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Product : NTC THERMISTOR

Redfish Part No. : RBN-2019-24

Specifications : R₂₅ 50 KΩ ± 5 %

B₂₅₋₈₅ 3978°K ± 1 %

B₀₋₅₀ 3892°K ± 1 %

NAME : NTC THERMISTOR SENSOR

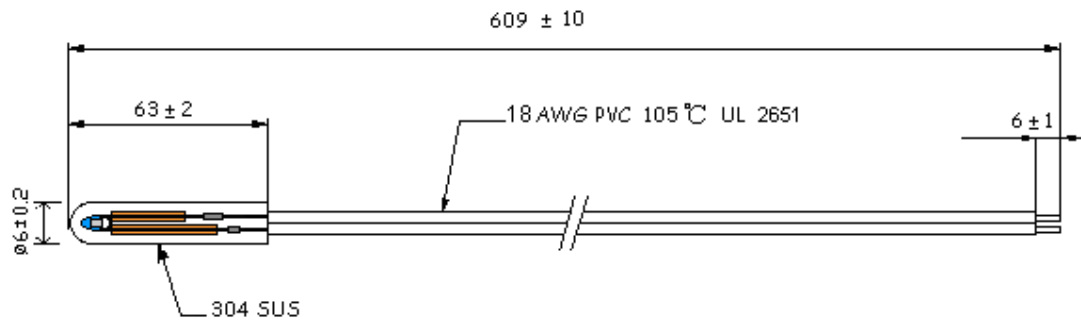
PART NO. : RBN-2019-24

1. ELECTRICAL SPECIFICATION

ITEM	PARTICULARS	SPECIFICATION	
1-1	Resistance	Resistance at 25°C R ₂₅	50K±5%
1-2	"B" Constance	R ₂₅ To R ₈₅ °C B _{25/85} B _{0/50}	3978·K ±1% 3892·K ±1%
1-3	Operating Temp. Range		-40 TO 125°C
1-4	Dissipation Constance	in still air	3.0 mW/°C
1-5	Insulation resistance		DC500V,100M
1-6	Dielectric strength		AC1800V 1sec
1-7	Thermal Time Constant	in still air	25 sec max.

1-1. APPEARANCE DIMENSIONS

(unit:mm)



2. ENVIRONMENTAL TEST

	ITEM	CONDITIONS	SPECIFICATION	
2-1	High Temperature Storage	80°C (AIR) 1000 Hrs	△ R25 △ B25/85	±1% < 3% ±1% < 2%
2-2	Lower Temperature Storage	- 40°C (AIR) 1000 Hrs	△ R25 △ B25/85	±1% < 3% ±1% < 2%
2-3	High Humidity Storage	40°C / 95% / 1000 Hrs	△ R25 △ B25/85	±1% < 3% ±1% < 2%
2-4	Thermal Shock	- 40°C ↔ 80°C / 10 Cycles	△ R25 △ B25/85	±1% < 3% ±1% < 2%

3. INSPECTION CONDITION

3-1. SAMPLING METHOD: Apply to MIL-STD-105D

3-2. LEVEL: Level 1, AQL 1.0%

3-3. CHECK POINT AND METHOD

Check point	Test method	Grade
Appearance and Dimension	Refer to 4-2.	Important
Electrical Characteristics	Refer to 4-3.	Very Important
Mechanical Characteristics	Refer to 4-4.	Very Important
Environment Test	Refer to 4-5.	Very Important

※ Follow the special specification if another check point required.

4. TEST SPECIFICATION

4-1. TEST CONDITION

4-1-1. NORMAL CONDITION

Temperature : 15~35°C

Relative humidity : 25 ~85%

Atmosphere : 860 ~ 1016 mbar

4-1-2. STANDARD CONDITION

Temperature : 25°C

Relative humidity : 50%

Atmosphere : 1013 mbar

4-2. APPEARANCE AND DIMENSION

4-2-1. APPEARANCE: Visual test on normally but it can be use microscope or other equipment if necessary

4-2-2. DIMENSION: Apply to following tool normally
Vernier calipers : It can be check within 0.05 mm

4-3. ELECTRICAL CHARACTERISTICS

4-3-1. ZERO POWER RESISTANCE ($R_0@T^{\circ}C$)

The resistance value of a Thermistor at a specified temperature with zero electrical power dissipation. The temperature controlled liquid bath for precise measurements must be $0.05^{\circ}C$ on temperature tolerance and the liquid volume of the bath should be at least 1000 times that of any object placed in it.

