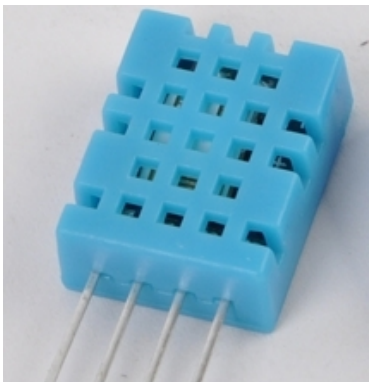
DHT11 Digital Humidity & Temperature Sensor

► relative humidity and temperature test
► Whole calibration, digital output
► excellent long-term stability
► No-need extra compenent
► Overlong signal transmission distance
► ultralow energy consumption
► Pin installation
► complete interchangeability



DHT11 product overview

DHT11 digital humidity temperature sensor is the composition sensor which contains calibrated digital output. It applies to specialized digital module, and collects technology and humidity & temperature sensor technology. All of this can guarantee the product with extremely high reliability and excellent long-term stability.
This sensor contains one resistance type moisture element and one NTC temperature-testing component, which connected to high-performance 8 pro SCM. Therefore, there are so many advantages below: high quality and excellent, extremely fast response, high antijamming capability. For each DHT11 sensor, it can calibrate in the extremely exact temperature check room. The calibration factor is stored in the OTP RAM in the form of procedural. When it tests processing of the signal inside the sensor, it needs to call the calibration factor. The single wire system port makes the system intergration simplier and faster. The excellent advantage like extreme minimum volume and ultralow energy consumption and the signal transmission distance up 20m or above, makes it become the best choice even under harshest application environment. Variously.

It is 4 pin single row package. Convenient connecting, if you need the special package type, we can customize it per your requirement.

Application area
► HVAC ► Checkout equipment
► Automobile ► data recorder
► Consumption ► automatic control
► Meteorological station ► household appliances
► Psychrometric regulator ► medical treatment
► dehumidifier

Order information

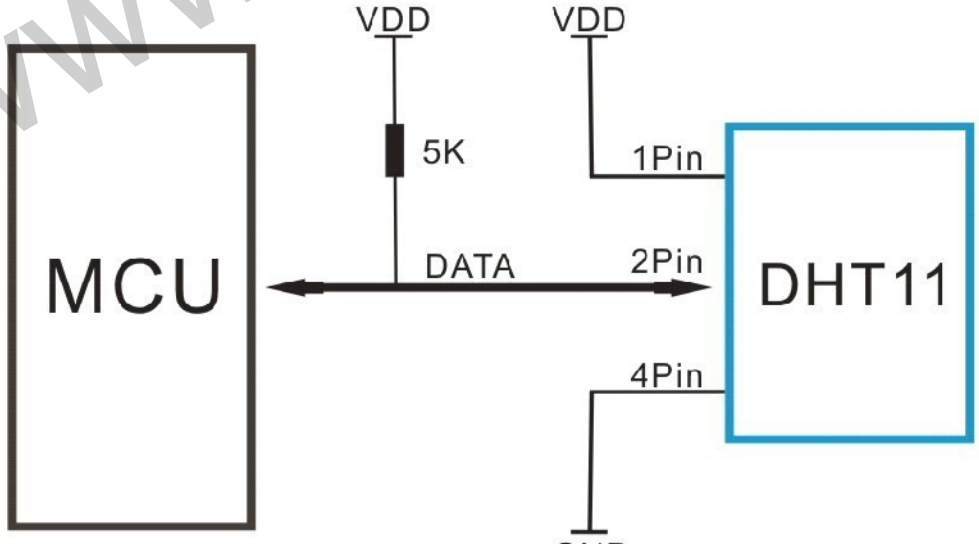
module	Range omeasurement	Hygrometric	Thermometry	definition	package
DHT11	20 ı 90％RH 0 ı 50℃	±5％RH	±2℃	1	Four pin singal upright

