

Southern Tech Sensing Technology Co., Ltd.

TKJW100 Digital Pressure Sensor

Features

- Measuring range:0-100KPaor0-burden100KPa (Gauge pressure form)
- Measuring medium: air, gas, etc.
- A version communication mode: single bus
- B version communication mode: I2C output
- Operating temperature range: -30~+85°C

High cost performance

- Digital output, I/O port can be connected, which can save the user's MCU operational amplifier and AD; Standard
- pressure output, which can save the user pressure calibration and other production processes;
- Temperature compensation calibration has been completed, stable and reliable temperature measurement and compensation algorithm, wide
- temperature range; wide working voltage, 2 or 3 batteries, lithium battery or AC power step-down are all applicable; good after-sales service, full
- technical guidance and assistance;

Application Areas

- Gas filling equipment pressure measurement;
- Pressure measurement of gas tanks, gas cylinders and other containers;
- Pressure measurement of vacuum equipment;
- Negative pressure measurement of gas tanks, air bags, etc.;

Product Overview

TKJW100 series digital pressure sensor is a new high-sensitivity digital output pressure measurement chip. It uses 100KPa gauge pressure MEMS pressure sensor as the

pressure sensitive element and integrates high-precision microprocessor chip and algorithm to amplify, nonlinearly process and compensate the pressure signal in the whole

temperature range before outputting it in digital form.

SOP6 SMD package, the measuring range and output mode within 100KPa can also be customized according to customer requirements;

Specifications

1PSI=6.89KPa 15PSI=103KPa 100KPa=14.5PSI

project	Numeric	unit		
Operating voltage	3-5	V		
Response time	10	Ms		
Maximum pressure	30	Psi		
Working current	≤3	mA		
Sensitivity	0.01	Psi		
Pressure range	0~15	Psi		
Pressure measurement accuracy	0.15	Psi		
Output value	100~1600	number		
Operating temperature	- 30~+85	°C		
Temperature compensation measurement accuracy	1	%FS		





Overall dimensions and pad size (in mm)







焊盘尺寸:





Electrical Connections





VDD (3.0V-5V power supply, it is recommended that the power supply be controlled by the MCU's IO port)

GND (ground)

SCL, SDA (used for I2C communication, connected to the I2C communication pin of the master

MCU) SO (used for single-line communication, left floating in I2C mode)

Pin Number	1	2	3	4	5	6
Pin Definition	VDDA	VDD	SO	GND	SDA	SCL

Selection Guide

TI	K	Digital piezoresistive pressure sensor					
		serial num	nber	Package			
		JW	1	SOP6			
	Range code			Range			
				010	0Kpa~10Kpa		
				040	0Kpa~40Kp	а	
				100	100 0Kpa~100Kpa		
				200	- 100Kpa~100Kpa		
			1		serial number Output method		
					A1 Single bus		s
					B1	IIC	
					C1	Serial Port	
TI	K	JW	1	010	A1	Full model	specifications

For technical parameters or questions, please contact us

If the user has special requirements for the performance parameters, functions, and styles of the sensor, please contact our company for negotiation;

I2C digital output communication rules

The MCU powers the sensor and then reads the sensor data via I2C. When power saving is required, the sensor can be powered off.

Communication protocol:

Communication method: 1 2C (ADDR[1:7], 1010000B) BIT0: indicates read/write (1 for read, 0 for write)



Logical order of reading data:

The host sends {START}, {device key address (A0H) }, wait for the sensor's ACK (if no ACK, send {STOP}), {Data location site (00H) }, wait for the sensor's ACK (if no ACK, send {STOP}), the host sends {START}, {device key address (A1H)}, wait for the sensor's ACK, the host starts receiving data (3 bytes of data, The first byte is the high pressure, the second byte is the low pressure, and the third byte is the The first two bytes are added together as a check digit. , ACK for each byte of data), and sends {STOP} after receiving the required data.



I²C 接口参数

PARAMETERS	SYMBOL	MIN	TYP	MAX	UNITS
SCLK CLOCK FREQUENCY	fsci	40		200	KHZ
START CONDITION HOLD TIME RELATIVE TO SCL EDGE	LHOSTA	1			uS
MINIMUM SCL CLOCK LOW WIDTH 1	tLow	2			uS
MINIMUM SCL CLOCK HIGH WIDTH 1	thigh	2			uS
START CONDITION SETUP TIME RELATIVE TO SCL EDGE	L SUSTA	1	· · · · · · · · · · · · · · · · · · ·		uS
DATA HOLD TIME ON SDA RELATIVE TO SCL EDGE	THODAT	0			uS
DATA SETUP TIME ON SDA RELATIVE TO SCL EDGE	ISUDAT	1			uS
STOP CONDITION SETUP TIME ON SCL	tsusto	1			uS
BUS FREE TIME BETWEEN STOP AND START CONDITION	teus	200			uS

1 COMBINED LOW AND HIGH WIDTHS MUST EQUAL OR EXCEED MINIMUM SCL PERIOD.

I²C 时钟图



Single bus digital pressure sensor digital output communication rules

Communication:

MCU powers the sensor and then receives sensor data in single bus mode. When power saving is needed, the sensor can be powered off. In normal

communication, MCU can collect sensor data regularly as needed, and it is recommended to collect data every 100ms.

The communication protocol is as follows:

Timing of single-wire interface:



The single-wire interface uses pulse width modulation to encode data. PWM encoding does not require data frame synchronization.



