

# GZP160

## Pressure Sensor

mV Signal Output

Datasheet

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## Document Revision History

Revision	Description	Date
V1.0	Initial version	2011.06.27
V1.1	Complete product information	2020.10.28
V1.2	Modify product size drawing Modify the order guider	2020.11.06
V1.3	Add cover, table of contents	2021.10.25
V1.4	Add customization function	2021.12.12
V1.5	Corrected pin numbers and pin definitions, equivalent circuit diagram	2022.01.04
V1.6	Update address	2022.08.29
V1.7	Update template	2023.05.02
V1.8	Updated material description	2023.05.25
V1.9	Update drawings and templates	2025.03.13

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## 1 Product Description

The GZP160 series pressure sensor features a MEMS silicon solid-state sensor packaged in a 6-pin dual in-line package or 6-pin(SO6) SMT package. All parts in this series are uncompensated high-performance die mounted on a substrate with a plastic cap. Pins are designed for board mounted assembly. The GZP160 is ideal for applications requiring low hysteresis, high reliability and stability. With constant voltage excitation or constant current excitation, the GZP160 produces a voltage output that is linearly proportional to the input pressure. The user can add on external signal conditioning circuitry to amplify the output signal and maximize its performance. The GZP160 is compatible with most non-corrosive gases including air.

### 1.1 Features

- Pressure range 10/40/100/200/700kPa
- Gauge pressure type
- SOP or DIP package
- Suitable for non-corrosive gases
- Driven by constant voltage or constant current
- Low cost for mass production



### 1.2 Applications

- Electronic blood pressure monitors, ventilators, oxygen concentrators, monitors and other medical fields
- Negative pressure measurement, pressure instruments, pneumatic components and other fields
- Massagers, massage chairs, air mattresses and other sports and fitness equipment
- Vacuum packaging machine, vacuum mixer, vacuum wall breaker, vacuum fresh-keeping box, vacuum pump and other vacuum negative pressure fields
- Washing machines, beer machines, coffee machines, vacuum cleaners, water purifiers, water heaters and other home appliances

## 2 Function Description

The GZP160 pressure sensor is suitable for applications in medical and healthy care, automotive electronics, industry automation and other fields. Its key component is a silicon piezoresistive pressure sensor manufactured using MEMS technology. This pressure sensor consists of an elastic membrane and four resistors integrated into the membrane. These four piezoresistors form a Wheatstone bridge structure. When pressure acts on the membrane, the bridge generates a voltage output signal that is linearly proportional to the applied pressure.

### 2.1 Electrical Connections

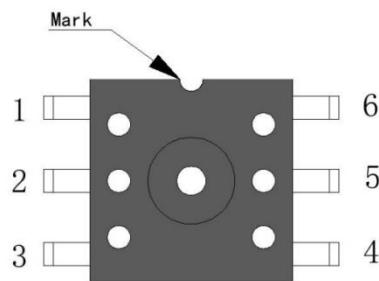


Fig.1 Pin Definition

The pin correspondence is shown in Table 1.

Tab.1 Pin correspondence table

PIN No.	Definition	Description	PIN No.	Definition	Description
1	GND	Power input negative	4	VS+	Power input positive
2	VO-	Output negative	5	VO+	Output positive
3	NC	No Connect	6	GND	Power input negative

## 2.2 Block Diagram

The principle block diagram of the pressure sensor is shown in Figure 2.

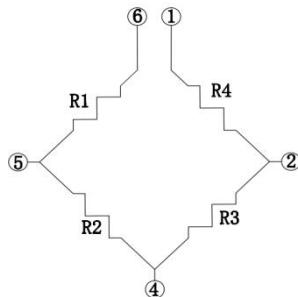


Fig.2 Schematic diagram

## 3 Structural Performance

Pressure sensitive chip: Silicon material

Lead: Gold wire

Package shell: PPS material

Pins: Copper with silver plating

Bottom cover material: LCP material

Net weight: About 0.4 grams

## 4 Technical Indicators

The following indicators of the pressure sensor are measured under the following conditions:

Measuring medium: Air

Medium temperature:  $(25 \pm 1)^\circ\text{C}$

Ambient temperature:  $(25 \pm 1)^\circ\text{C}$

Vibration :  $0.1\text{g (1m/s}^2\text{)} \text{ Max}$

Humidity:  $(50\% \pm 10\%) \text{ RH}$

Power supply:  $(5 \pm 0.005)\text{V DC}$

## 4.1 Electrical Performance

The electrical performance of the sensor is shown in Table 2.