4-3-2. β VALUE ($\beta (T/T)$)

The β value is the ratio of the zero power resistance of a thermistor measured at two specified reference temperature. It may be determined as following equation.

$$\beta (T/T) = \frac{\ln \frac{R@T}{R@T}}{\frac{1}{T} - \frac{1}{T}} (T < T)$$

$R@T$ = Resistance at Kelvin temperature T

$R@T$ = Resistance at Kelvin temperature T

T, T = Kelvin temperature ($K = ^{\circ}C + 273.15$)

4-3-3. DISSIPATION CONSTANT (δ)

Unless otherwise specified, the dissipation constant is given for the Thermistor when supported by its leads in stirred oil at an ambient temperature of $25^{\circ}C$ within Thermistor under chamber have a volume greater than 1,000 times the volume of the Thermistor under test. Usually, the power dissipated is taken as the power required to raise the body temperature of the Thermistor by $50^{\circ}C$.

4-3-4. THERMAL TIME CONSTANT (τ)

The time constant is the time required for a Thermistor to change 63.2% of the difference between its initial and final body temperature in stirred oil.

4-3-5. INSULATING RESISTANCE

There shall be satisfied insulation resistance at specified DC voltage between coating area and terminal. $100M\Omega$ Min. at DC 500V unless otherwise specified.

4-4. MECHANICAL CHARACTERISTICS

4-4-1. REQUIREMENT: Requirements shall be as specified herein after each test.

- Zero power resistance: Max. $\pm 2\%$ change from initial at specified temperature
- β value: Max. $\pm 1\%$ change from initial value
- Insulation resistance: Min. $100M\Omega$ at DC 500V
- No mechanical damage – leakage, removal, breakage, etc – in appearance.

4-4-2. TERMINAL STRENGTH

- Pull test: Apply to the one terminal 1kg, 30sec. In terminal axes direction.

4-4-3. RANDOM VIBRATION

Apply frequency 50 ~200Hz, acceleration 37.8G, direction X, Y, Z, for 90sec.

4-4-4. DROP TEST

Drop on rigid plate (concrete) from 75 cm high by 3 times.

4-4-5. SOLDERABILITY

Dip two terminals in $235^{\circ}\text{C}\pm 5^{\circ}\text{C}$ molten solder for 2 sec.

Test the soldering area is over 95% in dip-area.

4-4-6. RESISTANCE TO SOLDERING HEAT

Dip two terminals to point located 2.0~2.5 mm from element in $260^{\circ}\text{C}\pm 5^{\circ}\text{C}$ molten solder for 10 sec.

4-5. ENVIRONMENT TEST

4-5-1. REQUIREMENT: Refer to 4-4-1.

4-5-2. LOW TEMPERATURE STORAGE

Store in cold still air at $-40^{\circ}\text{C}\pm 5^{\circ}\text{C}$ for 1000 hours.

4-5-3. HOT TEMPERATURE STORAGE

Store in hot still air at $80^{\circ}\text{C}\pm 5^{\circ}\text{C}$ for 1000 hours.

4-5-4. TEMPERATURE CYCLE

Test 10 times as following conditioned air.

-40°C x 1HR. ←ROOM TEMP. 0.5HR. → 80°C x 1HR.

4-5-5. THERMAL SHOCK

Test 50 times as following conditioned air.

-40°C x 0.5HR. ←5MIN. → 80°C x 0.5HR.

4-5-6. IMMERSION

Test 2 times by dipping 0.9% salt solution as following condition.

