



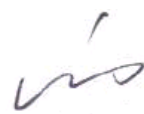

Customer : 아오이비

Document No. : AP16-TH-0819-02

Approval Sheet [for Product Specification]

Product	Chip NTC Thermistor
Part No	ECTH100505 103F 3830FST

Approved by Customer : [Signing or Stamping here]

Joinset Co., Ltd.			
QA	Production	R&D	Sales Part
			



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Chip NTC Thermistor

■ Features

1. Small Size, Low Capacitance at 40MHz [Below 3pF]
2. Corresponding to the high B value
3. Strong against electrostatic discharge
4. Excellent in cost- performance
5. High accuracy and High Environmental Resistance are provided due to our original Manufacturing Method
6. All Pb-free product [Pb and Cd are not contained in product]

■ Applications

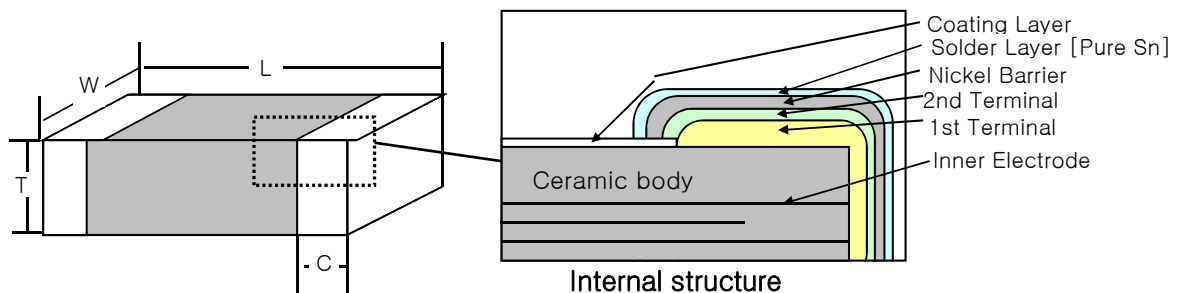
1. Mobile communication related Equipment [TCXO, RF Circuit, LCD Panel, Battery Pack]
2. Computer related Equipment
3. Video Camcorder, Car Audio related Equipment
4. Optical communication related Equipment

■ Part Number

ECTH	100505	103	F	3830	F	S	T
①	②	③	④	⑤	⑥	⑦	⑧

①	Series	Chip Thermistor
②	Dimension	Refer to Shape & Dimension
③	Resistance	103 = 10KΩ [= 10 x 10 ³ Ω] @ 25°C ± 0.2°C
④	R Tolerance	F : ±1% of Nominal Resistance
⑤	B Value	B _{25°C/85°C} = 3830K
⑥	B Tolerance	F : ±1% of Nominal B Value
⑦	Type	S : Pb free product
⑧	Packing	T : Paper carrier Tape & Plastic Reel

■ Shape & Dimension



Size	L[mm]	W[mm]	T[mm]	C[mm]
0603	0.60 ± 0.03	0.30 ± 0.03	0.30 ± 0.03	0.15 ± 0.05
1005	1.00 ± 0.05	0.50 ± 0.05	0.50 ± 0.05	0.25 ± 0.10
1608	1.60 ± 0.10	0.80 ± 0.10	0.80 ± 0.10	0.40 ± 0.20
2012	2.00 ± 0.20	1.25 ± 0.20	0.85 ± 0.20	0.50 ± 0.20

■ Specifications

TYPE	B value [K]	Nominal Resistance (Ω) [at 25℃]										
		22	50	100	500	1k	5k	10k	50k	100k	500k	1M
SMD CHIP	2800			100Ω								
	3150	22Ω		68Ω								
	3250			100Ω		220Ω						
	3435							10kΩ				
	3520					1kΩ		6.8kΩ				
	3800							10kΩ		150kΩ		
	3970						5kΩ		68kΩ			
	4050					1kΩ				470kΩ		
	4200								68kΩ		680kΩ	
	4550							10kΩ			220kΩ	
	4750									220kΩ		

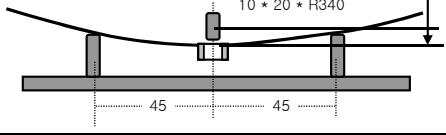
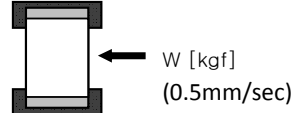
※ B value is calculated from the resistance at 25℃ and 85℃.

