ACD10 Product Data Sheet

NDIR CO_2 sensor

- Small and compact, with a simple design
- Fully calibrated
- Digital output
- Excellent long-term stability
- Fast response, quick recovery, and strong anti-EMC capability

Summary

ACD10 uses the Non-Dispersive Infrared (NDIR) to detect the concentration of CO_2 in the air. ACD10 has advantages of selectivity, no oxygen dependence, and long lifetime etc. Built-in temperature compensation; digital interface output, easy to use. ACD10 is a high-performance sensor with tight combination of infrared absorption gas detection technology, precision optical circuit design, and high-precision signal detection circuit design.

Application

The application scenario of ACD10 is very wide. It is suitable for air quality monitoring equipment, fresh air system, air purification equipment, HVAC equipment etc.

Figure 1. ACD10

1. Working principle

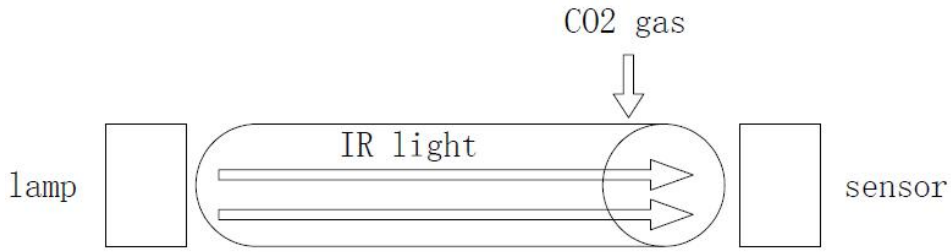

Figure 2. Schematic Diagram

2. Parameters

Product model	ACD10
Supply voltage	4.75～5.25*V*
Supply current[1]	Average current <45mA
Typical power consumption	225mW@5*V*
Measurement range	400～5000ppm
Accuracy	$\pm(50ppm + 5\%\ Readings)$
Preheat time	120 Seconds
Operating conditions	-10℃～50℃; 0～95%RH (non-condensation)
Storage conditions	-20℃～60℃; 0～95%RH (non-condensation)
Data refresh frequency	1 second
Service life	>5years
Interface	UART

Table 1. Technical parameters

[1]Peak operating current: 150mA

User Guide

1. Interface definition and communication protocol

1.1 ACD10 pin assignment

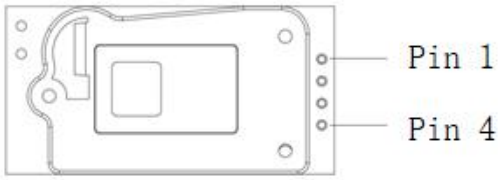

Figure 3. ACD10 pin

Pin 1	TX	UART TX
Pin 2	RX	UART RX
Pin 3	GND	Power ground
Pin 4	VCC	Power supply

Table 2. Pin Definition

1.2 Communication interface

The UART is compatible with 3 V and 5 V levels.

1.3 The UART communication protocol

1.3.1 Protocol overview

Porter rate: 1200, 8, N, 1; protocol data are hex.

1.3.2 Protocol format

Frame head	Fixed code	Length	Command code	Data 1	…	Data n	Checksum (CS)
FE	A6	XX	XX	XX	…	XX	XX

Table 3. Protocol Format

Protocol format description:

Description	Detailed description
Length	Data length
Command number	Command code
Data	Valid data
Checksum	Checksum = fixed code + length + command code + data

Table 4.protocol format description

1.3.3 Command list

No.	Functions	Command word
1	Read CO_2 concentration results	0x01
2	CO_2 concentration single point calibration	0x03
3	Read the software version	0x1E
4	Read the instrument number	0x1F

Table 5. List of commands

Results of CO_2 Concentration Reading:

Send	FE A6 00 01 A7
Response	FE A6 04 01 D1~D4 CS
Description	CO_2 concentration value = D1×256+D2; D3,D4 were reserved

Table 6. Read the concentration instructions

CO_2 concentration value for single-point calibration:

Send	FE A6 02 03 D1 D2 CS
Response	FE A6 00 03 A9
Description	Single-point calibrated concentration value =D1×256+D2

Table 7. Single-point calibration instruction

Read software Version:

Send	FE A6 00 1E C4
Response	FE A6 0B 1E D1~D11 CS
Description	D1~D10 is ASCII code for the version number; D11 is reserved

Table 8. Instructions for reading the software version

Read the instrument number:

