Temperature and Humidity Module

（Model No.ZS05）

Manual

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Zhengzhou Winsen Electronics Technology Co.,Ltd

Statement

Thanks for purchasing our product. In order to let customers use it better and reduce the faults caused by misuse, please read the manual carefully and operate it correctly in accordance with the instructions. If users disobey the terms or remove, disassemble, change the components inside of the sensor, we shall not be responsible for the loss.

The specific such as color, appearance, sizes &etc, please in kind prevail.

We are devoting ourselves to products development and technical innovation, so we reserve the right to improve the products without notice. Please confirm it is the valid version before using this manual. At the same time, users' comments on optimized using way are welcome.

Please keep the manual properly, in order to get help if you have questions during the usage in the future.

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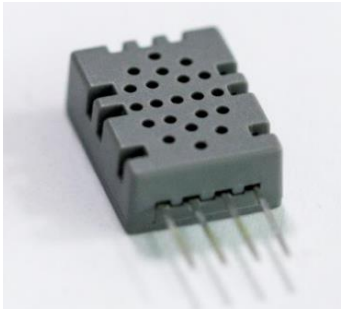
ZS05 Temperature and Humidity Module

ZS05 temperature and humidity module is a digital signal output temperature and humidity sensor module. It uses dedicated digital module acquisition technology to ensure high reliability and stability. ZS05 adopts standard IIC communication mode, which can be directly connected to IIC communication bus, easy to use



Features

Low cost
Low power consumption,Small sizes
High sensitivity
Standard IIC digital interface

Application

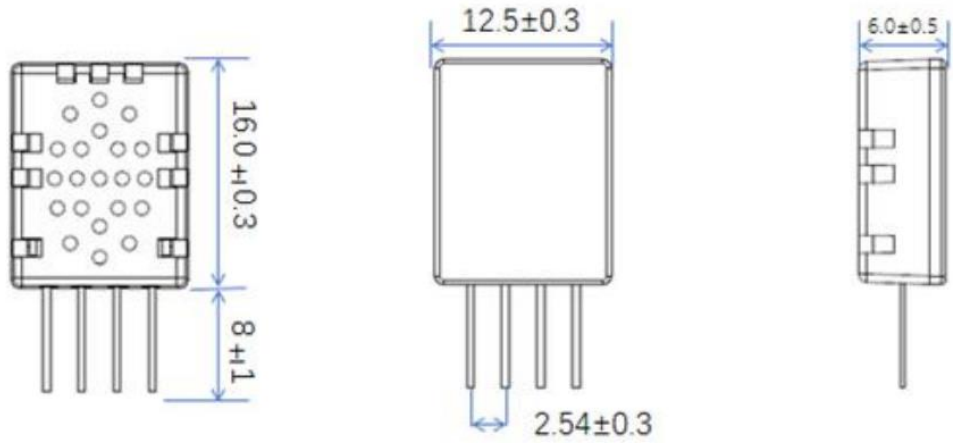
Storage, industrial production, process controlling, environment monitoring, household appliances, meteorological field and enterprises with strict cost requirements.

Parameters

Table 1.

Part No.	ZS05
Detection Object	Relative humidity, temperature
Operation Voltage	3.3～5.5V DC
Detection Range	20～90%RH
Accuracy for humidity detection	±5%RH (at25℃，60%RH，Vin=3.3V)
Accuracy for temperature detection	±1℃
Operation temperature	-20℃～60℃
Package	Single row straight 4-pins(SIP4)

