规格承认书

SPECIFICATION FOR APPROVAL

客户(Customer)：

品名(Product Name)： NTC热敏传感器 NTC thermal sensor

维宏料号(Part Number)：WH282104F395030-2-10

发布日期(Issue Date)：2024.9.20

发布版本(Rev. No.)：V1.1

文件编号(Doc. No.)：WH-0-01

客户承认Customer Approved

判定结果 Result		
检验 Inspector	审核 Checked	核准 Approved

维宏感应（山东）科技有限公司

Weihong Induction (Shandong) Technology Co., Ltd

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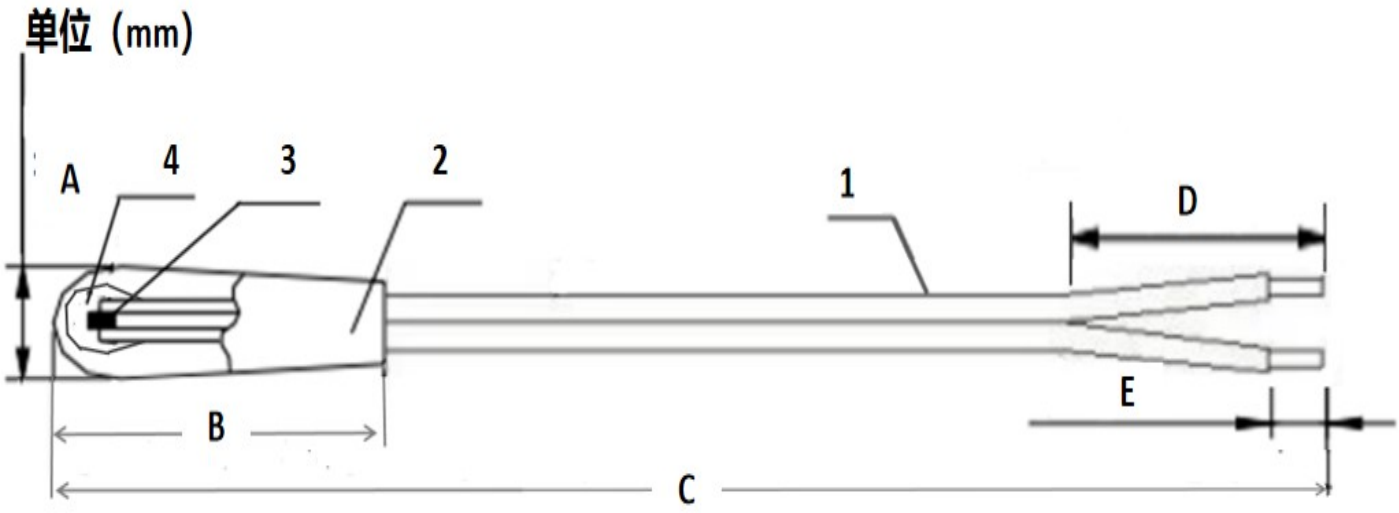
修订记录清单 Revised Record Sheet

版本 REV. NO	发布日期 REV. Date	修改内容 Revised Content
V1.1	2024.9.20	新版本发布(New Released)

1. 外形尺寸 Shape and Dimensions:

		材料清单 Bill of Material							
NO	名称 name	材料规格Material specifications	数量 number	备注 notes	NO	名称name	材料规格Material specifications	数量 number	备注 notes
1	线材 wire rod	UL2651-28#并线	2	黑色 black	2	环氧树脂 epoxy resin	包封类环氧树脂 Encapsulated epoxy resin	1	黑色 black
3	芯片 chip	R25=100KΩ,B25/50=3950,1%	1	/	4	硅胶 silica gel	硅胶 silica gel	1	透明 transparent

主要参数	
项目	数值
R25阻值 resistance	100KΩ ±1%
B25/50	3950K ±1%



A	B	C	D	E
Max 3.5	Max 6.0	30±3	10±3	2±0.5

版本	修改内容 REVISION	修改者 Modified By	修改日期 modification date	确认 confirm	维宏料号 Weihong part number	WH282104F395030-2-10
V1.1	新做成	刘兆霞	2024.9.20	马国辉	日期date	2024.9.20

2. 产品型号说明 Product Identification(Part Number):