※ Variations are available on request.

1005 Type

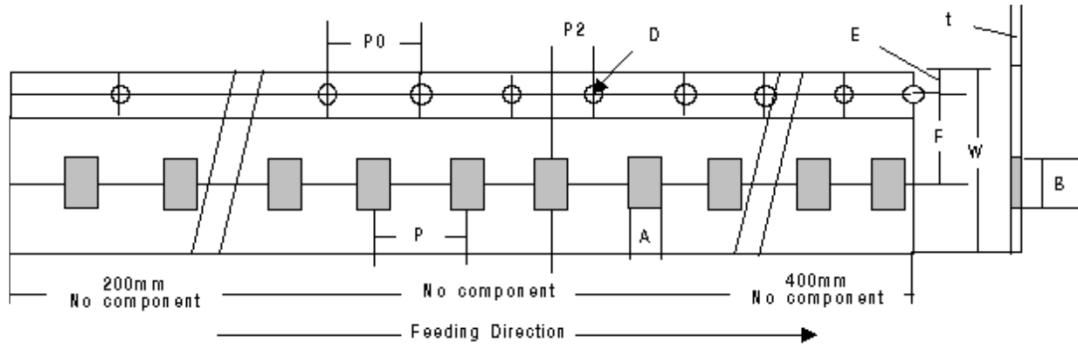
No	Part No	R25℃ [kΩ]	B[25℃/85℃]	B tolerance	Operating Temperature
1	ECTH100505 103F 3830FST	10kΩ	3830K	±1%	-40℃ ~ 125℃

■ Performance Specification

No	ITEM	Requirements	Test condition
1	Operating Temp. Range	-40℃ ~ +125℃	
2	Resistance	Within Tolerance of Resistance	Measured at 25℃ in Silicon Oil Bath
3	B Value	Within Tolerance of B Value	$B_{25℃/85℃}[K]= \ln(R_{25℃}/R_{85℃})/(1/T_{25℃}-1/T_{85℃})$
4	Max Rated Wattage[mW]	100 mW	Measured in the still air with the sample which is soldered on a glass epoxy board t = 1.6mm
5	Heat Dissipation Constant [mW/℃]	1 mW/℃	Measured in the still air with the sample which is soldered on a solder coated copper wire Φ = 0.25
6	Solderability	More than 90% of the terminal electrode shall be covered with new solder.	1. Type of solder : Sn-3.0Ag-0.5Cu 2. Soldering Temp & Time : 230±5℃, 5±1 sec
7	Resistance to Solder Heat	1. No Serious mechanical damage 2. More than 50% of the terminal electrode shall be covered with new solder 3. ΔR ≤ ± 3% (Ref. To initial value)	1. Type of solder : Sn-3.0Ag-0.5Cu 2. Soldering Temp & Time : * Solder Heat Test : 260±5℃, 5±1sec 3. Preheat the Part at 120~150℃, 1min. Let sit at R.T, for 24Hrs then Measure
8	Humidity Test	1. No Serious mechanical damage 2. ΔR ≤ ± 3% (Ref. To initial value) 3. ΔB ≤ ± 3% (Ref. To initial value)	1. Test Temp. & Relative Humidity & Time : 85±5℃, 85±5% RH, 500± 24Hrs 2. Let sit at R.T, for 24Hrs then Measure
9	Thermal Shock	1. No Serious mechanical damage 2. ΔR ≤ ± 3% (Ref. To initial value) 3. ΔB ≤ ± 3% (Ref. To initial value)	1. Temp. : -40±5℃, +85±5℃ 2. Soak Time : 30min ± 3min The cycles is repeated 100 times
10	High Temp. Resistance	1. No Serious mechanical damage 2. ΔR ≤ ± 3% (Ref. To initial value) 3. ΔB ≤ ± 3% (Ref. To initial value)	1. Temp. : +85±5℃ 2. Time : 1000Hrs ± 12Hrs Let sit at R.T, for 24Hrs then Measure
11	Low Temp. Resistance	1. No Serious mechanical damage 2. ΔR ≤ ± 3% (Ref. To initial value) 3. ΔB ≤ ± 3% (Ref. To initial value)	1. Temp. : -40±5℃ 2. Time : 1000Hrs ± 12Hrs Let sit at R.T, for 24Hrs then Measure
12	Bending Strength	1. No Serious mechanical damage	Add load at 0.5mm/sec until glass epoxy board bends up to 1mm [= Bending Depth] 
13	Adhesive Strength of Termination	1. Adhesion above the standard Size W[kgf]	1005 1608 2012 0.5 1.0 1.2 

