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SPECIFICATION FOR APPROVAL

CUSTOMER	Blume_Delta-R
CERTIFIED MODEL/TYPE	TTS-103
PART NO.	TTS1A103F34D1TV0(RoHS+HF)
APPLICATION	
CUSTOMER P/N	
ISSUE DATE	MAY.28.2024
REV. NO.	1.0
REV. DATE	

FOR CUSTOMER APPROVAL	CHECKED BY
	HU FENG
	APPROVED BY
	HU FENG



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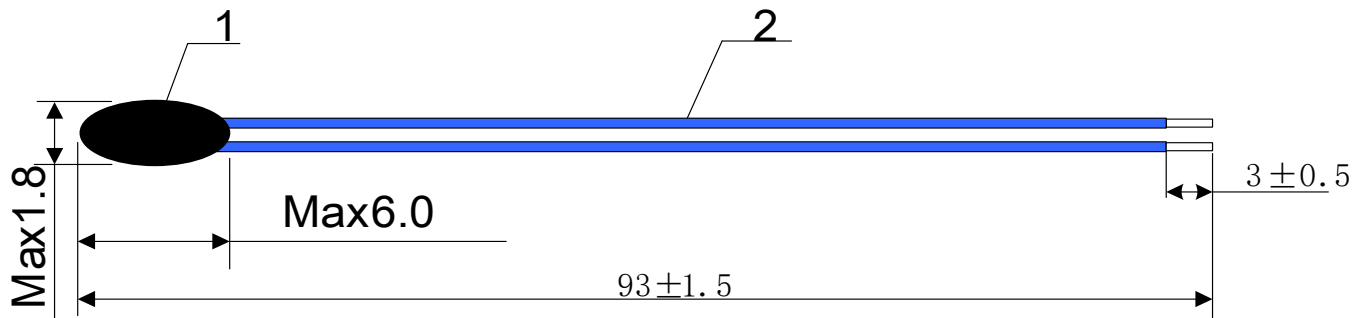
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Part Number Code

Example :

TTS **1** **A** **103** **F** **34D** **1** **T** **V0**
(1) (2) (3) (4) (5) (6) (7) (8) (9)

No.	Item	Digit	Specification
(1)	Product Type	TTS	Thinking NTC thermistor TTS type
(2)	Body Size	1	φ 1.8mm x L 6.0mm (max.)
(3)	Definition of B Value	A	B _{25/85}
(4)	Zero Power Resistance at 25°C	103	10x 10 ³ Ω = 10 KΩ
(5)	Tolerance of R ₂₅	F	±1%
(6)	B Value	34D	3435K
(7)	Tolerance of B Value	1	± 1%
(8)	Appearance	T	Teflon cp wire(blue)
(9)	Optional Suffix	V0	RoHS compliance (RoHS+HF)