WH282	104	F	3950	30	2	10
①	②	③	④	⑤	⑥	⑦

①WH282:

- 维宏公司:28#并线产品

Weihong Company: 28# parallel products

②104：标准阻值 Standard resistance value

- 25℃的零功率电阻值100KΩ Zero power resistance value of 100K Ω at 25 ℃

③F：阻值允许偏差代号

Code for allowable deviation of resistance value

- F：±1%， G：±2%， H：±3%， J：±5%， K：±10%

④3950：B值

- B25/50℃ 值：3950K

⑤30：产品长度（mm） Product length (mm)

⑥2：尾部侵锡长度（mm）Tail tin penetration length

⑦10：尾部分叉长度（mm）Tail fork length

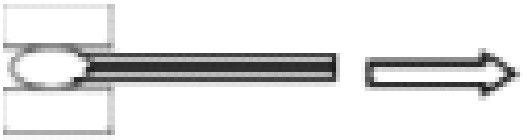
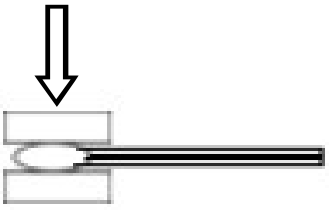
3. 电气特性 Electrical Characteristics：

序号	项目 project	符号 symbol	测试条件 Test conditions	单位 unit	性能要求 Performance Requirement
3.1	25℃的零功率电阻Zero power resistance value at 25 ℃	$R_{25℃}$	Ta=25±0.05℃ 测试功率≤0.1mw Ta=25 ± 0.05 ℃ Test power ≤ 0.1mw	KΩ	100KΩ±1%
3.2	B值	$B_{25/50}$	$B=[(T_a\times T_b)/(T_b-T_a)]\times \ln(R_a/R_b)$ $T_{b=50℃\pm0.05℃}$	K	3950±1%
3.3	耗散系数 Dissipation coefficient	δ	静止空气中In still air	mW/℃	≥2
3.4	时间常数 time constant	τ	静止空气中In still air	sec	≤7
3.5	绝缘耐压 insulation resistance	/	300V/DC 1min 100V/DC 1min	MΩ	≥300
3.6	工作温度范围 Operating temperature range	/	/	/	-40℃ ~ 125℃
3.7	最大额定功率 Maximum rated power	Pmax	/	mW	10
3.8	阻温特性 Resistance temperature characteristic	/	/	/	见附表1

4. 信赖性试验 Reliability Test：

项目 project	测试条件 Test conditions	技术要求 technical requirement
4.1尾部焊接 soldering resistance	温度：260±5℃，浸入深度距电阻体6mm，时间5±1 秒	R_{25} ΔR/R≤±2%
4.2稳态湿热 Damp heat steady state	温度：40℃±2℃，湿度：93±2%，时间：500小时	R_{25} ΔR/R≤±2%
4.3冷热冲击 Thermal Shock	-40℃ 30min→25℃ 5min→105℃ 30min→25℃ 5min，反复5次	R_{25} ΔR/R≤±2%
4.4低温储存 low temperature storage	温度: -40℃ 时间:1000小时	R_{25} ΔR/R≤±2%
4.5高温高湿老化 High temperature and high humidity storage	温度: 85℃±5℃ 湿度：85% 时间:1000小时 Temperature: 85 ℃± 5 ℃ Humidity: 85% Time: 1000 hours	R_{25} ΔR/R≤±5%

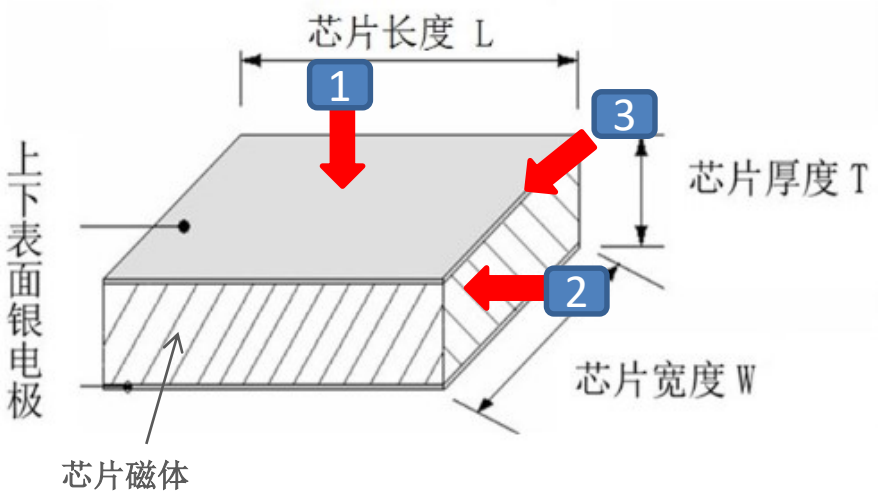
5. 机械性能：Mechanical performance:

项目 project	测试条件 Test conditions	技术要求 technical requirement
5.1自由跌落 free fall	跌落高度： 1.0m Drop height: 1.0m 跌落次数： 3次 Number of drops: 3 times 跌 落 面：木板 Falling surface: wooden board	外观无损伤 |△R25/ R25|≤1% |△B/ B|≤1%
5.2 水平拉力 Horizontal tensile force	 固定环氧头部：拉力：F=5±1N， 时间：10±1秒 Fixed resistor end: tension: 5 ± 1 N, time: 10 ± 1 seconds	无可见性损伤 No visible damage R_{25} Δ R/R≤±2%
5.3 压力测试 Stress testing	 常规室温接通阻值测试仪/万用表，阻值稳定后施加80N压力持续5秒 Connect the resistance tester/multimeter to the conventional room temperature at the tail line, and apply 50N pressure for 5 seconds after the resistance stabilizes	R_{25} ΔR/R≤±2%

6.高精度NTC热敏电阻芯片特性：

Characteristics of high-precision NTC thermistor chip:

芯片结构chip structure



芯片压力极限测试：Chip Pressure Limit Test

受力方向 Direction of force	极限压力值 Ultimate pressure value	受损部位 Damaged area
①正面 Frontal	80N	电极表面OK,芯片磁体破损。 The electrode surface is OK, and the chip magnet is damaged.
②侧面 Sides	40N	芯片电极/磁体均出现破损 Both chip electrodes and magnets are damaged
③侧面45度 45 degrees on the side	10N	芯片电极/磁体开裂分离 Chip electrode/magnet cracking separation
芯片电极与磁体结合力 Bonding force between chip electrode and magnet	2N	芯片电极/磁体交接处分离 Separation of chip electrode/magnet junction

7. 使用注意事项 Notes & Warnings：

7.1 本产品的用途：温度测量与控制；

The purpose of this product: temperature measurement and control;

7.2 避免流过热敏电阻芯片的电流引起元件自身发热而产生测量误差；

To avoid measurement errors caused by the heating of the component itself caused by the current flowing through the thermistor chip;

7.3 焊接时，焊接温度应低于 275℃，焊接时间＜3ses；

When welding, the welding temperature should be lower than 275 ℃ and the welding time should be less than 3 seconds;

7.4 允许任何方法运输，但要避免雨/雪直接或间接的淋袭。

Any method of transportation is allowed, but direct or indirect rain/snow should be avoided.

7.5 生产、运输或使用过程中应避免80N以上的外力挤压或损伤。

During production, transportation, or use, external forces exceeding 80N should be avoided from squeezing or damaging.

7.6 存储：Storage:

最佳存储温度： 25℃±3℃ 湿度：30%~60%

Class I: Storage temperature: 25 ℃± 3 ℃ Humidity: 30%~60%

存储有效期12个月内阻值变化3%以内（仅限整包密封包装），不排除锡脚表面氧化的可能。The resistance change within 12 months of storage validity is within 3% (limited to whole package vacuum packaging), and the possibility of oxidation on the surface of the tin feet cannot be ruled out.

常规存储温度：-10℃~40℃ 湿度：<75%

Class II: Storage temperature: -10 ℃~40 ℃ Humidity:<75%

存储有效期6个月内阻值变化3%以内（仅限整包密封包装），不排除锡脚表面氧化的可能。The resistance change within 6 months of storage is within 3% (limited to whole package vacuum packaging), and the possibility of oxidation on the surface of the tin feet cannot be ruled out.

