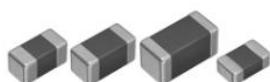


NTC 模块

硬件概述



热敏电阻器是敏感元件的一类，按照温度系数不同分为正温度系数热敏电阻器（PTC）和负温度系数热敏电阻器（NTC）。热敏电阻器的典型特点是对温度敏感，不同的温度下表现出不同的电阻值。正温度系数热敏电阻器（PTC）在温度越高时电阻值越大，负温度系数热敏电阻器（NTC）在温度越高时电阻值越低，它们同属于半导体器件。

热敏电阻将长期处于不动作状态；当环境温度和电流处于 c 区时，热敏电阻的散热功率与发热功率接近，因而可能动作也可能不动作。热敏电阻在环境温度相同时，动作时间随着电流的增加而急剧缩短；热敏电阻在环境温度相对较高时具有更短的动作时间和较小的维持电流及动作电流。

引脚定义



序号	符号	管脚名	功能描述
1	①	端电极	焊接固定
2	②	端电极	焊接固定

温度与电阻值对照表

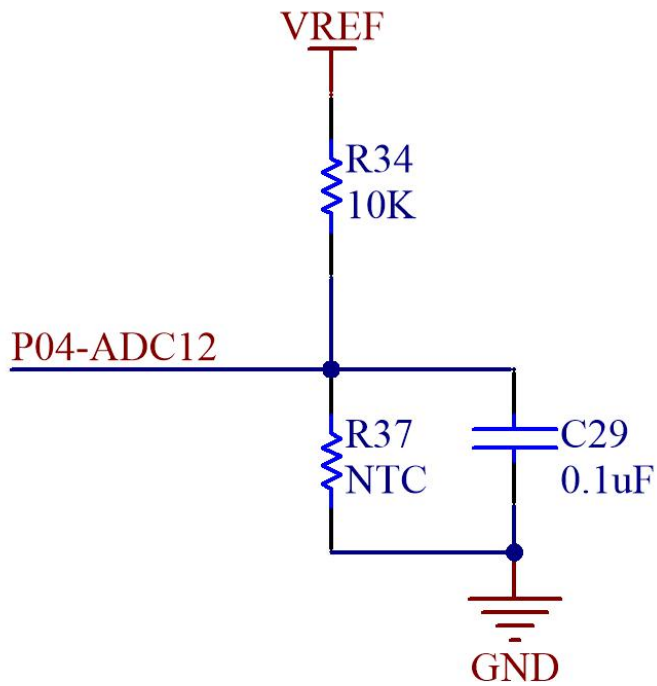
温度 Temp. (°C)	R 最小值 R_Min (Kohm)	R 中心值 R_Cent (Kohm)	R 最大值 R_Max (Kohm)	阻值公差 Res TOL.	温度公差 Temp. TOL.(°C)
-40	171.470	197.390	226.660	14.83%	2.53
-39	162.320	186.540	213.838	14.63%	2.51
-38	153.712	176.350	201.816	14.44%	2.50
-37	145.631	166.800	190.569	14.25%	2.49
-36	138.020	157.820	180.010	14.06%	2.47
-35	130.863	149.390	170.114	13.87%	2.46
-34	124.162	141.510	160.879	13.69%	2.44
-33	117.841	134.090	152.198	13.50%	2.43
-32	111.887	127.110	144.044	13.32%	2.42
-31	106.264	120.530	136.370	13.14%	2.40
-30	100.966	114.340	129.162	12.96%	2.39
-29	95.986	108.530	122.407	12.79%	2.37
-28	91.272	103.040	116.034	12.61%	2.36
-27	86.827	97.870	110.042	12.44%	2.34
-26	82.623	92.989	104.394	12.26%	2.33
-25	78.649	88.381	99.069	12.09%	2.31
-24	74.895	84.036	94.056	11.92%	2.29
-23	71.344	79.931	89.328	11.76%	2.28
-22	67.983	76.052	84.866	11.59%	2.26
-21	64.800	72.384	80.653	11.42%	2.25
-20	61.786	68.915	76.675	11.26%	2.23
-19	58.930	65.634	72.918	11.10%	2.21
-18	56.224	62.529	69.367	10.94%	2.20
-17	53.658	59.589	66.010	10.78%	2.18
-16	51.224	56.804	62.835	10.62%	2.16
-15	48.915	54.166	59.831	10.46%	2.14
-14	46.722	51.665	56.988	10.30%	2.13
-13	44.641	49.294	54.296	10.15%	2.11
-12	42.665	47.046	51.747	9.99%	2.09
-11	40.787	44.913	49.332	9.84%	2.07
-10	39.003	42.889	47.044	9.69%	2.06
-9	37.307	40.967	44.874	9.54%	2.04
-8	35.693	39.142	42.817	9.39%	2.02
-7	34.159	37.408	40.864	9.24%	2.00
-6	32.699	35.761	39.012	9.09%	1.98
-5	31.310	34.196	37.255	8.95%	1.96
-4	29.986	32.707	35.585	8.80%	1.94
-3	28.726	31.291	33.999	8.66%	1.93
-2	27.527	29.945	32.494	8.51%	1.91
-1	26.384	28.664	31.063	8.37%	1.89
0	25.295	27.445	29.703	8.23%	1.87
1	24.255	26.283	28.409	8.09%	1.85