1. Coating Resin: Black Epoxy
2. Lead Wire : Teflon cp wire(blue)

Electrical Characteristics

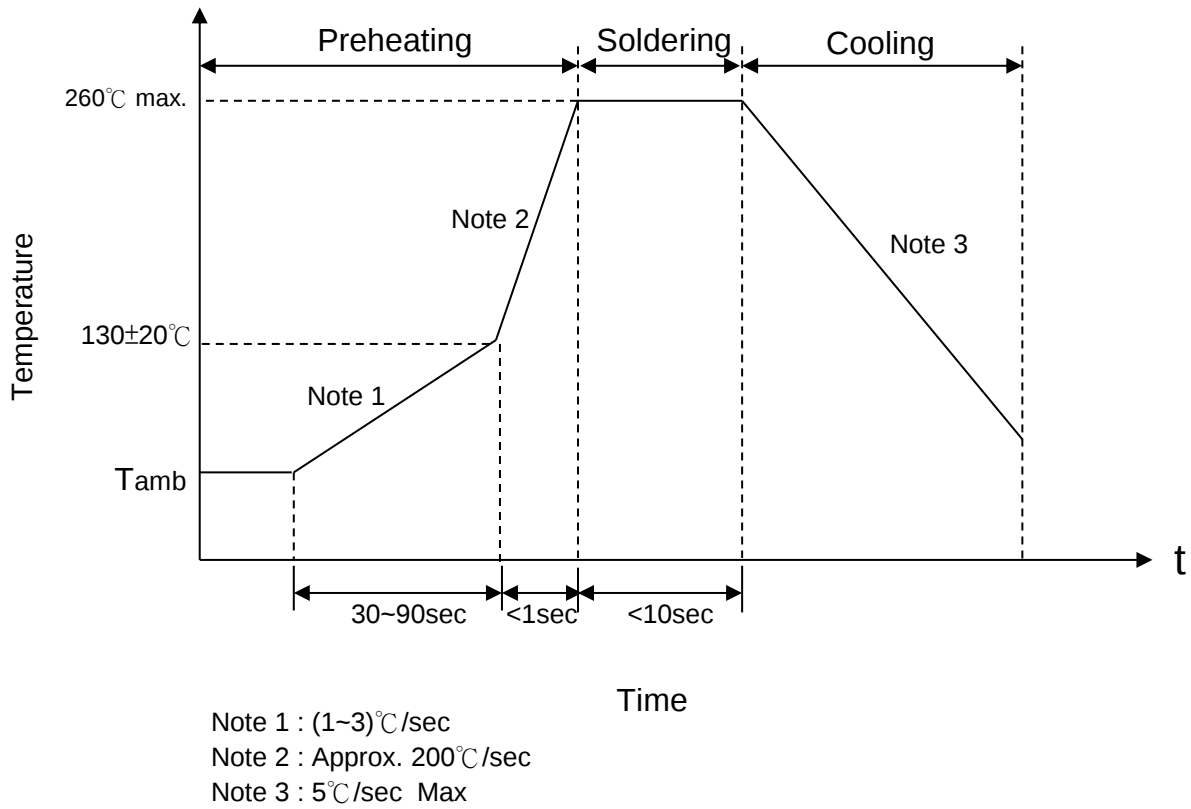
Part No.	Zero Power Resistance at 25°C	Tolerance of $R_{25^{\circ}\text{C}}$	$B_{25/85}$ Value	Tolerance of B Value	Max. Power Dissipation at 25°C	Dissipation Factor	Thermal Time Constant	Operating Temperature Range
	$R_{25^{\circ}\text{C}}$ (K Ω)	($\pm$ %)	(K)	($\pm$ %)	P_{max} (mW)	δ (mW/°C)	τ (sec.)	$T_L \sim T_U$ (°C)
TTS1A103F34D1TV0	10	1	3435	1	45	≥ 1	≤ 10	-40 ~+100

