GZP6182A Series

EVAP Pressure Sensor

Analog Output

Datasheet

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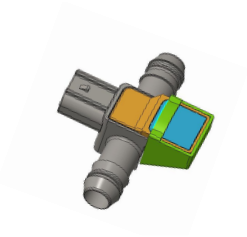
Document Revision History

Revision	Description	Date
V1.0	Initial version	2022.05.13
V1.1	Modify the recommended size of the mounting holes	2022.09.01
V1.2	Template modification	2023.02.07
V1.3	Increase product series	2024.05.28

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1. Product Description

The GZP6182 series products are calibrated fuel evaporation pressure sensor that launched by Sencoch for the automotive market. This product is used to measure the fuel evaporative pressure in the fuel pump or fuel manifold to ensure the EVAP system is functioning properly and reducing emissions. The product uses an automotive-grade signal conditioning chip to calibrate and compensate the output of the MEMS chip.



GZP6182A-03



GZP6182A-02

It can convert pressure signals into analog voltages (range and output can be customized). The sensor has fast response, high reliability, and good stability. It is a high-performance sensor product with excellent cost-effectiveness.



GZP6182A-01

1.1 Features

- Pressure range: -3.75~1.25/-3.75~3.5/-14.3~60/-20~40kPa
- High accuracy, fast response
- Working temperature range -40℃ to 130℃
- Overvoltage and reverse polarity protection
- Proportional analog voltage output with clamp set (customizable)
- Extensive automotive applications with affordable cost



GZP6182A-05

1.2 Application Areas

In automotive fuel tank applications, this technology monitors changes in the vacuum level within the vehicle's fuel evaporation system to determine if the system meets the standards for fuel evaporation leakage. Based on the pressure value within the cavity, it further determines whether there is a risk of fuel vapor emission. The detected pressure value is converted into a corresponding voltage value, and this pressure signal is transmitted to the ECU.

2. Function Description

This product is manufactured using advanced microelectromechanical principles. Its core technologies are a silicon piezoresistive effect- based MEMS pressure sensor chip and a high-performance signal conditioning ASIC chip. The silicon micro-piezoresistive MEMS pressure sensor chip outputs a voltage signal proportional to the measured pressure through a Wheatstone bridge composed of four strain-sensitive resistors. This signal is amplified, temperature-compensated, and linearized by the ASIC chip to obtain an output voltage that is proportional to the applied pressure. Linearization of the transfer function and temperature compensation are implemented by digital processing circuitry in the ASIC. Through polynomial compensation algorithms and multi-point pressure calibration technology at multiple temperatures, high-precision pressure measurement is achieved across the entire operating temperature range. The transfer function of the pressure sensor is created by the following parameters:

- Minimum and maximum rated pressure
- Voltage values at minimum and maximum rated pressure
- Clamping voltage

All parameters required for the complete calibration algorithm (such as offset, gain, temperature coefficients of offset and gain, and linearization parameters) are determined and stored in the E^2PROM inside the ASIC after calibration.

2.1 Electrical Connections

The recommended female electrical connector for this product is DELPHI PACKARD PART NO. 12059595.

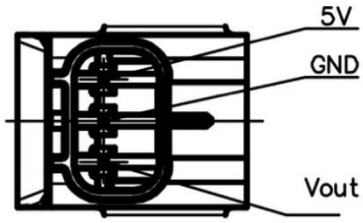


Fig.1 Pin diagram

The above connector is for TE2327988-1interface. For other connector types and sizes, please consult Sencoch.

Tab.1 Pin Correspondence

Serial Number	Describe	Remark
1	VCC	Power input positive terminal 5±0.25VDC
2	Vout	Product output voltage signal
3	GND	negative power input

2.2 Block Diagram

The sensor functional block diagram is shown in Figure 2.

