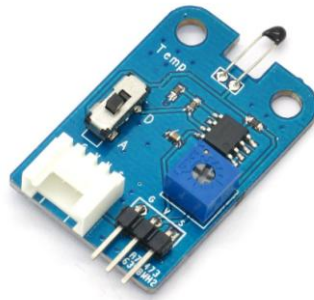**ITEAD STUDIO**
make innovation easier

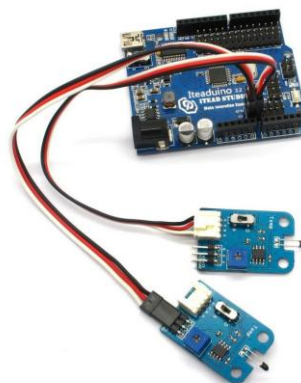# Electronic Brick of Temperature Sensor

Overview

What is an electronic brick? An electronic brick is an electronic module which can be assembled like Lego bricks simply by plugging in and pulling out. Compared to traditional universal boards and circuit modules assembled with various electronic components, electronic brick has standardized interfaces, plug and play, simplifying construction of prototype circuit on one's own. There are many types of electronic bricks, and we provide more than twenty types with different functions including buttons, sensors, Bluetooth modules, etc, whose functions cover from sensor to motor drive, from Ethernet to wireless communication via Bluetooth, and so on. We will continue to add more types to meet the various needs of different projects.
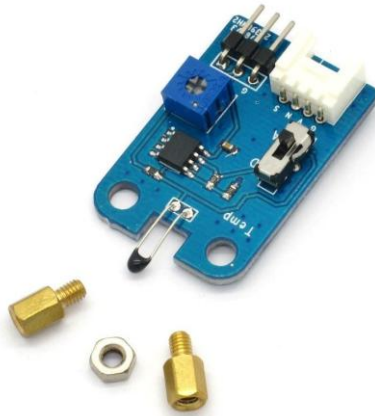
Electronic brick of temperature sensor is mainly used to detect the temperature changes in the environment. The control board can get the current temperature information via analog pins. Generally speaking, the resistance of temperature sensitive resistor decreases with the increase of temperature.
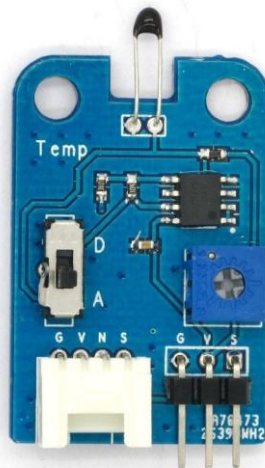
Features

1. Plug and play, easy to use. Compatible with the mainstream 2.54 interfaces and 4-Pin Grove interfaces in the market.
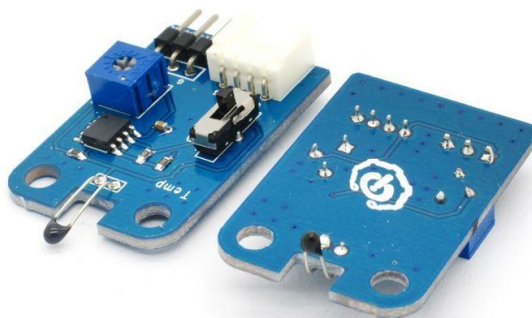
ITEAD STUDIO
make innovation easier

2. With use of M4 standard fixed holes, compatible with M4-standard kits such as Lego and Makeblock.

3. With switch to shift between analog and digital output. Able to read the specific temperature information (analog) or the over-high or over-low temperature information according to the threshold (digital). The adjustable potentiometer is used to set the temperature threshold. With hysteresis comparator circuit for more stable digital output voltage.

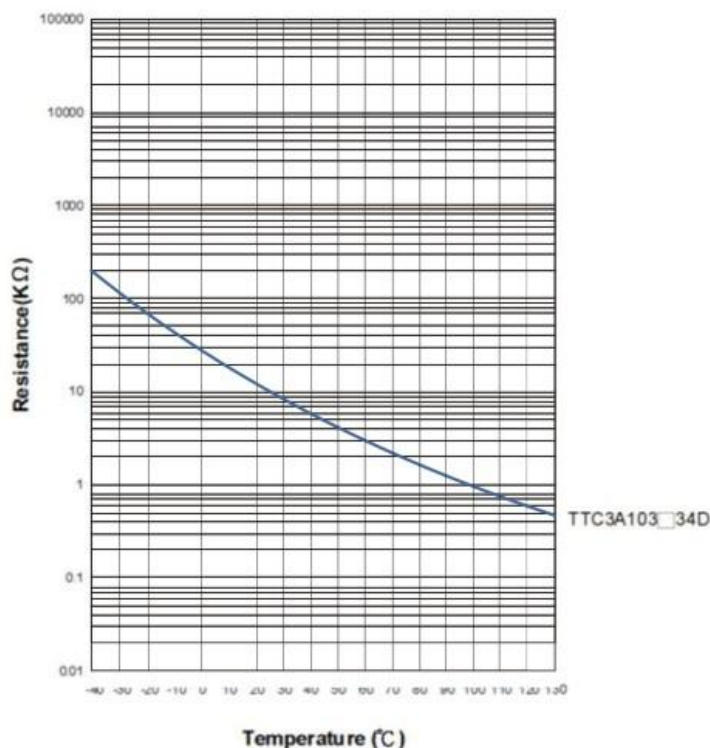4. Detecting direction can be rotated for better adaption.

