

# GZP6182A Series

## EVAP Pressure Sensor

Analog Output

Datasheet

Version: V1.3

Issued Date:2024.05.28

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Document Revision History

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| 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.

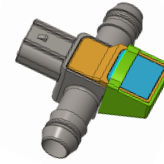
It can convert pressure signals into analog voltages (range and output can be customized). The sensor has fast response, high reliability, and good stability. It is a high-performance sensor product with excellent cost-effectiveness.

### 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°C to 130°C
- Overvoltage and reverse polarity protection
- Proportional analog voltage output with clamp set (customizable)
- Extensive automotive applications with affordable cost

### 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.



GZP6182A-03



GZP6182A-02



GZP6182A-01



GZP6182A-05

## 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<sup>2</sup>PROM inside the ASIC after calibration.

### 2.1 Electrical Connections

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

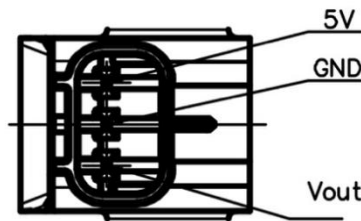


Fig.1 Pin diagram

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.

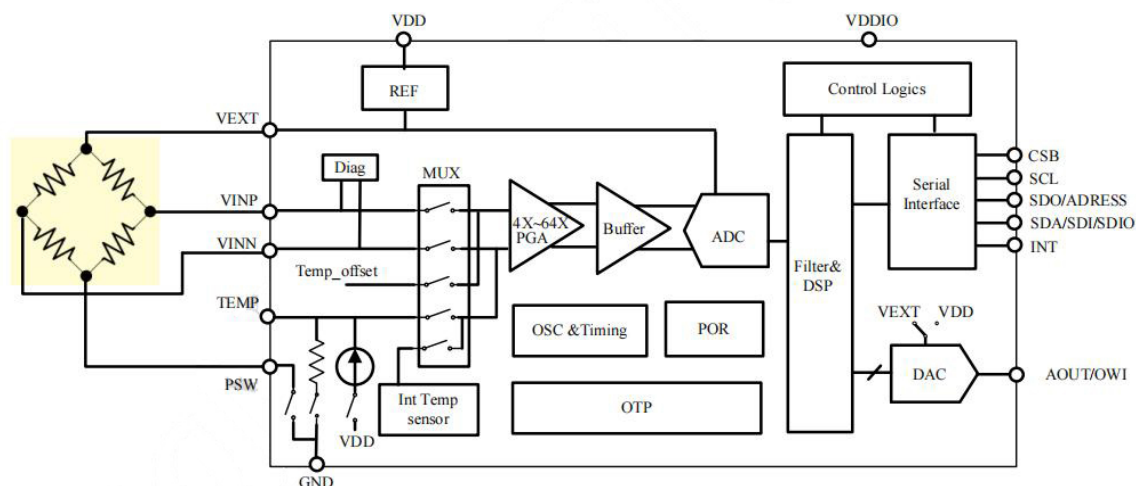


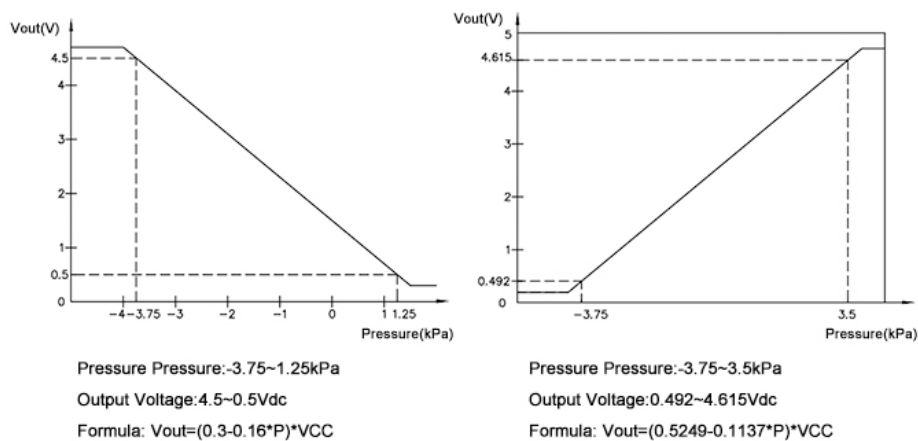
Fig.2 Sensor Functional Block Diagram

## 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:



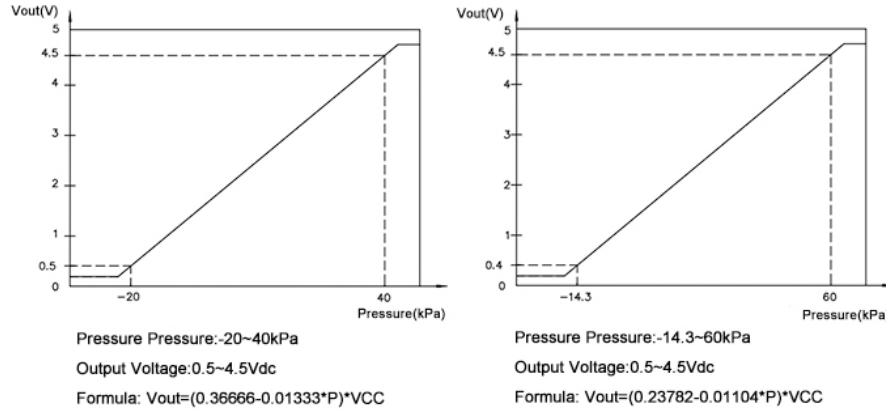