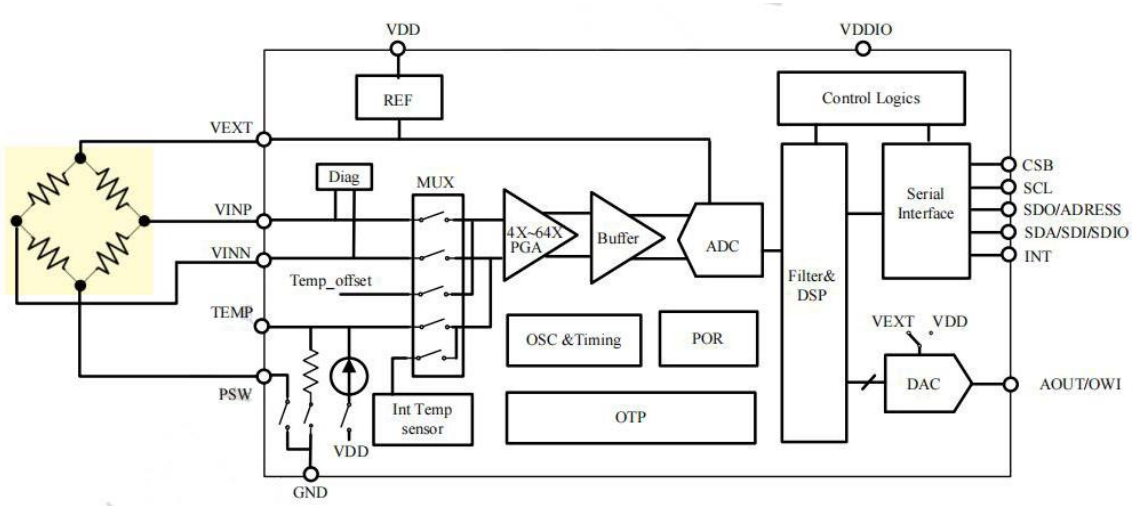
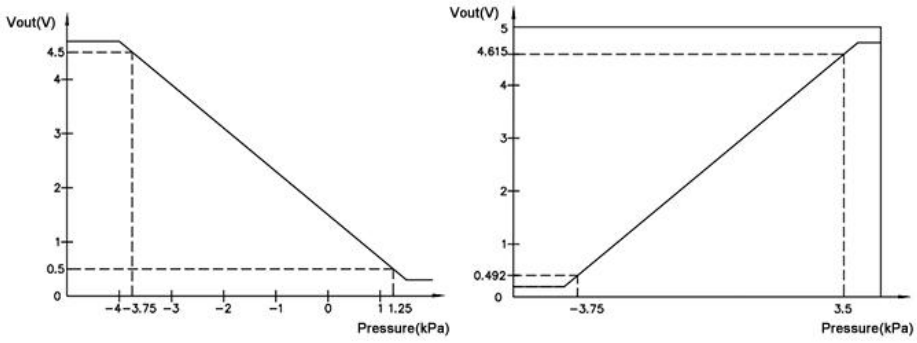


Fig.2 Sensor Functional Block Diagram

2.3 Pressure Function

P indicate the input pressure (the difference between inlet pressure and atmospheric pressure), in kPa. Vout is the output voltage, in volts (V).

The linear equation is shown in Figure 3:



Pressure Pressure:-3.75~1.25kPa
Output Voltage:4.5~0.5Vdc
Formula: Vout=(0.3-0.16*P)*VCC

Pressure Pressure:-3.75~3.5kPa
Output Voltage:0.492~4.615Vdc
Formula: Vout=(0.5249-0.1137*P)*VCC

