. Also.

If you have any questions, please do not hesitate to contact us.

■ Please check under actual use.

Since these specifications are for a single product, please check the actual state of use for reliability.

Performance and quality.

15 包装信息 Packaging information

Tube Information (in millimeters) Quantity per tube:70 PCS

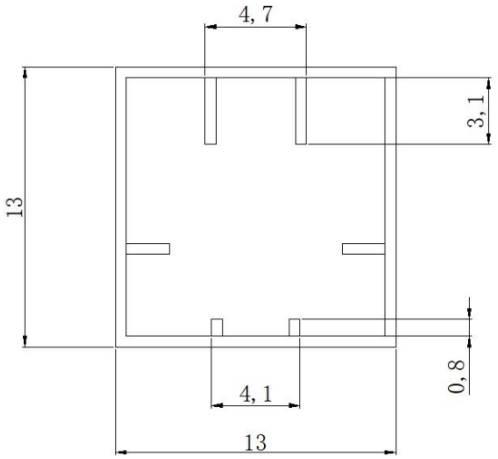
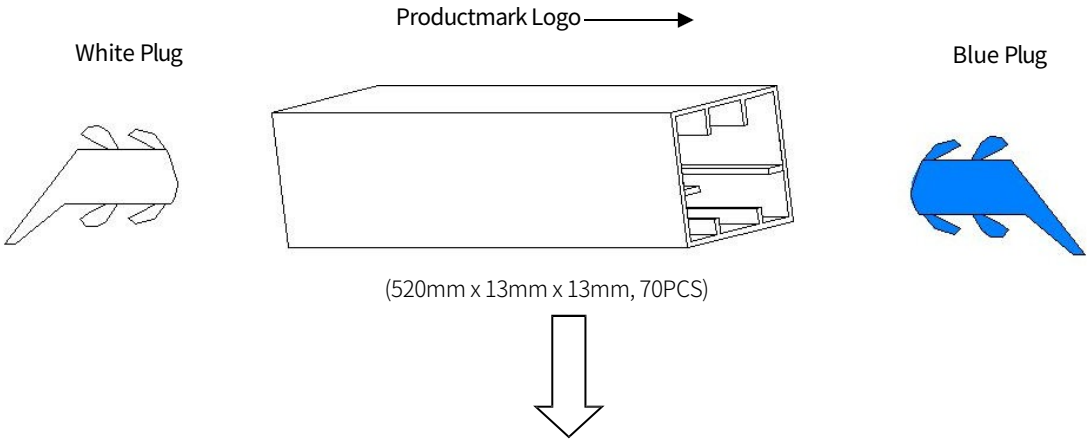


Figure 7. Schematic cross-section of feed tube



(520mm x 13mm x 13mm, 70PCS)

(Carton: 530mm x 145mm x 53mm, 2800PCS)

Figure 8.

安全注意事项

Precautions

This product is made from semiconductor parts used in general electronic equipment (communication equipment, measuring equipment, and machine tools, etc.). Products using these semiconductor parts may malfunction or fail due to external interference or surges, so please check performance and quality under actual use. As a precautionary measure, please design the device in a safe manner (installation of protective circuits such as fuses, circuit breakers, etc., and multiplication of devices, etc.) so that any malfunction will not harm life, body, or property. In order to prevent injuries and accidents, please observe the following precautions:

-Drive current and voltage should be used below the rated values.

-Wiring should be done in accordance with the electrical definitions. In particular, please note that reversing the power supply connection may cause accidents due to heat, smoke, fire, and other circuit damage.

-Use caution when securing the product and connecting the pressure inlet.

