SPECIFICATION

Product Name: NDIR CO_2 Sensor Module

Item No.: CM1106H-NS

Version: V0.1

Date: April 1st, 2019

Writer	Audit	Approved
Mei Yang		

Revision

No.	Version	Content	Reviser	Date
1	V0.1	Issue the high-end version CM1106H-NS	Yang Mei	April 1st, 2019

NDIR CO_2 Sensor Module

CM1106H-NS

Applications

- HVAC industry
- IAQ monitor
- Air purifier
- Automotive
- IoT devices
- Plant growth

Description

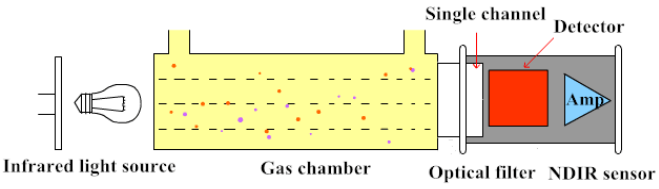
Infrared carbon dioxide CO_2 sensor CM1106H-NS can be used to detect CO_2 concentration of indoor air by adopting advanced non-dispersive infrared technology (NDIR). It is widely used in ventilation system, air conditioner, air purifier, IAQ monitor, agriculture, plant cultivation and cold-chain, etc.

Features

- NDIR technology with independent intellectual property
- Temperature calibration within whole measurement range
- Long life span, auto-calibration, maintenance free
- Small size and compact structure, easy to install

Working Principle

The main components of an NDIR CO_2 sensor are an infrared source, a sample chamber, a filter and an infrared detector. The infrared light is directed by the infrared source passing through the gas chamber towards the detector.



CO_2 molecules inside the gas chamber will only absorb a specific wavelength of the light. The filter allows only the specific wavelength corresponded to pass through it. The detector measures the intensity of infrared light that is related to the intensity of CO_2 and can be described through the Lambert-Beer's Law. The change in sensor signal reflects the change in gas concentration.

Specifications

Single Beam NDIR CO_2 Sensor Specification	
Target gas	Carbon dioxide (CO_2)
Operating principle	Non-dispersive infrared (NDIR)
Measurement range	400-2000ppm (Note 1) Up to 10000ppm extended range (Note 2)
Working temperature	-10°C ~ 50°C
Working humidity	0-95%RH (non-condensing)
Storage temperature	-30°C ~ 70°C
Storage humidity	0-95%RH (non-condensing)
Accuracy	± (30ppm+3% of reading) @ -10℃ -50℃ ,0-85%RH (Note 3)
Sampling frequency	1s
Time to first reading	T90 < 30s
Power supply	DC 3.5-5.5V
Ripple wave	<50mV
Working current	<45mA
Dimensions	33x19.7x8.9mm (pin is not included)
Weight	5g
Signal output	UART_TTL PWM: liner output
Life span	≥15 years
Maintenance	Maintenance-free for normal indoor application with Auto-calibration

Note 1： Sensor is designed to measure in the range 400~2000ppm with specified in the table accuracy. Nevertheless exposure to concentrations below 400ppm may result in incorrect operation of ABC algorithm and shall be avoided for model with ABC ON.

