

# THINKING ELECTRONIC INDUSTRIAL CO., LTD.

HEAD OFFICE: 12F-1, No.93, Ta-Shun 1st Rd., Kaohsiung, Taiwan  
 TEL: 886-7-5577660 FAX: 886-7-5570560

**MANUFACTURING SITE**

**R** KAOHSIUNG FACTORY: No.51, Kaifa Road, Nantze Export Processing Zone,  
 Kaohsiung City 81170, Taiwan  
 TEL: 886-7-9616668 FAX: 886-7-9616698

**R** KAOHSIUNG FACTORY 2:No. 2-2, Xinjian S. Rd., N.E.P.Z., Kaohsiung City 81170, Taiwan  
 TEL: 886-7-9630001 FAX: 886-7-3635113

**R** CHANGZHOU FACTORY: No.6,Longmen Road,Wujin National High&New-Tech Industrial  
 Development Zone,ChangZhou,JiangSu,China  
 TEL:86-519-86578999 FAX:86-519-86558643

**R** DONG GUAN FACTORY: Chiao-Tou Tsun, Sha-Tao Hsiang, Chang-An Town,  
 Dong-Guan City 523863, Guangdong, China  
 TEL:86-769-85542016 FAX:86-769-85546890

**R** YICHANG FACTORY: No. 283 Xiaoting Avenue, Xiaoting Dist., Yichang  
 City 443007, Hubei, China  
 TEL:86-717-6510010 FAX:86-717-6511430



## SPECIFICATION FOR APPROVAL

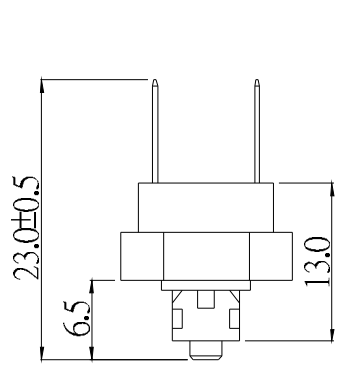
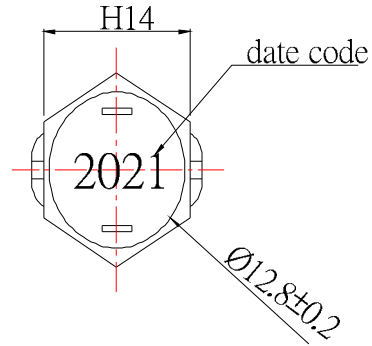
CUSTOMER	Ozdisan-Baff Technic
CERTIFIED	
MODEL/TYPE	
PART NO.	NTSF0103XZ970A(RoHS)
APPLICATION	
CUSTOMER P/N	
ISSUE DATE	May.17.2021
REV. NO	1.0
REV. DATE	

FOR CUSTOMER APPROVAL	CHECKED BY
	Xingqi Lee
	APPROVED BY
	FM.Chu

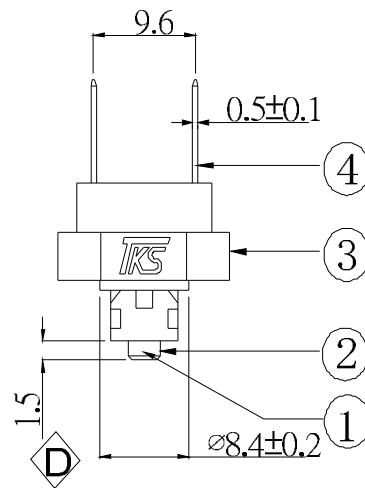
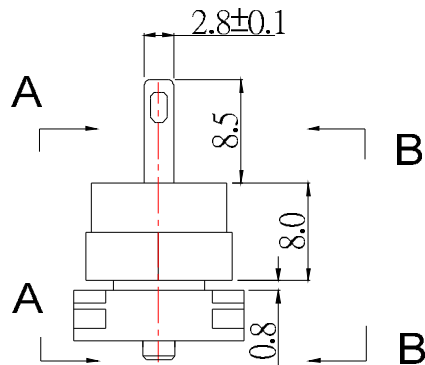