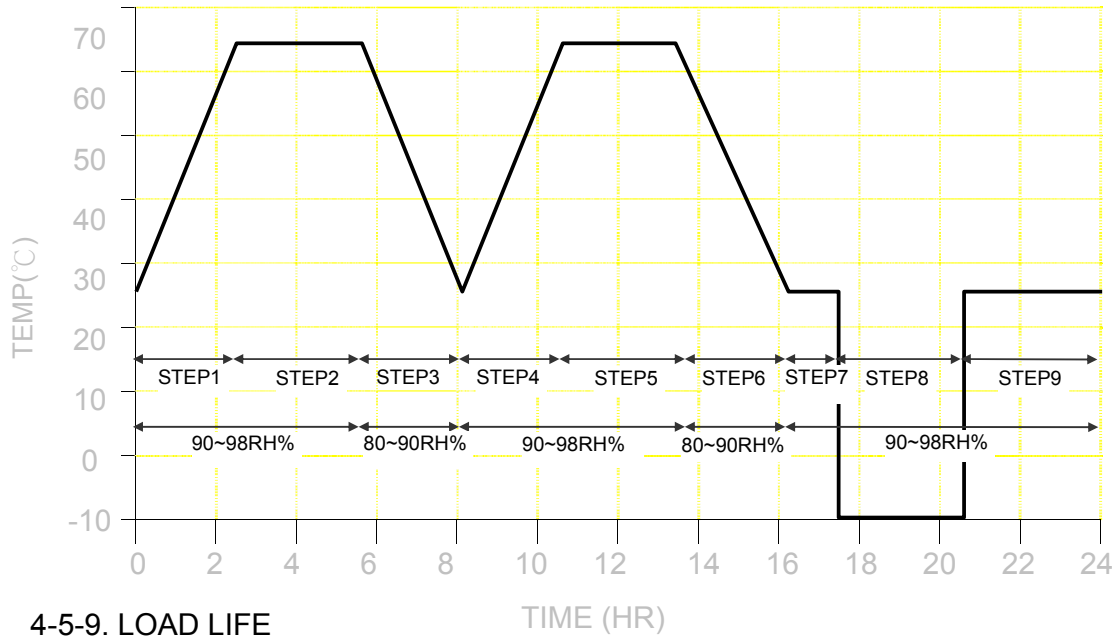
65°C x 15MIN. 25°C x 15MIN.

4-5-7. HUMIDITY

Test in condition 40°C , 95%RH for 1000 hours.

4-5-8. MOISTURE RESISTANCE

Test 10 times as following condition in 1.5hours after standing off form drying oven. But, apply the 50% of maximum power rating as initial 2hours of STEP 2 and STEP 5.



4-5-9. LOAD LIFE

Apply the maximum power rating ON for 1.5 hours and OFF 0.5 hours for 1000 hours in room temperature

5. RT CHARACTERISTICS

PART NO.:

RBN-2019-24

R₂₅ : 50,000 ohms ± 5%
B_{25/85} : 3978 °K ± 1%

Temperature (°C)	Resistance (Ω)			Temperature Coef. (%/°C)	Resist. Tolerance (%)		Temp. Tolerance (°C)	
	MIN.	CENTER	MAX.		MIN.	MAX.	MIN.	MAX.
-40.0	1739899	2047229	2402822	-7.30	-15.01	17.37	-2.38	2.06
-39.0	1621396	1903636	2229419	-7.24	-14.83	17.11	-2.36	2.05
-38.0	1511871	1771211	2069848	-7.18	-14.64	16.86	-2.35	2.04
-37.0	1410580	1649004	1922908	-7.12	-14.46	16.61	-2.33	2.03
-36.0	1316845	1536154	1787508	-7.06	-14.28	16.36	-2.32	2.02
-35.0	1230048	1431880	1662662	-7.00	-14.10	16.12	-2.30	2.01
-34.0	1149628	1335469	1547473	-6.94	-13.92	15.87	-2.29	2.00