■ Packing specifications

1. Carrier tape



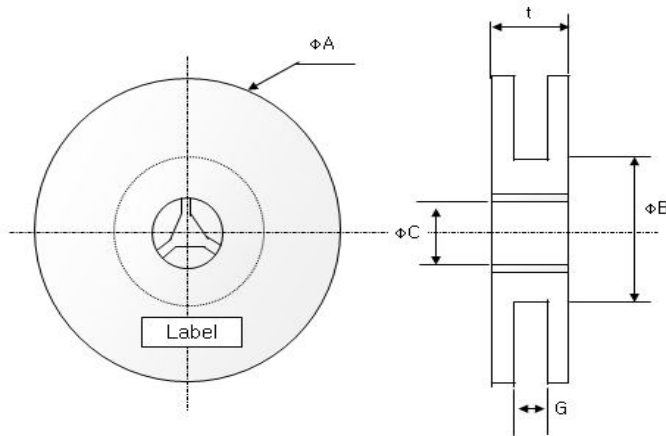
unit : mm

Size	A0	B0	W	D1	E	F	P	P0	P2	t
0603	0.38±0.05	0.68±0.05	8.00±0.20	1.50±0.25	1.75±0.10	3.50±0.50	2.0±0.05	4.0±0.10	2.0±0.10	0.5 max.
1005	0.65±0.10	1.15±0.10					2.0±0.05			0.7 max.
1608	1.10±0.10	1.90±0.10					4.0±0.10			1.1 max.
2012	1.50±0.10	2.35±0.10					4.0±0.10			1.1 max.

* paper type

2. Reel & Label

[Plastic Reel]



unit : mm

code	dimension
ΦA	180 ⁺⁰ ₋₃
ΦB	60 ⁺¹ ₋₀
ΦC	13 ± 0.3
G	9 ^{+0.3} ₋₀
t	11.4 ± 1

* 1005 ~ 2012 size

[Label]

PROD CD : ① ECTH100505 103F 3830FST



LOT NO : ② TC121102-20Y 10,000 *



QTY ③ 10,000 SEQ NO: ④ 001/009 INSPECTOR: ⑤ SJ PARK



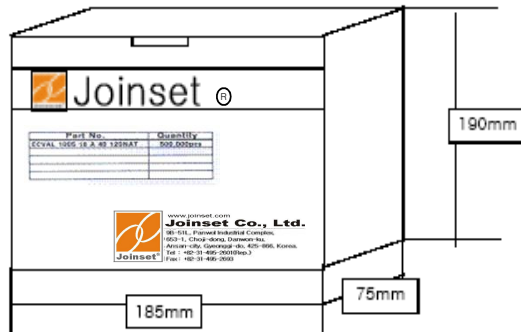
① ECTH100505 103F 3830FST ⑦ JOINSET

code	decription
①	Part no.
②	Lot no.
③	Quantity
④	Sequence no.
⑤	Inspector
⑥	Packing date
⑦	Manufacturer

■ Packing specifications

3. Box

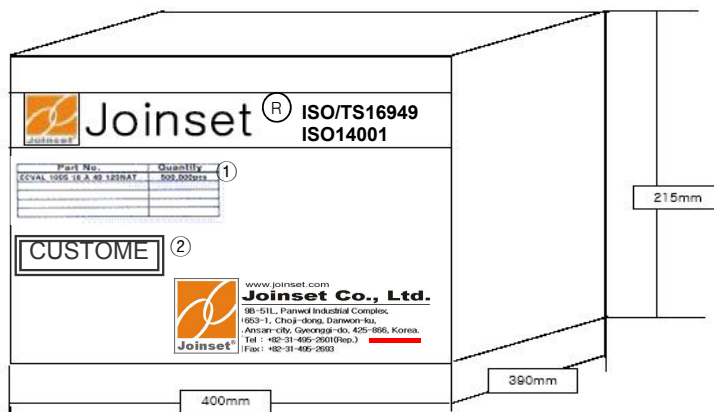
1) Inner box



* 5 Reels in each Inner Box

* Label : Part no. & Quantity

2) Outer box



* Outer Box contains 10 Inner Box (50 Reels)