Specifications

PCB size	36.0mm X 24.0mm X 1.6mm
Working voltage	3.3 or 5V DC
Operating voltage	3.3 or 5V DC
Compatible interfaces	2.54 3-pin interface and 4-pin Grove interface[1]

Note 1 :   D for digital output port, A for analog output port, S for analog/digital output port (defined according to the switch), V and G for voltage at the common collector and ground respectively

Note 2 :   When setting as analog output, output range is 0-3.3V or 0-5V according to the working voltage (V,G); when setting as digital output, output is 0/3.3V or 0/5V according to the working voltage (V,G).
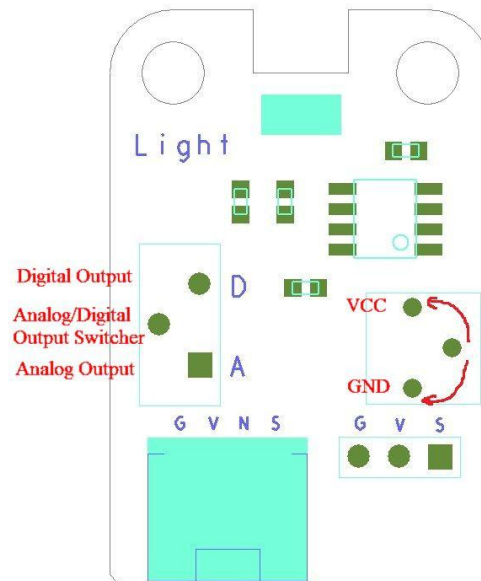
Electrical characteristics

Parameter	Min.	Typical	Max.	Unit
Working voltage	2.1	5	5.5	VDC
Analog output voltage (VCC=5V)	0	Vout	5	V
Digital output voltage (VCC=5V)	0	-	5	V
Working current (VCC=5V)	-	5	-	mA
Temperature sensitive resistor (temperature is 25℃)	-	10	-	kohm
Threshold hysteresis ΔUth	-	VCC*0.09	-	V

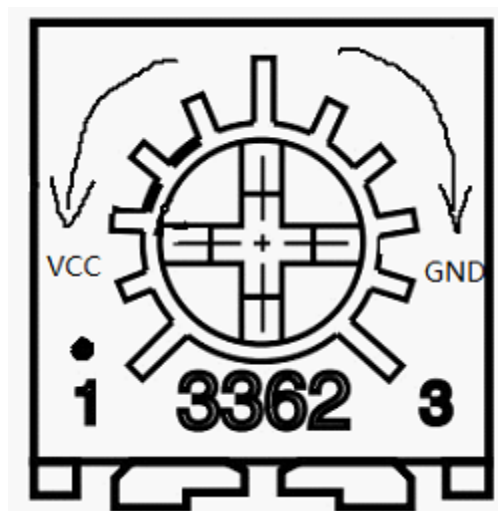Temperature Vs. Thermistor resistance

Hardware

Top view

Switch and indicator

1. Regulating of threshold voltage:

The threshold voltage is a voltage for comparison. When the temperature value read by the sensor is above the threshold value, a low level (0V) will be digitally output; when the temperature value read by the sensor is below the threshold value, a high level (3.3V or 5V) will be digitally output. In this way, the digital pin can be used directly to read the current temperature in the environment to see if it is above the threshold or not. The threshold voltage can be regulated by simply twisting the potentiometer which is shown in the following diagram, and it increases by rotating to left side and decreases by rotating to right side.

2. Switch to shift between analog and digital output

For S pin in 2.54mm 3-pin interface and 4-pin Grove interface, it outputs analog signals when switch is pushed to A terminal and digital signals when pushed to D terminal. When there is analog signal output, it can read the specific temperature value; when there is digital signal output, it can only indicate whether the temperature is above threshold value or not.

DEMO

1. Push the snap switch of sensor to analog output, connect S port to A0 port of Arduino board, and we will use the following program to read the analog value of temperature and send it to computer for display via the serial port.

```
int ASignal = A0;
void setup() {
   Serial.begin(9600);
}
void loop() {
   int sensorValue = analogRead(ASignal);
   Serial.println(voltage);
}
```

2. Push the snap switch of sensor to digital output, connect S port to D2 port of Arduino board, and we will use the following program to read the digital value of temperature and send the threshold condition to computer for display.

```
int DSIGNAL = D2;
void setup()
{
   Serial.begin(9600);
   pinMode(DSIGNAL, INPUT);
}
void loop()
{
   int DsignalState = digitalRead(DSIGNAL);
   Serial.println(DsignalState);
   delay(100);
}
```

Revision record

Version	Description	Date	Written by
v1.0	Initial edition	12th, April, 2013	Stan Lee