Reliability

Item	Standard	Test conditions / Methods	Specifications															
Tensile Strength of Terminals	IEC60068-2-21	Gradually applying the force specified and keeping the unit fixed for 10±1 sec. <table><tr><td>Terminal diameter (mm)</td><td>Force (Kg)</td></tr><tr><td>d ≤ 0.25</td><td>0.10</td></tr><tr><td>0.25<d ≤ 0.3</td><td>0.25</td></tr><tr><td>0.3<d ≤ 0.5</td><td>0.50</td></tr></table>	Terminal diameter (mm)	Force (Kg)	d ≤ 0.25	0.10	0.25<d ≤ 0.3	0.25	0.3<d ≤ 0.5	0.50	No visible damage							
Terminal diameter (mm)	Force (Kg)																	
d ≤ 0.25	0.10																	
0.25<d ≤ 0.3	0.25																	
0.3<d ≤ 0.5	0.50																	
Bending Strength of Terminals	IEC60068-2- 21	Hold specimen and apply the force specified below to each lead. Bend the specimen to 90°, then return to the original position. Repeat the procedure in the opposite direction. <table><tr><td>Terminal diameter (mm)</td><td>Force (Kg)</td></tr><tr><td>d ≤ 0.25</td><td>0.050</td></tr><tr><td>0.25<d ≤ 0.3</td><td>0.125</td></tr><tr><td>0.3<d ≤ 0.5</td><td>0.250</td></tr></table>	Terminal diameter (mm)	Force (Kg)	d ≤ 0.25	0.050	0.25<d ≤ 0.3	0.125	0.3<d ≤ 0.5	0.250	No visible damage							
Terminal diameter (mm)	Force (Kg)																	
d ≤ 0.25	0.050																	
0.25<d ≤ 0.3	0.125																	
0.3<d ≤ 0.5	0.250																	
Solderability	IEC60068-2-20	245 ± 3 °C , 3 ± 0.3 sec	At least 95% of terminal electrode is covered by new solder															
Resistance to Soldering Heat	IEC60068-2-20	260 ± 3 °C , 10 ± 1 sec	No visible damage ΔR ₂₅ /R ₂₅ ≤ 3 %															
High Temperature Storage	IEC60068-2-2	100 ± 5 °C , 1000 ± 24 hrs	No visible damage ΔR ₂₅ /R ₂₅ ≤ 5 %															
Damp Heat, Steady State	IEC60068-2-78	40 ± 2 °C , 9 0 ~ 95 % RH , 1000 ± 24hrs	No visible damage ΔR ₂₅ /R ₂₅ ≤ 3%															
Rapid Change of Temperature	IEC60068-2-14	The conditions shown below shall be repeated 5 cycles <table><tr><td>Step</td><td>Temperature (°C)</td><td>Period (minutes)</td></tr><tr><td>1</td><td>-40 ± 5</td><td>30 ± 3</td></tr><tr><td>2</td><td>Room temperature</td><td>5 ± 3</td></tr><tr><td>3</td><td>100 ± 5</td><td>30 ± 3</td></tr><tr><td>4</td><td>Room temperature</td><td>5 ± 3</td></tr></table>	Step	Temperature (°C)	Period (minutes)	1	-40 ± 5	30 ± 3	2	Room temperature	5 ± 3	3	100 ± 5	30 ± 3	4	Room temperature	5 ± 3	No visible damage ΔR ₂₅ /R ₂₅ ≤ 3 %
Step	Temperature (°C)	Period (minutes)																
1	-40 ± 5	30 ± 3																
2	Room temperature	5 ± 3																
3	100 ± 5	30 ± 3																
4	Room temperature	5 ± 3																
Max. Power Dissipation	IEC60539-1 4.26.3	25 ± 5 °C , Pmax. , 1000 ± 24 hrs	No visible damage ΔR ₂₅ /R ₂₅ ≤ 5 %															

Soldering Recommendation

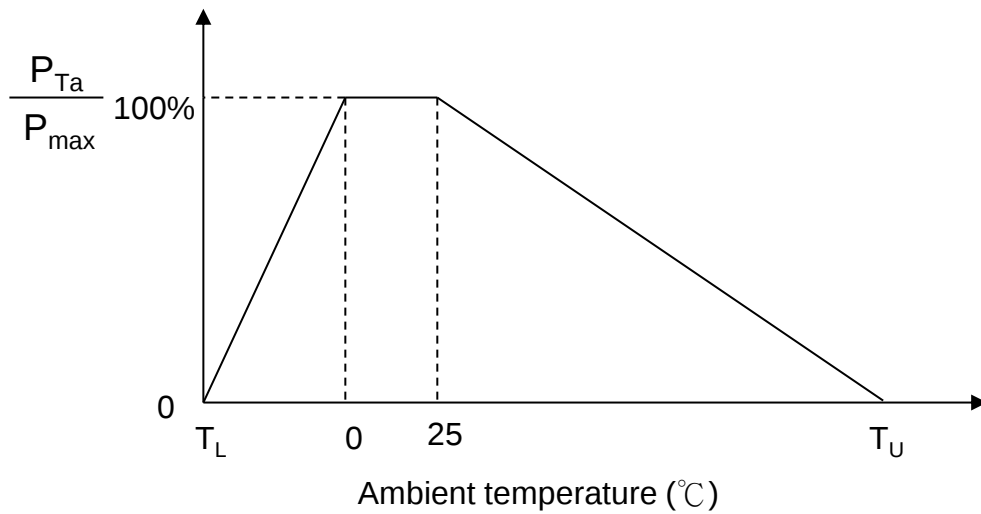
■ Wave Soldering Profile



■ Recommended Reworking Conditions with Soldering Iron

Item	Conditions
Temperature of Soldering Iron-tip	360°C (max.)
Soldering Time	3 sec (max.)
Distance from Thermistor	10 mm (min.)