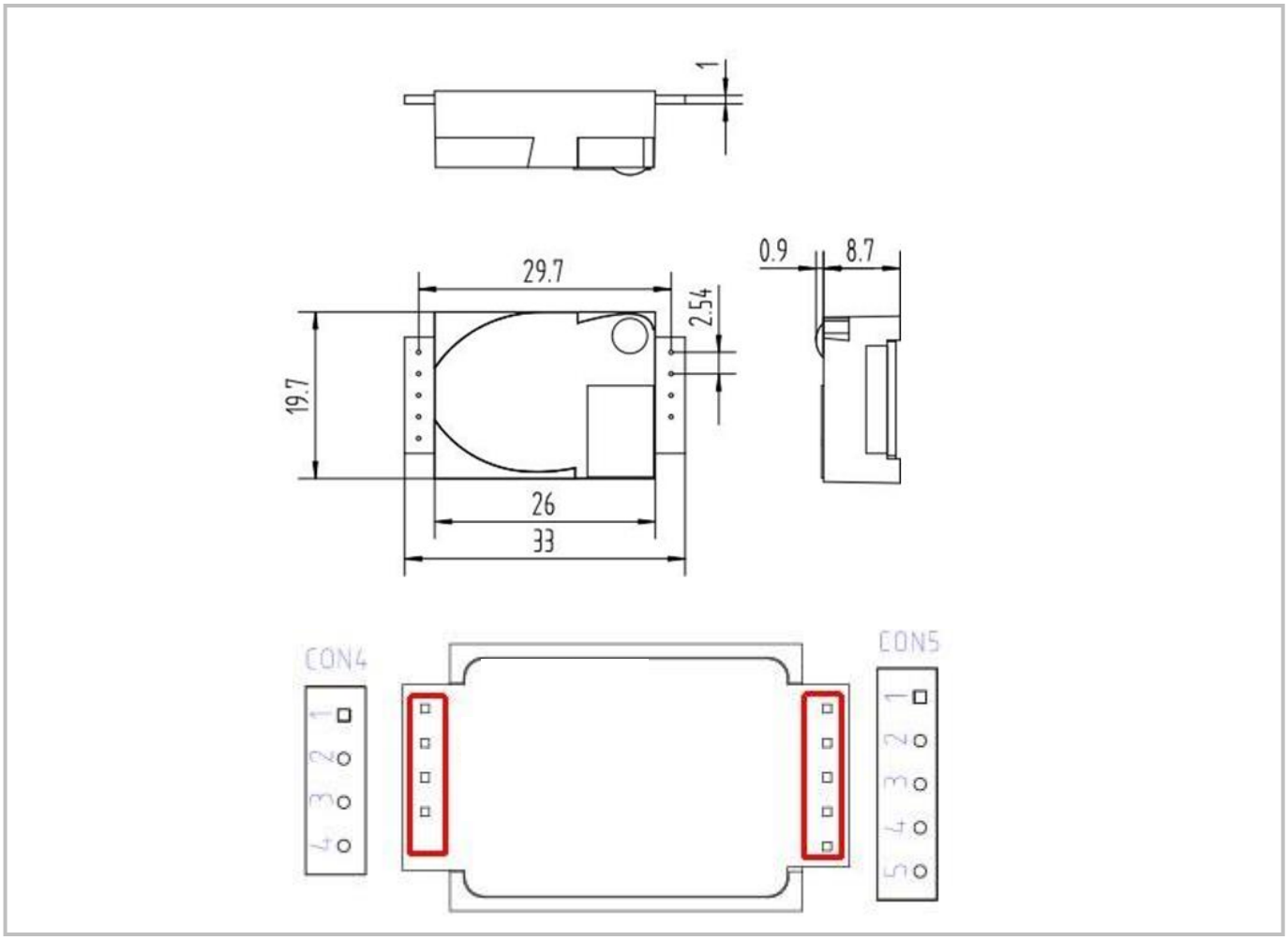
Note 2: Sensor provides readings via UART in the extended range but the accuracy is degraded compared to specification in the table one.

Note 3: In normal IAQ applications, accuracy is defined with -10°C -50°C ,0-85%RH and after minimum two (2) ABC periods of continuous operation with ABC on. Some industrial applications do require maintenance. Contact Cubic for further information.

Note 4: Specification is referenced to certified calibration mixtures. Uncertainty of calibration gas mixtures(±2% currently) is to be added to the specified accuracy for absolute measurements.