1. Sensor capability instruction

prameter	condition	Min	Typ	Max	unit
humidity					
definition		1	1	1	%RH
			8		Bit
repeatibility			±1		%RH
accuracy	25℃		±4		%RH
	0－50℃			±5	%RH
interchangeabili	Complete interchangeability				
Range ability	0℃	3		9	%RH
	25℃	2		9	%RH
	50℃	2		8	%RH
Response time	1/e(63%)25℃，1m/s air	6	10	15	S
delaying			±1		%RH
Long-term	Typical value		±1		%RH/yr
temperature					
definition		1	1	1	℃
		8	8	8	Bit
repeatability			±1		℃
accuracy		±1		±2	℃
Range ability		0		5	℃
Response time	1/e(63%)	6		3	S

2. connector instruction

suggestion that use 5K pull up resistor when the length of the connecting cable is shorter than 20m, and when longer than 20m, then you can choose an appropriate pull up 5k resistor.



3. supply pin

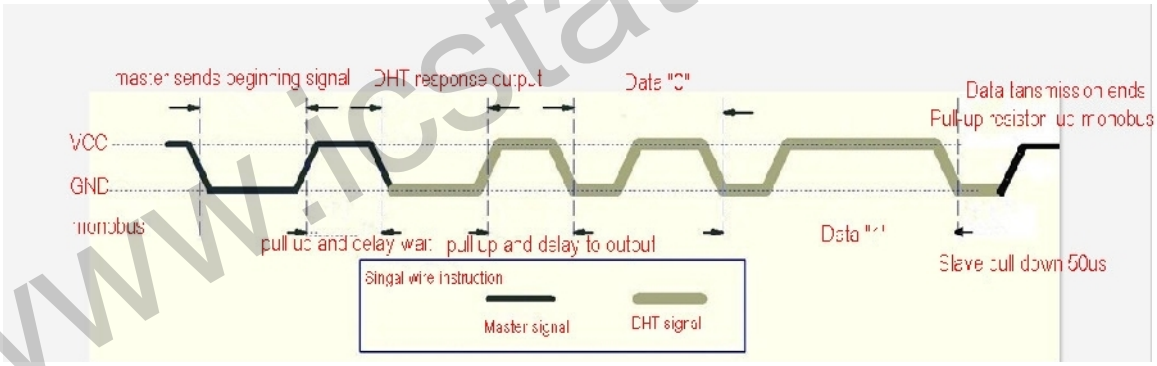
The supply voltage of the DHT11 is 3-5.5V. When connecting up to the sensor, you need to wait for 1s, and during the period when crossing the unstable status, there is no need to send any order. Between the supply pin VDD and GND, you can add a capacitor 100nF, which is used to decoupling filtering

4. serial interface(single line-two direction)

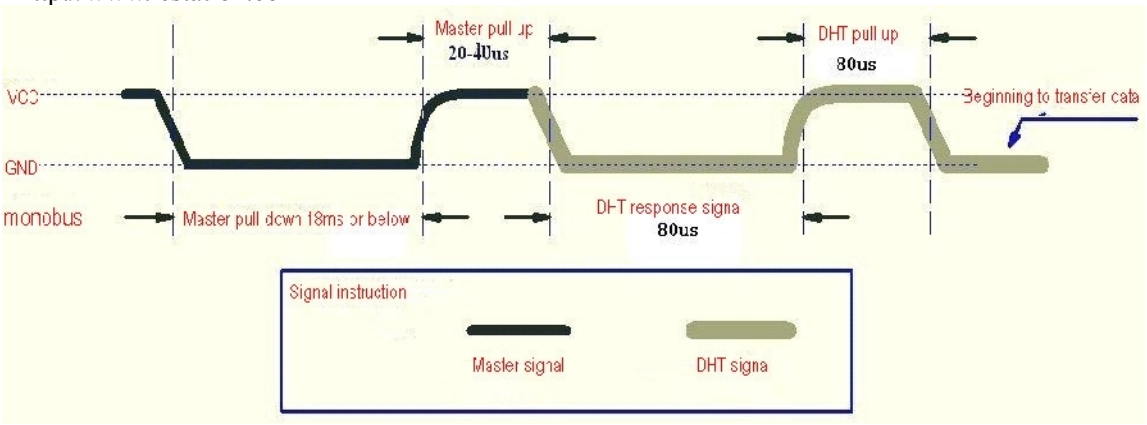
DATA is used to communication between the microcontroller and DHT11. AND use the Single bus data format , the communication time for one time is around 4ms.
The data contains Decimal and integer part. The detailed format is in the instruction below, when the integer is used to future expanding, then the data will be zero.