-33.0	1075071	1246272	1441125	-6.88	-13.74	15.63	-2.27	2.00
-32.0	1005909	1163700	1342878	-6.83	-13.56	15.40	-2.26	1.99
-31.0	941713	1087215	1252060	-6.77	-13.38	15.16	-2.24	1.98
-30.0	882092	1016324	1168055	-6.71	-13.21	14.93	-2.22	1.97
-29.0	826689	950581	1090307	-6.66	-13.03	14.70	-2.21	1.96
-28.0	775176	889576	1018307	-6.61	-12.86	14.47	-2.19	1.95
-27.0	727252	832934	951589	-6.55	-12.69	14.25	-2.17	1.94
-26.0	682644	780315	889730	-6.50	-12.52	14.02	-2.16	1.93
-25.0	641099	731404	832343	-6.45	-12.35	13.80	-2.14	1.92
-24.0	602386	685915	779074	-6.40	-12.18	13.58	-2.12	1.90
-23.0	566293	643586	729600	-6.34	-12.01	13.36	-2.11	1.89
-22.0	532624	604175	683625	-6.29	-11.84	13.15	-2.09	1.88
-21.0	501201	567462	640878	-6.24	-11.68	12.94	-2.07	1.87
-20.0	471858	533244	601110	-6.19	-11.51	12.73	-2.05	1.86
-19.0	444444	501335	564095	-6.15	-11.35	12.52	-2.04	1.85
-18.0	418819	471563	529622	-6.10	-11.18	12.31	-2.02	1.83
-17.0	394854	443771	497501	-6.05	-11.02	12.11	-2.00	1.82
-16.0	372432	417815	467556	-6.00	-10.86	11.91	-1.98	1.81
-15.0	351442	393560	439624	-5.96	-10.70	11.70	-1.96	1.80
-14.0	331783	370885	413558	-5.91	-10.54	11.51	-1.95	1.78
-13.0	313363	349675	389220	-5.87	-10.38	11.31	-1.93	1.77
-12.0	296095	329827	366484	-5.82	-10.23	11.11	-1.91	1.76
-11.0	279899	311245	345235	-5.78	-10.07	10.92	-1.89	1.74
-10.0	264703	293839	325366	-5.73	-9.92	10.73	-1.87	1.73
-9.0	250437	277527	306778	-5.69	-9.76	10.54	-1.85	1.72
-8.0	237039	262233	289380	-5.65	-9.61	10.35	-1.83	1.70
-7.0	224451	247888	273089	-5.60	-9.45	10.17	-1.81	1.69
-6.0	212618	234427	257826	-5.56	-9.30	9.98	-1.79	1.67
-5.0	201490	221788	243522	-5.52	-9.15	9.80	-1.77	1.66
-4.0	191021	209918	230108	-5.48	-9.00	9.62	-1.76	1.64
-3.0	181167	198764	217524	-5.44	-8.85	9.44	-1.74	1.63
-2.0	171889	188278	205714	-5.40	-8.70	9.26	-1.72	1.61
-1.0	163149	178417	194625	-5.36	-8.56	9.08	-1.69	1.60
0.0	154913	169138	184208	-5.32	-8.41	8.91	-1.67	1.58
1.0	147148	160405	174419	-5.28	-8.26	8.74	-1.65	1.56
2.0	139824	152181	165216	-5.24	-8.12	8.57	-1.63	1.55
3.0	132914	144434	156560	-5.21	-7.98	8.40	-1.61	1.53
4.0	126392	137133	148414	-5.17	-7.83	8.23	-1.59	1.52
5.0	120234	130250	140747	-5.13	-7.69	8.06	-1.57	1.50
6.0	114416	123757	133527	-5.09	-7.55	7.89	-1.55	1.48
7.0	108918	117632	126724	-5.06	-7.41	7.73	-1.53	1.46
8.0	103721	111849	120313	-5.02	-7.27	7.57	-1.51	1.45
9.0	98806	106390	114268	-4.99	-7.13	7.41	-1.49	1.43
10.0	94157	101232	108567	-4.95	-6.99	7.25	-1.46	1.41
11.0	89756	96358	103187	-4.92	-6.85	7.09	-1.44	1.39
12.0	85590	91751	98109	-4.88	-6.71	6.93	-1.42	1.38
13.0	81645	87393	93313	-4.85	-6.58	6.77	-1.40	1.36