Structure



Front Back Side

Fig1： Structure

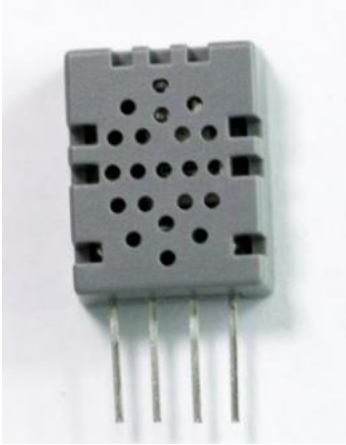
Temperature and humidity performance

Humidity performance					
Parameter	Condition	MIN	TYP	MAX	UNIT
Resolution			0.1		%RH
Measuring range		20		90	%RH
Accuracy			±5		%RH
Detection time			5		S
Voltage		3.3		5.5	V
Working current		2.8		6.6	mA
Quiescent Current		15	20		uA
Storage conditions	＜90%RH				

Temperature performance					
Parameter	Condition	MIN	TYP	MAX	UNIT
Resolution			0.1		℃
Measuring range		-20		60	℃
Accuracy			±1		℃
Detection time			5		S
Voltage		3.3		5.5	V
Working current		2.8		6.6	mA
Quiescent Current		15	20		uA
Storage conditions	-25℃~70℃				

Pins definition

1. VCC Power supply3.3～5.5V DC
2. SDA Data foot
3. GND Power ground
4. SLC Clock pin



VCC SDA GND SCL

Pin definition map

Typical circuit

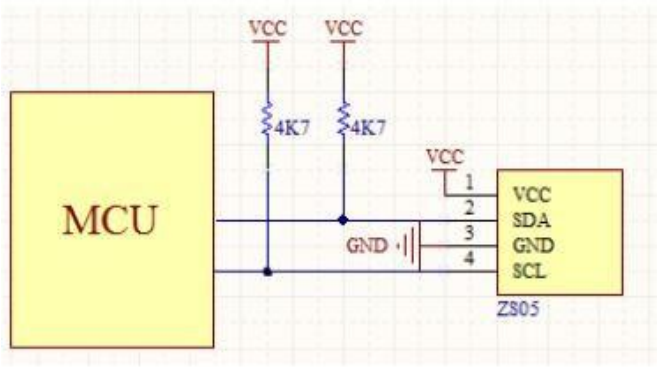


Fig3. application circuit

Electrical performance

Parameter	Condition	Min	Typ	Max	UNIT
Power supply		3.3	5	5.5	V
Low level output voltage		0		300	mV
High level output voltage		90%		100%	VDD
Low level input voltage		0%		30%	VDD
High level input voltage		70%		100%	VDD
Output current	open		8		mA
	Tristate (off)	10	20		uA
The sampling period		2			S

Data interface

Power Supply Pin: (VCC GND) The ZS05 has a supply voltage range of 3.3V - 5.5V.

Serial Clock Input: (SCL) The SCL pin is the clock line for IIC communication.

Serial Data (SDA): The SDA pin is a three-state structure for reading and writing sensor data.

IIC communication protocol

The ZS05 supports the IIC mode for communication. It is compiled according to the IIC standard protocol and can be directly hung on the IIC bus. The sensor SDA pin is connected to the IIC data bus, and the SCL is connected to the IIC clock bus. When using it, the two pins must be connected to a 1KΩ. ~10KΩ pull-up resistor, I2C address is 0xB8 (DEV SEL); IIC communication rate can't be higher than 50KHZ.

BYTE ADDR	R/W	Desc	Note
0x00	R	Humidity integer	Relative humidity value
0x01	R	Humidity decimal place	
0x02	R	Temperature integer	Relative temperature value
0x03	R	Temperature decimal place	
0x04	R		Checksum

IIC interface characteristics: The following communication specifications must be strictly observed, otherwise the sensor will not work properly.