Operation procedure is below:
The complete data transmission is 40 bit, high first out.
The data format : 8bit humidity integer data +8bit humidity decimal data +8bit temperature integer data+8bit temperature decimal data+8bit checksum.
When the data transferring correctly, validation and data is equal to “8bit humility integer data+8bit humility decimal data+8bi temperature decimal data+8bit temperature decimal data. The result is the last eight number.

When user MCU sending the first signal for one time, DHT11 will turn low_consuming model into high consuming model,after the beginning signal of the master ends, DHT11 will send response signal,send 40 bit data, and the trigger one time signal collection. The user can choose to read the data partly, under the model, DHT11 can receive the humility &temperature collection for the beginning signal. If you haven’t got the beginning signal sent by master, DHT11 will not collect the humility & temperature initiatively. After receiving the data, it can convert into a low_speed model.
1.communication process is below:



When trunk is in idle state, it is high-electric level. The master will pull down trunk to wait the DHT11 response.The time must be over 18ms. Which can guarantee DHT11 to test the beginning singal. After DHT11 receive the beginning signal from the master, the beginning signal to wait the master ends. And then send 80us low_electric level response signal. After master ends sending the beginning signal, and then delay 20-40s, read DHT11 response signal.After the master sends the beginning signal, you can convert it into input model, or output high level model. Trunk will pull up with the pull-up resistor.



