THINKING ELECTRONIC INDUSTRIAL CO., LTD.

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☑ KAOHSIUNG FACTORY: No.51, Kaifa Road, Nantze Export Processing Zone, Kaohsiung City 81170, Taiwan
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☐ CHANGZHOU FACTORY: No.6,Longmen Road,Wujin National High&New-Tech Industrial Development Zone,ChangZhou,JiangSu,China
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☑ DONG GUAN FACTORY: Chiao-Tou Tsun, Sha-Tao Hsiang, Chang-An Town, Dong-Guan City 523863, Guangdong, China
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☑ 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	立創電子
MODEL NO.	NTSA0502
PART NO.	NTSA0502KZ088(RoHS)
APPLICATION	
CUSTOMER P/N	
ISSUE DATE	DEC.02,2020
REV. NO	1.3
REV. DATE	Oct.16.2018

FOR CUSTOMER APPROVAL	CHECKED BY
	戶鋒
	APPROVED BY
	朱鳳美

THINKING ELECTRONIC INDUSTRIAL CO.,LTD

CUSTOMER:立創電子

THINKING P/N:NTSA0502KZ088

REVISED RECORD SHEET

REV. NO	REV. DATE	REVISED CONTENT
1.0	2011/5/26	新標準制作
1.1	2011/5/31	端子由B40420BL-2(鍍錫）改為MA242519II101000
1.2	2011/7/4	去掉線材UL NUMBER的 OR EQ
1.3	2018/10/16	頭部端子增加凹點，如圖片， 不影響產品性能

Part Number Code

Example :

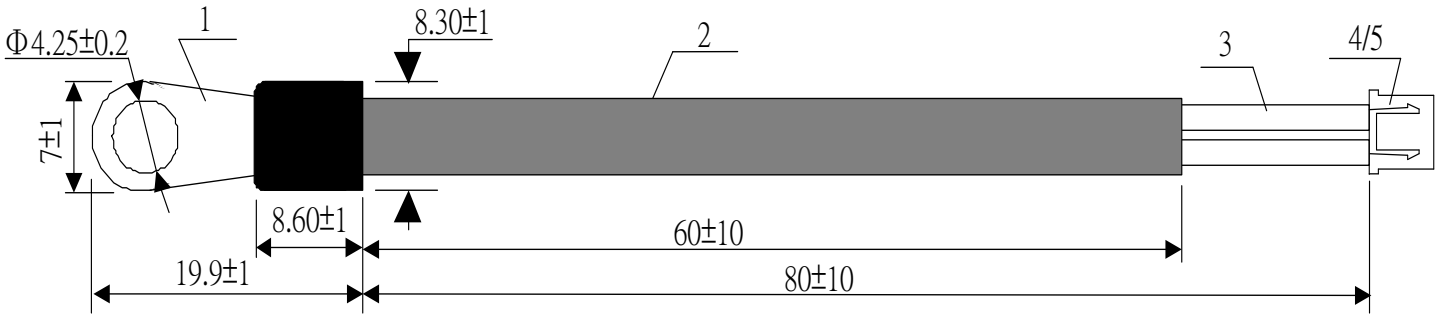
NTS A0 502 K Z088

(1) (2) (3) (4) (5)

No.	Item	Digit	Specification
(1)	Product Type	NTS	Thinking NTC thermistor for temperature sensor
(2)	Type Series	A0	Housing type
(3)	Zero power resistance at25℃ (R_{25})	502	$5*10^2\Omega$=5K Ω
(4)	Tolerance of R_{25}	K	10%
(5)	Optional Suffix	Z088	(RoHS)Special code for customer

A. Material List		
NO.	ITEM	DESCRIPTION
1	TERMINAL	MA242519II101P000
2	TUBE	Φ2.5熱縮套管(黑色)ZHP
3	LEAD WIRE	UL10362#22TS WHITE WIRE(無印字)
4	TERMINAL	SXH-001T-P0.6(JST) OR I25002PS-2(WST)
5	HOUSING	XHP-2(JST) OR P2-I25002(WST)
*	NTC THERMISTOR	C093B502K33H7B01 (THINKING)