Tab.2 Electrical performance table

Parameter	Min.	Typical values	Max.	Unit
Constant voltage power supply		5	15	V
Constant current power supply		1	3	mA
Bridge resistance	4	5	6	kΩ
Input impedance	4	5	6	kΩ
Output impedance	4	5	6	kΩ

## 4.2 Temperature Characteristics

The temperature characteristics of the sensor are shown in Table 3.

Tab.3 Temperature characteristics

Parameter	Min.	Typical values	Max.	Unit
Operating temperature	-30		+100	°C
Storage temperature	-40		+125	°C
Resistance temperature coefficient	1600	2100	2600	ppm/ °C
Zero temperature coefficient constant current power supply	-0.05	±0.02	0.05	%FS/°C
Zero temperature coefficient constant voltage power supply	-0.2		0.2	%FS/°C
Full-scale temperature coefficient constant current power supply	-0.05	±0.02	0.05	%FS/°C
Full-scale temperature coefficient constant voltage power supply	-0.26	-0.23	-0.2	%FS/°C

### 4.3 Mechanical Properties

The mechanical properties of the sensor are shown in Table 4.

Tab.4 Mechanical properties

Parameter	Minimum	Typical values	Maximum	Unit
Measuring range	10, 40, 100, 200, 700			kPa
Zero output	-10		10	mV
Full scale output 10kPa	35	50	65	mV
Full scale output 40kPa	60	75	90	mV
Full scale output 100/200kPa	60	90	120	mV
Full scale output 700kPa	80	110	140	mV
Overload Pressure (pressure range $\leq$ 40kPa)	3X			Rate
Overload Pressure (40kPa $\leq$ pressure range $\leq$ 200kPa)	2X			Rate
Overload Pressure (pressure range $>$ 200kPa)	1.5X			Rate
Non-linearity (pressure range $\leq$ 10kPa)	-1.0	$\pm 0.5$	1.0	%FS
Non-linearity (pressure range $\geq$ 20kPa)	-0.3	$\pm 0.15$	0.3	%FS
Hysteresis	-0.3	$\pm 0.15$	0.3	%FS
Repeatability	-0.3	$\pm 0.15$	0.3	%FS

## 5 Appearance Structure

The external dimensions of the pressure sensor are shown in Figures 3, 4 and 5. (If tolerance is unspecified , it shall be in accordance with GB/T1804-M) and the recommended footprint..

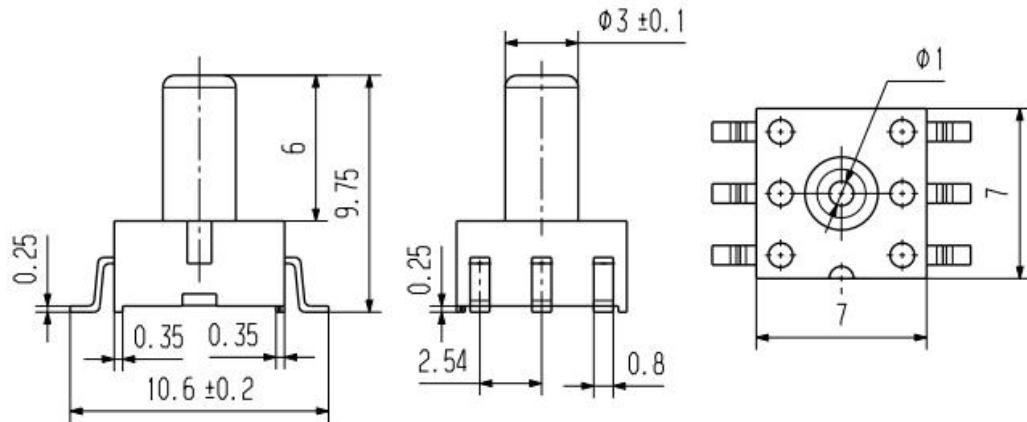


Fig.3 Appearance structure (SOP package)