The rate can be changed automatically according to the sender's code rate, allowing the communication code rate to be changed without configuration. Valid data bits always start with a falling edge, with a 75% duty cycle for logic '1' and a 25% duty cycle for logic '0'. The start bit of a data packet is always the "start" bit, with a 50% duty cycle.

Single-line communication data format description:

Normally, the sensor's single bus is in the input pull-up state. When the host initiates communication, it first gives a 0.1mS low pulse, and then the host enters the input pull-up state to wait for the

sensor to send data. After the sensor completes sending the data, it returns to the input pull-up state.

The sensor sends data in the following format:

High pressure (1BYTE) + low pressure (1BYTE) + check code (1BYTE) Check code = (high pressure + low

pressure) If there is an overflow, keep the lower 8 bits of data as the check code. Sensor sends data logic

diagram

+1ms	+2ms	+3ms	+4ms	+5ms	+6ms
START					
	0/5%MR				

Data Description

The transmission interval between two measurement data packets is: 100ms (recommended), which can be set by the user according to actual needs.

Pressure output:

The pressure is 0, the output is 100

The pressure is 15PSI, the output is 1600 (BCD) HEX is 0640, and

the output value corresponds to 0.01PSI

Note: When the pressure is 0, the output may not be 100. Since the sensor may drift to zero due to factors such as the environment and assembly, the MCU needs to save the output pressure value as the zero value when the pressure is 0. When measuring later, the actual pressure value is obtained by subtracting the zero value from the read value. For fan-type micro-pressure sensors, it is recommended that the MCU read and save the sensor zero point first, and then measure the pressure.

Precautions for use

1. Welding

Since this product has a small structure with low heat capacity, please minimize the influence of heat from the outside. Otherwise, it may cause thermal deformation.

Please use non-corrosive rosin type flux. Also, since the product is exposed to the outside, please be careful not to use

The flux penetrates inside.

1) Hand welding

Please use a soldering iron with a head temperature of 260~300°C (30 W) and perform the work within 5 seconds.

• When soldering with a load applied to the terminals, the output may change, so be careful.

Please clean the soldering iron tip thoroughly.

2) DIP soldering (DIP terminal type)

- Perform the work within 5 seconds in a DIP soldering bath at a temperature below 260°C.



When mounting on a substrate with a small heat capacity, thermal deformation may occur, so avoid DIP soldering.

3) Reflow soldering (SMD terminal type)

The recommended reflow oven temperature setting conditions are shown below.



Please refer to the recommended specifications of the printed circuit board for the printed circuit board routing.

Since self-calibration is not possible, please carefully align the terminals and wiring.

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

• Due to the device and conditions, the tip of the pressure inlet may melt and deform due to high temperature. Please make sure to use the pressure inlet under the actual mounting conditions.

Next, perform a confirmation test.

4) Correction of welding parts

Please complete the corrections at one time.

When correcting a lap soldering, use a soldering iron with a smoother head shape and do not apply additional flux.

Regarding the temperature of the soldering iron tip, please use a soldering iron that is below the temperature specified in the specification sheet.

5) Excessive force applied to the terminals may cause deformation and damage solderability, so please avoid dropping the product or performing complicated operations.

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

7) After installing the sensor, when cutting and bending the substrate, be careful not to cause stress on the soldering part.

8) Since the sensor terminals are exposed, any contact with metal sheets or other objects will cause abnormal output.

Hands waiting to touch.

9) After soldering, when coating is applied to prevent insulation degradation of the substrate, be careful not to allow chemicals to adhere to the sensor.

2. Cleaning

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

2) When using ultrasonic cleaning, it may cause product failure, so please avoid using ultrasonic cleaning.

3. Environment

1) Please avoid places where there are corrosive gases (organic solvent gas, sulfurous acid gas, hydrogen sulfide gas, etc.) that have a bad effect on the product.

Use and keep.

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

used in places.

3) Do not use in an environment where condensation occurs. In addition, moisture attached to the sensor chip may freeze and cause the sensor output to change.

Move or destroy.

4) The chip of the pressure sensor is structurally exposed to light, and the output will change. Especially when applying pressure through a transparent cover, please avoid using

The light hits the sensor chip.

5) Please avoid using the product in a manner that applies high-frequency vibrations, such as ultrasonic waves.

Please confirm in actual use

Since this specification is for a single product, please confirm the performance and quality under actual usage conditions in order to improve reliability during actual use.

About other uses

1) Pressure range, if the installation method is wrong, it may cause an accident, so please be careful.

2) The only pressure medium that can be used directly is dry air. Other media, especially corrosive gases (organic solvent gases, sulfurous acid gases)

Use in environments containing liquids, hydrogen sulfide gas, etc.) or moisture or foreign matter may cause malfunction or damage, so avoid using the product in the above environments.

3) There is a pressure sensor chip inside the pressure inlet. If a needle or other foreign object is inserted into the pressure inlet, the chip will be damaged and the inlet will be blocked.

Please avoid the above operation. Also, please avoid blocking the air inlet when using.

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

5) As static electricity may cause damage, please pay attention to the following matters when using.

(1) When storing, use conductive material to short-circuit the terminals, or wrap the entire device with aluminum foil. Plastic containers are easily charged.

Therefore, do not use it when storing it and transporting it.

(2) When in use, please ground charged objects and workers on the table to allow the surrounding static electricity to discharge safely.

6) Please pay full attention to the fixing and selection of the product, sleeve, and introduction tube according to the pressure used. In addition, if you have any questions, please contact us.