Max. Power Dissipation Derating Curve



Note: T_L = Minimum operating temperature(°C)

T_U = Maximum operating temperature (°C)

For example :

Ambient temperature(T_a) = 55°C

Maximum operating temperature(T_u) = 100°C

$P_{Ta} = (T_u - T_a) / (T_u - 25) \times P_{max} = 60\% P_{max}$

RoHS Compliant Declaration

We hereby declare the components delivered to your company
are compliant with RoHS Directive 2015/863/EU

Install and use

1. Use this product within the specified temperature range.
2. Higher temperature may cause deterioration of the characteristics or the material quality of this product.
3. Do not melt the solder in resin head, when you solder this product. If you melt the solder in resin head, it has possibility that the break of wire, short and insulation damage.
4. Do not touch the resin head directly by solder iron. It may cause the melt of solder in resin head.
5. At least away from resin head 10mm above when lead dividing.
6. In case you cut the lead wire of this product less than 10mm from resin head, the heat of melted solder at lead wire edge is propagated easily to the resin head along the lead wire.
7. Radius of lead bending should be more than 1mm when lead bending.
Holding element by side lead wire is recommended when lead wire is bent or cut.
8. Do not apply an excessive force to the lead. Otherwise, it may cause junction between lead and element to break or crack.
9. The ceramic element of this product is fragile, and care must be taken not to load an excessive press-force or not to give a shock at handling. Such forces may cause cracking or chipping.
10. If you mold by resin this product, please evaluate the quality of this product before you use it.

Warehouse Storage Conditions of Products

To keep solderability of product from declining, the following storage condition is recommended.

1. Storage condition:

Temperature -10°C to +40°C

Humidity less than 75%RH (not dewing condition)

2. Storage term:

Use this product within 1 year after delivery by first-in and first-out stocking system.

3. Handling after unpacking:

After unpacking, reseal product promptly or store it in a sealed container with a drying agent.

4. Storage place:

Do not store this product in corrosive gas (Sulfuric acid gas, Chlorine gas, etc.) or in direct sunlight.

Warn and note item

This product is designed for application in an ordinary environment (normal room temperature, humidity and atmospheric pressure).

Do not use under the following conditions because all of these factors can deteriorate the product characteristics or cause failures and burn-out.

1. Corrosive gas or deoxidizing gas (Chlorine gas, Hydrogen sulfide gas, Ammonia gas, Sulfuric acid gas, Nitric oxide gas, etc.)
2. Volatile or flammable gas
3. Dusty conditions
4. Under vacuum, or under high or low pressure
5. Wet or humid locations; soak in the liquid or wash with liquid
6. Places with salt water, oils, chemical liquids or organic solvents and do not use directly with quick-drying glue.
7. Strong vibrations
8. Other places where similar hazardous conditions exist
9. Be sure to provide an appropriate fail-safe function on your product to prevent secondary damages that may be caused by the abnormal function or the failure of our product.

Restriction of Weapon and Military End-Use

Thinking has established and implemented the fundamental policy on none of our product should be used or sold,

through any channels, for use in the design, development, production, utilization, maintenance or operation of,

or otherwise contribution to any weapons (Weapons of Mass Destruction [nuclear, chemical or biological weapons or missiles]

or conventional weapons) or goods or systems specially designed or intended for military

end-use or utilization by military end-users.

Safety Approvals (Certified Model/Type : TTS-103)



* UL 1434 / cUL recognized (File # E138827)