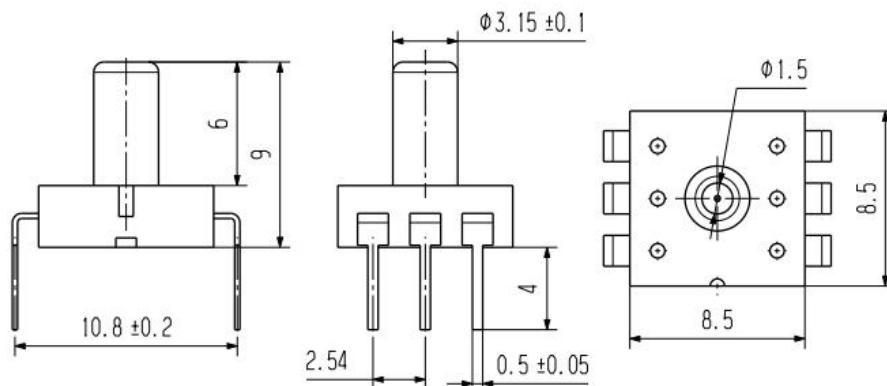


Fig.4 Appearance structure (DIP package - R type)

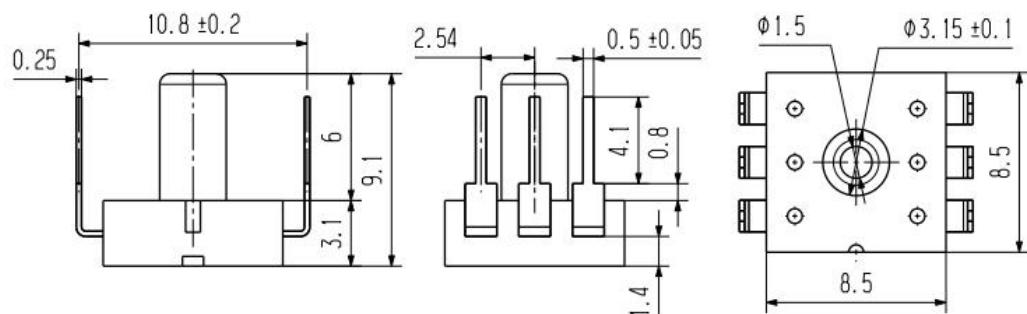


Fig.5 Appearance structure (DIP package - F type)

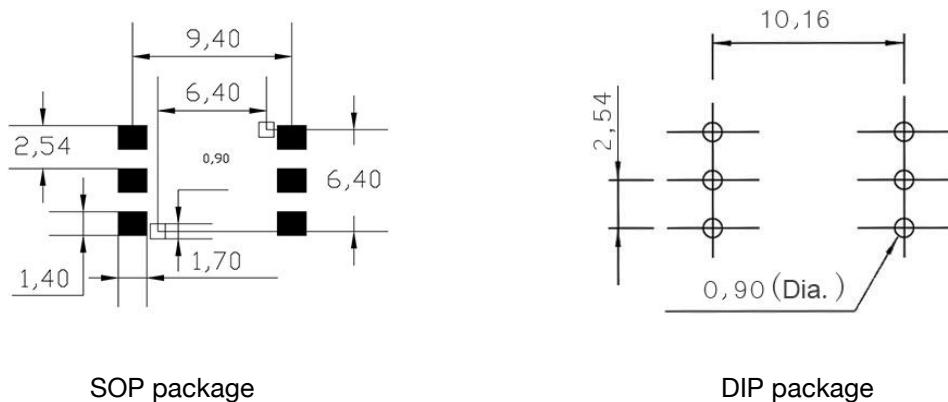


Fig.6 Recommended Footprint

## 6 Order Guide

### GZP 160 - 040 S F01 - L01 WX

GZP	Pressure Sensor Series
160	Product Series
040	Pressure range 010: 10kPa, can measure from -10 to 10kPa 040: 40kPa, can measure from -40 to 40kPa 101:100kPa, can measure from -100 to 100kPa 201:200kPa, can measure from -100 to 200kPa 701:700kPa, can measure from -100 to 700kPa
S	Appearance type S: SOP D:DIP
R(Only for DIP Type)	R: Pin direction is opposite with inlet F:Pin direction is parallel with inlet
F01	Packing method F01: Tube
WX	Company interior code

#### Order Tips

- Some models do not include all the ranges mentioned above.
- Some product models are only available in specific packing.
- For more information, please contact Sencoch.