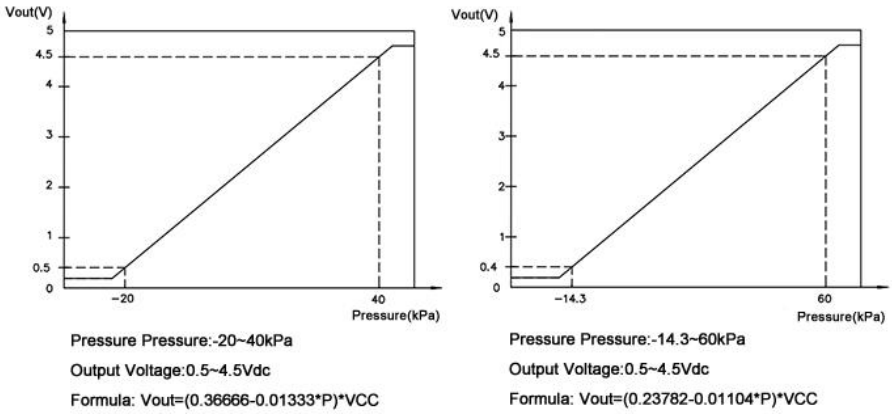


Fig.3 Voltage output curve

2.4 Accuracy

The accuracy of the GZP6182A fuel evaporative pressure sensor is affected by the supply voltage, input pressure, ambient temperature, and aging effects. The value calculated using the transfer function is the sensor's specified value, which is also its theoretical value. The sensor's error is equal to the difference between the actual output voltage value and the specified output voltage value at the specified input pressure.

2.4.1 Overall Accuracy

The overall accuracy takes into account different error sources within the measurement pressure range and operating temperature range. These error sources mainly include:

Pressure: The output deviation between the actual output voltage and the specified output voltage within the specified pressure range.

Temperature: Output deviation at different temperatures within the temperature range.

Aging: The drift of parameters over time.

The overall accuracy is represented by an error band, which consists of three-line segments. The data is shown in Figure 4 as shown.

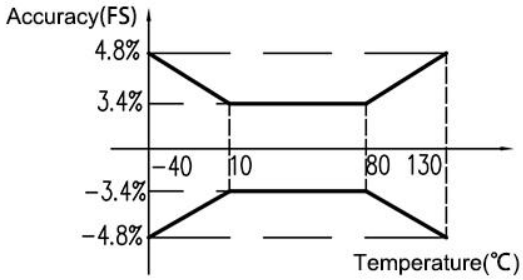


Fig.4 Relationship between overall accuracy and temperature

3. Technical Specifications

The following sensor specifications were measured at a power supply of (5±0.25) V DC and a temperature of 25℃.

3.1 Maximum Rated Parameters

The maximum rated parameters of the sensor are shown in Table 3.

Tab.3 The maximum rated parameters

Attribute	Minimum	Typical	Maximum	Unit	Remark
Maximum voltage			18	V	1h
Reverse voltage			-14	V	
Overload pressure			300	k PaG	60s
ESD protection			±4	KV	

3.2 Performance Indicators

The sensor performance indicators are shown in Table 4.

Tab.4 Sensor performance indicators

Attribute	Values	Unit
Pressure range	-3.75- ~ 3.5 or 14.3 ~ 60 (customizable range)	kPa G
Output signal	0.492 ~ 4.615 or 0.4 ~ 4.5 (Customizable range)	V
Protection level	IP6K9K	
Response time	≤ 2	MS
Upper clamping voltage	94 (customizable)	%VSS
Lower clamping voltage	6 (customizable)	%VSS
Insulation resistance	≥10MΩ/500VDC	MΩ
Operating temperature	-40 ~ 135	℃
Storage temperature	-40 ~ 135	℃

4. Structure and Specification

The sensor's external dimensions (unit: mm, unless tolerances are specified, in accordance with GB/T1804-V) and electrical definition are shown in Figure 5.