* Label : ① Part no. & Quantity ② Customer

3) Packing Quantity

unit : pcs

Chip size	060303	100505	160808	201208	Carrier Tape
pcs/reel	15,000	10,000	4,000	4,000	Paper
Inner Box	75,000	50,000	20,000	20,000	-
Outer	750,000	500,000	200,000	200,000	-

■ Following conditions

Should be kept in order to avoid deterioration of solderability of external electrodes and the characteristics of this products.

(1) Storage Condition : Temperature: -10°C to +40°C. Humidity: less than 75 %RH, without dewing.

(2) Storage Term : Use this product within 12 months after delivery.

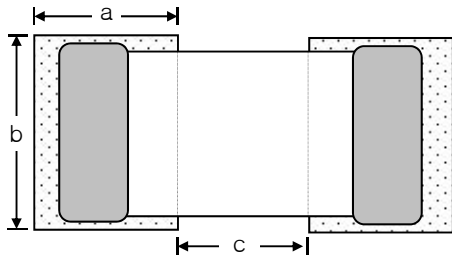
If 12 months or more elapsed, please check the solderability before use.

(3) Storage Place : Store this product in no corrosive gas (SOX, Cl, etc.), nor directly under sunshine.

* This product doesn't do the damp-proof packing. (Be proper for 'Moisture Sensitivity Level 1'.)