## 7 Precautions for Use

### 7.1 Soldering

Because this product has a small structure with low heat capacity, please minimize the effects of external heat. Failure to do so may cause damage due to thermal deformation and change in characteristics. Please use non-corrosive rosin-based flux . Also, since the product is exposed to the outside, be careful not to allow flux to penetrate the interior.

#### ( 1 ) Manual welding

- Use a soldering iron with a head temperature between 260 and 300°C (30 W) and perform the work within 5 seconds.
- Please note that the output may change when soldering with a load applied to the terminals.
- Please keep the soldering iron tip clean.

#### ( 2 ) Reflow soldering

- Preheating requires a gradual ramp-up from low temperature (e.g. 80°C) to high temperature ( $\leq 130^{\circ}\text{C}$ ), with a preheating duration of 120 seconds.
- During soldering, the solder pot temperature range shall be  $245\pm 10^{\circ}\text{C}$ .
- The temperature between components and solder wave must not fall below  $180^{\circ}\text{C}$ .
- PCB dwell time in solder wave: 2–5 seconds.

#### ( 3 ) Reflow soldering (SMD terminal type)

- The recommended reflow oven temperature setting conditions are shown in Figure 7.

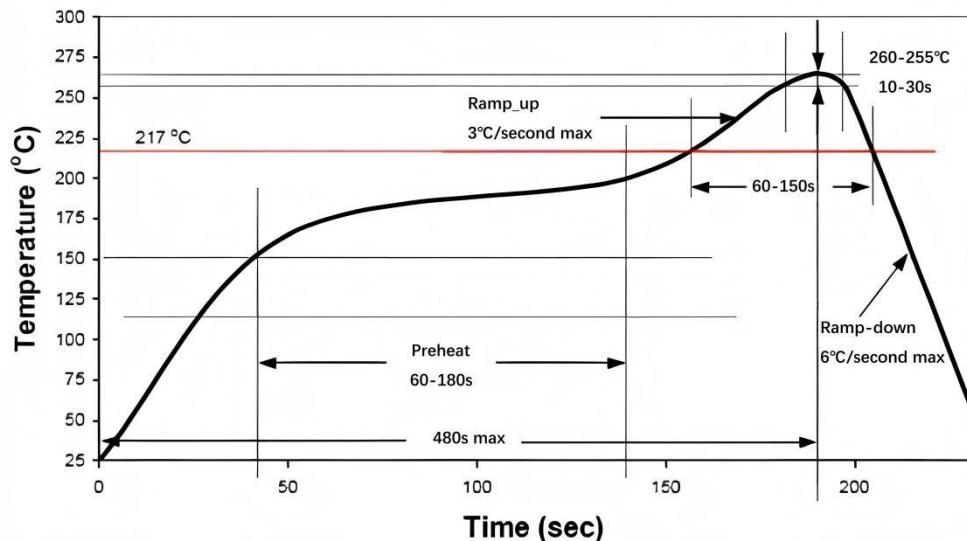


Fig.7 Reflow soldering temperature setting conditions

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

(4) After installing the sensor, be careful not to generate stress on the solder joint when cutting and bending the substrate .

(5) Since the sensor terminals are exposed, contact with metal pieces or other objects may cause abnormal output. Be careful not to touch the terminals with metal pieces or your hands.

(6) After soldering, when applying coating to prevent deterioration of the insulation of the substrate, be careful not to allow chemicals to adhere to the sensor.

## 7.2 Cleaning requirements

Avoid using ultrasonic cleaning as it may cause product failure.

## 7.3 Storage and transportation

(1) Due to the structure of the pressure sensor chip, the output will fluctuate when it is exposed to light. Especially when applying pressure through a transparent cover, etc., please avoid light from reaching the sensor chip.

(2) Normally packaged pressure sensors can be transported by ordinary transportation vehicles. Please note: The product must be protected from moisture, shock, sunburn and

pressure during transportation.

#### 7.4 Other precautions for use

(1) If the installation method is incorrect, it may cause an accident, so please be careful.

(2) Avoid using the product in a manner that applies high-frequency vibrations, such as ultrasonic waves.

(3) The only pressure media that can be used directly are air and non-corrosive gases. Other media, especially corrosive media or media containing foreign matter, may cause malfunction and damage. Therefore, please avoid using it in the above environments .