B. Electrical Characteristic	
ITEM	VALUE
R25℃	5KΩ±10%
B25/50	3375K±7%



Rev.	Date	Subjects of Change	ECN No	Designed by	Checked by	Approved by		
							Customer	立創電子
							Customer P/N	
							Thinking P/N	NTSA0502KZ088
##	2018/10/16	頭部端子增加凹點，如圖片，不影響產品性能		曹建暉	戶鋒	朱鳳美	Drawing NO.	SA1105027
##	2011/7/4	去掉線材UL NUMBER的 OR EQ		蔣萌芽	黃春梅	郭明龍	Date	2018/10/16
##	2011/5/31	端子由B40420BL-2(鍍錫）改為MA242519II101000		蔣萌芽	黃春梅	郭明龍	Scale:	Tol: ±0.3r Unit: mm
##	2011/5/24	新圖檔制作		蔣萌芽	黃春梅	郭明龍	*THINKING ELECTRONIC INDUSTRIAL CO.,LTD*	

興勤電子工業股份有限公司
THINKING ELECTRONIC INDUSTRIAL CO.,LTD
SUBJECT:CERTIFICATION OF MATERIALS

CUSTOMER:立創電子

THINKING P/N:NTSA0502KZ088

NO	Part name	DESCRIPTION	Supplier	Supplier P/n	UL file NO.	Q'TY	Remark
1	TERMINAL			MA242519II101P000		1	
2	COATING RESIN			BLACK EPOXY			
3	TUBE	Φ2.5mm black heat-shrink tube VW-1, 125℃, 600VAC	CHANGYUAN ELECTRONICS GROUP CO LTD	CYG-ZHP	E180908	1	
			DONGGUAN SALIPT CO LTD	SALIPT S-901-600	E209436		
			WELL ONE CO LTD	GT-2	E257529		
9	LEAD WIRE	VW-1 250℃, 600VAC TS WHITE WIRE	GUANGZHOU FENGTAI MEIHUA CABLE CO LTD	UL10362#22	E204798	2	
			QIFURUI ELECTRONICS CO		E211048		
5	TERMINAL	PHOS BRONZE	JAPAN SOLDERLESS TERMINAL MFG CO LTD	SXH-001T-P0.6		2	
			WELI SHENG TERMINAL INDUSTRIAL CO LTD	I25002PS-2			
6	HOUSING	UL 94 V-2	JAPAN SOLDERLESS TERMINAL MFG CO LTD	XHP-2	E60389	1	
			WELI SHENG TERMINAL INDUSTRIAL CO LTD	P2-I25002	E149293		
*	THERMISTOR		THINKING	C093A103F34D1B		1	