溫度 Temp. (°C)	R 最小值 R_Min (Kohm)	R 中心值 R_Cent (Kohm)	R 最大值 R_Max (Kohm)	阻值公差 Res TOL.	溫度公差 Temp. TOL.(°C)
2	23.265	25.177	27.178	7.95%	1.83
3	22.320	24.124	26.008	7.81%	1.81
4	21.420	23.121	24.895	7.67%	1.79
5	20.560	22.165	23.836	7.54%	1.77
6	19.739	21.253	22.826	7.40%	1.75
7	18.955	20.384	21.865	7.27%	1.73
8	18.207	19.555	20.950	7.13%	1.71
9	17.492	18.764	20.078	7.00%	1.68
10	16.810	18.010	19.247	6.87%	1.66
11	16.158	17.290	18.455	6.74%	1.64
12	15.534	16.602	17.699	6.61%	1.62
13	14.938	15.946	16.979	6.48%	1.60
14	14.368	15.319	16.292	6.35%	1.58
15	13.823	14.720	15.636	6.22%	1.56
16	13.301	14.148	15.011	6.10%	1.53
17	12.802	13.601	14.413	5.97%	1.51
18	12.324	13.078	13.843	5.85%	1.49
19	11.867	12.578	13.298	5.72%	1.47
20	11.429	12.099	12.777	5.60%	1.45
21	11.010	11.642	12.280	5.48%	1.42
22	10.608	11.204	11.804	5.36%	1.40
23	10.223	10.785	11.350	5.24%	1.38
24	9.854	10.384	10.916	5.12%	1.35
25	9.500	10.000	10.500	5.00%	1.33
26	9.140	9.632	10.125	5.12%	1.37
27	8.796	9.280	9.766	5.24%	1.41
28	8.467	8.943	9.421	5.35%	1.45
29	8.152	8.619	9.090	5.47%	1.49
30	7.850	8.309	8.773	5.59%	1.53
31	7.561	8.012	8.468	5.70%	1.57
32	7.284	7.727	8.176	5.82%	1.62
33	7.018	7.453	7.895	5.93%	1.66
34	6.764	7.191	7.626	6.04%	1.70
35	6.520	6.939	7.366	6.16%	1.74
36	6.287	6.698	7.118	6.27%	1.78
37	6.063	6.466	6.878	6.38%	1.83
38	5.848	6.243	6.649	6.49%	1.87
39	5.642	6.029	6.428	6.61%	1.91
40	5.444	5.824	6.215	6.72%	1.96
41	5.254	5.627	6.011	6.83%	2.00
42	5.072	5.437	5.814	6.94%	2.05
43	4.897	5.255	5.625	7.05%	2.09
44	4.729	5.080	5.443	7.16%	2.14
45	4.567	4.911	5.268	7.26%	2.18

溫度 Temp. (°C)	R 最小值 R_Min (Kohm)	R 中心值 R_Cent (Kohm)	R 最大值 R_Max (Kohm)	阻值公差 Res TOL.	溫度公差 Temp. TOL.(°C)
46	4.412	4.749	5.099	7.37%	2.23
47	4.263	4.593	4.937	7.48%	2.27
48	4.120	4.443	4.780	7.59%	2.32
49	3.982	4.299	4.630	7.69%	2.36
50	3.849	4.160	4.485	7.80%	2.41
51	3.722	4.027	4.345	7.90%	2.46
52	3.600	3.898	4.210	8.01%	2.50
53	3.482	3.774	4.080	8.11%	2.55
54	3.368	3.654	3.955	8.22%	2.60
55	3.259	3.539	3.834	8.32%	2.65
56	3.154	3.429	3.717	8.43%	2.69
57	3.053	3.322	3.605	8.53%	2.74
58	2.956	3.219	3.497	8.63%	2.79
59	2.862	3.119	3.392	8.73%	2.84
60	2.771	3.024	3.291	8.84%	2.89
61	2.684	2.931	3.193	8.94%	2.94
62	2.600	2.842	3.099	9.04%	2.99
63	2.519	2.756	3.008	9.14%	3.04
64	2.441	2.673	2.920	9.24%	3.09
65	2.366	2.593	2.835	9.34%	3.14
66	2.293	2.516	2.753	9.44%	3.19
67	2.223	2.441	2.674	9.54%	3.24
68	2.156	2.369	2.598	9.64%	3.29
69	2.091	2.300	2.524	9.73%	3.34
70	2.028	2.233	2.452	9.83%	3.40
71	1.967	2.168	2.383	9.93%	3.45
72	1.908	2.105	2.316	10.03%	3.50
73	1.852	2.044	2.251	10.12%	3.55
74	1.797	1.986	2.189	10.22%	3.61
75	1.744	1.929	2.128	10.31%	3.66
76	1.693	1.874	2.069	10.41%	3.71
77	1.644	1.821	2.013	10.50%	3.77
78	1.596	1.770	1.958	10.60%	3.82
79	1.550	1.720	1.904	10.69%	3.87
80	1.506	1.673	1.853	10.79%	3.93
81	1.463	1.626	1.803	10.88%	3.98
82	1.421	1.581	1.755	10.97%	4.04
83	1.381	1.538	1.708	11.07%	4.10
84	1.342	1.496	1.662	11.16%	4.15
85	1.304	1.455	1.619	11.25%	4.21
86	1.268	1.416	1.576	11.34%	4.26
87	1.233	1.377	1.535	11.43%	4.32
88	1.199	1.340	1.495	11.53%	4.38
89	1.166	1.304	1.456	11.62%	4.43