Dimensions and Connector

1. Dimensions (Unit mm, tolerance ±0.2 mm)

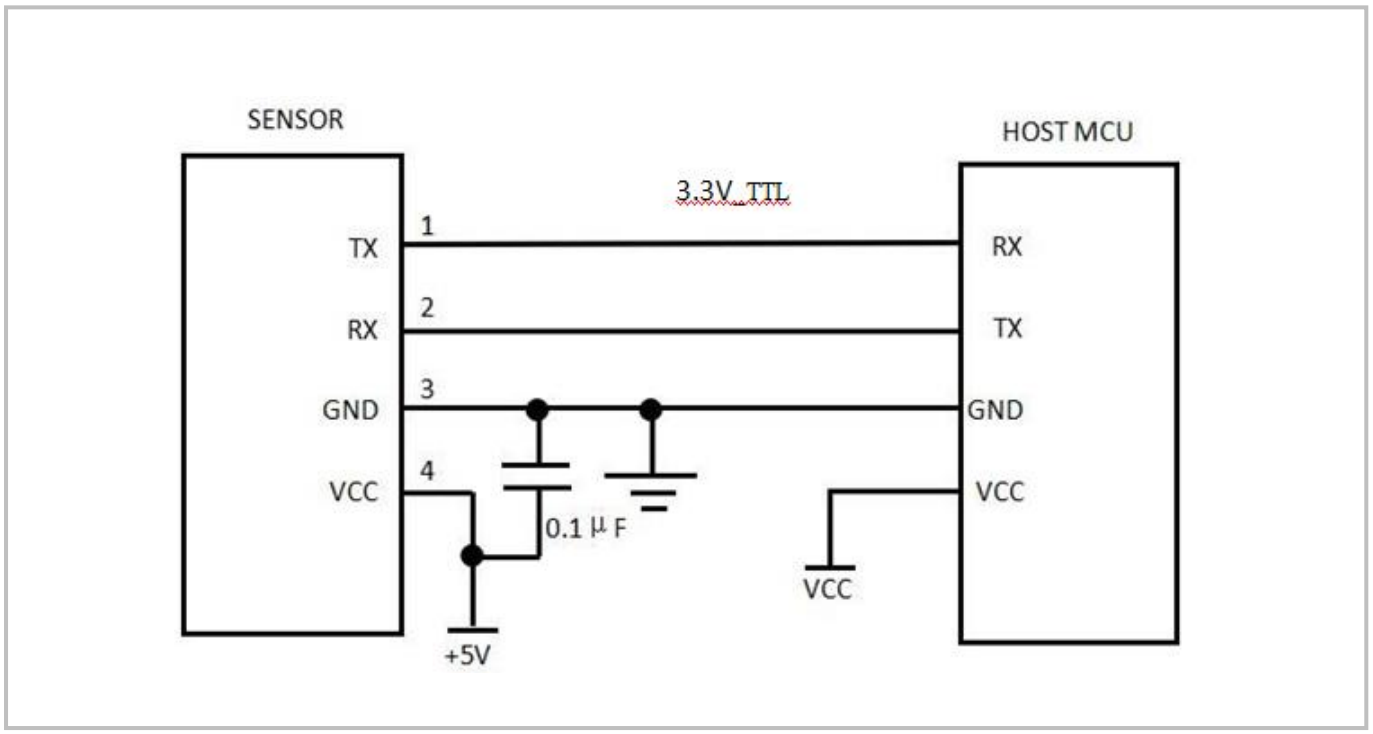


2. I/O Connector Pinout

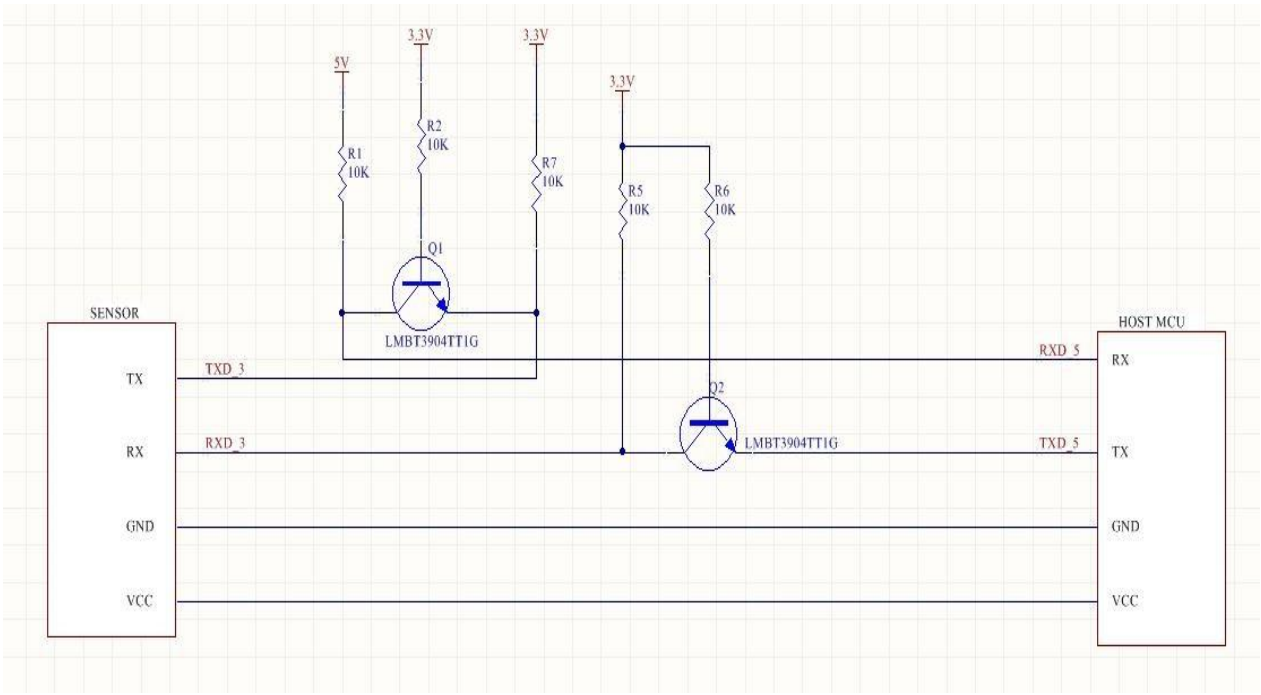
CON4			CON5		
Pin	Name	Description	Pin	Name	Description
1	+5V	Power supply input (3.5-5.5V)	1	+3.3	Power supply output (3.3V/100mA)
2	GND	Power supply input (GND)	2	RX	UART receiving 3.3V
3	A	Alarming (Reserved)	3	TX	UART sending (3.3V TTL)
4	PWM	PWM output	4	R/T	RS485 control site （Reserved）
			5	CA	Manual calibration