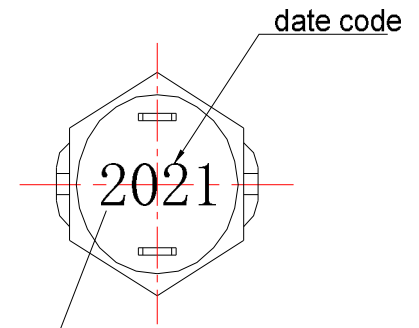
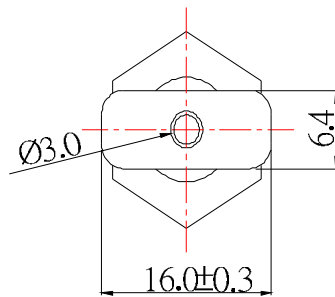
A. Material List		
NO.	ITEM	DESCRIPTION
1	Element	NTC thermistor
2	Cap	Φ4.0*3.5(Nickel-plated brass)
2	Body	PA66+30%GF(Gray)
4	Terminal	2.8x14.6 (Brass)
B. Electrical Characteristic		
ITEM	VALUE	
R25℃	10KΩ±3.8%	
B25/85℃	3435K±1.5%	



Section B-B



Section A-A



Date code 2021:  
20 represents week 20 while  
21 refers to year 2021

								Customer	Ozdisan-Baff Technic	
								Customer P/N		
								Thinking P/N	NTSF0103XZ970A	
								Drawing NO.	SF2105017	
								Date	2021/5/17	
								Tol: ±0.3mm	Unit: mm	Scale:
1.0	2021/5/17	New Released				QiuPing Lee	Xingqi Lee	FM Chu	THINKING ELECTRONIC INDUSTRIAL CO.,LTD	
Rev.	Date	Subjects of Change			ECN No.	Designed by	Checked by	Approved by		



# Specification of NTC Thermistor for Temperature Measurement and Control

PART NO . NTSF0103XZ970A \_\_\_\_\_

CUSTOMER P/N . \_\_\_\_\_

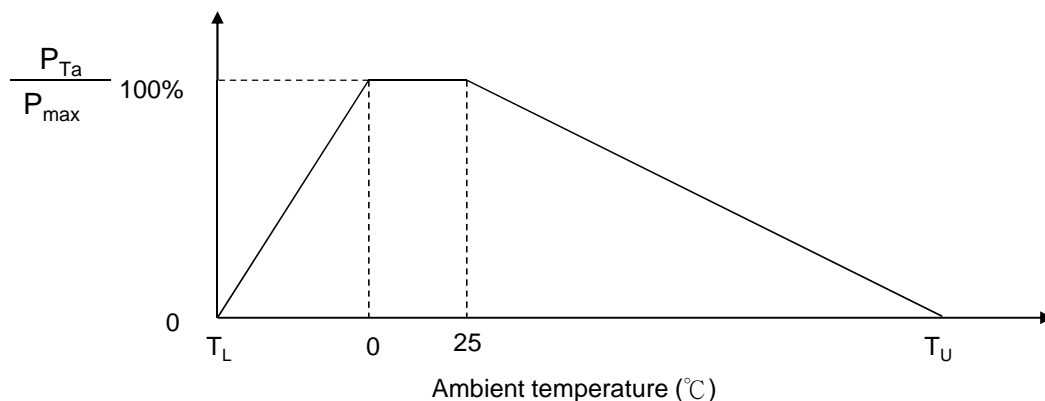
## 1. Electrical characteristics

	Parameter	Symbol	Test Conditions	Min.	Nor.	Max.	Unit.
a.	Resistance At 25°C	$R_{25^{\circ}\text{C}}$	$T_a=25^{\circ}\text{C}\pm 0.05^{\circ}\text{C}$ $P_T\leq 0.1\text{mW}$	9.620	10.00	10.380	K $\Omega$
b.	B Constant	$B_{25/85}$	$(1779.71 * \ln(R_{25}/R_{85}))$	3383.48	3435.00	3486.53	K
c.	Thermal Response Time(in water)	$\tau$	$25^{\circ}\text{C}\rightarrow 85^{\circ}\text{C}$ $T_1=25+(85-25)*63.2\%=62.9^{\circ}\text{C}$	-----	-----	2	Sec
d.	Hi-Pot Test	-----	1000V AC 1Sec	-----	-----	10	m A
e.	Insulation test	-----	DC 500V 1Sec	100	-----	-----	M $\Omega$

## 2. Maximun Ratings

	Parameter	Specification	Unit
a.	Operation Temperature Range	-40-----+140	°C
b.	Max. Power Dissipation at 25°C	4	mW

### Max. Power Dissipation Derating Curve



Note:  $T_L$  = Minimum Temp. of Operating Temp. Range (°C)