IIC Example Code（附件：IIC 代码案例）

IIC Example Code (Annex: IIC Code Cases)

```
#include <reg52.h> #include
<math.h> #define DELAY_TIME
600
#define TRUE 1
#define FALSE 0
#define uchar unsigned char #define
uint unsigned int

//---------- define IIC SCL,SDA port ----------

sbit SCL = P1 ^ 7; sbit
SDA= P1^ 6.

//---------- define Max7219 port ----------

sbit  Max7219_pinCLK=  P2^  2;  sbit
Max7219_pinCS=  P2^  1;  sbit
Max7219_pinDIN= P2^ 0;

//---------- delay time_us ----------
void DELAY(uint t)
{
        while (t ! = 0)
            t--;
}

//---------- IIC START CONDITION ----------
void I2C_Start(void)
{
      SDA= 1;                          //SDA output high
      DELAY(DELAY_TIME); SCL =
      1.
      DELAY(DELAY_TIME).               //SCL output high
      SDA = 0; //SDA = 0; DELAY(DELAY_TIME).
      DELAY(DELAY_TIME); SCL =
      0; DELAY(DELAY_TIME).
}

//---------- IIC STOP CONDITION ----------
void I2C_Stop(void)
```

```
{
        SDA = 0; //SDA OUTPUT LOW DELAY(DELAY_TIME);
                                                //SDA OUTPUT LOW
        DELAY(DELAY_TIME).
        SCL = 1;
        DELAY(DELAY_TIME); SDA =
        1; DELAY(DELAY_TIME).
        SCL = 0; //SCL OUTPUT LOW DELAY(DELAY_TIME);
                                                //SCL OUTPUT LOW
        DELAY(DELAY_TIME).
}

//---------------------- IIC SEND DATA "0" ----------------------------------------------------------
void SEND_0(void)
{
        SDA= 0.
        DELAY(DELAY_TIME); SCL =
        1; DELAY(DELAY_TIME); SCL
        = 0; DELAY(DELAY_TIME).
}

//---------------------- IIC SEND DATA "1" ----------------------------------------------------------
void SEND_1(void)
{

        SDA = 1;
        DELAY(DELAY_TIME); SCL =
        1; DELAY(DELAY_TIME); SCL
        = 0; DELAY(DELAY_TIME).
}

//---------------------- Check SLAVE's Acknowledge bit ----------------------------------------------
Check_Acknowledge(void)
{

        SDA = 1;
        DELAY(DELAY_TIME); SCL =
        1;
        DELAY(DELAY_TIME / 2); F0 =
        SDA.
```

```
    DELAY(DELAY_TIME / 2).
    SCL = 0;
    DELAY(DELAY_TIME); if (F0
    == 1)
        return FALSE; return
    TRUE;
}

// ---------- Write One Byte of Data void ----------
WriteI2CByte(uchar b) reentrant
{

    char i;
    for (i= 0; i< 8; i++)
        if ((b<< i) & 0x80)
            SEND_1();
        else
            SEND_0();
}

// ---------- Read One Byte of Data ----------
uchar ReadI2CByte(void) reentrant
{

    char b = 0, i;
    for (i= 0; i< 8; i++)
    {
        SDA= 1.
        DELAY(DELAY_TIME); SCL =
        1; DELAY(DELAY_TIME).
        //DELAY(10); F0 =
        SDA.
        DELAY(DELAY_TIME).
        //DELAY(10); SCL =
        0;
        if (F0== 1)
        {
            b= b<< 1;
            b= b| 0x01.
        }
        else
            b= b<< 1;
```

```
    }
    return b;
}

//----------write One Byte of Data,Data from MASTER byte of Data, Data from MASTER the SLAVER
//---------- SLAVER address bit:01101101 ----------
void Write_One_Byte(uchar addr, uchar thedata)          //Write "thedata" to the SLAVER's address of "addr".
{
    bit acktemp= 1;
    I2C_Start();                                        //IIC START
    WriteI2CByte(0xDA); //IIC WRITE operation, SLAVER address bit:01101010   //IIC WRITE operation,SLAVER address bit:01101010
    acktemp = Check_Acknowledge();                      //check the SLAVER
    WriteI2CByte(addr); /*address*/
    acktemp= Check_Acknowledge();
    WriteI2CByte(thedata);          /*thedata*/
    acktemp= Check_Acknowledge();
    I2C_Stop();                                         //IIC STOP
}

//----------Reaed One Byte of Data,Data from SLAVER byte of Data, Data from SLAVER the MASTER
uchar Read_One_Byte(uchar addr)
{
    bit acktemp= 1;
    uchar mydata.

    I2C_Start();
    WriteI2CByte(0xDA).
    acktemp = Check_Acknowledge();
    WriteI2CByte(addr).
    acktemp = Check_Acknowledge();
    I2C_Start().
    WriteI2CByte(0xDB);                                 //IIC READ operation
    acktemp= Check_Acknowledge();
    mydata = ReadI2CByte(); acktemp =
    Check_Acknowledge(); I2C_Stop().
    return mydata;
}
//---------- Delay_ms ----------