Send	FE A6 00 1F C5
Response	FE A6 0A 1F D1~D10 CS
Description	The D1~D10 is ASCII code

Table 9. Instructions for reading the instrument number

2. Dimensions

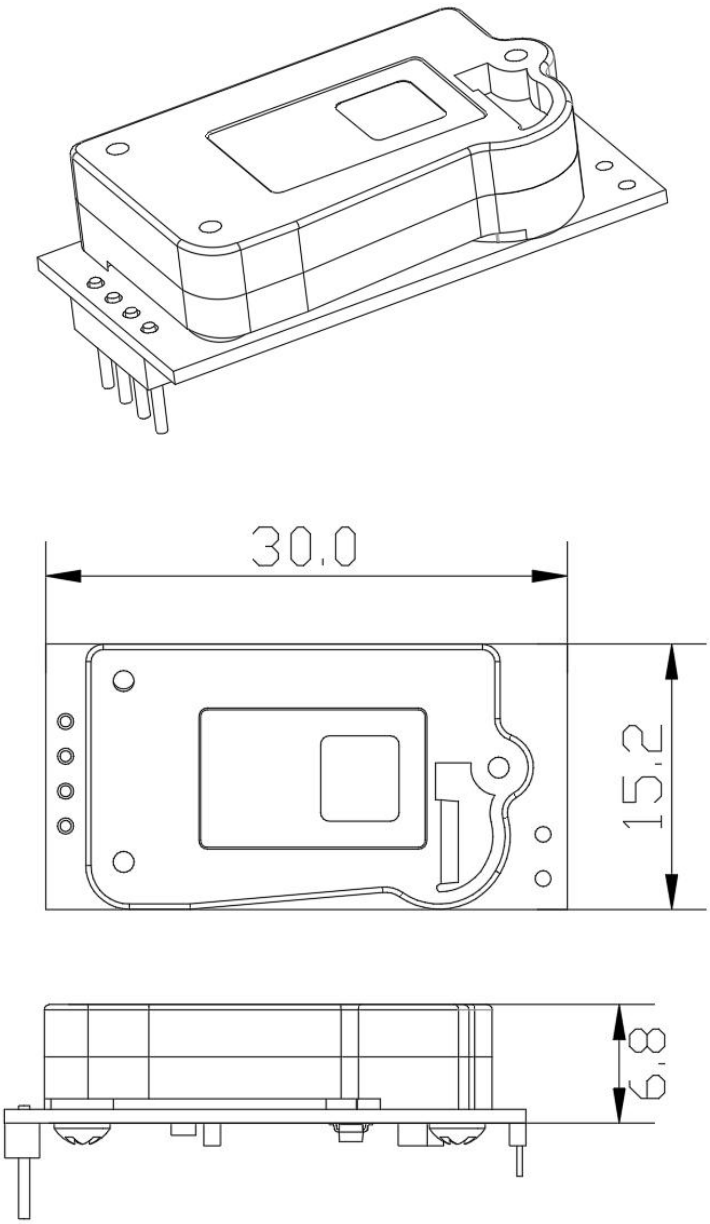

Figure 4. ACD10 dimension (unit: mm)

3. Packaging

ACD10 is packed in a plastic tray with 50 sensors per tray, as shown in Figure 5.

