

# HANLUCK ELECTRONICS



## 翰耐电子

### SPECIFICATION FOR APPROVAL

### 承认书

CUSTOMER :

客户名称

**MICRO MODERN**

PRODUCT ITEM:

产品名称

**温度传感器**

ITEM NUMBER:

客户物料编码

PART NUMBER:

规格型号

**HL- G013-1**

DATE :

编制日期

**2021/4/29**

## APPROVAL SHEET

SUPPLIER		CUSTOMER CONFIRM	
供应商确认		客户确认	
Prepared by 拟制	Approval by 批准	Checked by 审核	Approval by 批准
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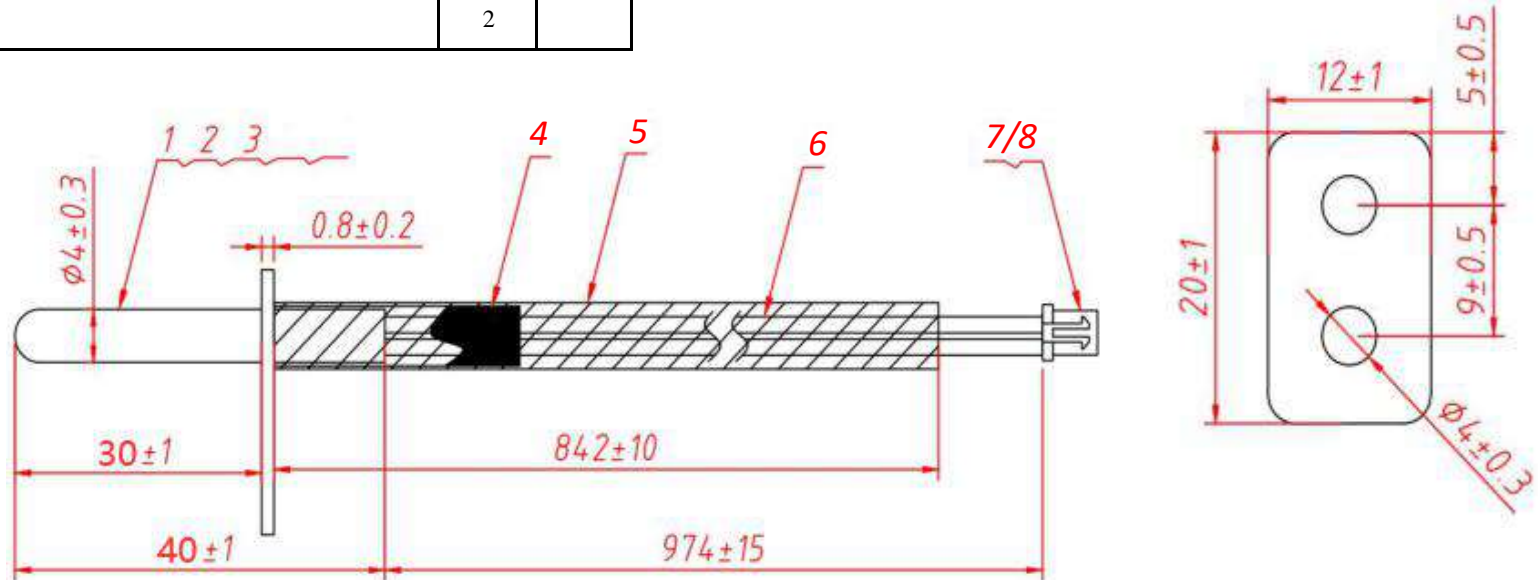


材料及规格  
Material & Specification

# Hanluck Electronics

序号 No.	名称 Part name	规格描述 Specification description	数量 Qty	备注 Note
1	热敏电阻 Thermistor	R25°C =100KΩ±1% B25/50=3950K±1%	1	
2	外壳 Casing	Φ4×30×40-12×20 SUS304	1	
3	绝缘套管 Insulation	Sleeve Φ2.4 Transparent sleeve	1	
4	绝缘套管 Insulation	Φ4.8 Black heat shrinking tubing	1	
5	导线 Wire	26AWG White glassfiber wire	2	
6	护线套管 Sleeve	Φ4 White glassfiber sleeve	1	
7	连接器 Connector	XH-2P White	1	
8	端子 Terminal	XH-T	2	

版本 Rev.	变更单号 ECN No.	变更内容 Revised Content	批准人 Approved	日期 Date
A/0				



Technical Requirements

- 表面光滑无毛刺;  
Smooth surface without burr ;
- 导线与端子连接可靠,经20N10秒拉力试验不松脱;  
Wire and terminal must resist a tensile force at least 20N in 10S.
- 符合欧盟ROHS2.0环保指令。  
Comply with Rohs2.0 directive.