14.0	77906	83271	88783	-4.81	-6.44	6.62	-1.37	1.34
15.0	74364	79370	84502	-4.78	-6.31	6.47	-1.35	1.32
16.0	71005	75677	80455	-4.75	-6.17	6.31	-1.33	1.30
17.0	67819	72179	76628	-4.72	-6.04	6.16	-1.31	1.28
18.0	64797	68866	73007	-4.68	-5.91	6.01	-1.28	1.26
19.0	61929	65726	69580	-4.65	-5.78	5.86	-1.26	1.24
20.0	59206	62748	66336	-4.62	-5.65	5.72	-1.24	1.22
21.0	56620	59925	63264	-4.59	-5.51	5.57	-1.21	1.20
22.0	54164	57246	60353	-4.56	-5.38	5.43	-1.19	1.18
23.0	51829	54705	57595	-4.53	-5.26	5.28	-1.17	1.16
24.0	49610	52291	54980	-4.50	-5.13	5.14	-1.14	1.14
25.0	47500	50000	52500	-4.47	-5.00	5.00	-1.12	1.12
26.0	45371	47823	50282	-4.44	-5.13	5.14	-1.16	1.16
27.0	43352	45755	48171	-4.41	-5.25	5.28	-1.20	1.19
28.0	41434	43789	46162	-4.38	-5.38	5.42	-1.24	1.23
29.0	39613	41919	44249	-4.35	-5.50	5.56	-1.28	1.27
30.0	37884	40141	42427	-4.32	-5.62	5.69	-1.32	1.30
31.0	36240	38450	40691	-4.29	-5.75	5.83	-1.36	1.34
32.0	34678	36840	39038	-4.26	-5.87	5.97	-1.40	1.38
33.0	33193	35307	37461	-4.24	-5.99	6.10	-1.44	1.41
34.0	31781	33847	35958	-4.21	-6.11	6.24	-1.48	1.45
35.0	30437	32457	34524	-4.18	-6.22	6.37	-1.52	1.49
36.0	29158	31132	33157	-4.15	-6.34	6.50	-1.57	1.53
37.0	27941	29869	31851	-4.13	-6.46	6.64	-1.61	1.56
38.0	26782	28666	30605	-4.10	-6.57	6.77	-1.65	1.60
39.0	25677	27518	29416	-4.07	-6.69	6.90	-1.69	1.64
40.0	24625	26422	28279	-4.05	-6.80	7.03	-1.74	1.68
41.0	23623	25377	27194	-4.02	-6.91	7.16	-1.78	1.72
42.0	22667	24380	26156	-4.00	-7.03	7.29	-1.82	1.76
43.0	21756	23427	25165	-3.97	-7.14	7.42	-1.87	1.80
44.0	20886	22518	24217	-3.95	-7.25	7.54	-1.91	1.84
45.0	20057	21649	23310	-3.92	-7.36	7.67	-1.96	1.88
46.0	19265	20819	22442	-3.90	-7.46	7.80	-2.00	1.92
47.0	18509	20026	21612	-3.87	-7.57	7.92	-2.05	1.95
48.0	17788	19267	20818	-3.85	-7.68	8.05	-2.09	2.00
49.0	17098	18542	20057	-3.83	-7.79	8.17	-2.14	2.04
50.0	16440	17848	19329	-3.80	-7.89	8.30	-2.18	2.08
51.0	15810	17184	18631	-3.78	-8.00	8.42	-2.23	2.12
52.0	15209	16549	17963	-3.76	-8.10	8.54	-2.27	2.16
53.0	14633	15941	17322	-3.73	-8.20	8.66	-2.32	2.20
54.0	14083	15359	16708	-3.71	-8.31	8.78	-2.37	2.24
55.0	13557	14801	16119	-3.69	-8.41	8.91	-2.42	2.28
56.0	13053	14267	15555	-3.66	-8.51	9.03	-2.46	2.32
57.0	12571	13755	15013	-3.64	-8.61	9.15	-2.51	2.36
58.0	12110	13265	14494	-3.62	-8.71	9.26	-2.56	2.41
59.0	11668	12794	13995	-3.60	-8.81	9.38	-2.61	2.45
60.0	11244	12344	13516	-3.58	-8.90	9.50	-2.66	2.49