$T_U$  = Maximum Temp. of Operating Temp. Range (°C)

## 3. Reliability Test

No.	Item	Test Conditions	Variable
a.	Temp. cycle test (in air)	$-20^{\circ}\text{C} \times 30\text{min} \rightarrow +25^{\circ}\text{C} \times 5\text{min}$ $105^{\circ}\text{C} \times 30\text{min} \rightarrow +25^{\circ}\text{C} \times 5\text{min}$ } 10Cycles	Within $\pm 2\%$
b.	High temp. Test	$140\pm 5^{\circ}\text{C} * 1000 \text{ HRS}$ (in air)	Within $\pm 2\%$
c.	Low temp. Test	$-40\pm 5^{\circ}\text{C} * 1000 \text{ HRS}$ (in air)	Within $\pm 2\%$
d.	Humidity test	$60^{\circ}\text{C} 95\% \text{ RH} * 1000 \text{ HRS}$	Within $\pm 2\%$

\*This product is made by high temperature resistant glass which contains lead.

## **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:

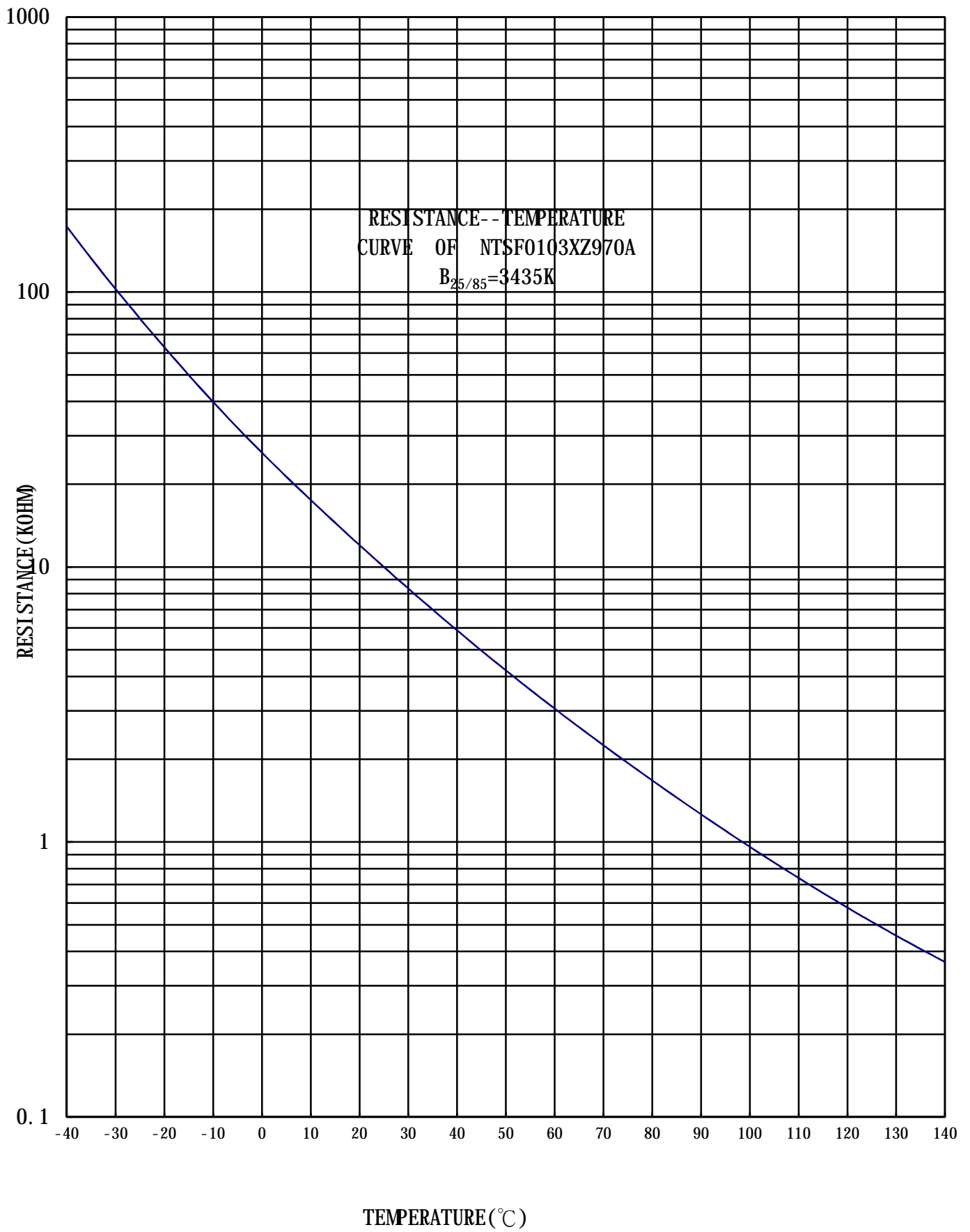
Do not store this product in corrosive gas (Sulfuric acid gas, Chlorine gas, etc.) or in direct sunlight.

