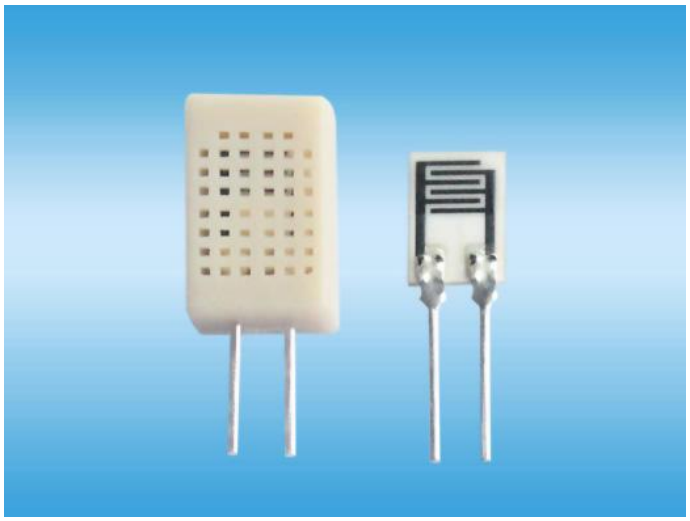
参考資料

Humidity sensitive resistor

Product Manual

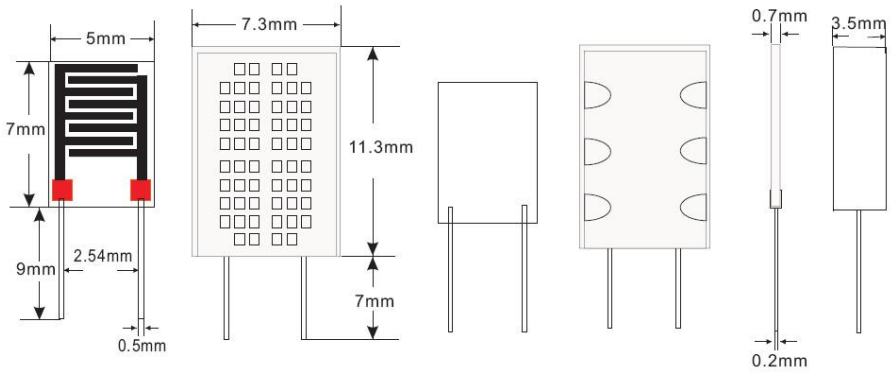
HR202L



1、Product Overview

HR202L hygristor is to a new moisture–sensitive components of organic polymer materials, has a sense of wet wide range, fast response, anti–pollution ability, without heating the cleaning and long–term use of reliable performance and many other features.

2、Dimensions（Unit: mm）



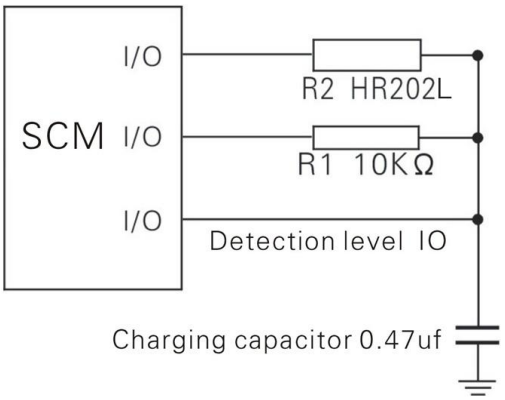
3、Range of applications

Used to display temperature and humidity meter, temperature and humidity gift table, atmospheric environmental monitoring, industrial process control, agriculture, measuring instruments and other applications.

4、Features

Outlook is smart, long–term stability, wide temperature and humidity measuring range, high and low temperature humidity measurement precision.

5、Circuit diagram



5、Product parameters

Fixed voltage: 1.5V AC (Max, sine wave)
Fixed power: 0.2mW (Max, sine wave)
Operating frequency: 500Hz ~ 2kHz
Operating temperature: 0 ~ 60 ℃
Use Humidity: 95% RH (non–condensing)
Wet hysteresis difference: ≤ 2% RH
Response time: moisture, ≤ 20S; dehumidifying ≤ 40S
Stability: ≤ 1% RH / year
The humidity detection accuracy: ≤ ±5% RH

Relative humidity
Conditions: at 25 ℃ 1kHz 1V AC (sine wave)
Humidity: 60% RH
Central value: 31 KΩ
Impedance values range: 19.8 ~ 50.2 KΩ
Humidity detection accuracy: ± 5% RH

6、Standard test conditions

Atmosphere, the temperature was 25℃, measurement frequency of 1kHz, measured voltage 1V AC (sine wave) as a reference. Characteristic measurement, measured before the first humidity sensor placed in the dry air of 25℃ / 0%RH for 30 minutes, humidity generating means generating the humidity of 60%RH, after 15 minutes into the humidity sensor measured impedance value.