61.0	10839	11911	13057	-3.56	-9.00	9.62	-2.70	2.53
62.0	10450	11496	12615	-3.53	-9.10	9.73	-2.75	2.57
63.0	10078	11098	12191	-3.51	-9.19	9.85	-2.80	2.62
64.0	9721	10716	11784	-3.49	-9.29	9.97	-2.85	2.66
65.0	9378	10349	11393	-3.47	-9.38	10.08	-2.90	2.70
66.0	9050	9997	11017	-3.45	-9.48	10.20	-2.95	2.75
67.0	8735	9659	10655	-3.43	-9.57	10.31	-3.00	2.79
68.0	8432	9334	10307	-3.41	-9.66	10.42	-3.06	2.83
69.0	8142	9022	9973	-3.39	-9.76	10.53	-3.11	2.88
70.0	7863	8722	9651	-3.37	-9.85	10.65	-3.16	2.92
71.0	7596	8434	9341	-3.35	-9.94	10.76	-3.21	2.97
72.0	7338	8157	9043	-3.33	-10.03	10.87	-3.26	3.01
73.0	7092	7890	8756	-3.31	-10.12	10.98	-3.31	3.05
74.0	6854	7634	8480	-3.29	-10.21	11.09	-3.37	3.10
75.0	6626	7387	8214	-3.28	-10.30	11.20	-3.42	3.14
76.0	6407	7150	7958	-3.26	-10.38	11.31	-3.47	3.19
77.0	6196	6921	7711	-3.24	-10.47	11.42	-3.53	3.23
78.0	5994	6701	7474	-3.22	-10.56	11.53	-3.58	3.28
79.0	5799	6489	7244	-3.20	-10.64	11.63	-3.63	3.33
80.0	5611	6286	7024	-3.18	-10.73	11.74	-3.69	3.37
81.0	5431	6089	6811	-3.17	-10.82	11.85	-3.74	3.42
82.0	5257	5900	6605	-3.15	-10.90	11.95	-3.80	3.46
83.0	5090	5718	6407	-3.13	-10.98	12.06	-3.85	3.51
84.0	4929	5542	6216	-3.11	-11.07	12.16	-3.91	3.56
85.0	4774	5373	6032	-3.09	-11.15	12.27	-3.96	3.60
86.0	4624	5209	5854	-3.08	-11.23	12.37	-4.02	3.65
87.0	4480	5052	5682	-3.06	-11.31	12.47	-4.08	3.70
88.0	4342	4900	5516	-3.04	-11.39	12.58	-4.13	3.74
89.0	4208	4754	5356	-3.03	-11.48	12.68	-4.19	3.79
90.0	4079	4612	5202	-3.01	-11.56	12.78	-4.25	3.84
91.0	3955	4476	5052	-2.99	-11.63	12.88	-4.30	3.89
92.0	3835	4344	4908	-2.98	-11.71	12.99	-4.36	3.93
93.0	3720	4217	4769	-2.96	-11.79	13.09	-4.42	3.98
94.0	3608	4094	4634	-2.95	-11.87	13.19	-4.48	4.03
95.0	3501	3976	4504	-2.93	-11.95	13.29	-4.54	4.08
96.0	3397	3861	4378	-2.91	-12.03	13.39	-4.59	4.13
97.0	3297	3751	4257	-2.90	-12.10	13.48	-4.65	4.18
98.0	3200	3644	4139	-2.88	-12.18	13.58	-4.71	4.23
99.0	3107	3541	4025	-2.87	-12.25	13.68	-4.77	4.27
100.0	3017	3441	3915	-2.85	-12.33	13.78	-4.83	4.32
101.0	2930	3344	3808	-2.84	-12.40	13.88	-4.89	4.37
102.0	2845	3251	3705	-2.82	-12.48	13.97	-4.95	4.42
103.0	2764	3161	3606	-2.81	-12.55	14.07	-5.01	4.47
104.0	2686	3074	3509	-2.79	-12.63	14.16	-5.07	4.52
105.0	2610	2989	3416	-2.78	-12.70	14.26	-5.14	4.57
106.0	2536	2908	3325	-2.76	-12.77	14.35	-5.20	4.62
107.0	2465	2829	3237	-2.75	-12.84	14.45	-5.26	4.68

108.0	2397	2752	3153	-2.73	-12.91	14.54	-5.32	4.73
109.0	2330	2678	3070	-2.72	-12.99	14.64	-5.38	4.78
110.0	2266	2607	2991	-2.70	-13.06	14.73	-5.45	4.83
111.0	2204	2537	2913	-2.69	-13.13	14.82	-5.51	4.88
112.0	2144	2470	2838	-2.68	-13.20	14.92	-5.57	4.93
113.0	2086	2405	2766	-2.66	-13.27	15.01	-5.64	4.98
114.0	2030	2342	2696	-2.65	-13.34	15.10	-5.70	5.03
115.0	1975	2281	2627	-2.64	-13.40	15.19	-5.76	5.09
116.0	1922	2222	2561	-2.62	-13.47	15.28	-5.83	5.14
117.0	1871	2164	2497	-2.61	-13.54	15.37	-5.89	5.19
118.0	1822	2109	2435	-2.59	-13.61	15.46	-5.96	5.24
119.0	1774	2055	2375	-2.58	-13.67	15.55	-6.02	5.30
120.0	1728	2003	2316	-2.57	-13.74	15.64	-6.09	5.35
121.0	1683	1952	2259	-2.56	-13.81	15.73	-6.16	5.40
122.0	1639	1903	2204	-2.54	-13.87	15.82	-6.22	5.46
123.0	1597	1855	2150	-2.53	-13.94	15.91	-6.29	5.51
124.0	1556	1809	2098	-2.52	-14.00	15.99	-6.35	5.56
125.0	1516	1764	2048	-2.50	-14.07	16.08	-6.42	5.62