## **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.



## R-T TABLE

Part No:NTSF0103XZ970A

$R_{25^{\circ}\text{C}}=10\text{K}\Omega\pm 3.8\%$

$B_{25/85}=3435\text{K}\pm 1.5\%$

Temperature (°C)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol. (°C)	
-40	187.49	173.07	159.52	-1.47	1.47
-39	177.37	163.86	151.15	-1.47	1.47
-38	167.88	155.22	143.30	-1.47	1.47
-37	159.00	147.12	135.94	-1.47	1.47
-36	150.66	139.52	129.02	-1.47	1.47
-35	142.84	132.38	122.51	-1.47	1.47
-34	135.50	125.67	116.40	-1.46	1.47
-33	128.59	119.36	110.63	-1.46	1.47
-32	122.09	113.42	105.20	-1.46	1.46
-31	115.97	107.81	100.08	-1.46	1.46
-30	110.19	102.52	95.238	-1.45	1.46
-29	104.74	97.518	90.662	-1.44	1.45
-28	99.591	92.792	86.332	-1.44	1.44
-27	94.722	88.321	82.233	-1.43	1.44
-26	90.116	84.088	78.350	-1.42	1.43
-25	85.757	80.079	74.669	-1.42	1.42
-24	81.631	76.282	71.180	-1.41	1.42
-23	77.723	72.682	67.871	-1.40	1.41
-22	74.021	69.271	64.732	-1.39	1.40
-21	70.515	66.037	61.754	-1.38	1.40
-20	67.193	62.971	58.929	-1.38	1.39
-19	64.045	60.064	56.248	-1.37	1.38
-18	61.063	57.307	53.705	-1.36	1.38
-17	58.237	54.694	51.291	-1.36	1.37
-16	55.560	52.215	49.001	-1.35	1.37
-15	53.022	49.865	46.828	-1.34	1.36
-14	50.618	47.636	44.765	-1.34	1.36
-13	48.339	45.522	42.808	-1.33	1.35
-12	46.178	43.517	40.950	-1.33	1.35
-11	44.130	41.615	39.186	-1.32	1.35
-10	42.188	39.810	37.511	-1.32	1.34
-9	40.345	38.096	35.921	-1.31	1.34
-8	38.597	36.469	34.409	-1.31	1.33
-7	36.938	34.924	32.973	-1.30	1.33
-6	35.363	33.456	31.607	-1.30	1.33
-5	33.866	32.061	30.308	-1.29	1.32
-4	32.444	30.734	29.073	-1.29	1.32
-3	31.092	29.472	27.896	-1.28	1.31
-2	29.806	28.271	26.776	-1.28	1.31
-1	28.583	27.127	25.709	-1.27	1.30
0	27.418	26.037	24.691	-1.27	1.30
1	26.308	24.999	23.721	-1.26	1.29