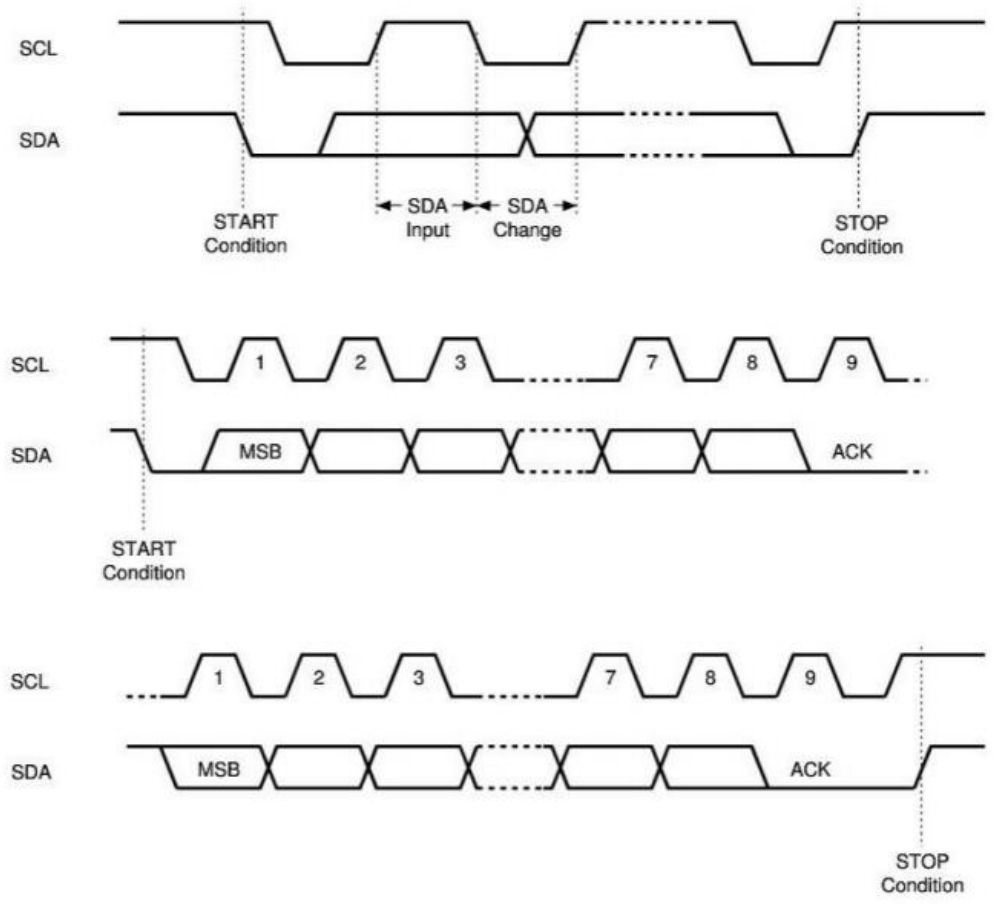


Fig4.IIC communication protocol

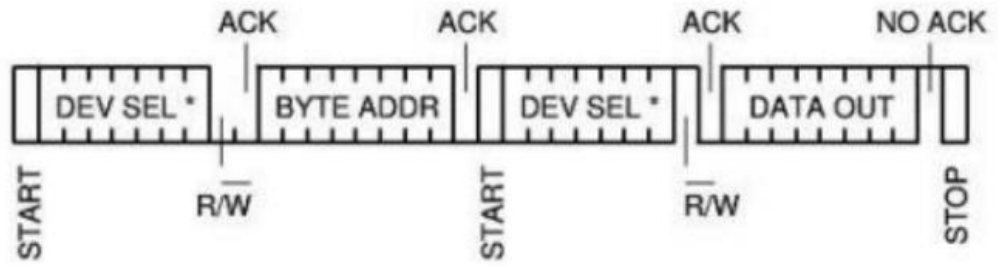


Fig5.IIC read timing diagram

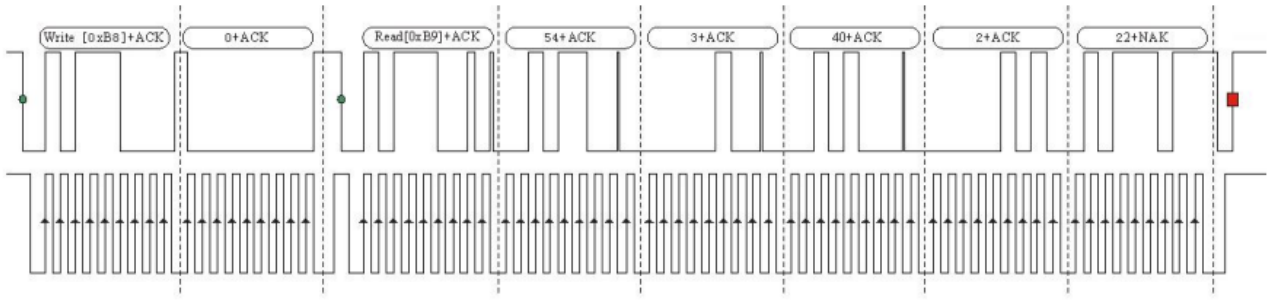


Fig6.Reference timing diagram

Data Format

The data is divided into a fractional part and an integer part. A complete data transmission is 40bit, and the high order is first out.

Data format: 8bit humidity integer data+8bit humidity decimal data+8bit temperature integer data+8bit temperature decimal data +8bit checksum

When the data is transmitted correctly, the checksum data is equal to the last 8 digits of the result of "8bit humidity integer data + 8bit humidity decimal data + 8bit temperature integer data + 8bit temperature decimal data".

Note: The fractional part of temperature and humidity is 0

Example 1: The received 40-bit data is:

00110111 00000000 00010010 00000000 01001001

High humidity 8 bits Low humidity 8 bits High temperature 8 bits Low temperature 8 bits Check digit

Determine whether the temperature is positive or negative:

Judging the highest digit of the 8-bit lower temperature, if the highest digit of the 8-bit lower temperature is "1", then the temperature is judged to be a negative value, and a minus sign is added before the value when outputting the temperature value, if the highest digit of the 8-bit lower temperature is "1" 0", the temperature is judged to be a positive value, and the temperature value is output normally.

Calculation:

00110111 + 00000000 + 00010010 + 00000000 = 01001001

Receive the data correctly:

Humidity: 00110111 = 37H = 55% RH

Temperature: 00010010 = 12H = 18° C

Example 2: The received 40-bit data is:

00110111	00000000	00010010	10000000	11001001
High humidity 8 bits	Low humidity 8 bits	High temperature 8 bits	Low temperature 8 bits	Check digit