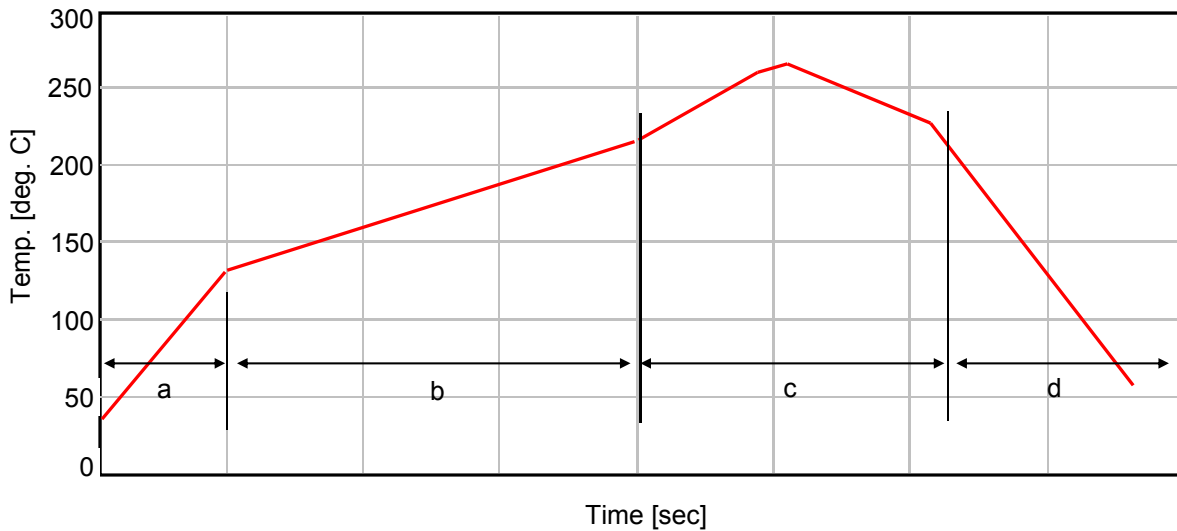
■ Recommended Soldering condition

1) Land Pattern Design



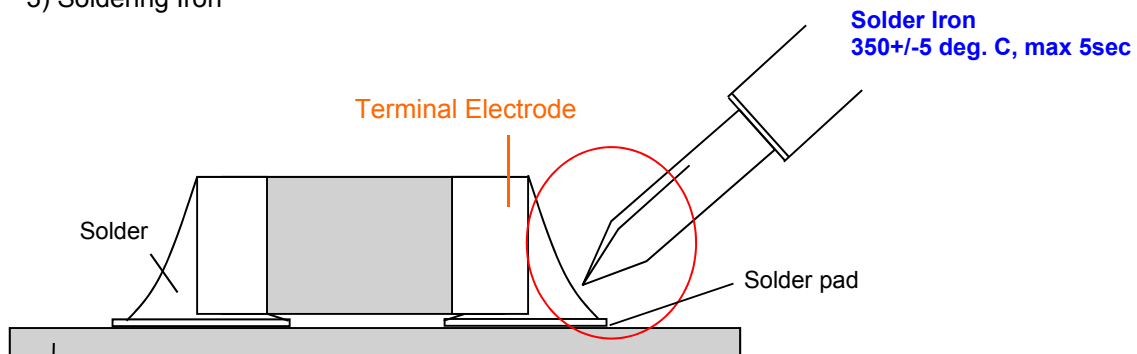
Code	Land Dimension with Chip Size [mm]			
	0603	1005	1608	2012
a	0.20~0.35	0.30~0.50	0.60~0.70	0.60~0.70
b	0.25~0.40	0.40~0.60	0.60~0.80	0.80~1.10
c	0.25~0.40	0.30~0.50	0.60~0.80	1.00~1.20

2) Reflow Soldering

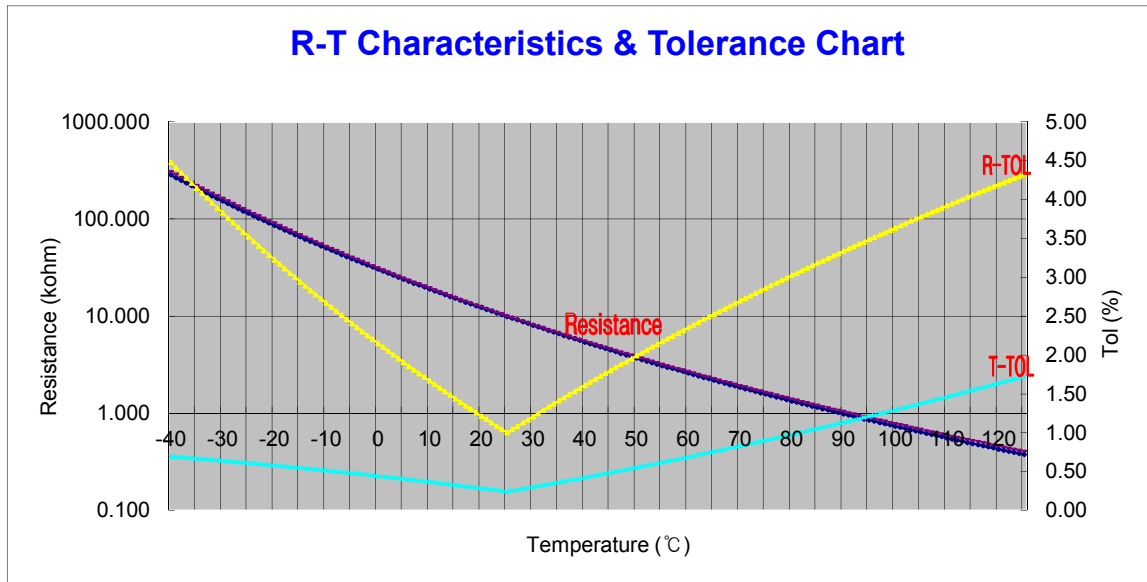


Zone		temp. range [deg. C]	time [sec]	Remark
a	Curing	RT ~ 130	60	* Solder : Sn-Ag-Cu * 260deg. C, within 10sec
b	Preheat	max 220	90 ~ 150	
c	Soldering	220 ~ 260	90 ~ 150	
d	Cooling	220 ~ RT	min 60	

3) Soldering Iron



To prevent a defective crack from thermal shock due to solder iron, the end of iron-tip must be located on between terminal electrode and solder pad



Part no . ECTH100505103F3830FST

(Unit : kohm)

