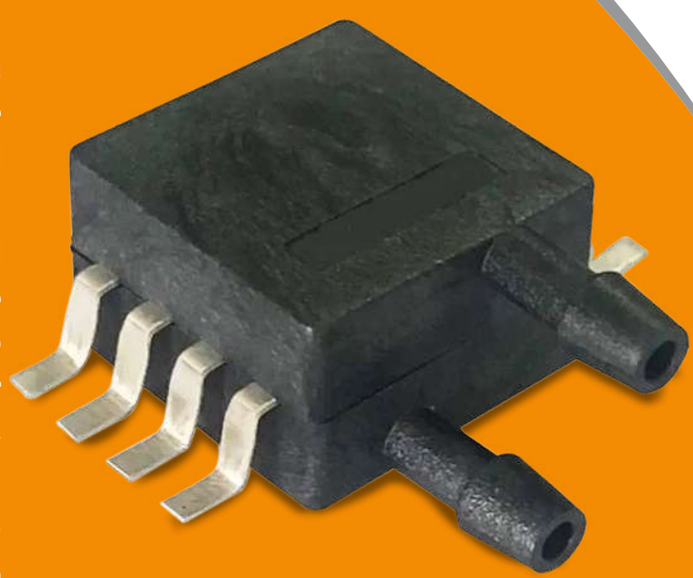
AS70 Series

Un-Amplified Differential Pressure Sensor

AS70 is a surface mounting pressure sensor based on silicon based piezoresistive pressure sensor die. The sensor die is bonded on a substrate with a plastic cap and packaged in 8-pin SOP. The small size and high reliability of on-chip integration make this sensor a simple and economical choice for high volume application in a variety of industries. With standard SOP8 package, AS70 is easy for users to install by SMT.

With good repeatability, linearity, stability and sensibility, AS70 is very facile for users to calibrate output & thermal drift and make temperature compensation by using exterior operational amplifier or integrated circuit.(For direct application if required, please check AS22 series)

The AS70 pressure sensor is intended for use with non-corrosive gas or air. It is highly prohibited to choke the side of pressure diaphragm during actual application. Please consult us if a pressure medium other then air is to be used.



Major features

- Ranges: -100kPa ~ 0…1 ~ 200kPa
- MEMS Technology, Solid-state reliability
- Low cost for high volume application
- Surface Mounting
- For non-corrosive gas or air
- Working temp.: -30℃ ~ +125℃(-22℉ ~ +257℉)
- Differential or Gauge pressure type

Applications

For Medical and healthy equipment field, such as Blood pressure test and monitor, Patient Monitoring, Infusion and Syringe pumps, Anaesthesia machines, Respirators and Ventilators, NPWT, DVT, COPD treatment, Catheter, Kidney dialysis, Cupping& Cosmetology, Massage device etc.

For Home appliance field, such as Refrigerator, Printer, Humidifier, Washer/Dryer, Coffee Machine, Cleaner, Robotic, Emergency lamp, Sport equipment etc.

For Other fields, such as air pump, emergency lamp, dust collector, HVAC and pneumatic device, automotive application etc.

Electronic performance

Power Supply	:	≤15 Vdc or ≤3.0 mAdc
Input Impedance	:	4kΩ ~ 6kΩ
Output Impedance	:	4kΩ ~ 6kΩ
Insulation Resistor	:	100MΩ,100VDC
Over Pressure	:	2X Rated Pressure
Burst Pressure	:	3X Rated Pressure

Construction

Sensing Die	:	Silicon
Die Mounting Glue	:	Silicone Glue
Leading wire	:	Gold wire
Package Housing	:	PPS(Phenylene sulfide)
Pin	:	Silver plated copper
Net Weight	:	Approx.1g

Environment condition

Orientation	: Deviate 90° from any direction, zero change ≤ 0.05%FS
Shock	: No change at 10gRMS, (20 ~ 2000)Hz condition
Impact	: 100g,11ms

Medium Compatibility

Pressure side	: Air or gas compatible with silicone, silicone glue, epoxy glue or PPS
Reference side	: Dry air and non-corrosive gas compatible with PPS, silicon & silicone glue or epoxy, gold, aluminium and silver.