规格型号 Part Number	HL- G013-1	温度传感器 Temperature Sensor
比例 Sacle:		
单位 Unit :	mm	

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### 1.电气性能 (Electrical Characteristic)

No. 序号	Item 项目	Symbol 标号	Test Conditions/Methods 测试条件/测试方法	Technical Requirement 技术要求	Unit 单位
1-1	25°C 电阻值 (Resistance At 25°C)	R25	Ta=25°C±0.05°C 测试功率≤0.1mW	100KΩ ±1%	KΩ
1-2	B值 (B Constant)	B25/50	$B=[(Ta \times Tb)/(Tb-Ta)] \times \ln(Ra/Rb)$ Ta=25°C±0.05°C Tb=50°C±0.05°C	3950 ±1%	K
1-3	耗散系数 (Thermal Dissipation Constant)	δ	Ta=25°C (In still air)	≥3	mW/°C
1-4	时间常数-水中 (Thermal Time Constant-in water)	τ	25°C→100°C T1=25+(100-25)*63.2%=72.4°C	≤15	Sec
1-5	绝缘测试 (Insulation test)	/	DC 500V 5Sec	100	MΩ
1-6	耐压测试 (Hi-Pot Test)	/	1500V AC 10Sec	1.0	mA
1-7	工作温度范围 Operating Temperature Range	/	/	-20~+200	°C
1-8	25°C最大功率 (Maximum Power Rating-At25°C)	Pmax	/	50	mW

### 2.机械性能 (Mechanical Characteristics)

No. 序号	Item 项目	Technical Specifications 技术要求	Test Conditions/Methods 测试条件/测试方法	Testing Equipment 测试设备
2-1	拉力测试 (Pulling Test)	产品不被破坏和损坏 (No breakout and obvious damage)	加载9.8N (1kg) 1分钟 (Fasten body with a load applied to each lead 1.0kg for 1min)	Tensile Machine 拉力计
		最小1.5KG (min.1.5KG)	尾部端子与线材间垂直测试, 直至端子与线材脱落, 记录其最大拉力 (Rear of the board terminals and wire vertical test, terminals with wire turn off, records the max. pull)	
2-2	自由落体测试 (Free Falling Test)	无可见性损伤 (No obvious damage)	1米的高度, 让产品做自由落体运动, 下落到10mm厚的橡木板上, 5次 (After 5 time natural fall to a maple board from 1M high)	Tensile Machine 拉力计

### 3.可靠性测试 (Reliability Test)

No. 序号	Item 项目	Technical Specifications 技术要求	Test Conditions/Methods 测试条件/测试方法	Testing Equipment 测试设备
3-1	高温储存 High-temperature storage	ΔR/R25 ≤ ±3% ΔB/B ≤ ±3%	200±5°C, 1000±24h (参照IEC60068-2-2/GB2423.2试验)	Oven
3-2	低温储存 Low-temperature storage	ΔR/R25 ≤ ±3% ΔB/B ≤ ±3%	-20±5°C, 500±24h (参照IEC60068-2-1/GB2423.1试验)	Refrigerator
3-3	恒温恒湿测试 (Humidity test)	ΔR/R25 ≤ ±3% ΔB/B ≤ ±3%	40±2°C, 90%-95% RH环境下放置1000±24h (参照IEC60068-2-3/GB2423.3试验)	Humidity Machine
3-4	冷热循环测试 Thermal shock test	ΔR/R25 ≤ ±3% ΔB/B ≤ ±3%	-40°C×30min→25°C×5min →180°C×30min→25°C×5min, 反复10次 (参照IEC60068-2-14/GB2423.22试验)	Thermal Shock Test Machine

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### 5.产品储存条件 (Storage Condition of Products)

#### 5-1 储存条件 (Storage Conditions):

- (1) 储存温度 (Storage Temperature):  $-10^{\circ}\text{C} \sim +40^{\circ}\text{C}$
- (2) 相对湿度 (Relative Humidity):  $\leq 75\% \text{RH}$
- (3) 远离腐蚀和阳光照射 (Keep away from corrosive atmosphere and sunlight)

#### 5-2 储存时间 (Period of Storage): 1 year

#### 5-3 产品使用条件: Application Condition

- (1) 产品使用的最大工作温度, 最大功率等, 均依照规格书要求作业, 不可超出规格书之范围;

The max working temperature, max power has to be within spec.

- (2) 产品移动、安装必须轻拿轻放, 不可用力拉动;

When move the parts with slight power and without pull

- (3) 感温端子发生变形、氧化等现象时, 不要使用, 以免影响感温精度;

Don't use the parts when these sensor terminal deformed, oxidized, this will affect the temperature accuracy.

- (4) 产品外观发现变形、破损时, 不可使用, 以免影响电性能

Don't use the parts when deformed, broken, this will affect the electrical performance.