8. 附表1： 阻温特性表 R-T table

R25=100KΩ， B25/50=3950K，精度:±1%

温度 [℃]	R最大 [kΩ]	R中心 [kΩ]	R最小 [kΩ]	温度偏差 [℃]	
-50	6383	6065	5763	-0.8	+0.8
-49	5958	5665	5386	-0.8	+0.8
-48	5565	5295	5037	-0.8	+0.8
-47	5200	4951	4714	-0.8	+0.8
-46	4863	4633	4413	-0.8	+0.8
-45	4550	4337	4135	-0.8	+0.8
-44	4259	4063	3876	-0.8	+0.8
-43	3990	3809	3635	-0.8	+0.8
-42	3739	3572	3411	-0.8	+0.8
-41	3507	3352	3203	-0.8	+0.8
-40	3290	3147	3009	-0.8	+0.7
-39	3083	2951	2824	-0.7	+0.7
-38	2891	2768	2651	-0.7	+0.7
-37	2712	2599	2490	-0.7	+0.7
-36	2546	2441	2340	-0.7	+0.7
-35	2391	2294	2200	-0.7	+0.7
-34	2247	2157	2070	-0.7	+0.7
-33	2112	2029	1948	-0.7	+0.7
-32	1987	1909	1835	-0.7	+0.7
-31	1870	1798	1729	-0.7	+0.7
-30	1760	1694	1630	-0.7	+0.7
-29	1656	1595	1535	-0.7	+0.7
-28	1559	1502	1446	-0.7	+0.7
-27	1468	1415	1364	-0.7	+0.7
-26	1383	1334	1286	-0.7	+0.7
-25	1304	1258	1214	-0.7	+0.7
-24	1230	1187	1146	-0.6	+0.7
-23	1160	1121	1083	-0.6	+0.6
-22	1095	1059	1023	-0.6	+0.6
-21	1034	1000	967.8	-0.6	+0.6
-20	976.9	945.7	915.4	-0.6	+0.6

温度 [℃]	R最大 [kΩ]	R中心 [kΩ]	R最小 [kΩ]	温度偏差 [℃]	
-19	922.2	893.2	865.1	-0.6	+0.6
-18	871.0	844.1	818.0	-0.6	+0.6
-17	822.9	798.0	773.7	-0.6	+0.6
-16	777.9	754.7	732.2	-0.6	+0.6
-15	735.6	714.1	693.2	-0.6	+0.6
-14	696.0	676.0	656.5	-0.6	+0.6
-13	658.7	640.2	622.1	-0.6	+0.6
-12	623.8	606.5	589.7	-0.6	+0.6
-11	590.9	574.8	559.2	-0.6	+0.6
-10	560.0	545.1	530.5	-0.6	+0.6
-9	530.4	516.5	503.0	-0.5	+0.5
-8	502.5	489.6	477.1	-0.5	+0.5
-7	476.3	464.4	452.7	-0.5	+0.5
-6	451.7	440.6	429.7	-0.5	+0.5
-5	428.5	418.2	408.1	-0.5	+0.5
-4	406.6	397.1	387.7	-0.5	+0.5
-3	386.1	377.1	368.4	-0.5	+0.5
-2	366.7	358.4	350.2	-0.5	+0.5
-1	348.4	340.7	333.1	-0.5	+0.5
0	331.1	324.0	316.9	-0.5	+0.5
1	314.6	308.0	301.4	-0.5	+0.5
2	299.1	292.9	286.8	-0.5	+0.5
3	284.4	278.7	273.0	-0.5	+0.5
4	270.5	265.2	259.9	-0.4	+0.5
5	257.4	252.5	247.6	-0.4	+0.4
6	245.1	240.5	235.9	-0.4	+0.4
7	233.4	229.1	224.9	-0.4	+0.4
8	222.3	218.3	214.4	-0.4	+0.4
9	211.8	208.2	204.5	-0.4	+0.4
10	201.9	198.5	195.1	-0.4	+0.4