Test condition

Medium	:	Gas(Clean air and Non-corrosive gases)
Medium Temp	:	(25±1)℃/(77±1.8)℉
Environment Temp.	:	(25±1)℃/(77±1.8)℉
Shock	:	0.1g (1m/s2) Max
Humidity	:	(50%±10%) RH
Power Supply	:	(5±0.005) Vdc

Specifications

Specifications		Min.	Typ.	Max	Unit
Pressure Range①		--100,1,3,5,10,20,40,100,200			kPa
Ambient Temperature		-30		+100	℃/℉
Storage Temperature		-40		+150	℃/℉
Bridge Resistance		4	5	6	kΩ
Offset/Zero Output		-5	2	+15	mV
FS Output	1kPa/0.145 Psi	10	20	30	mV
	3kPa/0.45 Psi	20	30	40	mV
	7kPa/0.725 Psi				
	10kPa/1.45 Psi				
	20kPa/2.9 Psi				
	40kPa/5.8 Psi				
	≥100kPa/≥15 Psi				
Temp. Coefficient of Resistance⑤		1600	2200	2800	ppm/℃
TCO(Temp. Coefficient of Offset)⑤		-0.08	±0.05	0.08	%FS/℃
		-0.05	±0.02	0.05	%FS/℃
TCS(Temp. Coefficient of Span)⑤		-0.25	-0.21	-0.17	%FS/℃
		-0.05	±0.02	0.05	%FS/℃
Linearity④		-0.7	±0.5	0.7	%FS
Hysteresis		-0.3	±0.15	0.3	%FS
Repeatability		-0.3	±0.15	0.3	%FS

Note:

① The max negative pressure specified above is exactly 98.07kPa in actual application.

② Excited by constant voltage

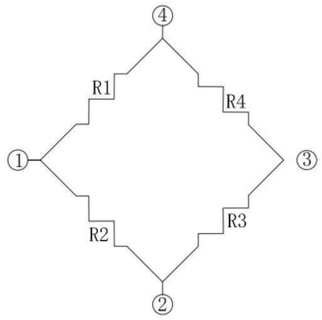
③Excited by constant current

④ Defined as best fit straight line

⑤Temperature coefficient is measured from 0℃ to 60℃.(32℉ ~ 140℉)

Unless otherwise specified,measurements were taken on base of above testing condition

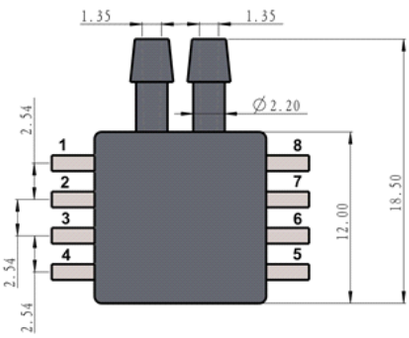
PIN connection & definition

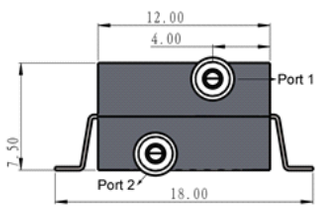


Pin	1	2	3	4	5	6	7	8
Definition B1	Vo-	Vs+	Vo+	GND	N/C	N/C	N/C	N/C
Definition B2	GND	Vo+	Vs+	Vo-	N/C	N/C	N/C	N/C

Symbol	Vs+	GND	Vo+	Vo-
Definition	Power +	Power -	Output +	Output -

Dimension (Unit:mm)





Type	PORT 1	PORT 2	Illustration
Differential Pressure	+P range	-P range	Output is proportional with the pressure difference value between PORT 1 and PORT 2. If Presssure of PORT 1< Presssure of PORT 2, the output polarity (Vo+ and Vo-) will be reverse.
Gauge Pressure	+P range	ATM	Output is proportional with the pressure of PORT1. If Presssure of PORT 1< Presssure of PORT 2, the output polarity (Vo+ and Vo-) will be reverse.