### 6.产品测试条件(Testing Condition of products)

#### 6-1 阻值测试 (Resistivity Testing):

- (1) 测试设备(Testing Equipment)

恒温槽 $\pm 0.05^{\circ}\text{C}$  (Thermostatic Bath $\pm 0.05^{\circ}\text{C}$ )、数字万用表(Digital Multimeter)

- (2) 测试方法 (Testing Method)

恒温槽设定为需要测试的温度, 待测试温度确认完毕后, 将产品感温头处完全浸入恒温槽中感温约60分钟, 产品尾端连接数字万用表并读数, 数字稳定后记录其数字, 即为产品的阻值。

Fix the temperature of the bath, after the temperature confirmation, immerse the sensor head into the bath and for 60min, then read out the degrees from the digital multimeter and record the data when the digit stabilize.

#### 6-2 B值测试 (Beta Testing):

- (1) 测试设备 (Testing Equipment)

恒温槽 $\pm 0.05^{\circ}\text{C}$  (Thermostatic Bath $\pm 0.05^{\circ}\text{C}$ )、数字万用表 (Digital Multimeter) 函数计算器(Function Calculator)

- (2) 测试方法(Testing Method)

根据B值的关系, 分别测试所需要计算B值的两个温度点的阻值; 阻值的测试方法如5-1所述; 计算B值:

Method of calculating :  $B = 2.3026T1 * T2 / (T2 - T1) * \text{Log}10R1/R2$  &  $B = \text{Ln}(R1/R2) / (1/T1 - 1/T2)$

R1=温度T1时之电阻值; R2=温度T2时之电阻值;

R1=R at Temperature T1, R2=R at Temperature T2

T1=273.15+t1 $^{\circ}\text{C}$  T2=273.15+t2 $^{\circ}\text{C}$  t1&t2=恒温槽显示的温度值

t1&t2= The showed temperature data on the bath screen

例如: 计算R=10K $\Omega$  B25/50=3950K 值

T1=273.15+25=298.15 T2=273.15+50=323.15 R1=10K $\Omega$  R2=3.589K $\Omega$

B25/50=2.3026\*298.15\*323.15/(323.15-298.15)\*Log1010/3.589=3949.12K

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### 6.产品测试条件 (Testing Condition of products)

#### 6-3 热时间常数(ThermalTimeConstant)

##### (1) 测试设备(TestingEquipment):

恒温槽 $\pm 0.05^{\circ}\text{C}$ (ThermostaticBath $\pm 0.05^{\circ}\text{C}$ )、数字万用表(DigitalMultimeter)、秒表(Stopwatch)

##### (2) 测试方法(TestingMethod)

根据热时间常数的定义，计算出最初温度与最终温度差63.2%的温度点并测试这个温度点的阻值；将产品放入每一个恒温槽中，当阻值达到稳定时，快速将其移到第二个恒温槽并开始计时，当阻值达到以上测试点的阻值时停止计时，记录的时间即为产品的反应时间。

As per the definition of the thermal time constant, get the temperature point difference 63.2% between the initial temperature and final temperature immerse the parts into every bath, move the part from the bath to another one asap when the resistance stabilizes, stop recording when the resistance reaches the above resistance, the recording time if called response time.

例如：测试 $25^{\circ}\text{C}$ - $85^{\circ}\text{C}$ 的反应时间 e.g Response time of  $25^{\circ}\text{C}$ - $85^{\circ}\text{C}$

a.取样，分别在 $25^{\circ}\text{C}$ ， $25+(85-25)*63.2\%=62.9^{\circ}\text{C}$ 的恒温槽中测出每只样品的电阻值，并记录；

Take samples,T est the resistance at  $25+(85-25)*63.2\%=62.9^{\circ}\text{C}$

b.将两个恒温槽调到 $25\pm 0.1^{\circ}\text{C}$ 、 $85\pm 0.1^{\circ}\text{C}$ ，产品先放置在 $25\pm 0.1^{\circ}\text{C}$ 的槽中，且接入数字电表上，当产品阻值居于稳定时，再将产品从 $25^{\circ}\text{C}$ 的槽中快速移至 $85^{\circ}\text{C}$ 的槽中，当产品离开 $25^{\circ}\text{C}$ 槽中时开始启动移表计时，产品温度升高温差的63.2% (即产品阻值降至 $62.9^{\circ}\text{C}$ 时所测之零功率电阻值)时停止计时，计时器显示的时间即为热反应时间。

Fix the constant bath to be  $25+0.1^{\circ}\text{C}$ ， $85+0.1^{\circ}\text{C}$ ，put the samples into the  $25+0.1^{\circ}\text{C}$  bath, and connect with a digital multimeter, move the present sample from  $25^{\circ}\text{C}$  bath to  $85^{\circ}\text{C}$  bath asap when the resistance be stable. Start to record the time when the part leaves  $25^{\circ}\text{C}$  bath. Stop recording the time when the the shifting up of temperature difference 63.2% (the zero resistance when the resistance deduces to the  $62.9^{\circ}\text{C}$ ), the time is called thermal time constant.