TEMP(C)	MIN	MEAN	MAX	R-TOL(MIN)	R-TOL(MAX)	T-TOL(MIN)	T-TOL(MAX)
-40	282.517	295.196	308.413	4.30	4.48	0.66	0.69
-39	264.997	276.711	288.914	4.23	4.41	0.66	0.68
-38	248.685	259.511	270.782	4.17	4.34	0.65	0.68
-37	233.490	243.499	253.912	4.11	4.28	0.65	0.67
-36	219.327	228.584	238.209	4.05	4.21	0.64	0.67
-35	206.120	214.685	223.584	3.99	4.15	0.64	0.66
-34	193.798	201.726	209.957	3.93	4.08	0.63	0.66
-33	182.296	189.636	197.252	3.87	4.02	0.63	0.65
-32	171.555	178.353	185.402	3.81	3.95	0.62	0.65
-31	161.519	167.817	174.344	3.75	3.89	0.62	0.64
-30	152.137	157.974	164.019	3.69	3.83	0.61	0.64
-29	143.364	148.775	154.375	3.64	3.76	0.61	0.63
-28	135.154	140.172	145.361	3.58	3.70	0.60	0.62
-27	127.470	132.124	136.934	3.52	3.64	0.60	0.62
-26	120.273	124.591	129.051	3.47	3.58	0.59	0.61
-25	113.530	117.537	121.674	3.41	3.52	0.59	0.61
-24	107.209	110.929	114.767	3.35	3.46	0.58	0.60
-23	101.281	104.736	108.297	3.30	3.40	0.58	0.59
-22	95.721	98.929	102.235	3.24	3.34	0.57	0.59
-21	90.501	93.481	96.550	3.19	3.28	0.56	0.58
-20	85.600	88.369	91.219	3.13	3.22	0.56	0.58
-19	80.996	83.570	86.217	3.08	3.17	0.55	0.57
-18	76.669	79.062	81.521	3.03	3.11	0.55	0.56
-17	72.601	74.826	77.110	2.97	3.05	0.54	0.56
-16	68.776	70.844	72.967	2.92	3.00	0.54	0.55
-15	65.176	67.099	69.072	2.87	2.94	0.53	0.54
-14	61.787	63.576	65.411	2.81	2.89	0.52	0.54
-13	58.596	60.260	61.966	2.76	2.83	0.52	0.53
-12	55.590	57.138	58.724	2.71	2.78	0.51	0.52
-11	52.757	54.198	55.673	2.66	2.72	0.50	0.52
-10	50.086	51.427	52.799	2.61	2.67	0.50	0.51
-9	47.567	48.815	50.091	2.56	2.61	0.49	0.50
-8	45.190	46.352	47.539	2.51	2.56	0.49	0.50
-7	42.947	44.029	45.133	2.46	2.51	0.48	0.49
-6	40.829	41.836	42.863	2.41	2.46	0.47	0.48
-5	38.829	39.766	40.722	2.36	2.40	0.47	0.48
-4	36.939	37.811	38.701	2.31	2.35	0.46	0.47
-3	35.152	35.964	36.792	2.26	2.30	0.45	0.46
-2	33.463	34.219	34.989	2.21	2.25	0.45	0.45
-1	31.865	32.569	33.285	2.16	2.20	0.44	0.45
0	30.353	31.009	31.675	2.11	2.15	0.43	0.44
1	28.922	29.532	30.152	2.07	2.10	0.42	0.43
2	27.567	28.135	28.712	2.02	2.05	0.42	0.42
3	26.284	26.812	27.349	1.97	2.00	0.41	0.42
4	25.068	25.560	26.059	1.92	1.95	0.40	0.41
5	23.916	24.373	24.837	1.88	1.90	0.40	0.40