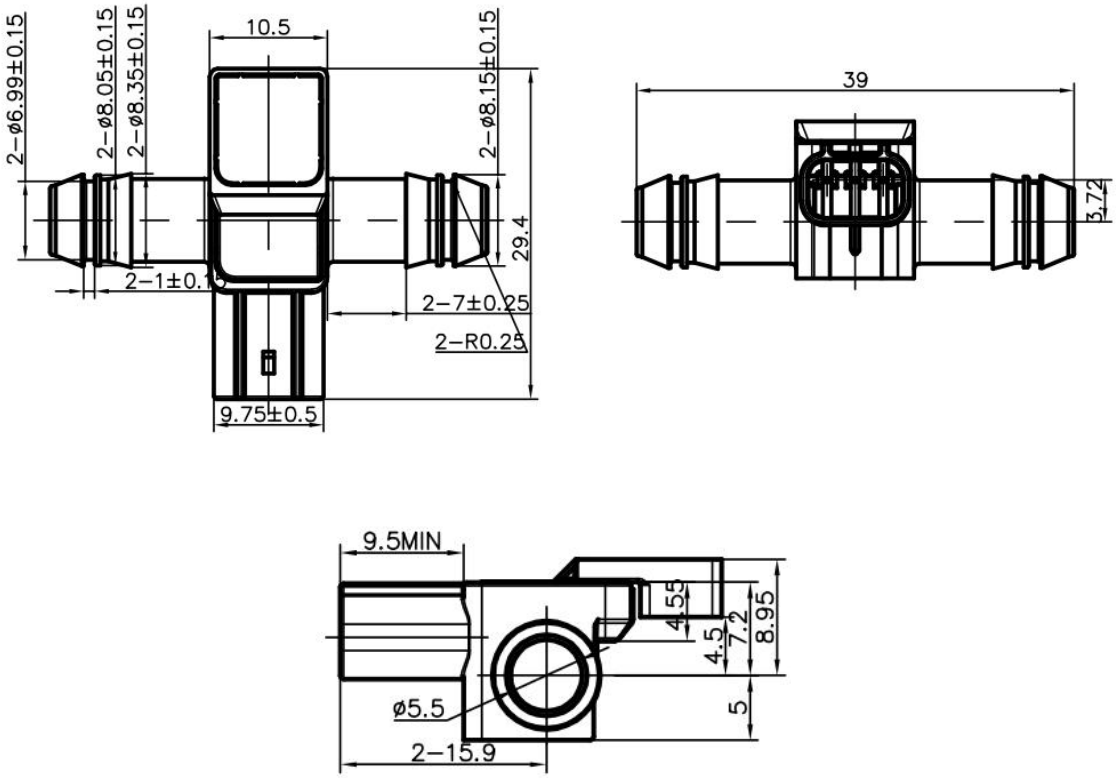


Fig.5 GZP6182A-03

5. Order Guide

GZP 6182 A - 03 - A003 T003 B02

Tab.5 Order Guide

GZP	Sencoch
6182 A	Product Categories
03	00: Interface Type PACKARD 12059595
A003	Pressure Range A003: -3.75~3.5kPa A298: -14.3~60kPa
T221	Power Supply and Output T221:5V/0.492~4.615V E024:5V/ 0.4~4.5V
B0 2	Packaging Method B02: Tray

6. Installation Instructions

1) Do not immerse the sensor in liquid lubricants.

2) Do not touch rubber seals with bare hands; avoid contaminating rubber seals during assembly.

3) Do not use hammers, rods, or similar tools to strike the sensor during installation.

4) The sensor is for one-time installation only; sensors that have been installed must not be reused.

5) Allowable angular deviation in the vertical direction:

- Under normal conditions: a = b ≤ 90°
- When the sensor is exposed to liquid fuel (any type): a = b ≤ 40°

7. Precautions for use

1) The sensor should only be unpacked before it is installed on the engine.

2) This sensor is designed for measuring fuel tank pressure in internal combustion engines that use gasoline or diesel fuel. It is not permitted for use in other applications. Please confirm with our company in advance if you require its use in other applications.

3) The pressure gauge port is used to measure atmospheric pressure. It is necessary to prevent the pressure gauge port from being blocked during installation (painting) and use.

4) Pressure sensors in standard packaging can be transported using ordinary conveyor systems. Please note: Protect the product from moisture, impact, sun damage, and pressure during transportation.

5) Please feel free to contact Sencoch for any question.

■ Please confirm under actual usage conditions

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