(4) A pressure sensor chip is located inside the pressure inlet. Inserting a needle or other foreign object into the pressure inlet can damage the chip and clog the inlet , so please avoid such an operation.

(5) Please use the product within the rated pressure range. Using the product outside the rated pressure range may cause damage.

(6) Since static electricity may cause damage, please be careful to ground charged objects on the table and operators when using it to allow the surrounding static electricity to discharge safely.

(7) Depending on the pressure used, please pay full attention to the fixing and selection of the product, sleeve, and introduction tube.

If you have any questions, please feel free to ask.

■ Please confirm under actual usage conditions

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

## 8 Amplifier Circuit Example

The pressure sensor is driven by a constant current to convert the voltage, which is then amplified as needed. The circuit shown below is a commonly used circuit.

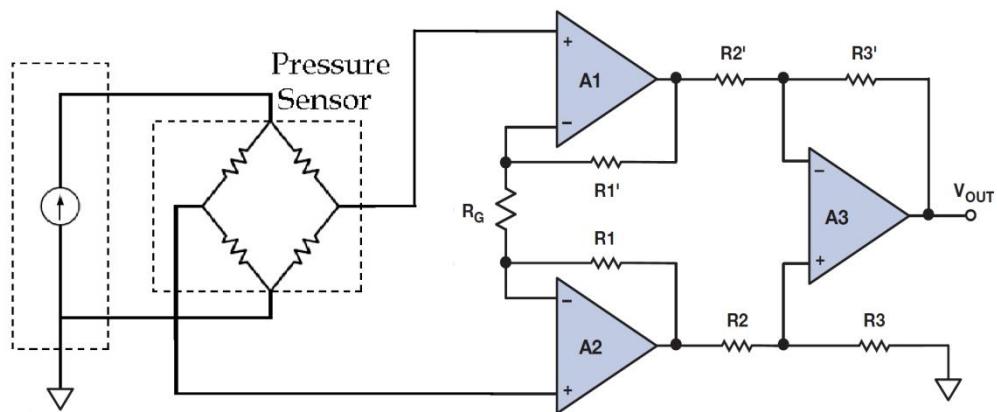


Fig.8 Amplifier circuit example.

## 9 Packaging Information

Reel&Tape (SOP package only):

Quantity per reel: 400 pcs; Inner box: 2 rolls (800 pcs total); Outer carton: 16 rolls (6,400 pcs total)

Plastic tube:

Product Series		Tube (PCS)	Box (PCS)	Box (PCS)	Remark
GZP160	SOP package	70	2800	28000	Vacuum packaging
	DIP package	58	1740	17400	Vacuum packaging

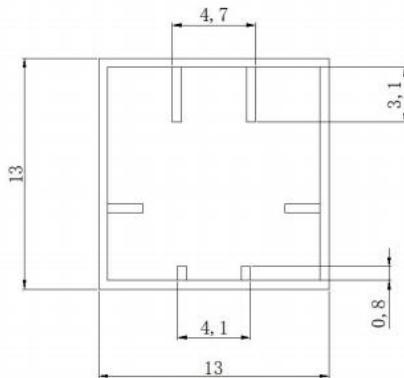
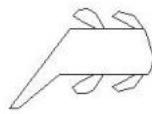