#### 6-4 绝缘测试 (Insulation Testing):

##### (1) 测试设备 (Testing Equipment):

耐压测试机 (Hi-Pot Test Machine)

##### (2) 测试方法(TestingMethod)

耐压测试机电极的一端与测试介质(钢珠或锡珠)连接导通，设定测试的条件参数，产品前端放入测试介质中,尾端与耐压测试机的电极另一端连接导通，按下耐压测试机的开关开始测试；在设定的条件的时间内耐压测试机未报警，产品绝缘测试通过；反之。则不通过。

Connect through the voltage withstanding testor and the testing medium (steel ball or tin ball ), fix testing parameter, put the front end to the medium , the tail end is connected to another end of the testor, press down the button of voltaget estor, if the testor does not give an alarm, the parts pass the voltage withstanding test. Conversely, it does not pass.



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### Resistance - Temperature Table

#### R-T 阻值表(R-T data):

NTC 热敏电阻 R-T 表					
R25=100±1% B25/50=3950±1% B25/85=4015±1% (ID:489)					
T(°C)	R ↓ (%)	Rmin (KΩ)	Rcen (KΩ)	Rmax (KΩ)	R ↑ (%)
-40	-4.43	3133.0041	3278.2191	3427.4271	4.551
-39	-4.369	2944.644	3079.179	3217.3311	4.487
-38	-4.309	2768.5798	2893.2493	3021.1952	4.422
-37	-4.249	2603.9446	2719.4982	2838.019	4.358
-36	-4.189	2449.9373	2557.0649	2666.8794	4.295
-35	-4.13	2305.8174	2405.1542	2506.9237	4.231
-34	-4.071	2170.8993	2263.0305	2357.3638	4.168
-33	-4.012	2044.5488	2130.0136	2217.4714	4.106
-32	-3.954	1926.1785	2005.4741	2086.5729	4.044
-31	-3.896	1815.2444	1888.8292	1964.0451	3.982
-30	-3.838	1711.242	1779.5388	1849.3106	3.921
-29	-3.78	1612.7957	1676.1494	1740.8353	3.859
-28	-3.722	1520.5221	1579.3011	1639.2829	3.798
-27	-3.664	1434.0019	1488.546	1544.1756	3.737
-26	-3.607	1352.8471	1403.4695	1455.0713	3.677
-25	-3.55	1276.697	1323.687	1371.5602	3.617
-24	-3.493	1205.2178	1248.8423	1293.2629	3.557
-23	-3.437	1138.099	1178.6045	1219.8273	3.498
-22	-3.381	1075.0528	1112.6671	1150.9273	3.439
-21	-3.325	1015.8115	1050.745	1086.2598	3.38
-20	-3.269	960.1267	992.5739	1025.544	3.322
-19	-3.212	906.637	936.7283	967.2885	3.262
-18	-3.156	856.4381	884.349	912.6801	3.204
-17	-3.1	809.309	835.2014	861.4701	3.145
-16	-3.044	765.0447	789.0678	813.4276	3.087
-15	-2.989	723.4548	745.7464	768.3391	3.03
-14	-2.934	684.3629	705.0501	726.0063	2.972
-13	-2.879	647.605	666.8053	686.2456	2.915
-12	-2.825	613.029	630.8508	648.8866	2.859
-11	-2.771	580.4933	597.0368	613.771	2.803
-10	-2.717	549.8662	565.2241	580.7516	2.747
-9	-2.666	522.0383	536.3346	550.7822	2.694
-8	-2.614	495.7154	509.022	522.4634	2.641



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### Resistance - Temperature Table