## R-T TABLE

Part No:NTSF0103XZ970A

$R_{25^{\circ}\text{C}}=10\text{K}\Omega\pm 3.8\%$

$B_{25/85}=3435\text{K}\pm 1.5\%$

Temperature (°C)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol. (°C)	
2	25.250	24.008	22.794	-1.25	1.28
3	24.241	23.063	21.910	-1.25	1.28
4	23.279	22.160	21.065	-1.24	1.27
5	22.360	21.299	20.258	-1.23	1.26
6	21.483	20.475	19.486	-1.22	1.26
7	20.644	19.687	18.748	-1.22	1.25
8	19.843	18.934	18.041	-1.21	1.24
9	19.076	18.213	17.364	-1.20	1.23
10	18.343	17.523	16.716	-1.19	1.22
11	17.641	16.863	16.095	-1.18	1.21
12	16.969	16.229	15.500	-1.17	1.20
13	16.325	15.623	14.929	-1.16	1.19
14	15.708	15.041	14.381	-1.15	1.18
15	15.117	14.483	13.856	-1.14	1.17
16	14.551	13.948	13.351	-1.13	1.16
17	14.007	13.435	12.867	-1.11	1.15
18	13.486	12.942	12.402	-1.10	1.14
19	12.986	12.469	11.955	-1.09	1.13
20	12.506	12.015	11.526	-1.08	1.12
21	12.045	11.579	11.114	-1.07	1.11
22	11.603	11.160	10.718	-1.06	1.10
23	11.179	10.758	10.338	-1.05	1.09
24	10.771	10.371	9.9717	-1.04	1.08
25	10.380	10.000	9.6200	-1.02	1.07
26	10.015	9.6433	9.2718	-1.04	1.08
27	9.6644	9.3004	8.9373	-1.06	1.10
28	9.3271	8.9710	8.6160	-1.08	1.12
29	9.0027	8.6543	8.3075	-1.10	1.14
30	8.6908	8.3500	8.0110	-1.12	1.16
31	8.3908	8.0574	7.7262	-1.14	1.18
32	8.1022	7.7762	7.4525	-1.16	1.20
33	7.8246	7.5058	7.1896	-1.18	1.22
34	7.5576	7.2458	6.9369	-1.20	1.24
35	7.3007	6.9958	6.6940	-1.22	1.26
36	7.0535	6.7555	6.4606	-1.24	1.28
37	6.8157	6.5243	6.2363	-1.26	1.30
38	6.5869	6.3019	6.0206	-1.28	1.32
39	6.3666	6.0881	5.8133	-1.30	1.34
40	6.1547	5.8824	5.6140	-1.32	1.36
41	5.9507	5.6845	5.4223	-1.35	1.38
42	5.7543	5.4940	5.2380	-1.37	1.40
43	5.5652	5.3108	5.0607	-1.39	1.42

## R-T TABLE

Part No:NTSF0103XZ970A

R25°C=10KΩ±3.8%

B<sub>25/85</sub>=3435K±1.5%

Temperature (°C)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol. (°C)	
44	5.3831	5.1345	4.8902	-1.41	1.44
45	5.2078	4.9648	4.7262	-1.43	1.46
46	5.0390	4.8014	4.5684	-1.45	1.48
47	4.8764	4.6441	4.4165	-1.48	1.50
48	4.7197	4.4927	4.2704	-1.50	1.52
49	4.5688	4.3469	4.1298	-1.52	1.55
50	4.4234	4.2064	3.9944	-1.54	1.57
51	4.2832	4.0711	3.8640	-1.57	1.59
52	4.1481	3.9408	3.7384	-1.59	1.61
53	4.0178	3.8152	3.6175	-1.61	1.63
54	3.8922	3.6941	3.5011	-1.64	1.65
55	3.7711	3.5775	3.3889	-1.66	1.68
56	3.6543	3.4650	3.2807	-1.68	1.70
57	3.5416	3.3565	3.1765	-1.71	1.72
58	3.4329	3.2519	3.0761	-1.73	1.74
59	3.3279	3.1510	2.9792	-1.75	1.77
60	3.2267	3.0537	2.8859	-1.78	1.79
61	3.1289	2.9598	2.7958	-1.80	1.81
62	3.0345	2.8692	2.7089	-1.82	1.83
63	2.9433	2.7817	2.6251	-1.85	1.85
64	2.8553	2.6972	2.5442	-1.87	1.88
65	2.7702	2.6157	2.4661	-1.90	1.90
66	2.6880	2.5369	2.3908	-1.92	1.92
67	2.6086	2.4608	2.3180	-1.94	1.94
68	2.5319	2.3873	2.2478	-1.97	1.96
69	2.4577	2.3163	2.1799	-1.99	1.99
70	2.3859	2.2477	2.1144	-2.01	2.01
71	2.3165	2.1813	2.0511	-2.04	2.03
72	2.2495	2.1172	1.9899	-2.06	2.05
73	2.1846	2.0552	1.9308	-2.09	2.08
74	2.1218	1.9953	1.8736	-2.11	2.10
75	2.0610	1.9373	1.8184	-2.13	2.12
76	2.0023	1.8812	1.7649	-2.16	2.14
77	1.9454	1.8270	1.7133	-2.18	2.17
78	1.8903	1.7745	1.6633	-2.21	2.19
79	1.8370	1.7237	1.6150	-2.23	2.21
80	1.7854	1.6745	1.5683	-2.26	2.23
81	1.7354	1.6269	1.5231	-2.28	2.26
82	1.6870	1.5809	1.4793	-2.30	2.28
83	1.6401	1.5363	1.4370	-2.33	2.30
84	1.5947	1.4931	1.3960	-2.35	2.32
85	1.5508	1.4513	1.3564	-2.38	2.35