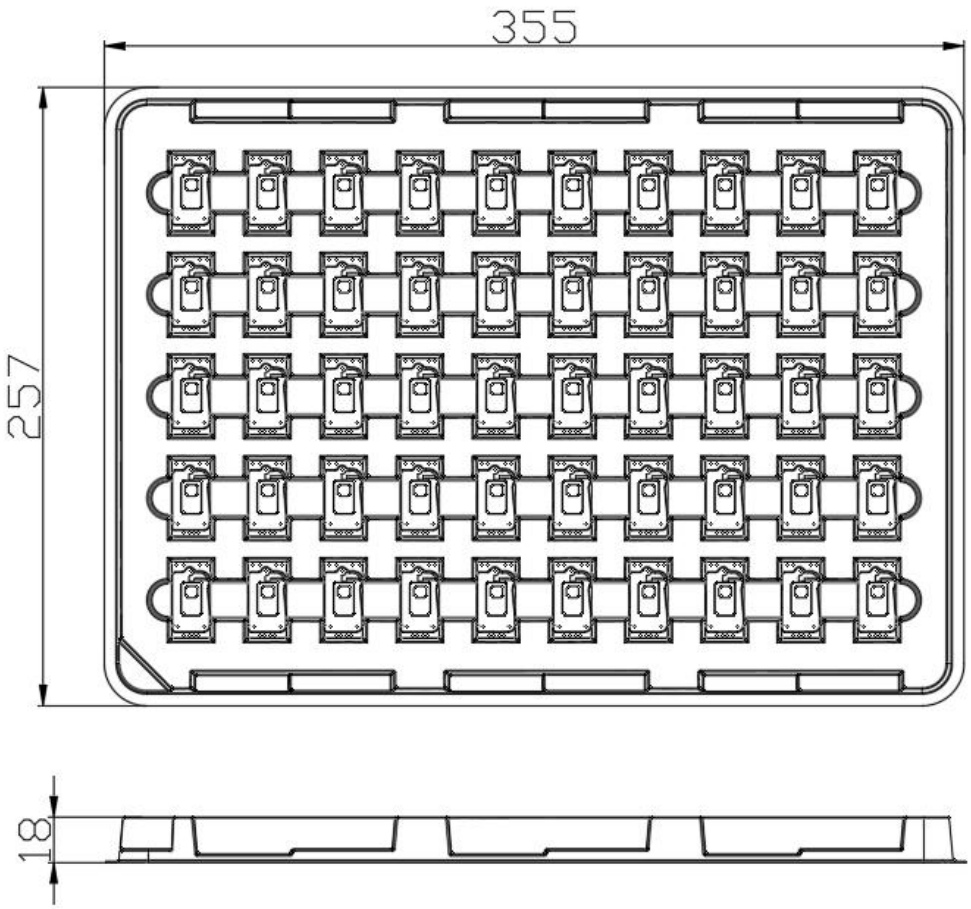

Figure 5. Size of plastic tray (unit: mm)

A single sensor weighs around 3g; one tray with 50 sensors weighs around 165g.

4. Precautions

4.1. Do not disassemble the sensor to prevent irreversible damage.

4.2. For zero calibration, sensor must be operated continuously in a stable gas environment (400 ppm) for more than 20 minutes.

4.3. Sensors should be calibrated regularly, with a calibration period of less than 6 months.

4.4. The equipment inlet and outlet opening size should be larger than the sensor inlet opening size.

4.5. The sensor should be kept away from the heat source and should avoid direct sunlight exposure and other thermal radiation.

4.6. Do not use the sensors for a long time in environments with high dust density.

4.7. Wave-soldering is prohibited for the sensor. When welding with iron, the temperature should be set below 350 ± 5℃ and the welding time should be less than 3 seconds.

4.8. It is recommended that a welded socket can be used by the customer to directly plug and pull the sensor, which is easy for maintenance.

4.9. The data of the sold sensor has been inspected and the data is in good consistency. Do not take the third-party inspection instrument or data as the comparison standard. If the user wants the inspection data to be in consistent with the third-party inspection equipment, the data can be fitted and calibrated according to the actual inspection results.

Warning

Personal injury

Do not apply this product to safety protection devices or emergency stop equipment, and any other applications that may cause personal injury due to the product's failure. Do not use this product unless there is a special purpose or use authorization. Refer to the product data sheet and application guide before installing, handling, using or maintaining the product. Failure to follow this recommendation may result in death and serious personal injury.

If the buyer intends to purchase or use Aosong’s products without obtaining any application licenses and authorizations, the buyer will bear all the compensation for personal injury and death arising therefrom, and relieve any possible claims against Aosong’s managers, employees, affiliated subsidiaries and agents, distributors, etc., including: various costs, compensation fees, attorney fees and so on.

ESD protection

Due to the inherent design of the element, leading to its sensitivity for static electricity. To prevent static import injury and not reduce product performance, please take necessary antistatic measures when applying this product.

Quality assurance

The company provides the quality guarantee of 12 months (calculated from the date of shipment) to direct purchasers of its products, based on the technical specifications in the product data manual published by Aosong. If the product is proved to be defective during the warranty period, the company will provide free repair or replacement. Users need to satisfy the following conditions:

- Notify our company in writing within 14 days after the defect is found.
- The defect of this product will help to find out the deficiency in design, material and technology of our product.
- The product should be sent back to our company at the buyer’s expense.
- The product should be within the warranty period.

The company is only responsible for products that are defective when used in applications that meet the technical conditions of the product. The company does not make any guarantees or written statements about the application of its products in those special applications. At the same time, the company does not make any promises about the reliability of its products when applied to products or circuits.

This manual may be changed at any time without notice.