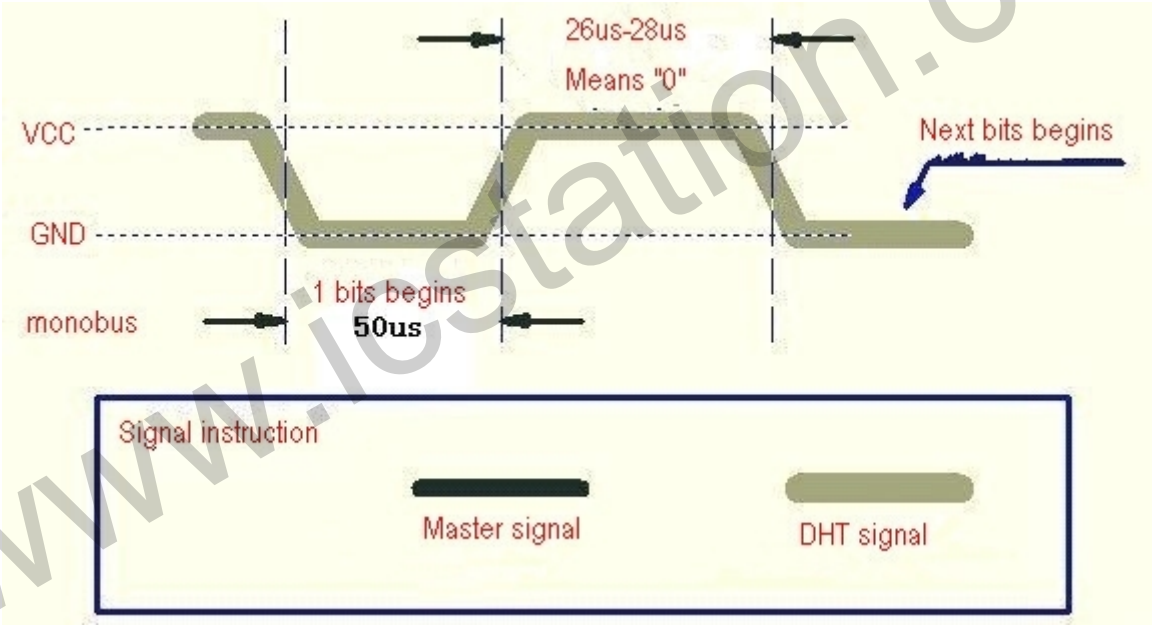
Picture 2

Trunk is low electric level. It indicates that after DHT11 sends response signal, then pull up 80us, intending to send the data.It can begins with 50us low electric level time space per one bit.When you decide if the data bits is 0 or 1 by the length of the high-electric level. The format can be seen the picture below:

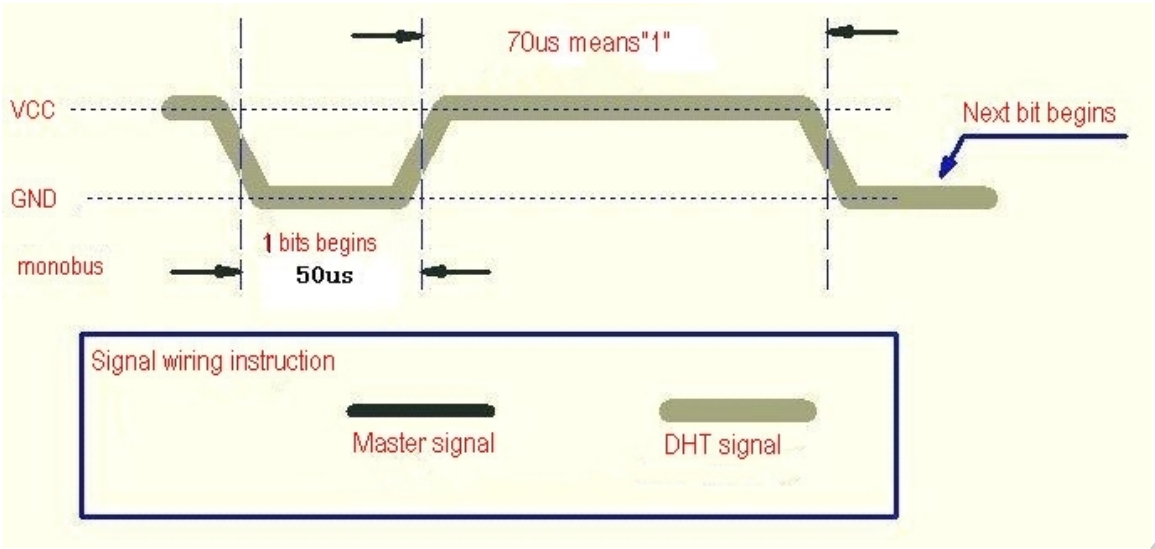
If the response signal read is high_electric level, then the DHT11 will not response. You can check if the circuit is normal, when the data of the last bit ends sending, DHT11 pull down trunk 50us, then trunk will go into idle status from up to down.

The expressive method of data 0 signal is below:

Picture 3



Picture4



5. measurement definition

Measurement definition is 8bit(temperature) ’8bit(humility).

6. Electrical specification

VDD=5V ’T = 25℃ ’(except special label)

parameter	conditon	min	typ	max	unit
supply	DC	3	5	5.5	V
Supply current	test	0.5		2.5	mA
	average	0.2		1	mA
	wait	100		150	uA
Collection period	second	1			time

Note: collection period id can’t be lower 1 second

7. application information

7.1

Working and storage condition: If the working range is over the suggested range, it will lead to the temporary float signal up to 3% RH. After returning the normal working condition, the sensor will recover into calibration status.