温度 [℃]	R最大 [kΩ]	R中心 [kΩ]	R最小 [kΩ]	温度偏差 [℃]	
11	192.4	189.2	186.1	-0.4	+0.4
12	183.4	180.5	177.6	-0.4	+0.4
13	174.9	172.1	169.4	-0.4	+0.4
14	166.8	164.3	161.8	-0.4	+0.4
15	159.1	156.8	154.5	-0.4	+0.4
16	151.9	149.7	147.6	-0.4	+0.4
17	145.0	143.0	141.0	-0.3	+0.3
18	138.5	136.6	134.8	-0.3	+0.3
19	132.3	130.6	128.9	-0.3	+0.3
20	126.4	124.8	123.3	-0.3	+0.3
21	120.8	119.3	117.9	-0.3	+0.3
22	115.5	114.1	112.8	-0.3	+0.3
23	110.4	109.2	107.9	-0.3	+0.3
24	105.6	104.5	103.3	-0.3	+0.3
25	101.0	100.0	99.00	-0.3	+0.3
26	96.72	95.72	94.72	-0.3	+0.3
27	92.65	91.65	90.65	-0.3	+0.3
28	88.77	87.78	86.78	-0.3	+0.3
29	85.08	84.09	83.10	-0.3	+0.3
30	81.57	80.58	79.60	-0.3	+0.3
31	78.19	77.21	76.24	-0.3	+0.3
32	74.97	74.00	73.04	-0.4	+0.4
33	71.91	70.95	69.99	-0.4	+0.4
34	68.99	68.04	67.09	-0.4	+0.4
35	66.20	65.26	64.33	-0.4	+0.4
36	63.55	62.62	61.70	-0.4	+0.4
37	61.02	60.10	59.19	-0.4	+0.4
38	58.60	57.70	56.80	-0.4	+0.4
39	56.29	55.40	54.52	-0.4	+0.4
40	54.09	53.21	52.35	-0.5	+0.5

温度 [℃]	R最大 [kΩ]	R中心 [kΩ]	R最小 [kΩ]	温度偏差 [℃]	
41	51.96	51.10	50.25	-0.5	+0.5
42	49.93	49.08	48.24	-0.5	+0.5
43	47.99	47.16	46.33	-0.5	+0.5
44	46.14	45.32	44.51	-0.5	+0.5
45	44.37	43.56	42.76	-0.5	+0.5
46	42.68	41.88	41.10	-0.5	+0.5
47	41.06	40.28	39.51	-0.5	+0.5
48	39.51	38.75	37.99	-0.6	+0.6
49	38.03	37.28	36.54	-0.6	+0.6
50	36.62	35.88	35.15	-0.6	+0.6
51	35.25	34.53	33.81	-0.6	+0.6
52	33.94	33.23	32.53	-0.6	+0.6
53	32.69	31.99	31.31	-0.6	+0.6
54	31.49	30.80	30.13	-0.6	+0.6
55	30.34	29.67	29.01	-0.6	+0.6
56	29.24	28.58	27.94	-0.7	+0.7
57	28.18	27.54	26.91	-0.7	+0.7
58	27.17	26.54	25.93	-0.7	+0.7
59	26.20	25.59	24.98	-0.7	+0.7
60	25.28	24.67	24.08	-0.7	+0.7
61	24.38	23.79	23.21	-0.7	+0.7
62	23.52	22.94	22.37	-0.7	+0.7
63	22.69	22.12	21.57	-0.7	+0.7
64	21.90	21.34	20.80	-0.8	+0.8
65	21.14	20.60	20.06	-0.8	+0.8
66	20.41	19.88	19.36	-0.8	+0.8
67	19.71	19.19	18.68	-0.8	+0.8
68	19.03	18.53	18.03	-0.8	+0.8
69	18.39	17.89	17.41	-0.8	+0.8
70	17.77	17.28	16.81	-0.8	+0.8
71	17.17	16.69	16.23	-0.9	+0.9
72	16.59	16.12	15.67	-0.9	+0.9
73	16.04	15.58	15.13	-0.9	+0.9