TEMP(C)	MIN	MEAN	MAX	R-TOL(MIN)	R-TOL(MAX)	T-TOL(MIN)	T-TOL(MAX)
6	22.823	23.249	23.680	1.83	1.86	0.39	0.39
7	21.787	22.183	22.584	1.79	1.81	0.38	0.39
8	20.804	21.172	21.545	1.74	1.76	0.37	0.38
9	19.871	20.213	20.560	1.69	1.71	0.37	0.37
10	18.985	19.304	19.625	1.65	1.67	0.36	0.36
11	18.144	18.440	18.739	1.60	1.62	0.35	0.35
12	17.346	17.620	17.898	1.56	1.57	0.34	0.35
13	16.587	16.842	17.099	1.51	1.53	0.34	0.34
14	15.865	16.102	16.341	1.47	1.48	0.33	0.33
15	15.179	15.399	15.620	1.43	1.44	0.32	0.32
16	14.527	14.731	14.936	1.38	1.39	0.31	0.31
17	13.907	14.095	14.285	1.34	1.35	0.30	0.31
18	13.316	13.491	13.667	1.30	1.30	0.30	0.30
19	12.754	12.916	13.079	1.25	1.26	0.29	0.29
20	12.219	12.369	12.519	1.21	1.21	0.28	0.28
21	11.709	11.848	11.987	1.17	1.17	0.27	0.27
22	11.224	11.352	11.480	1.13	1.13	0.26	0.26
23	10.761	10.879	10.997	1.08	1.09	0.26	0.26
24	10.320	10.429	10.538	1.04	1.04	0.25	0.25
25	9.900	10.000	10.100	1.00	1.00	0.24	0.24
26	9.491	9.591	9.691	1.04	1.04	0.25	0.25
27	9.101	9.201	9.301	1.08	1.08	0.26	0.26
28	8.730	8.829	8.928	1.12	1.13	0.27	0.27
29	8.375	8.474	8.573	1.16	1.17	0.28	0.29
30	8.037	8.135	8.234	1.20	1.21	0.30	0.30
31	7.715	7.812	7.910	1.24	1.25	0.31	0.31
32	7.407	7.503	7.600	1.28	1.29	0.32	0.32
33	7.113	7.209	7.305	1.32	1.33	0.33	0.33
34	6.833	6.927	7.022	1.36	1.37	0.34	0.35
35	6.565	6.658	6.752	1.40	1.41	0.35	0.36
36	6.309	6.401	6.494	1.44	1.45	0.37	0.37
37	6.064	6.155	6.247	1.48	1.49	0.38	0.38
38	5.830	5.920	6.011	1.52	1.53	0.39	0.39
39	5.606	5.695	5.784	1.56	1.57	0.40	0.41
40	5.393	5.480	5.568	1.59	1.61	0.41	0.42
41	5.188	5.274	5.361	1.63	1.65	0.43	0.43
42	4.992	5.077	5.163	1.67	1.69	0.44	0.44
43	4.805	4.888	4.973	1.71	1.73	0.45	0.46
44	4.626	4.708	4.791	1.74	1.76	0.46	0.47
45	4.454	4.535	4.617	1.78	1.80	0.48	0.48
46	4.290	4.369	4.450	1.82	1.84	0.49	0.50
47	4.132	4.210	4.289	1.85	1.88	0.50	0.51
48	3.982	4.058	4.136	1.89	1.91	0.51	0.52
49	3.837	3.912	3.989	1.92	1.95	0.53	0.53
50	3.698	3.772	3.847	1.96	1.99	0.54	0.55
51	3.566	3.638	3.712	2.00	2.03	0.55	0.56
52	3.438	3.509	3.582	2.03	2.06	0.57	0.57
53	3.316	3.386	3.457	2.07	2.10	0.58	0.59
54	3.199	3.267	3.337	2.10	2.14	0.59	0.60
55	3.086	3.154	3.222	2.14	2.17	0.60	0.61
56	2.978	3.044	3.112	2.17	2.21	0.62	0.63
57	2.875	2.940	3.006	2.20	2.24	0.63	0.64
58	2.775	2.839	2.904	2.24	2.28	0.64	0.66
59	2.680	2.742	2.806	2.27	2.32	0.66	0.67
60	2.588	2.649	2.711	2.31	2.35	0.67	0.68
61	2.500	2.560	2.621	2.34	2.39	0.68	0.70
62	2.415	2.474	2.534	2.37	2.42	0.70	0.71
63	2.334	2.391	2.450	2.41	2.46	0.71	0.72
64	2.255	2.312	2.369	2.44	2.49	0.72	0.74
65	2.180	2.235	2.292	2.47	2.52	0.74	0.75
66	2.108	2.162	2.217	2.50	2.56	0.75	0.77
67	2.038	2.091	2.145	2.54	2.59	0.76	0.78
68	1.971	2.023	2.076	2.57	2.63	0.78	0.80
69	1.907	1.958	2.010	2.60	2.66	0.79	0.81
70	1.845	1.895	1.946	2.63	2.69	0.81	0.82
71	1.785	1.834	1.884	2.67	2.73	0.82	0.84
72	1.727	1.775	1.824	2.70	2.76	0.83	0.85
73	1.672	1.719	1.767	2.73	2.79	0.85	0.87
74	1.619	1.665	1.712	2.76	2.83	0.86	0.88
75	1.567	1.612	1.659	2.79	2.86	0.88	0.90