Certificates

- (1) IATF 16949 certificate
- (2) ISO 9001 certificate

Test Report

- (1) RoHS+HF test report

R - T Table

Part No:TTS1A103F34D1TV0

R25 = 10K Ω $\pm$ 1%

B25/85 = 3435 K $\pm$ 1%

Temperature (°C)	Rmax. (K Ω)	Rnor. (K Ω)	Rmin. (K Ω)	Temperature Tol. (°C)	
-40	202.1842	194.3303	186.7628	-0.71	0.72
-39	191.1930	183.8677	176.8054	-0.71	0.71
-38	180.8669	174.0329	167.4404	-0.70	0.71
-37	171.1615	164.7842	158.6286	-0.70	0.70
-36	162.0355	156.0828	150.3339	-0.69	0.70
-35	153.4509	147.8933	142.5228	-0.69	0.69
-34	145.3725	140.1825	135.1643	-0.68	0.68
-33	137.7676	132.9199	128.2299	-0.67	0.68
-32	130.6060	126.0768	121.6926	-0.67	0.67
-31	123.8593	119.6269	115.5276	-0.66	0.67
-30	117.5012	113.5454	109.7117	-0.66	0.66
-29	111.5074	107.8092	104.2232	-0.65	0.66
-28	105.8549	102.3969	99.0419	-0.65	0.65
-27	100.5225	97.2885	94.1490	-0.64	0.64
-26	95.4903	92.4651	89.5269	-0.63	0.64
-25	90.7397	87.9095	85.1590	-0.63	0.63
-24	86.2535	83.6052	81.0300	-0.62	0.63
-23	82.0155	79.5369	77.1256	-0.62	0.62
-22	78.0105	75.6905	73.4322	-0.61	0.61
-21	74.2246	72.0526	69.9372	-0.60	0.61
-20	70.6444	68.6108	66.6290	-0.60	0.60
-19	67.2577	65.3533	63.4966	-0.59	0.60
-18	64.0529	62.2694	60.5295	-0.58	0.59
-17	61.0193	59.3487	57.7182	-0.58	0.58
-16	58.1467	56.5818	55.0536	-0.57	0.58
-15	55.4258	53.9598	52.5272	-0.57	0.57
-14	52.8477	51.4741	50.1312	-0.56	0.56
-13	50.4041	49.1171	47.8581	-0.55	0.56
-12	48.0874	46.8813	45.7009	-0.55	0.55
-11	45.8901	44.7599	43.6531	-0.54	0.54
-10	43.8056	42.7464	41.7086	-0.53	0.54
-9	41.8274	40.8347	39.8615	-0.53	0.53
-8	39.9496	39.0191	38.1066	-0.52	0.52
-7	38.1664	37.2944	36.4387	-0.51	0.52
-6	36.4728	35.6555	34.8530	-0.51	0.51
-5	34.8637	34.0977	33.3451	-0.50	0.50
-4	33.3344	32.6165	31.9108	-0.49	0.49
-3	31.8806	31.2077	30.5460	-0.48	0.49
-2	30.4982	29.8676	29.2472	-0.48	0.48
-1	29.1833	28.5924	28.0106	-0.47	0.47
0	27.9322	27.3785	26.8331	-0.46	0.47
1	26.7417	26.2229	25.7116	-0.45	0.46
2	25.6083	25.1223	24.6430	-0.45	0.45
3	24.5291	24.0738	23.6246	-0.44	0.44

4	23.5013	23.0749	22.6539	-0.43	0.44
5	22.5221	22.1227	21.7283	-0.43	0.43
6	21.5890	21.2151	20.8456	-0.42	0.42
7	20.6996	20.3496	20.0034	-0.41	0.41
8	19.8516	19.5240	19.1999	-0.40	0.41
9	19.0430	18.7364	18.4330	-0.39	0.40
10	18.2716	17.9849	17.7008	-0.39	0.39
11	17.5357	17.2675	17.0017	-0.38	0.38
12	16.8333	16.5826	16.3339	-0.37	0.38
13	16.1628	15.9285	15.6960	-0.36	0.37
14	15.5227	15.3037	15.0864	-0.36	0.36
15	14.9113	14.7068	14.5037	-0.35	0.35
16	14.3272	14.1364	13.9466	-0.34	0.34
17	13.7692	13.5911	13.4140	-0.33	0.33
18	13.2358	13.0697	12.9045	-0.32	0.33
19	12.7260	12.5712	12.4170	-0.32	0.32
20	12.2385	12.0943	11.9506	-0.31	0.31
21	11.7722	11.6380	11.5042	-0.30	0.30
22	11.3262	11.2013	11.0768	-0.29	0.29
23	10.8994	10.7834	10.6675	-0.28	0.29
24	10.4910	10.3832	10.2755	-0.27	0.28
25	10.1000	10.0000	9.9000	-0.27	0.27
26	9.7329	9.6329	9.5330	-0.28	0.28
27	9.3811	9.2813	9.1816	-0.29	0.29
28	9.0438	8.9443	8.8450	-0.30	0.30
29	8.7204	8.6213	8.5224	-0.31	0.31
30	8.4103	8.3116	8.2133	-0.32	0.33
31	8.1128	8.0147	7.9170	-0.34	0.34
32	7.8273	7.7299	7.6329	-0.35	0.35
33	7.5534	7.4567	7.3605	-0.36	0.36
34	7.2905	7.1945	7.0992	-0.37	0.37
35	7.0380	6.9430	6.8485	-0.38	0.39
36	6.7956	6.7014	6.6079	-0.40	0.40
37	6.5628	6.4696	6.3770	-0.41	0.41
38	6.3391	6.2469	6.1554	-0.42	0.42
39	6.1242	6.0330	5.9426	-0.43	0.43
40	5.9177	5.8275	5.7382	-0.44	0.45
41	5.7191	5.6300	5.5418	-0.46	0.46
42	5.5282	5.4403	5.3532	-0.47	0.47
43	5.3447	5.2578	5.1719	-0.48	0.48
44	5.1681	5.0824	4.9977	-0.49	0.50
45	4.9983	4.9137	4.8302	-0.51	0.51
46	4.8348	4.7515	4.6691	-0.52	0.52
47	4.6776	4.5954	4.5142	-0.53	0.54
48	4.5262	4.4452	4.3652	-0.54	0.55
49	4.3804	4.3006	4.2218	-0.56	0.56
50	4.2401	4.1615	4.0839	-0.57	0.57
51	4.1049	4.0275	3.9511	-0.58	0.59
52	3.9747	3.8985	3.8233	-0.60	0.60
53	3.8493	3.7742	3.7002	-0.61	0.61
54	3.7284	3.6545	3.5817	-0.62	0.63