温度 [℃]	R最大 [kΩ]	R中心 [kΩ]	R最小 [kΩ]	温度偏差 [℃]	
74	15.50	15.06	14.62	-0.9	+0.9
75	14.99	14.55	14.13	-0.9	+0.9
76	14.50	14.07	13.65	-0.9	+0.9
77	14.02	13.61	13.20	-0.9	+0.9
78	13.57	13.16	12.76	-1.0	+1.0
79	13.13	12.73	12.34	-1.0	+1.0
80	12.71	12.32	11.93	-1.0	+1.0
81	12.30	11.91	11.54	-1.0	+1.0
82	11.90	11.53	11.17	-1.0	+1.0
83	11.53	11.16	10.80	-1.0	+1.0
84	11.16	10.80	10.45	-1.0	+1.0
85	10.81	10.46	10.12	-1.1	+1.1
86	10.47	10.13	9.798	-1.1	+1.1
87	10.14	9.807	9.485	-1.1	+1.1
88	9.823	9.499	9.185	-1.1	+1.1
89	9.519	9.202	8.895	-1.1	+1.1
90	9.227	8.917	8.616	-1.1	+1.1
91	8.943	8.640	8.346	-1.1	+1.2
92	8.670	8.374	8.086	-1.2	+1.2
93	8.407	8.117	7.836	-1.2	+1.2
94	8.153	7.869	7.594	-1.2	+1.2
95	7.908	7.630	7.361	-1.2	+1.2
96	7.671	7.399	7.137	-1.2	+1.2
97	7.443	7.177	6.920	-1.2	+1.3
98	7.223	6.963	6.711	-1.3	+1.3
99	7.010	6.756	6.510	-1.3	+1.3
100	6.805	6.556	6.316	-1.3	+1.3
101	6.606	6.362	6.127	-1.3	+1.3
102	6.414	6.175	5.945	-1.3	+1.3
103	6.228	5.995	5.770	-1.3	+1.3
104	6.049	5.820	5.600	-1.3	+1.4
105	5.875	5.652	5.436	-1.4	+1.4

温度 [℃]	R最大 [kΩ]	R中心 [kΩ]	R最小 [kΩ]	温度偏差 [℃]	
106	5.708	5.489	5.278	-1.4	+1.4
107	5.546	5.332	5.126	-1.4	+1.4
108	5.390	5.180	4.978	-1.4	+1.4
109	5.238	5.033	4.836	-1.4	+1.4
110	5.092	4.891	4.698	-1.5	+1.5
111	4.950	4.754	4.565	-1.5	+1.5
112	4.813	4.621	4.435	-1.5	+1.5
113	4.680	4.492	4.311	-1.5	+1.5
114	4.552	4.367	4.190	-1.5	+1.5
115	4.428	4.247	4.073	-1.5	+1.5
116	4.307	4.130	3.960	-1.6	+1.6
117	4.191	4.018	3.851	-1.6	+1.6
118	4.078	3.909	3.746	-1.6	+1.6
119	3.969	3.803	3.643	-1.6	+1.6
120	3.863	3.701	3.544	-1.6	+1.6
121	3.760	3.601	3.448	-1.6	+1.6
122	3.660	3.504	3.354	-1.6	+1.7
123	3.563	3.410	3.263	-1.7	+1.7
124	3.469	3.319	3.176	-1.7	+1.7
125	3.378	3.232	3.091	-1.7	+1.7
126	3.290	3.146	3.009	-1.7	+1.7
127	3.205	3.064	2.929	-1.7	+1.8
128	3.122	2.984	2.852	-1.8	+1.8
129	3.042	2.906	2.777	-1.8	+1.8
130	2.964	2.831	2.704	-1.8	+1.8
131	2.887	2.757	2.633	-1.8	+1.8
132	2.813	2.686	2.564	-1.8	+1.8
133	2.741	2.616	2.497	-1.8	+1.8
134	2.671	2.549	2.432	-1.8	+1.9
135	2.603	2.484	2.369	-1.9	+1.9
136	2.538	2.420	2.308	-1.9	+1.9
137	2.474	2.359	2.249	-1.9	+1.9

温度 [℃]	R最大 [kΩ]	R中心 [kΩ]	R最小 [kΩ]	温度偏差 [℃]	
138	2.412	2.299	2.192	-1.9	+1.9
139	2.352	2.242	2.136	-1.9	+1.9
140	2.294	2.186	2.082	-1.9	+1.9
141	2.236	2.130	2.029	-1.9	+1.9
142	2.180	2.076	1.977	-1.9	+2.0
143	2.126	2.024	1.926	-2.0	+2.0
144	2.073	1.973	1.878	-2.0	+2.0
145	2.022	1.924	1.830	-2.0	+2.0
146	1.972	1.876	1.785	-2.0	+2.0
147	1.924	1.830	1.740	-2.0	+2.1
148	1.877	1.785	1.697	-2.1	+2.1
149	1.832	1.741	1.655	-2.1	+2.1
150	1.788	1.699	1.614	-2.1	+2.1