溫度 Temp. (°C)	R 最小值 R_Min (Kohm)	R 中心值 R_Cent (Kohm)	R 最大值 R_Max (Kohm)	阻值公差 Res TOL	溫度公差 Temp. TOL(°C)
90	1.134	1.270	1.418	11.71%	4.49
91	1.103	1.236	1.382	11.80%	4.55
92	1.073	1.204	1.347	11.89%	4.61
93	1.044	1.172	1.312	11.98%	4.66
94	1.016	1.141	1.279	12.06%	4.72
95	0.989	1.112	1.247	12.15%	4.78
96	0.962	1.083	1.215	12.24%	4.84
97	0.937	1.055	1.185	12.33%	4.90
98	0.912	1.028	1.155	12.42%	4.96
99	0.888	1.002	1.127	12.50%	5.02
100	0.865	0.976	1.099	12.59%	5.08
101	0.842	0.951	1.072	12.68%	5.14
102	0.820	0.927	1.046	12.76%	5.20
103	0.799	0.904	1.020	12.85%	5.26
104	0.779	0.882	0.996	12.94%	5.32
105	0.759	0.860	0.972	13.02%	5.38
106	0.739	0.838	0.948	13.11%	5.45
107	0.721	0.818	0.926	13.19%	5.51
108	0.702	0.798	0.904	13.28%	5.57
109	0.685	0.778	0.882	13.36%	5.63
110	0.668	0.759	0.861	13.44%	5.70
111	0.651	0.741	0.841	13.53%	5.76
112	0.635	0.723	0.822	13.61%	5.82
113	0.619	0.706	0.802	13.69%	5.89
114	0.604	0.689	0.784	13.77%	5.95
115	0.589	0.673	0.766	13.86%	6.01
116	0.575	0.657	0.748	13.94%	6.08
117	0.561	0.641	0.731	14.02%	6.14
118	0.548	0.626	0.715	14.10%	6.21
119	0.534	0.612	0.699	14.18%	6.27
120	0.522	0.598	0.683	14.26%	6.34
121	0.509	0.584	0.668	14.34%	6.41
122	0.497	0.570	0.653	14.42%	6.47
123	0.486	0.557	0.638	14.50%	6.54
124	0.474	0.545	0.624	14.58%	6.61
125	0.463	0.532	0.610	14.66%	6.67

电路原理图



图形化模块

1. 初始化 NTC 的控制引脚

NTC初始化在

2. 读取 NTC 温度

NTC热敏电阻读温度

示例代码 1

设置 NTC 读取温度，并用数码管显示。



调用函数代码

引入头文件

```
#include "lib/ntc.h"
```

预定义 RGB 灯连接引脚

```
#define NTC_ADC_PIN ADC_P04
```

```
void ntc_init()//NTC 初始化函数, 参数无
```

```
float ntc_read_temp()//NTC 读取温度函数, 参数无
```

示例代码 1

```
#define NTC_ADC_PIN ADC_P04//NTC 的引脚
```

```
#include <STC8HX.h>
```

```
uint32 sys_clk = 24000000;
```

```
//系统时钟确认
```

```
#include "lib/hc595.h"
```

```
#include "lib/rgb.h"
```

```
#include "lib/delay.h"
```

```
#include "lib/nixietube.h"
```

```
#include "lib/led8.h"
```

```
#include "lib/ntc.h"//引用 NTC 头文件
```

```
void twen_board_init()
```

```
{  
  
    hc595_init();//HC595 初始化  
  
    hc595_disable();//HC595 禁止点阵和数码管输出  
  
    rgb_init();//RGB 初始化  
  
    delay(10);  
  
    rgb_show(0,0,0,0);//关闭 RGB  
  
    delay(10);  
}  
  
void setup()  
{  
  
    twen_board_init();//天问 51 初始化  
  
    nix_init();//数码管初始化  
  
    led8_disable();//关闭 8 个 LED 流水灯电源  
  
    ntc_init();//NTC 热敏电阻测量初始化  
}  
  
void loop()  
{  
  
    nix_scan_callback();//数码管扫描回调函数  
  
    nix_display_clear();//数码管清屏  
  
    nix_display_num((ntc_read_temp()));//数码管显示 NTC 温度
```



```
}
```

```
void main(void)
```

```
{
```

```
  setup();
```

```
  while(1){
```

```
    loop();
```

```
  }
```

```
}
```