-7	-2.563	470.8105	483.1943	495.698	2.588
-6	-2.512	447.242	458.7654	470.3952	2.535
-5	-2.461	424.9334	435.6544	446.4698	2.483
-4	-2.41	403.8128	413.7856	423.8419	2.43
-3	-2.36	383.8127	393.0877	402.4364	2.378
-2	-2.309	364.8695	373.4938	382.183	2.326
-1	-2.259	346.9239	354.9413	363.0156	2.275
0	-2.209	329.9196	337.3709	344.8721	2.223
1	-2.156	313.042	319.9407	326.8826	2.17
2	-2.104	297.1448	303.5316	309.9559	2.117
3	-2.052	282.1649	288.0776	294.0226	2.064
4	-2.001	268.0433	273.5168	279.018	2.011
5	-1.95	254.7256	259.792	264.8821	1.959
6	-1.9	242.161	246.85	251.5592	1.908
7	-1.849	230.302	234.6411	238.9973	1.857
8	-1.799	219.1047	223.1193	227.1483	1.806
9	-1.75	208.5278	212.2415	215.9672	1.755
10	-1.7	198.5333	201.9677	205.4121	1.705
11	-1.652	189.0853	192.2606	195.4441	1.656
12	-1.603	180.1508	183.0856	186.0271	1.607
13	-1.555	171.6985	174.41	177.1269	1.558
14	-1.507	163.6994	166.2037	168.7123	1.509
15	-1.459	156.1266	158.4384	160.7536	1.461
16	-1.412	148.9545	151.0876	153.2233	1.414
17	-1.365	142.1597	144.1268	146.0958	1.366
18	-1.318	135.7198	137.5327	139.347	1.319
19	-1.272	129.6143	131.284	132.9547	1.273
20	-1.226	123.8238	125.3604	126.8977	1.226
21	-1.18	118.33	119.743	121.1564	1.18
22	-1.135	113.1162	114.4143	115.7126	1.135
23	-1.089	108.1661	109.3575	110.5489	1.089
24	-1.045	103.465	104.5572	105.6494	1.045
25	-1	99	100	101	1
26	-1.044	94.6725	95.6715	96.6706	1.044
27	-1.088	90.5729	91.5692	92.5656	1.088
28	-1.132	86.6763	87.6683	88.6604	1.132
29	-1.175	82.9715	83.9578	84.9443	1.175
30	-1.218	79.4479	80.4272	81.4068	1.218





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### Resistance - Temperature Table

31	-1.26	76.0956	77.0668	78.0385	1.261
32	-1.302	72.9053	73.8674	74.8302	1.303
33	-1.344	69.8683	70.8204	71.7734	1.346
34	-1.386	66.9764	67.9178	68.8602	1.388
35	-1.428	64.2216	65.1517	66.083	1.429
36	-1.469	61.597	62.5151	63.4346	1.471
37	-1.51	59.0955	60.0012	60.9085	1.512
38	-1.55	56.7106	57.6035	58.4981	1.553
39	-1.59	54.4363	55.316	56.1977	1.594
40	-1.63	52.2669	53.1332	54.0016	1.634
41	-1.67	50.1969	51.0495	51.9044	1.675
42	-1.71	48.2212	49.0599	49.9011	1.715
43	-1.749	46.335	47.1597	47.9871	1.754
44	-1.788	44.5338	45.3445	46.158	1.794
45	-1.826	42.8133	43.6098	44.4093	1.833
46	-1.865	41.1693	41.9517	42.7372	1.872
47	-1.903	39.5982	40.3664	41.1379	1.911
48	-1.941	38.0962	38.8503	39.6079	1.95
49	-1.979	36.6601	37.4001	38.1437	1.988
50	-2.016	35.2864	36.0124	36.7422	2.027
51	-2.054	33.9512	34.6631	35.3789	2.065
52	-2.091	32.6726	33.3705	34.0725	2.104
53	-2.129	31.4481	32.1322	32.8204	2.142
54	-2.166	30.2752	30.9455	31.6201	2.18
55	-2.203	29.1513	29.808	30.4691	2.218
56	-2.24	28.0744	28.7176	29.3653	2.255
57	-2.277	27.042	27.672	28.3065	2.293
58	-2.313	26.0524	26.6693	27.2908	2.33
59	-2.349	25.1035	25.7074	26.3161	2.368
60	-2.385	24.1934	24.7846	25.3806	2.405
61	-2.421	23.3204	23.899	24.4825	2.442
62	-2.457	22.4827	23.049	23.6202	2.478
63	-2.492	21.6789	22.233	22.7921	2.515
64	-2.528	20.9072	21.4494	21.9967	2.551
65	-2.563	20.1666	20.697	21.2326	2.588
66	-2.598	19.4553	19.9742	20.4983	2.624
67	-2.633	18.7724	19.28	19.7928	2.66
68	-2.667	18.1163	18.6128	19.1145	2.696