```

```
void Delay_xms(uint x)
{
    uint i, j.
    for (i= 0; i< x; i++)
        for (j= 0; j< 112; j++)
            ;
}

//-------------Write One Byte to the Max7219-------------- void
Write_Max7219_byte(uchar DATA)
{
    uchar i.
    Max7219_pinCS = 0; //CS low effect for (i = 8; i >=
    1; i--)                                    //CS low effect for
    (i = 8; i >= 1; i--)
    {
        Max7219_pinCLK= 0;.
        Max7219_pinDIN= DATA & 0x80; DATA =
        DATA << 1;
        Max7219_pinCLK= 1; //when pinCLK is high send the Data.          //when pinCLK is high send the Data
    }
}
//-------------decide which address shows the Data-------------
void Write_Max7219(uchar address,uchar dat)
{
    Max7219_pinCS= 0;.
    Write_Max7219_byte(address);
    Write_Max7219_byte(dat);
    Max7219_pinCS = 1;
}

//-------------MAX_7219 Initialization-------------- void
Init_MAX7219(void)
{
    Write_Max7219(0x09, 0xff).              //Decode mode: BCD code
    Write_Max7219(0x0a, 0x03).               //Brightness
    Write_Max7219(0x0b, 0x07); //Scanning limit: 8 digits display                    //扫描界
    限：8 个数码管显示 Write_Max7219(0x0c, 0x01);                    //Power-down
    mode: 0; Normal mode: 1 Write_Max7219(0x0f, 0x01); //Display test: 1; Test test mode:
    1                                          //Display test: 1; test end, normal display: 0
}


void main(void)
{
```

```
uchar yali1, yali2, yali3,wendu1,wendu2; uchar
temp_a5; uchar temp_a2; uchar temp_a5; uchar
temp_a5
long int ad,temp; long
float pas; uchar dis[8];
Init_MAX7219().
Delay_xms(1000); Write_Max7219(0x0f,
0x00); while (1)
{

    temp_a5 = Read_One_Byte(0xA5);//Read ASIC Sys_config (read system configuration value)
    temp_a5 = temp_a5 & 0xFD; / / (Raw_data_on: 0: output calibrated data, output is
The value after calibration, i.e. the value in the 0x06-0x0a register is the calibrated
    value) Write_One_Byte(0xA5, temp_a5); //Set ADC output calibrated Data
    Write_One_Byte(0x30, 0x0A); //indicate a combined conversion (once temperature conversion
immediately followed by once sensor signal conversion). Write measurement commands in 0x30, 000: single
temperature measurement, 001: single pressure measurement, 010: combined: single pressure and
temperature measurement, 011: sleep mode (performs combined mode measurements at certain time
intervals))
    while ((Read_One_Byte(0x30) & 0x08)> 0);    //Judge whether Data collection is over
Determine whether data collection is finished

// ------------READ ADC output Data of Pressure                    ----------
    yali1= Read_One_Byte(0x06).
    yali2 = Read_One_Byte(0x07); yali3=
    Read_One_Byte(0x08).

    ad = yali1 * 65536 + yali2 * 256 + yali3.

// ------------READ ADC output Data of Temperature                    ----------
    wendu1= Read_One_Byte(0x09);
    wendu2= Read_One_Byte(0x0a); temp=wendu1*256+wendu2;

/*Conversion, the following is the conversion formula of 100kpa*/

        if (ad >  8388608)                  // Exceeding 8388606 is a negative pressure value and needs to be handled in the
    {
        display terminal.

    }
        pas = (ad - 16777216)/64/1000.                  //in kpa
    else
    {

        pas =  ad/64/1000; //in kpa.                    //in kpa
```

```
            }
            if (pas< 0)
                pas= fabs(pas).
/*Display program with Max7219*/
            dis[0] = (long int)pas / 10000000;
            dis[1] = (long int)pas % 10000000 / 1000000; dis[2]= (long
            int)pas % 1000000 / 100000; dis[3]= (long int)pas %
            100000 / 10000; dis[4]= (long int)pas % 10000 / 1000.
            dis[5] = (long int)pas % 1000 / 100; dis[6]= (long
            int)pas % 100 / 10; dis[7]= (long int)pas % 10;
            Write_Max7219(8, dis[0]); Write_Max7219(7,
            dis[1]); Write _Max7219(6, dis[2]);
            Write_Max7219(5, dis[3]); Write_Max7219(4,
            dis[4]); Write_Max7219(3, dis[5]);
            Write_Max7219(2, dis[6]); Write_Max7219(1 ,
            dis[7]).
            Delay_xms(100);                          //delay 100ms
        }
}
```

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