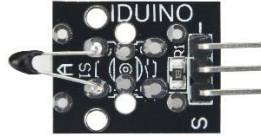


## Analog Temperature Sensor(ST1147)



### 1. Introduction

A thermistor is a type of resistor whose resistance is dependent on temperature, more so than in standard resistors. The word is a portmanteau of thermal and resistor. Thermistors are widely used as inrush current limiter, temperature sensors (NTC type typically), self-resetting overcurrent protectors, and self-regulating heating elements.

The Module's feature as below:

Feature	Value
Model No.	NTC-MF52 3950
Temperature Range	-55°C~ +125°C
Accuracy	+/- 0.5°C
Pull-up resistor	10KΩ

### 2. Pinout

Pin	Description
"S"	Signal pin
"-"	Gnd
"+"	Vcc(reference voltage:5V DC)

### Temperature convert Formula

Here we use Steinhart–Hart equation to calculate the corresponding temperature. The equation is

$$\frac{1}{T} = A + B \ln(R) + C[\ln(R)]^3,$$

where:

$T$  is the temperature (in Kelvins)

$R$  is the resistance at  $T$  (in ohms)

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$A$ ,  $B$ , and  $C$  are the Steinhart–Hart coefficients which vary depending on the type and model of thermistor and the temperature range of interest. (The most general form of the applied equation contains a  $[\ln(R)]^2$  term, but this is frequently neglected because it is typically much smaller than the other coefficients).

**Note:** For this module, the recommended coefficients of  $A, B, C$  are

$A$  equals 0.001129148;

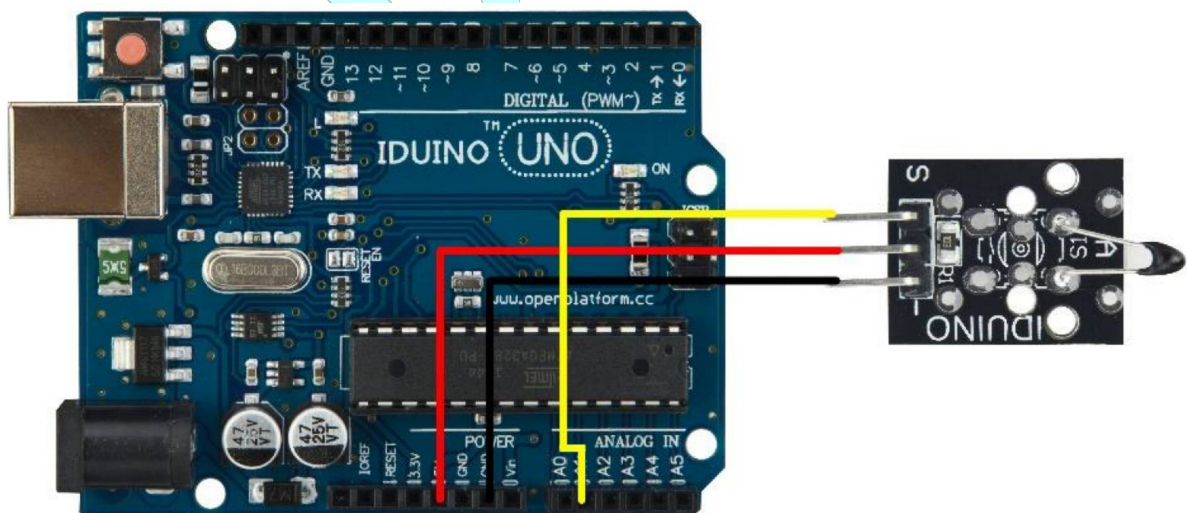
$B$  equals 0.000234125;

$C$  equals 0.0000000876741;

More, the same item products has a little bit different  $A, B, C$  coefficients, which depends your environmental temperature. If the recommended coefficients are not accurate enough, you'd better amend the  $A, B, C$  coefficients by Thermistor Calculator tool.

### 3 Example

This is a simple code for the NTC thermistor module, Connection as below:



### **Example Code:**

```
#include <math.h>

double Thermistor(int RawADC) {
    double Temp;
    double Res;

    Res = (10000.0 * RawADC) / (1023 - RawADC);

    Temp = log(Res);

    Temp = 1 / (0.001129148 + 0.000234125 * Temp +
               0.0000000876741 * Temp * Temp * Temp);

    Temp = Temp - 273.15;

    return Temp;
}

void setup() {
    Serial.begin(9600);
}

void loop() {
    Serial.print(Thermistor(analogRead(1)));

    Serial.println(" Celsius");

    delay(1000);
}
```