Measuring device：

Split humidity generating device ： AHR – 1
LCR Bridge ： TH2810A
Measurement line ： 1 core shielded cable

Stability testing：

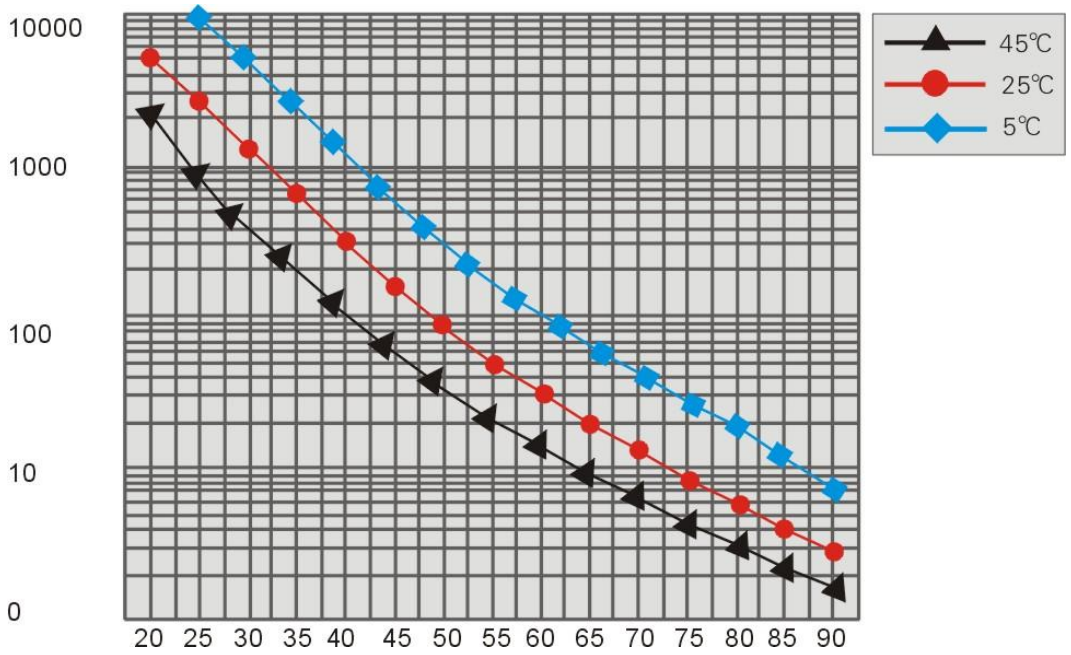
No.	Project	Test methods	Specifications value
1	Pin strength	0.5kg leads Rally 10 seconds	No damage, pin off Electrical characteristics normally
2	Impact resistance	Hard texture board 1m height naturally fall was repeated three times.	No damage, pin off Electrical characteristics normally
3	Resistance to shock	A frequency of 10 ~ 55Hz, amplitude 1.5mm (10 ~ 55Hz ~ 10Hz) to the direction of the X–Y–Z 2 hours each vibration test	No damage, pin off Electrical characteristics normally
4	Heat resistance	Temperature 80 ℃, humidity 30% RH 1000 hours following air	± 5%RH Within
5	Cold resistance	Temperature of 10 ℃, humidity 70% RH 1000 hours following air	± 5%RH Within
6	Moisture resistance	Temperature of 40 ℃, humidity 90% RH 1000 hours following air	± 5%RH Within
7	Temperature cycling	0℃ placed under 30 minutes, And then transferred to 50℃ for 30 minutes, Then placed in 0℃ for 30 minutes, 5 cycles	± 5%RH Within
8	Humidity cycling	25 ℃, 30% RH for 30 minutes, And then transferred to 90% RH for 30 minutes, 30% RH for 30 minutes and then placed 5 cycles.	± 5%RH Within
9	Resistance to organic solvents	At room temperature organic solvents 30 minutes of ethanol gas The acetone gas is 30 minutes	± 5%RH Within
10	Energized placed	Normal temperature and humidity 1kHz 5Vp–p connection standing for 1,000 hours	± 5%RH 以内

Unit value change amount to a humidity of 60% RH as the reference.
After each test, a humidity sensor placed in normal air of normal temperature and humidity for 24 hours was measured after the humidity change amount.