Determine whether the temperature is positive or negative:

Judging the highest digit of the 8-bit lower temperature, if the highest digit of the 8-bit lower temperature is "1", the temperature is judged to be a negative value, and a minus sign is added before the value when outputting the temperature value, if the highest digit of the 8-bit lower temperature is "1" 0”, the temperature is judged to be a positive value, and the temperature value is output normally

Calculation:

00110111 + 00000000 + 00010010 + 10000000 = 11001001

Receive the data correctly:

Humidity: 00110111 = 37H = 55%RH

Temperature: 00010010 = 12H = -18℃

Note: Since the water vapor below zero will exist in the form of ice crystals, only the temperature can be tested when the temperature is below zero, and the humidity data is inaccurate.

Caution

- When the module is soldered, the temperature of the case should not be higher than 150℃, and the temperature of the sensor should not exceed 120℃. For manual soldering, the contact time should be less than 10 seconds at the highest temperature of 260℃.
- Temperature affects the relative humidity of gas, so when measuring humidity, the humidity sensor should work at the same temperature as much as possible. If sharing a printed circuit board with electronic components that emit heat, mount the sensor as far away from the electronic components as possible and under the heat source while maintaining good ventilation of the enclosure.
- Don’t use it in dusty environment for long time
- Don’t touch the humidity component inside
- Forbid storing the module in corrosive environment for long time.
- Recommended storage conditions: temperature 10℃～40℃, humidity is less than 60%RH
- Avoid condensation