# HANLUCK ELECTRONICS

## 翰耐电子

### Resistance - Temperature Table

69	-2.702	17.4861	17.9716	18.4624	2.731
70	-2.736	16.8805	17.3553	17.8355	2.767
71	-2.77	16.2983	16.7627	17.2324	2.802
72	-2.804	15.7389	16.193	16.6524	2.837
73	-2.838	15.201	15.645	16.0944	2.872
74	-2.872	14.6838	15.1179	15.5574	2.907
75	-2.905	14.1864	14.6108	15.0407	2.942
76	-2.938	13.7079	14.1229	14.5433	2.977
77	-2.971	13.2476	13.6533	14.0644	3.011
78	-3.004	12.8047	13.2013	13.6033	3.045
79	-3.037	12.3783	12.766	13.1592	3.08
80	-3.07	11.968	12.3471	12.7316	3.114
81	-3.103	11.5729	11.9435	12.3194	3.148
82	-3.135	11.1927	11.5549	11.9225	3.182
83	-3.167	10.8264	11.1805	11.54	3.215
84	-3.199	10.4735	10.8197	11.1712	3.249
85	-3.231	10.1336	10.472	10.8157	3.282
86	-3.263	9.8018	10.1325	10.4685	3.316
87	-3.296	9.482	9.8051	10.1335	3.349
88	-3.327	9.1737	9.4895	9.8105	3.383
89	-3.359	8.8766	9.1852	9.499	3.416
90	-3.391	8.5903	8.8918	9.1985	3.45
91	-3.423	8.3141	8.6087	8.9085	3.483
92	-3.454	8.0479	8.3358	8.6289	3.516
93	-3.485	7.791	8.0723	8.3588	3.549
94	-3.517	7.5433	7.8182	8.0982	3.581
95	-3.548	7.3043	7.573	7.8467	3.614
96	-3.578	7.0739	7.3364	7.6039	3.647
97	-3.609	6.8513	7.1078	7.3693	3.679
98	-3.64	6.6366	6.8873	7.1429	3.712
99	-3.671	6.4293	6.6743	6.9242	3.744
100	-3.701	6.2293	6.4687	6.713	3.776
101	-3.731	6.0361	6.2701	6.5089	3.808
102	-3.762	5.8498	6.0784	6.3118	3.84
103	-3.792	5.6696	5.893	6.1212	3.872
104	-3.822	5.4956	5.714	5.9371	3.904
105	-3.852	5.3276	5.541	5.7591	3.935
106	-3.881	5.1652	5.3738	5.587	3.967



# HANLUCK ELECTRONICS

## 翰耐电子

### Resistance - Temperature Table

107	-3.91	5.0115	5.2154	5.4239	3.998
108	-3.939	4.8629	5.0623	5.2662	4.028
109	-3.968	4.7192	4.9142	5.1137	4.059
110	-3.997	4.5803	4.771	4.9661	4.089
111	-4.025	4.446	4.6325	4.8233	4.12
112	-4.054	4.3162	4.4986	4.6853	4.15
113	-4.082	4.1905	4.3688	4.5514	4.18
114	-4.11	4.0691	4.2435	4.4222	4.21
115	-4.138	3.9518	4.1224	4.2972	4.24
116	-4.166	3.8384	4.0053	4.1763	4.27
117	-4.194	3.7288	3.892	4.0593	4.3
118	-4.222	3.6226	3.7823	3.946	4.329
119	-4.249	3.5199	3.6761	3.8363	4.358
120	-4.277	3.4203	3.5731	3.7299	4.388
121	-4.304	3.324	3.4735	3.6269	4.417
122	-4.331	3.2308	3.3771	3.5273	4.446
123	-4.359	3.1405	3.2836	3.4305	4.475
124	-4.386	3.0531	3.1931	3.3369	4.504
125	-4.412	2.9683	3.1053	3.2461	4.533
126	-4.439	2.8862	3.0203	3.1581	4.562
127	-4.466	2.8068	2.938	3.0729	4.59
128	-4.493	2.7298	2.8582	2.9902	4.619
129	-4.519	2.6552	2.7809	2.9101	4.647
130	-4.545	2.5828	2.7058	2.8323	4.676
131	-4.572	2.5127	2.6331	2.757	4.704
132	-4.598	2.4448	2.5626	2.6839	4.732
133	-4.624	2.3789	2.4942	2.6129	4.76
134	-4.65	2.315	2.4279	2.5442	4.788
135	-4.676	2.253	2.3635	2.4773	4.816
136	-4.701	2.193	2.3012	2.4127	4.844
137	-4.727	2.1348	2.2407	2.3499	4.871
138	-4.753	2.0782	2.1819	2.2888	4.899
139	-4.778	2.0234	2.1249	2.2296	4.927
140	-4.804	1.9702	2.0696	2.1721	4.954
141	-4.829	1.9186	2.0159	2.1163	4.981
142	-4.854	1.8685	1.9638	2.0622	5.009
143	-4.879	1.8199	1.9132	2.0095	5.036
144	-4.904	1.7727	1.8641	1.9585	5.063