Fig.9 Section schematic diagram

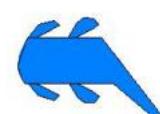
White Plug



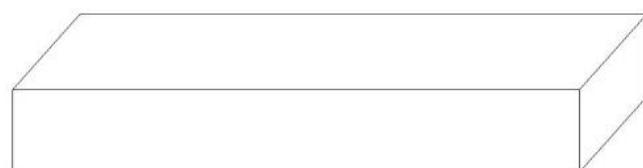
Mark Direction→



Blue Plug

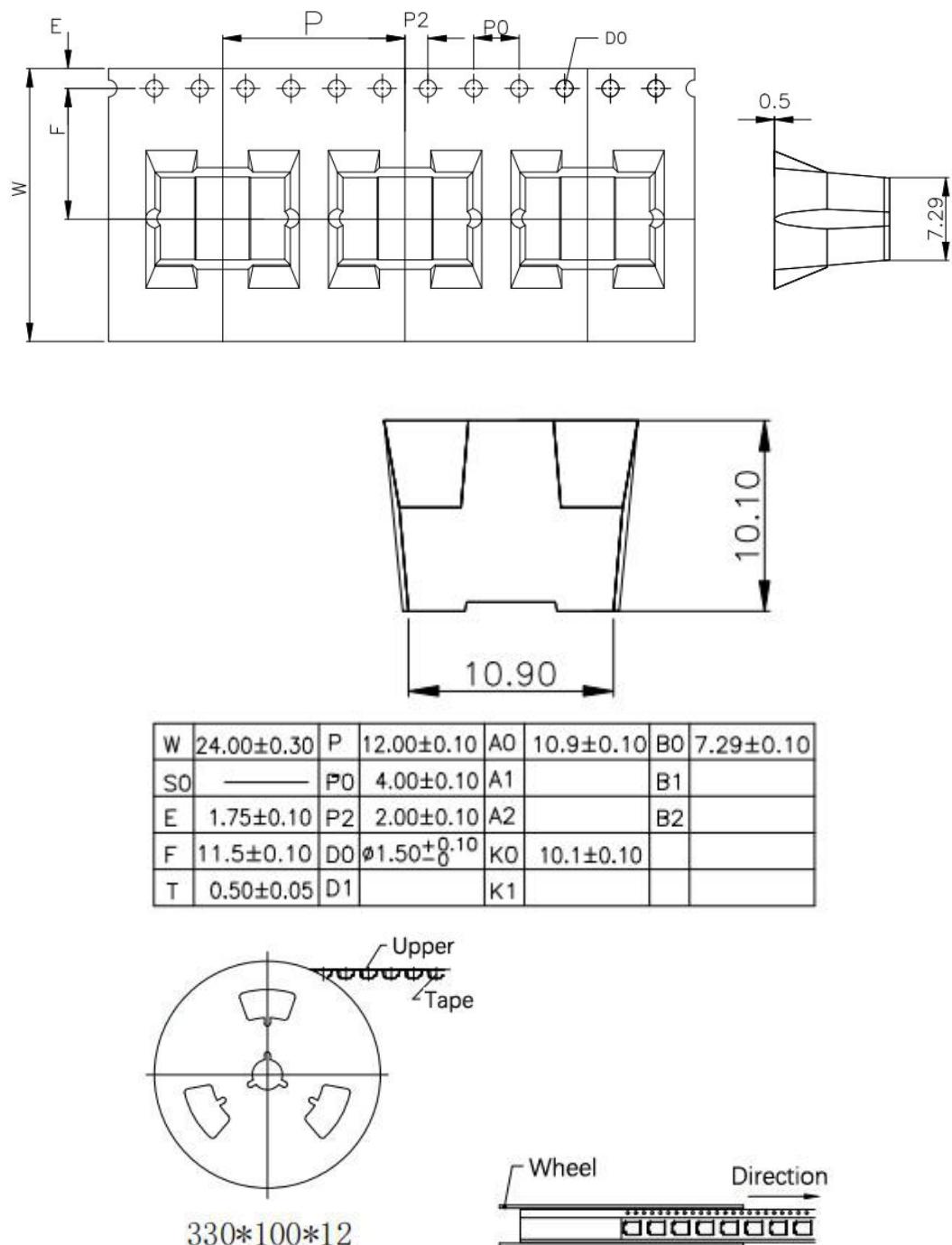


520mmx13mmx13mm 70pcs



530mm x145mmx53mm 2800pcs

Fig.10 Plastic tube drawing


**Fig.11 Reel&Tape Drawing**

## Safety Precautions

This product is made of semiconductor components for general electronic equipment (communication equipment, measuring equipment, working machinery, etc.). Products using these semiconductor components may malfunction and fail due to external interference and surges, so please confirm the performance and quality under actual use. To be on the safe side, please perform safety design on the device (setting of protection circuits such as fuses and circuit breakers, multiple devices, etc.) so that life, body, property, etc. will not be harmed in the event of a malfunction. To prevent injuries and accidents, please be sure to comply with the following matters:

·The driving current and voltage should be used below the rated values.

Please wire according to the electrical definition . In particular, reverse connection of the power supply may cause accidents due to circuit damage such as heat, smoke, and fire, so please be careful.

·Be careful when fixing the product and connecting the pressure inlet .

## Warranty and Disclaimer

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