7、Relative humidity – impedance characteristics

	0℃	5℃	10℃	15℃	20℃	25℃	30℃	35℃	40℃	45℃	50℃	55℃	60℃
20%RH				10M	6.7 M	5.0 M	3.9 M	3.0 M	2.4 M	1.75 M	1.45 M	1.15 M	970K
25%RH		10 M	7.0 M	5.0 M	3.4 M	2.6 M	1.9 M	1.5 M	1.1 M	880K	700K	560K	450K
30%RH	6.4 M	4.6 M	3.2 M	2.3 M	1.75 M	1.3 M	970K	740K	570K	420K	340K	270K	215K
35%RH	2.9 M	2.1 M	1.5 M	1.1 M	850K	630K	460K	380K	280K	210K	170K	150K	130K
40%RH	1.4 M	1.0 M	750K	540K	420K	310K	235K	190K	140K	110K	88K	70K	57K
45%RH	700K	500 K	380 K	280 K	210 K	160 K	125 K	100 K	78 K	64 K	50 K	41 K	34 K
50%RH	370 K	260 K	200 K	150 K	115 K	87 K	69 K	56 K	45 K	38 K	31 K	25 K	21 K
55%RH	190 K	140 K	110 K	84 K	64 K	49 K	39 K	33 K	27 K	24 K	19.5 K	17 K	14 K
60%RH	105 K	80 K	62 K	50 K	39 K	31 K	25 K	20 K	17.5 K	15 K	13 K	11 K	9.4 K
65%RH	62 K	48 K	37 K	30 K	24 K	19.5 K	16 K	13 K	11.5 K	10 K	8.6 K	7.6 K	6.8 K
70%RH	38 K	30 K	24 K	19 K	15.5 K	13 K	10.5 K	9.0 K	8.0 K	7.0 K	6.0 K	5.4 K	4.8 K
75%RH	23 K	18 K	15 K	12 K	10 K	8.4 K	7.2 K	6.2 K	5.6 K	4.9 K	4.2 K	3.8 K	3.4 K
80%RH	15.5 K	12.0 K	10.0 K	8.0 K	7.0 K	5.7 K	5.0 K	4.3 K	3.9 K	3.4 K	3.0 K	2.7 K	2.5 K
85%RH	10.5 K	8.2 K	6.8 K	5.5 K	4.8 K	4.0 K	3.5 K	3.1 K	2.8 K	2.4 K	2.1 K	1.9 K	1.8 K
90%RH	7.1 K	5.3 K	4.7 K	4.0 K	3.3 K	2.8 K	2.5 K	2.2 K	2.0 K	1.8 K	1.55 K	1.4 K	1.3 K

8、Electrical impedance R（KΩ）



9、Sample code

```
/**********************
SCM：SN8P2501B
Crystal: built–in 16M 4 Divide
Subroutine instructions：
__interrupt IntIn()     Timer interrupt function
StartOneTImeSample(void)     Perform a detection operation
**********************/
typedef struct
{
      unsigned char u8WihtchIOCharge;
      unsigned long u16ChargeTimeIo;       // Fixed resistor charging time
      unsigned long u16ChargeTimeHumi;    // Humidity resistance charging time
      }ChargeTyPe;

#define     CHARGE_HUMIDITY_IO_HIGH()              FP21 = 1
#define     CHARGE_HUNIDITY_IO_LOW()                FP21 = 0

#define     CHARGE_IO_HIGH()                                        FP20 = 1
#define     CHARGE_IO_LOW()                                      FP20 = 0

#define     CHARGE_IO_HI()                                          P2M = 0X00
#define     F_data                                                          20

__interrupt IntIn()
{
        WDTR = 0X5A;       // Watchdog
             T0C = F_data;
             m_st_ChargeType.u8WihtchIOCharge++;

             if(m_st_ChargeType.u8WihtchIOCharge&0x80)     // Wet charge
              {
                        if(m_st_ChargeType.u8WihtchIOCharge >= 0x84)     //High and low pulse 3:1
                         {
                                  CHARGE_HUNIDITY_IO_LOW();
                                  m_st_ChargeType.u8WihtchIOCharge = 0x80;
                         }
                        else if(m_st_ChargeType.u8WihtchIOCharge >= 0x81)
                         {
                                  CHARGE_HUMIDITY_IO_HIGH();
                        }
              }
```

```
else
      {
                        if(m_st_ChargeType.u8WihtchIOCharge == 0x01)// Standard Charge
                          {
                                CHARGE_IO_HIGH();
                          }
                        else if(m_st_ChargeType.u8WihtchIOCharge == 0x04)// High and low pulse 3:1
                          {
                                CHARGE_IO_LOW();
                                m_st_ChargeType.u8WihtchIOCharge = 0x00;
                          }
          }
m_st_ChargeType.u16ChargeTimeIo++;
      FT0IRQ = 0;     //clear t0 irq flag
}
void StartOneTImeSample(void)
{
          CHARGE_IO_HI();    // P1 port into input as a high impedance
          m_st_ChargeType.u16ChargeTimeIo = 0;       // Variable initialization
              if(m_st_ChargeType.u8WihtchIOCharge&0x80)
                {
                        FP21M = 1;       // Export
                        CHARGE_HUNIDITY_IO_LOW();
                }
             else
                {
                        FP20M = 1;     // Export
                        CHARGE_IO_LOW();
                }
           delay1N(2);                        // Delay to wait for the port stable
          T0C = F_data;                        // Hutchison values from the new loading
          FT0ENB = 1;                        // Timer automatically measured
          while(1)
           {
                    if(FP22)                        // Detecting the charging threshold
                      {
                            FT0ENB = 0;     //    Threshold to OFF timer
                            if(m_st_ChargeType.u8WihtchIOCharge&0x80)
                                  {
                                          m_st_ChargeType.u16ChargeTimeHumi =
m_st_ChargeType.u16ChargeTimeIo;
                                  }
                               break;
                      }
             }
          P2M = 0X23;
          P2 = 0X00;    // Discharge
           FP22M = 1;
          FP22 = 0;
           delay1N(100);
           FP22M = 0;
    }
```

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