# HANLUCK ELECTRONICS

## 翰耐电子

### Resistance - Temperature Table

145	-4.929	1.7269	1.8164	1.9088	5.09
146	-4.954	1.6823	1.77	1.8606	5.117
147	-4.979	1.6392	1.7251	1.8138	5.143
148	-5.003	1.5973	1.6814	1.7683	5.17
149	-5.028	1.5566	1.639	1.7242	5.197
150	-5.052	1.517	1.5977	1.6812	5.223
151	-5.077	1.4786	1.5577	1.6395	5.25
152	-5.101	1.4412	1.5187	1.5988	5.276
153	-5.125	1.4051	1.481	1.5595	5.302
154	-5.149	1.3698	1.4442	1.5212	5.329
155	-5.173	1.3355	1.4084	1.4838	5.355
156	-5.197	1.3022	1.3736	1.4475	5.381
157	-5.221	1.2699	1.3399	1.4123	5.407
158	-5.245	1.2385	1.3071	1.3781	5.433
159	-5.268	1.208	1.2752	1.3448	5.459
160	-5.292	1.1784	1.2442	1.3124	5.484
161	-5.315	1.1494	1.2139	1.2808	5.51
162	-5.339	1.1214	1.1846	1.2502	5.536
163	-5.362	1.094	1.156	1.2203	5.561
164	-5.385	1.0675	1.1283	1.1913	5.587
165	-5.409	1.0416	1.1012	1.163	5.612
166	-5.432	1.0165	1.0749	1.1355	5.637
167	-5.455	0.9922	1.0494	1.1088	5.662
168	-5.478	0.9683	1.0244	1.0827	5.688
169	-5.501	0.9452	1.0002	1.0573	5.713
170	-5.523	0.9228	0.9767	1.0327	5.738
171	-5.546	0.9008	0.9537	1.0087	5.763
172	-5.569	0.8795	0.9314	0.9853	5.787
173	-5.591	0.8587	0.9096	0.9625	5.812
174	-5.614	0.8385	0.8884	0.9403	5.837
175	-5.636	0.8188	0.8677	0.9186	5.862
176	-5.658	0.7997	0.8477	0.8976	5.886
177	-5.681	0.7812	0.8282	0.8772	5.91
178	-5.703	0.763	0.8091	0.8571	5.935
179	-5.725	0.7452	0.7905	0.8376	5.959
180	-5.747	0.728	0.7724	0.8186	5.984
181	-5.769	0.7113	0.7548	0.8001	6.008
182	-5.791	0.695	0.7377	0.7822	6.032



# HANLUCK ELECTRONICS

## 翰耐电子

### Resistance - Temperature Table

183	-5.813	0.679	0.7209	0.7646	6.056
184	-5.834	0.6636	0.7047	0.7475	6.08
185	-5.856	0.6485	0.6888	0.7308	6.104
186	-5.878	0.6337	0.6733	0.7146	6.128
187	-5.899	0.6194	0.6582	0.6987	6.152
188	-5.921	0.6055	0.6436	0.6833	6.175
189	-5.942	0.5919	0.6293	0.6683	6.199
190	-5.964	0.5785	0.6152	0.6535	6.223
191	-5.985	0.5656	0.6016	0.6392	6.246
192	-6.006	0.5531	0.5884	0.6253	6.27
193	-6.027	0.5408	0.5755	0.6117	6.293
194	-6.048	0.5288	0.5628	0.5983	6.317
195	-6.069	0.5171	0.5505	0.5854	6.34
196	-6.09	0.5057	0.5385	0.5728	6.363
197	-6.111	0.4946	0.5268	0.5604	6.386
198	-6.132	0.4837	0.5153	0.5483	6.409
199	-6.152	0.4732	0.5042	0.5366	6.432
200	-6.173	0.4628	0.4933	0.5251	6.455
201	-6.194	0.4528	0.4827	0.514	6.478
202	-6.214	0.4429	0.4723	0.503	6.501
203	-6.235	0.4334	0.4622	0.4924	6.524
204	-6.255	0.4241	0.4524	0.482	6.547
205	-6.276	0.415	0.4428	0.4719	6.569
206	-6.296	0.4061	0.4334	0.462	6.592
207	-6.316	0.3973	0.4241	0.4522	6.615
208	-6.336	0.3889	0.4152	0.4428	6.637
209	-6.357	0.3807	0.4065	0.4336	6.66
210	-6.377	0.3726	0.398	0.4246	6.682
211	-6.396	0.3648	0.3897	0.4158	6.704
212	-6.417	0.357	0.3815	0.4072	6.727
213	-6.437	0.3495	0.3735	0.3987	6.749
214	-6.456	0.3422	0.3658	0.3906	6.771
215	-6.476	0.335	0.3582	0.3825	6.793
216	-6.496	0.328	0.3508	0.3747	6.816
217	-6.516	0.3212	0.3436	0.3671	6.837
218	-6.535	0.3146	0.3366	0.3597	6.859
219	-6.555	0.3081	0.3297	0.3524	6.881
220	-6.574	0.3017	0.3229	0.3452	6.903