TEMP(C)	MIN	MEAN	MAX	R-TOL(MIN)	R-TOL(MAX)	T-TOL(MIN)	T-TOL(MAX)
76	1.518	1.562	1.607	2.82	2.89	0.89	0.91
77	1.470	1.513	1.558	2.85	2.93	0.90	0.93
78	1.424	1.467	1.510	2.88	2.96	0.92	0.94
79	1.380	1.421	1.464	2.91	2.99	0.93	0.96
80	1.337	1.378	1.420	2.94	3.02	0.95	0.97
81	1.296	1.336	1.377	2.97	3.05	0.96	0.99
82	1.256	1.295	1.335	3.00	3.09	0.98	1.00
83	1.218	1.256	1.295	3.03	3.12	0.99	1.02
84	1.181	1.218	1.257	3.06	3.15	1.01	1.03
85	1.145	1.182	1.220	3.09	3.18	1.02	1.05
86	1.111	1.147	1.184	3.12	3.21	1.04	1.07
87	1.078	1.113	1.149	3.15	3.24	1.05	1.08
88	1.046	1.080	1.115	3.18	3.27	1.06	1.10
89	1.015	1.048	1.083	3.21	3.30	1.08	1.11
90	0.985	1.018	1.052	3.24	3.33	1.09	1.13
91	0.956	0.988	1.021	3.27	3.36	1.11	1.14
92	0.928	0.960	0.992	3.29	3.40	1.12	1.16
93	0.901	0.932	0.964	3.32	3.43	1.14	1.18
94	0.875	0.905	0.937	3.35	3.46	1.15	1.19
95	0.850	0.879	0.910	3.38	3.49	1.17	1.21
96	0.825	0.855	0.885	3.41	3.52	1.19	1.22
97	0.802	0.830	0.860	3.43	3.54	1.20	1.24
98	0.779	0.807	0.836	3.46	3.57	1.22	1.26
99	0.757	0.784	0.813	3.49	3.60	1.23	1.27
100	0.736	0.763	0.790	3.52	3.63	1.25	1.29
101	0.715	0.741	0.769	3.54	3.66	1.26	1.31
102	0.695	0.721	0.748	3.57	3.69	1.28	1.32
103	0.676	0.701	0.727	3.60	3.72	1.29	1.34
104	0.657	0.682	0.708	3.62	3.75	1.31	1.36
105	0.639	0.663	0.689	3.65	3.78	1.33	1.37
106	0.622	0.646	0.670	3.68	3.81	1.34	1.39
107	0.605	0.628	0.652	3.70	3.83	1.36	1.41
108	0.588	0.611	0.635	3.73	3.86	1.37	1.42
109	0.573	0.595	0.618	3.75	3.89	1.39	1.44
110	0.557	0.579	0.602	3.78	3.92	1.40	1.46
111	0.542	0.564	0.586	3.81	3.95	1.42	1.47
112	0.528	0.549	0.571	3.83	3.97	1.44	1.49
113	0.514	0.534	0.556	3.86	4.00	1.45	1.51
114	0.500	0.521	0.541	3.88	4.03	1.47	1.52
115	0.487	0.507	0.528	3.91	4.06	1.49	1.54
116	0.474	0.494	0.514	3.93	4.08	1.50	1.56
117	0.462	0.481	0.501	3.96	4.11	1.52	1.58
118	0.450	0.469	0.488	3.98	4.14	1.53	1.59
119	0.438	0.457	0.476	4.01	4.17	1.55	1.61
120	0.427	0.445	0.464	4.03	4.19	1.57	1.63
121	0.416	0.434	0.452	4.06	4.22	1.58	1.65
122	0.406	0.423	0.441	4.08	4.25	1.60	1.67
123	0.395	0.412	0.430	4.11	4.27	1.62	1.68
124	0.385	0.402	0.419	4.13	4.30	1.63	1.70
125	0.376	0.392	0.409	4.16	4.33	1.65	1.72