Typical Application Circuit

Case1. UART_TTL 3.3V output



Case2. 5V level and 3.3V level conversion circuit



Description of Calibration

Auto Calibration:

Rough installing, non-correct soldering and transportation might result in a reducing of sensor reading accuracy and zero drift, sensor will correct the drift by the built-in self-correcting logic. Powering on the sensor for 7 days continuously, it will record the lowest CO2 concentration measurement value during these 7 days. Sensor will do auto calibration after 7 days and will regard the outdoor fresh air CO2 concentration (400ppm) as baseline. In order to ensure the reading accuracy after auto calibration, please make sure the working environment of sensor can reach the outdoor fresh air level, that is to say, the CO2 concentration of sensor can reduce to the outdoor air level (400ppm) during the 7 days.

Note: Please contact with Cubic for more detailed auto calibration strategy.

Manual Calibration:

Rough installing, non-correct soldering and transportation might result in a reducing of sensor reading accuracy and zero drift. If need to recover accuracy quickly after installing, you can do manual calibration. To put the sensor in the environment where the CO_2 concentration level can reach 400ppm, and the CO_2 concentration in this environment and the reading of CO_2 sensor should be stable before calibration. And then you can do manual calibration by sending command, please refer to the communication protocol for more details.

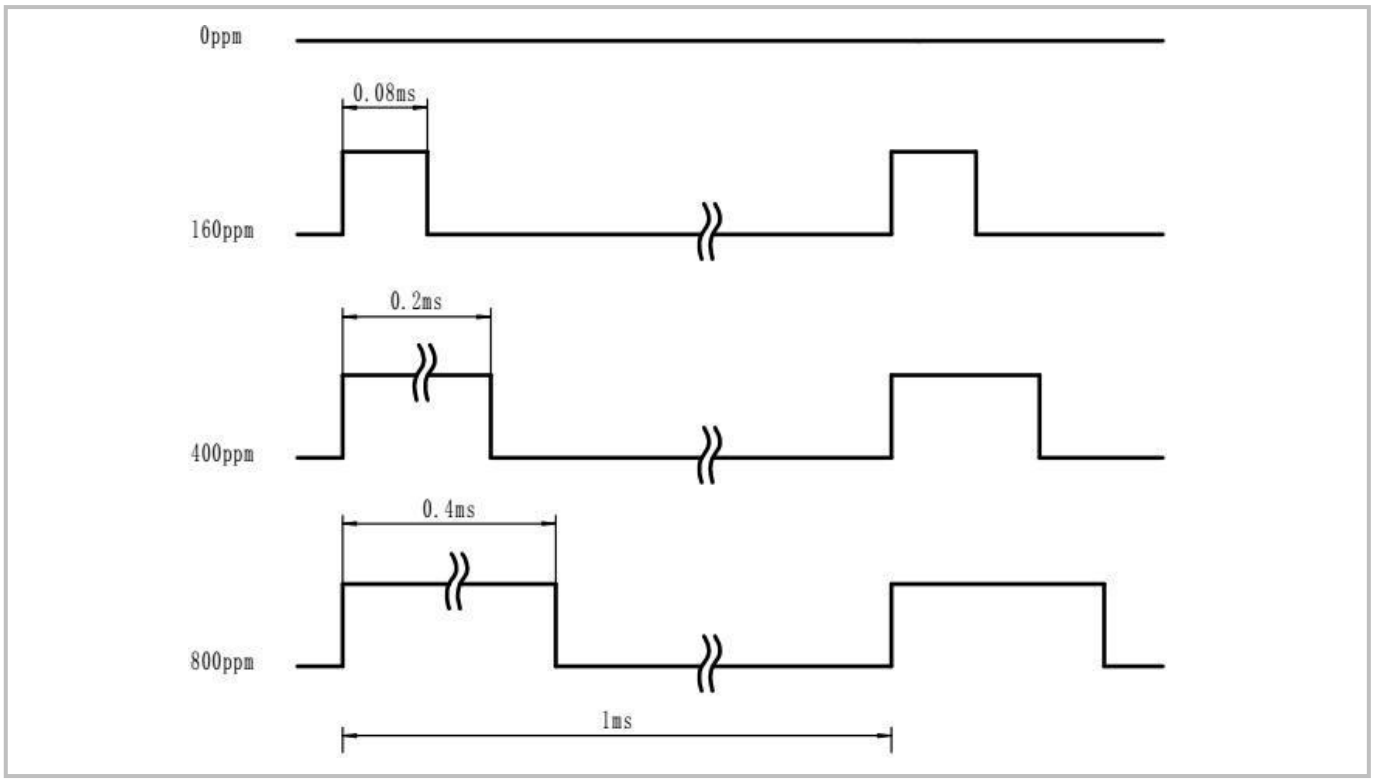
PWM and Alarm Output

PWM cycle: 1ms

Positive pulse width: PPM/2000

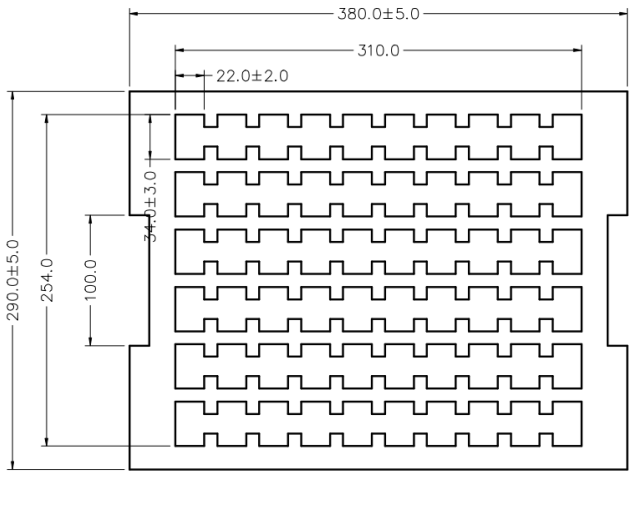
CO2 level measurement: (PWM positive pulse width) *2000

PWM output schema:

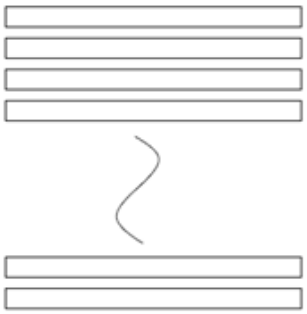


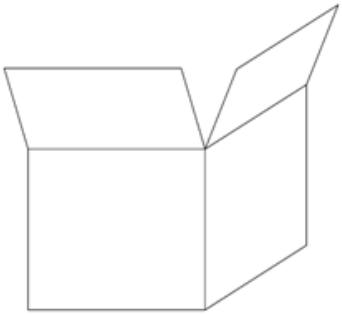
Packing Information

Tray Size



Tray Qty 18





Carton

Sensor per Tray	Tray Qty	Sensor per	Carton Dimensions	Packing Material
60 pcs	18 layers	1080 pcs	395*310*480 mm	Red anti-static EPE

After-Sales Services and Consultancy

Wuhan Cubic Optoelectronics Co., Ltd.

Tel: +86 (0)27 81628827 Fax: +86 (0)27 81628821

Add: Fenghuang No.3 Road, Fenghuang Industrial Park, Eastlake Hi-tech Development Zone, Wuhan 430205, China

E-mail: info@gassensor.com.cn