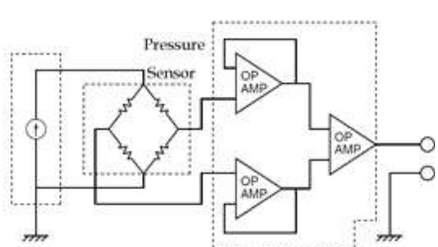
Order Guide

AS70	Piezo-resistive Pressure Sensor				
	Code	Range	100kPa=0.1mKp=750mmHg=10MH2O≈1bar≈14.5PSI		
	001	0 ~ 1kPa	Available for Negative pressure(-1 ~ 1kPa)		
	003	0 ~ 3kPa	Available for Negative pressure(-3 ~ 3kPa)		
	007	0 ~ 7kPa	Available for Negative pressure(-7 ~ 7kPa)		
	010	0 ~ 10kPa	Available for Negative pressure(-10 ~ 10kPa)		
	020	0 ~ 20kPa	Available for Negative pressure(-20 ~ 20kPa)		
	040	0 ~ 40kPa	Available for Negative pressure(-40 ~ 40kPa)		
	101	0 ~ 100kPa	Available for Negative pressure(-100 ~ 100kPa)		
	201	0 ~ 200kPa	Available for Negative pressure(-100 ~ 200kPa)		
		Code	Package Type		
		S	SOP		
			Code	PIN	
			D	PIN Def.1	Differential Pressure Type
			G	PIN Def.2	Gage Pressure Type
AS70	001	S	D		the whole spec.

Application circuit (example)

This pressure sensor(mV output) is usually amplified for final application by means of constant voltage or constant current.

The right circuit is a typical circuit application in where the pressure sensor is applied by constant current excitation



More recommendation

Both sensor at right place are calibrated pressure sensor with amplified analog output signal or digital output(IIC interface).

They are temperature compensation with customized pressure range and input/output parameter, which can be applied in your project directly

Please contact us more information.



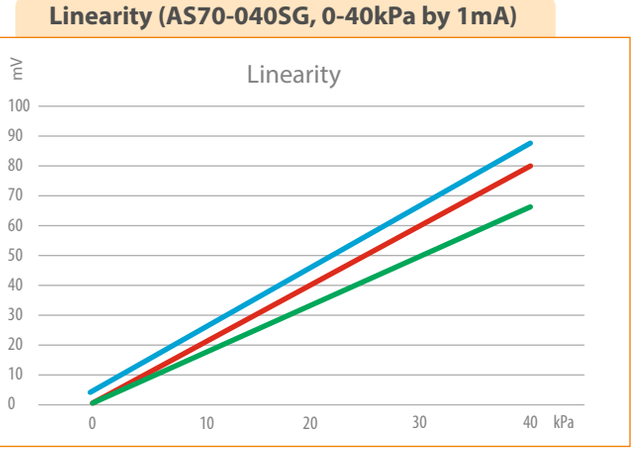
AS22



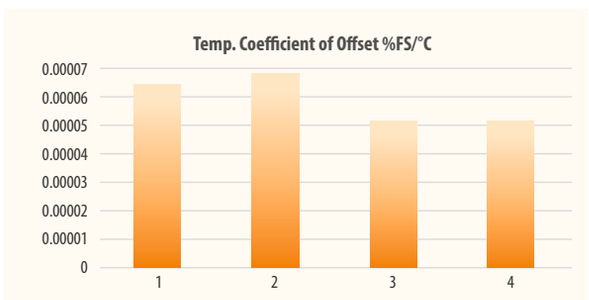
AS23

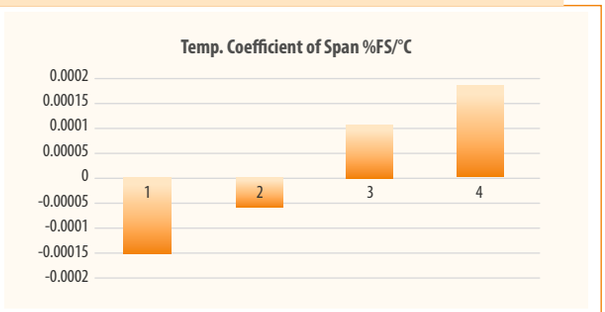
Reference diagram (Base on above test condition)