Fig.3 Voltage output curve

## 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.

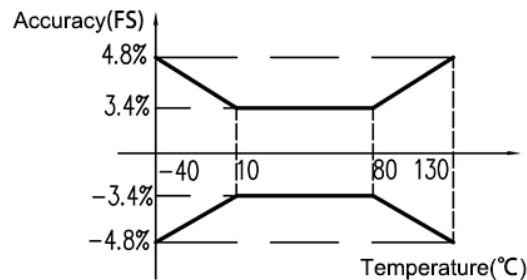


Fig.4 Relationship between overall accuracy and temperature

### 3. Technical Specifications

The following sensor specifications were measured at a power supply of (  $5 \pm 0.25$  ) V DC and a temperature of 25°C.

#### 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    |         |         | $\pm 4$ | 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          | $\leq 2$                                        | MS               |
| Upper clamping voltage | 94 (customizable)                               | %VSS             |
| Lower clamping voltage | 6 (customizable)                                | %VSS             |
| Insulation resistance  | $\geq 10\text{M}\Omega/500\text{VDC}$           | $\text{M}\Omega$ |
| Operating temperature  | -40 ~ 135                                       | °C               |
| Storage temperature    | -40 ~ 135                                       | °C               |

### 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.

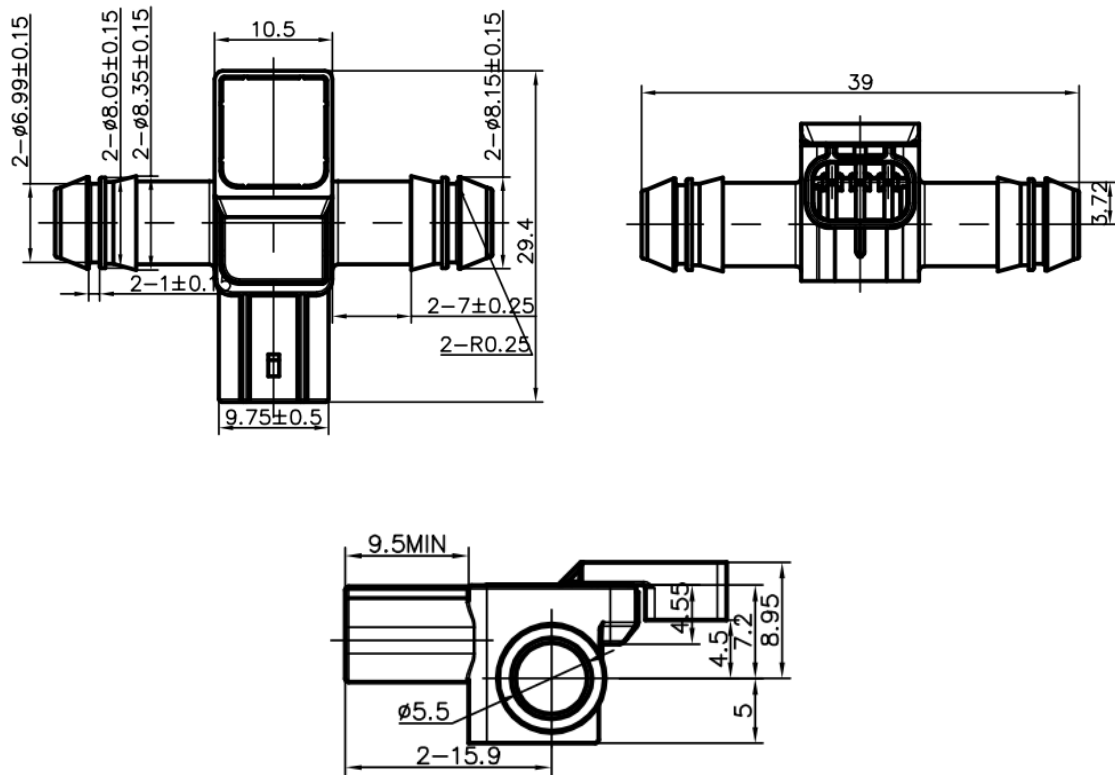


Fig.5 GZP6182A-03

## 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:  $a = b \leq 90^\circ$
  - When the sensor is exposed to liquid fuel (any type):  $a = b \leq 40^\circ$

## 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.