7.2

Expose in the chemical substance, the sense of Resistive humidity sensor will be disturbed by the chemical gas, and the explanation in the sensor layer in the chemical substance willl cause that the testing data will float and the sensitivity will descend. Under a completer pure circumstance , the pollution will release slowly. The recovery processing below will accelerate the processing. High concentration chemical pollution will lead to the damage of the sensor layer of the sensor completely.;

7.3 °

Recovery process, under extreme working condition or chemical gas sensor, after processing with the procedure, which can make it recover to the status when calibrating. Under the humility condition of 50-60℃ and< 10%RH, and keep 2 hours to dry, then uder the humility condition of 20-30 ℃和< 70 %RH, and keep 5 hours.

7.4

Considering the relative humility of the gas, to a large extent, it depends on the temperature. Therefore, when testing humility, we need to try our best to keep the humility sensor to work in the same temperature. If the component of releasing thermal use oine printed board at the same time. When installing, we need to try our best to make DHT11 far away with the components, what’more, it should install under heater and keep good ventilation. In order to lower heat conduction, we need to try our best to lower the copper layer between DHT11

and printed circuited board, and spare some space between them.

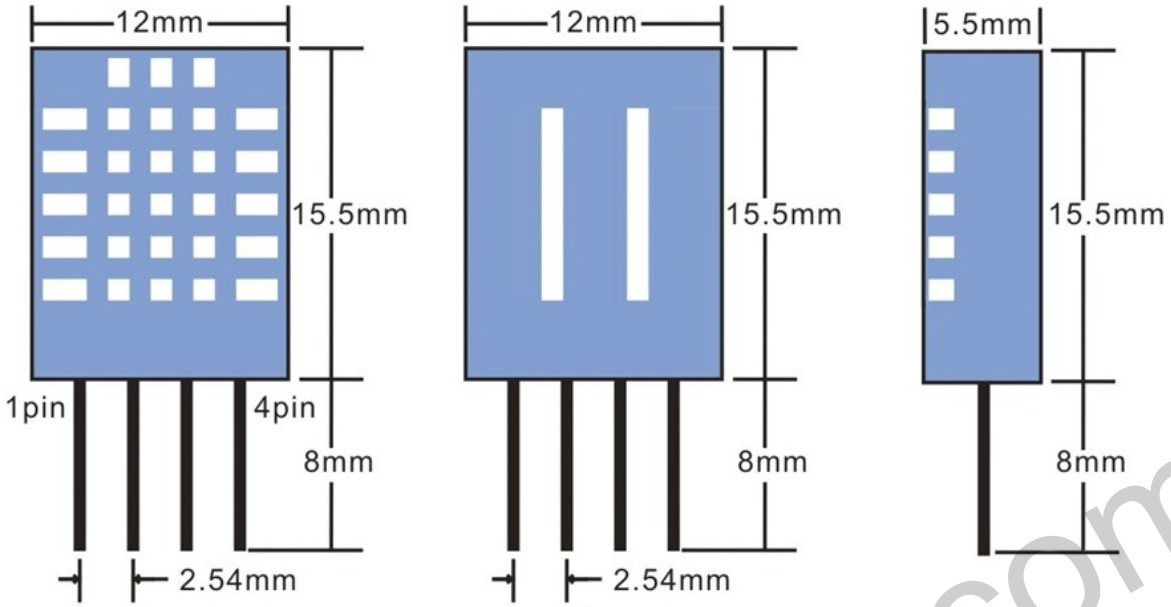
7.5

Light, expose under the sunshine or extreme strong ultraviolet for a long time, it will lower the performance.

7.6

Attention to wiring. DATA signal quality will affect communication distance and communication quality, we recommend to use high quality shielded wire.

8 `Package information



9 ` DHT11 pin instruction

Pin	name	note
1	VDD	supply 3 ı 5.5VDC
2	DATA	serial data monobus
3	NC	space, please hange
4	GND	ground connection the negative port of the supply

10 ` welding information
Weld, the contact time must below 10s under the condition of 260℃

11 `annoucements
(1)Avoid to use it under moisture condensation
(2)Long-term preservation condition: temperature 10-40 ℃, humility below 60％