55	3.6119	3.5392	3.4676	-0.63	0.64
56	3.4996	3.4281	3.3576	-0.65	0.65
57	3.3913	3.3210	3.2517	-0.66	0.67
58	3.2869	3.2177	3.1496	-0.67	0.68
59	3.1863	3.1182	3.0512	-0.69	0.69
60	3.0891	3.0222	2.9563	-0.70	0.71
61	2.9954	2.9296	2.8649	-0.71	0.72
62	2.9050	2.8403	2.7767	-0.73	0.73
63	2.8177	2.7541	2.6916	-0.74	0.75
64	2.7335	2.6710	2.6096	-0.76	0.76
65	2.6522	2.5907	2.5304	-0.77	0.78
66	2.5737	2.5133	2.4540	-0.78	0.79
67	2.4979	2.4385	2.3803	-0.80	0.80
68	2.4246	2.3663	2.3091	-0.81	0.82
69	2.3539	2.2966	2.2404	-0.82	0.83
70	2.2856	2.2292	2.1741	-0.84	0.85
71	2.2195	2.1642	2.1100	-0.85	0.86
72	2.1557	2.1013	2.0481	-0.87	0.88
73	2.0940	2.0406	1.9884	-0.88	0.89
74	2.0344	1.9819	1.9306	-0.90	0.90
75	1.9768	1.9252	1.8748	-0.91	0.92
76	1.9210	1.8704	1.8209	-0.92	0.93
77	1.8671	1.8174	1.7688	-0.94	0.95
78	1.8150	1.7661	1.7184	-0.95	0.96
79	1.7646	1.7166	1.6697	-0.97	0.98
80	1.7158	1.6686	1.6226	-0.98	0.99
81	1.6686	1.6223	1.5771	-1.00	1.01
82	1.6229	1.5774	1.5331	-1.01	1.02
83	1.5787	1.5340	1.4905	-1.03	1.04
84	1.5359	1.4920	1.4492	-1.04	1.05
85	1.4944	1.4513	1.4094	-1.06	1.07
86	1.4543	1.4120	1.3708	-1.07	1.08
87	1.4155	1.3739	1.3334	-1.09	1.10
88	1.3778	1.3370	1.2973	-1.11	1.11
89	1.3414	1.3013	1.2623	-1.12	1.13
90	1.3061	1.2667	1.2284	-1.14	1.15
91	1.2719	1.2333	1.1956	-1.15	1.16
92	1.2388	1.2008	1.1639	-1.17	1.18
93	1.2067	1.1694	1.1331	-1.18	1.19
94	1.1756	1.1389	1.1033	-1.20	1.21
95	1.1455	1.1094	1.0745	-1.22	1.23
96	1.1162	1.0809	1.0465	-1.23	1.24
97	1.0879	1.0532	1.0194	-1.25	1.26
98	1.0604	1.0263	0.9932	-1.27	1.28
99	1.0338	1.0003	0.9677	-1.28	1.30
100	1.0080	0.9750	0.9431	-1.30	1.31