## R-T TABLE

Part No:NTSF0103XZ970A

R25°C=10KΩ±3.8%

B<sub>25/85</sub>=3435K±1.5%

Temperature (°C)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol. (°C)	
86	1.5081	1.4109	1.3180	-2.40	2.37
87	1.4669	1.3717	1.2808	-2.43	2.39
88	1.4269	1.3337	1.2448	-2.45	2.42
89	1.3881	1.2969	1.2100	-2.48	2.44
90	1.3505	1.2613	1.1763	-2.50	2.46
91	1.3141	1.2268	1.1436	-2.53	2.49
92	1.2788	1.1933	1.1120	-2.56	2.51
93	1.2446	1.1609	1.0813	-2.58	2.54
94	1.2114	1.1295	1.0516	-2.61	2.56
95	1.1793	1.0991	1.0229	-2.64	2.58
96	1.1481	1.0696	0.99505	-2.66	2.61
97	1.1179	1.0410	0.96806	-2.69	2.63
98	1.0886	1.0133	0.94192	-2.72	2.66
99	1.0602	0.98648	0.91659	-2.74	2.68
100	1.0326	0.96045	0.89205	-2.77	2.71
101	1.0059	0.93522	0.86826	-2.80	2.74
102	0.97995	0.91075	0.84521	-2.83	2.76
103	0.95481	0.88703	0.82287	-2.86	2.79
104	0.93042	0.86403	0.80122	-2.89	2.82
105	0.90676	0.84173	0.78023	-2.92	2.84
106	0.88381	0.82010	0.75989	-2.95	2.87
107	0.86154	0.79913	0.74017	-2.98	2.90
108	0.83994	0.77879	0.72105	-3.01	2.93
109	0.81898	0.75907	0.70252	-3.04	2.96
110	0.79864	0.73993	0.68455	-3.07	2.98
111	0.77891	0.72137	0.66713	-3.10	3.01
112	0.75976	0.70337	0.65023	-3.13	3.04
113	0.74117	0.68591	0.63385	-3.16	3.07
114	0.72314	0.66897	0.61796	-3.20	3.10
115	0.70563	0.65253	0.60255	-3.23	3.13
116	0.68864	0.63658	0.58760	-3.26	3.16
117	0.67214	0.62110	0.57310	-3.30	3.20
118	0.65613	0.60608	0.55904	-3.33	3.23
119	0.64058	0.59151	0.54540	-3.37	3.26
120	0.62549	0.57736	0.53216	-3.40	3.29
121	0.61084	0.56363	0.51932	-3.44	3.32
122	0.59660	0.55030	0.50685	-3.47	3.36
123	0.58278	0.53736	0.49476	-3.51	3.39
124	0.56936	0.52480	0.48302	-3.55	3.42
125	0.55632	0.51260	0.47163	-3.58	3.46
126	0.54366	0.50075	0.46057	-3.62	3.49
127	0.53136	0.48925	0.44983	-3.66	3.53

## R-T TABLE

Part No:NTSF0103XZ970A

 $R_{25^{\circ}\text{C}}=10\text{K}\Omega\pm 3.8\%$  $B_{25/85}=3435\text{K}\pm 1.5\%$ 

Temperature (°C)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol. (°C)	
128	0.51940	0.47808	0.43941	-3.70	3.56
129	0.50779	0.46723	0.42929	-3.74	3.60
130	0.49650	0.45669	0.41946	-3.78	3.64
131	0.48553	0.44645	0.40991	-3.82	3.67
132	0.47487	0.43650	0.40064	-3.86	3.71
133	0.46451	0.42683	0.39163	-3.90	3.75
134	0.45444	0.41743	0.38288	-3.94	3.78
135	0.44464	0.40830	0.37438	-3.98	3.82
136	0.43511	0.39942	0.36612	-4.02	3.86
137	0.42585	0.39079	0.35809	-4.06	3.90
138	0.41684	0.38239	0.35029	-4.10	3.93
139	0.40808	0.37423	0.34270	-4.15	3.97
140	0.39955	0.36629	0.33532	-4.19	4.01