Linearity (AS70-040SG, 0-40kPa by 1mA)

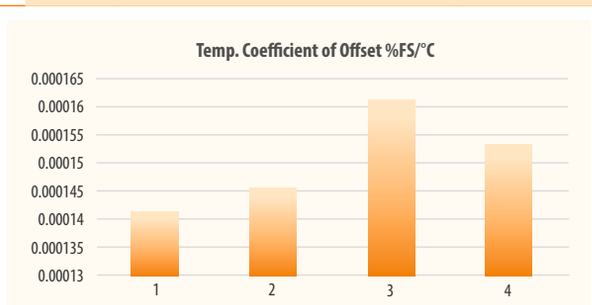


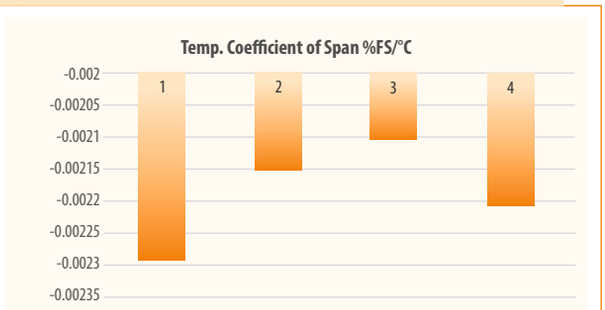
Temperature Coefficient excited by Constant Current(AS70-040SG, 0-40kPa by 1mA in 0-60°C)





Temperature Coefficient excited by Constant Voltage (AS70-4040SG, 0-40kPa by 5Vdc in 0-60°C)





General Notes

Mounting

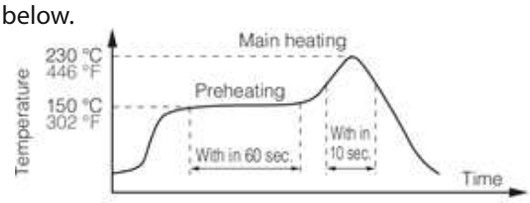
Adopting land on the PC board for ensuring the sensor is securely fixed

Soldering

Due to its small size, the thermal capacity of the pressure sensor is low. Therefore, take steps to minimize the effects of external heat. Damage and changes to characteristics may occur due to heat deformation. Use a non-corrosive resin type of flux. Since the pressure sensor is exposed to the atmosphere, do not allow flux to enter inside.

- **Manual soldering**
- Raise the temperature of the soldering tip between 260 and 300°C/500 and 572°F (30 W) and solder within 5s. ⊙The sensor output may vary if the load is applied on the terminal during soldering.
- Keep the soldering tip clean.
- **DIP soldering (DIP Terminal)**
- Keep the temperature of the DIP solder tank below 260°C/500 and solder within 5 seconds.
- To avoid heat deformation, do not perform DIP soldering when mounting on the circuit board which has a small thermal capacity.
- **Reflow soldering (SMD Terminal)**

The recommended reflow temperature profile conditions are given below.



- We recommend the screen solder printing method as the method of cream.
- Please refer to the recommended PC board specification diagram for the PC board foot pattern.
- Self-alignment may not always work as expected, therefore, please carefully the position of the terminals and pattern.
- The temperature of the profile is assumed to be a value measured with the printed wiring board of the terminal neighbourhood.
- Please evaluate solderability under the actual mounting conditions since welding and deformation of the pressure inlet port may occur due to heat stress depending on equipment's or conditions.
- **Rework soldering**
- Complete rework at a time.
- Use a flattened soldering tip when performing rework on the solder bridge. Do not add the flux.
- Keep the soldering tip below the temperature described in the specifications
- Avoid drop and rough handling as excessive force may deform the terminal and damage soldering characteristics.
- Keep the circuit board warpage within 0.05 mm of the full width of the sensor.
- After soldering, do not apply stress on the soldered part when cutting or bending the circuit board.
- Prevent human hands or metal pieces from contacting with the sensor terminal. Such contact may cause anomalous outlets as the terminal is exposed to the atmosphere.
- After soldering, prevent chemical agents from adhering to the sensor when applying coating to avoid insulation deterioration of the circuit board.