# HANLUCK ELECTRONICS

## 翰耐电子

### Resistance - Temperature Table

221	-6.594	0.2954	0.3163	0.3382	6.925
222	-6.613	0.2894	0.3099	0.3314	6.947
223	-6.632	0.2835	0.3036	0.3248	6.969
224	-6.652	0.2777	0.2975	0.3183	6.99
225	-6.671	0.2721	0.2915	0.3119	7.012
226	-6.69	0.2666	0.2857	0.3058	7.033
227	-6.709	0.2612	0.28	0.2998	7.054
228	-6.728	0.2558	0.2743	0.2937	7.076
229	-6.747	0.2507	0.2688	0.2879	7.098
230	-6.766	0.2457	0.2635	0.2823	7.119
231	-6.785	0.2407	0.2582	0.2766	7.14
232	-6.804	0.2359	0.2531	0.2712	7.162
233	-6.823	0.2312	0.2481	0.2659	7.183
234	-6.841	0.2267	0.2433	0.2608	7.203
235	-6.86	0.2221	0.2385	0.2557	7.225
236	-6.879	0.2177	0.2338	0.2507	7.246
237	-6.897	0.2135	0.2293	0.246	7.266
238	-6.916	0.2092	0.2247	0.2411	7.288
239	-6.935	0.205	0.2203	0.2364	7.309
240	-6.953	0.2011	0.2161	0.2319	7.329
241	-6.971	0.1971	0.2119	0.2275	7.35
242	-6.989	0.1933	0.2078	0.2231	7.371
243	-7.008	0.1895	0.2038	0.2189	7.392
244	-7.026	0.1859	0.1999	0.2147	7.412
245	-7.044	0.1823	0.1961	0.2107	7.433
246	-7.062	0.1787	0.1923	0.2066	7.454
247	-7.081	0.1752	0.1886	0.2027	7.474
248	-7.098	0.172	0.1851	0.199	7.494
249	-7.116	0.1687	0.1816	0.1952	7.515
250	-7.134	0.1654	0.1781	0.1915	7.535
251	-7.152	0.1622	0.1747	0.1879	7.556
252	-7.17	0.1591	0.1714	0.1844	7.576
253	-7.188	0.1561	0.1682	0.181	7.596
254	-7.206	0.1531	0.165	0.1776	7.617
255	-7.224	0.1502	0.1619	0.1743	7.637
256	-7.241	0.1474	0.1589	0.1711	7.657
257	-7.259	0.1446	0.1559	0.1679	7.677
258	-7.277	0.1419	0.153	0.1648	7.697



# HANLUCK ELECTRONICS

翰耐电子

## Resistance - Temperature Table

259	-7.294	0.1392	0.1502	0.1618	7.717
260	-7.312	0.1366	0.1474	0.1588	7.737
261	-7.329	0.1341	0.1447	0.1559	7.757
262	-7.346	0.1317	0.1421	0.1531	7.776
263	-7.364	0.1291	0.1394	0.1503	7.797
264	-7.381	0.1268	0.1369	0.1476	7.816
265	-7.398	0.1245	0.1344	0.1449	7.836
266	-7.416	0.1221	0.1319	0.1423	7.856
267	-7.433	0.1199	0.1295	0.1397	7.875
268	-7.45	0.1177	0.1272	0.1372	7.894
269	-7.468	0.1155	0.1248	0.1347	7.915
270	-7.485	0.1133	0.1225	0.1322	7.935
271	-7.502	0.1113	0.1203	0.1299	7.954
272	-7.518	0.1093	0.1182	0.1276	7.973
273	-7.536	0.1073	0.116	0.1253	7.993
274	-7.552	0.1054	0.114	0.1231	8.012
275	-7.57	0.1034	0.1119	0.1209	8.032
276	-7.586	0.1016	0.1099	0.1187	8.051
277	-7.603	0.0998	0.108	0.1167	8.069
278	-7.619	0.098	0.1061	0.1147	8.089
279	-7.636	0.0962	0.1042	0.1126	8.108
280	-7.653	0.0945	0.1023	0.1106	8.128
281	-7.67	0.0928	0.1005	0.1087	8.147
282	-7.686	0.0912	0.0988	0.1069	8.165
283	-7.703	0.0895	0.097	0.1049	8.185
284	-7.719	0.0879	0.0953	0.1031	8.204
285	-7.735	0.0865	0.0937	0.1014	8.222
286	-7.752	0.0849	0.092	0.0996	8.241
287	-7.769	0.0834	0.0904	0.0979	8.26
288	-7.785	0.0819	0.0888	0.0962	8.279
289	-7.801	0.0805	0.0873	0.0945	8.298
290	-7.817	0.0791	0.0858	0.0929	8.316
291	-7.834	0.0777	0.0843	0.0913	8.335
292	-7.849	0.0764	0.0829	0.0898	8.353
293	-7.866	0.075	0.0814	0.0882	8.373
294	-7.883	0.0737	0.08	0.0867	8.391
295	-7.898	0.0725	0.0787	0.0853	8.409
296	-7.915	0.0712	0.0773	0.0838	8.428



# HANLUCK ELECTRONICS

翰耐电子

## Resistance - Temperature Table

297	-7.93	0.07	0.076	0.0824	8.446
298	-7.948	0.0687	0.0746	0.0809	8.466
299	-7.964	0.0675	0.0733	0.0795	8.485
300	-7.979	0.0663	0.0721	0.0782	8.503