Wire Connection

- Correctly wire as in the connection diagram. Reverse connection may damage the product and degrade the performance
- Do not use idle terminals to prevent damages to the sensor.

Cleaning

- Since the pressure sensor chip is exposed to the atmosphere, do not allow cleaning fluid to enter inside.
- Avoid ultrasonic cleaning since this may cause breaks or disconnections in the wiring

Environment

- Please avoid using or storing the pressure sensor chip in a place exposed to corrosive gases (such as the gases given off by organic solvents, sulphurous acid gas, hydrogen sulphides, etc.) which will adversely affect the performance of the pressure sensor chip.
- Since this pressure sensor chip does not have a water-proof construction, please do not use the sensor in a location where it may be sprayed with water, etc.
- Avoid using the pressure sensors chip in an environment where condensation may form. Furthermore, its output may fluctuate if any moisture adhering to it freezes.
- The pressure sensor chip is constructed in such a way that its output will fluctuate when it is exposed to light. Especially when pressure is to be applied by means of a transparent tube, take steps to prevent the pressure sensor chip from being exposed to light.
- Avoid using the pressure sensor chip where it will be susceptible to ultrasonic or other high-frequency vibration.
- Please keep the sensors sealed using static shielding bags on storage. The PINs of sensor are plated byAg. If the sensors expose to an atmosphere, the PINs will be black by oxidation.

Quality Check under actual loading conditions

To assure reliability, check the sensor under actual loading conditions. Avoid any situation that may adversely affect its performance.

Other handling precautions

- That using the wrong pressure range or mounting method may result in accidents.
- The only direct pressure medium you can use is dry air. The use of other media, in particular, corrosive gases (organic solvent based gases, sulphurous acid based gases, and hydrogen sulphide based gases, etc.) and media that contains moisture or foreign substances will cause malfunction and damage. Please do not use them.

- The pressure sensor chip is positioned inside the pressure inlet. Never poke wires or other foreign matter through the pressure inlet since they may damage the chip or block the inlet. Avoid use when the atmospheric pressure inlet is blocked.
- Use an operating pressure which is within the rated pressure range. Using a pressure beyond this range may cause damage.
- Since static charge can damage the pressure sensor chip, bear in mind the following handling precautions.
- When storing the pressure sensor chips, use a conductive material to short the pins or wrap the entire chip in aluminium foil. Plastic containers should not be used to store or transport the chips since they readily become charged.
- When using the pressure sensor chips, all the charged articles on the bench surface and the work personnel should be grounded so that any ambient static will be safely discharged.
- Based on the pressure involved, give due consideration to the securing of the pressure sensor DIP type and to the securing and selection of the inlet tube.

Safety Precautions

- Do not use these sensors under any circumstances in which the range of their ratings, environment conditions or other specifications are exceeded. Using the sensors in any way which causes their specifications to be exceeded may generate abnormally high levels of heat, emit smoke, etc., resulting in damage to the circuitry and possibly causing an accident.
- Before connecting a connector, check the pin layout by referring to the connector wiring diagram, specifications diagram, etc., and make sure that the connector is connected properly. Take note that mistakes made in connection may cause unforeseen problems in operation, generate abnormally high levels of heat, emit smoke, etc., resulting in damage to the circuitry.
- Do not use any pressure sensor which has been disassembled or remodelled.
- Protection circuit recommended.

  The possible failure mode is either open or short of the output transistor.

  An excess heat is the cause for short mode failure. For any important and serious application in terms of safety, add protection circuit or any other protection method.
- Various safety equipment
- Safety equipment traffic light
- Security crime prevention equipment
- Equipment concerning control and safety of trains, cars, etc.
- Applications such as temperature control using sensor output etc.
- If it is expected that malfunction of each sensor may cause injury to persons or serious expansion damage, be sure to implement safety measures such as double safety circuit.

Due to continuous development of our products technical information's are subject to change.
Please ensure the compatibility between the measured medium and the contacting part of the product when placing an order.

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