Approved By: 朱鳳美 Checked By: 戶峰 Designed By: 曹建暉

Specification of NTC Thermistor for Temperature Compensation

PART NO . NTSA0502KZ088

CUSTOMER P/N . _____

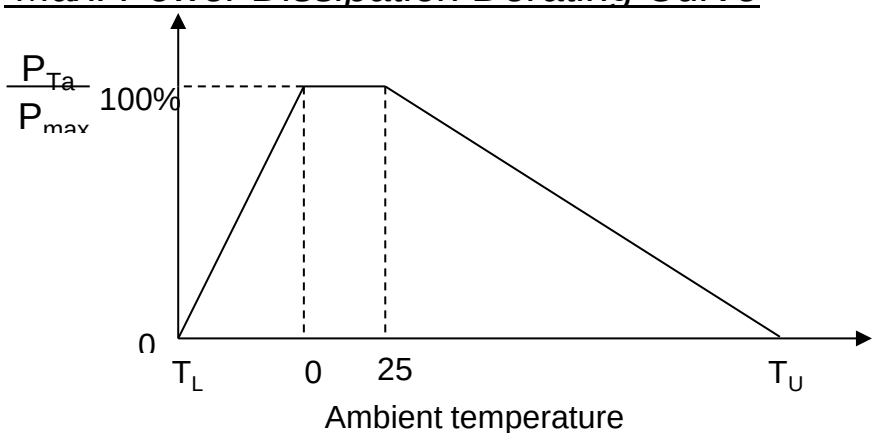
1. Electrical characteristics

	Parameter	Symbol	Test Conditions	Min.	Nor.	Max.	Unit.
a.	Resistance At 25℃	R_{25}	Ta=25℃±0.05℃ I<0.5mA	4.5	5	5.5	KΩ
b.	Resistance At 50℃	R_{50}	Ta=50℃±0.05℃ I<0.5mA	-----	2.083	-----	KΩ
c.	R_{25} / R50	K	----------	-----	2.401	-----	-----
d.	B Constant	B25/50	(3853.887 Ln K)	3139	3375	3611	K
e.	Thermal Dissipation Constant	δ	Ta=25℃ （in air）	-----	Approx.8	-----	mW/℃
f.	Thermal Time Constant	τ	25℃→85℃ T1=25+(85-25)*63.2%=62.9℃	-----	Approx.21	-----	Sec
g.	Hi-Pot Test	-------	3000V AC 10sec	-----	-----	10	mA

2.Maximun Ratings

	Parameter	Specification	Unit
a.	Operation Temperature Range	-30 ----- +125	℃
b.	Max' power Dissipation at 25℃	150	mW

Max. Power Dissipation Derating Curve



Note: T_L = Minimum Temp. of Operating Temp. Range (℃)

T_U = Maximum Temp. of Operating Temp. Range (℃)

3. Mechanical Characteristics

Leads Terminal Tensile Strength

Conditions	Test Result	
Fasten body with a Load Applied to each lead 4.5 kg for 10 sec.	No break out and damage	OK

4. Reliability Test

Item	Test Conditions	Variable
Temp. cycle test	-30 ℃ X 30 min → +25 ℃ X 5 min +125 ℃ X 30 min → +25 ℃ X 5 min } X 10cycles	Within ± 5 %
Humidity test	40 ℃ 95 % RH X 1000 HRS	Within ± 5 %
High Temperature Storage	125℃± 5 ℃ , 1000 ± 24 hrs	No visible damage | △R25/R25 | ≦5 %
low Temperature Storage	-30 ℃± 5 ℃ , 1000 ± 24 hrs	No visible damage | △R25/R25 | ≦5 %
Hi-Pot Test	3000V AC 10 sec	No visible damage I_{Leak}≦10mA

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℃ to +40℃

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:

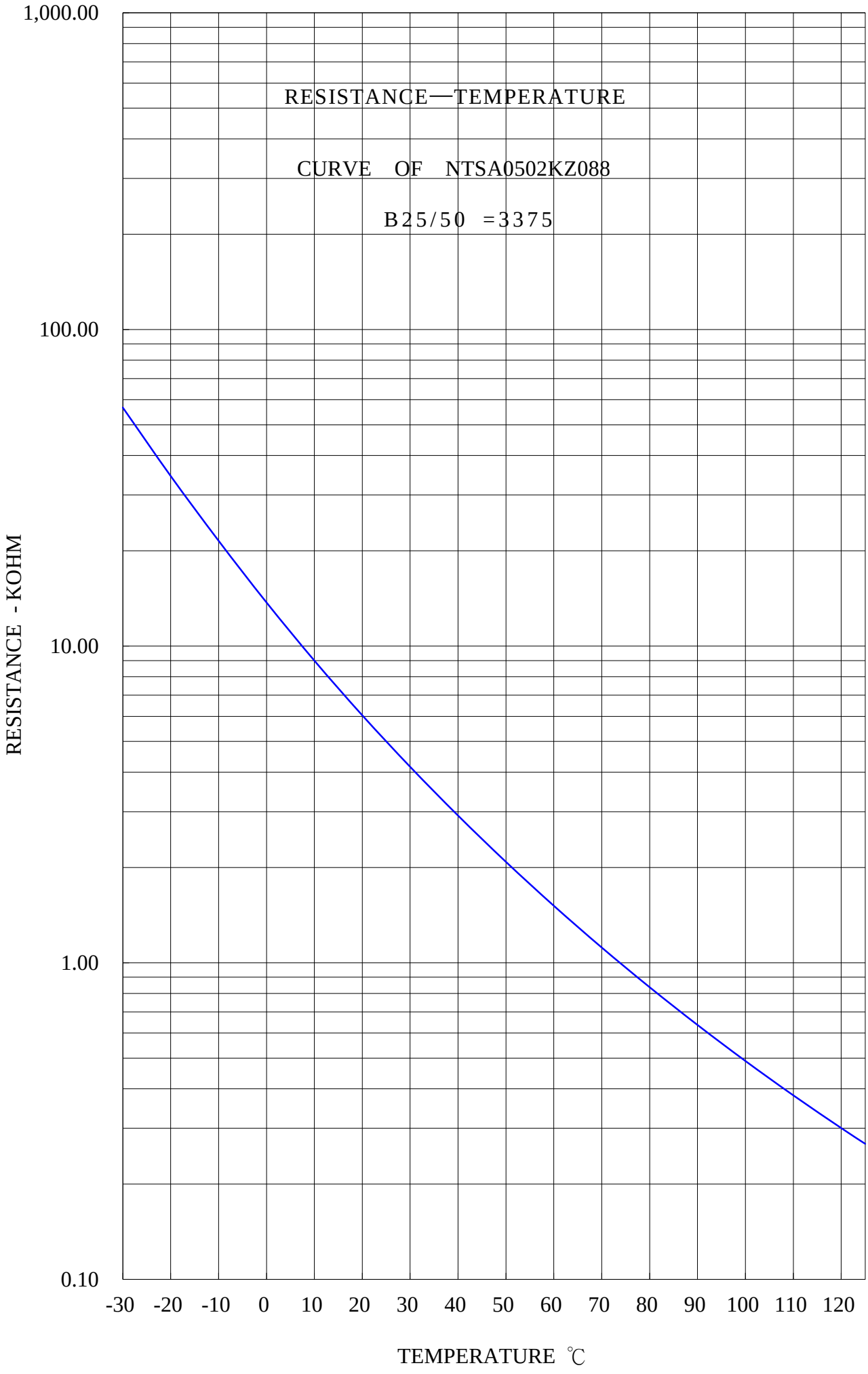
Do not store this product in corrosive gas (Sulfuric acid gas, Chlorine gas, etc.) or in direct sunlight.

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.


RESISTANCE—TEMPERATURE
CURVE OF NTSA0502KZ088
B25/50 =3375
1,000.00
100.00
10.00
1.00
0.10
RESISTANCE - KOHM
-30 -20 -10 0 10 20 30 40 50 60 70 80 90 100 110 120
TEMPERATURE ℃

R - T Table

Part no.:NTSA0502KZ088

R25 =5 KΩ ± 10%

B25/50 = 3375 K ± 7%

Temperature (℃)	Rmax. (KΩ)	Rnor. (KΩ)	Rmin. (KΩ)	Temperature Tol. (℃)	
-30	73.91	56.69	43.04	-5.66	4.77
-29	69.93	53.83	41.02	-5.63	4.76
-28	66.20	51.14	39.11	-5.60	4.75
-27	62.70	48.61	37.31	-5.57	4.74
-26	59.41	46.23	35.61	-5.53	4.72
-25	56.33	43.977	33.99	-5.49	4.70
-24	53.42	41.85	32.46	-5.45	4.68
-23	50.69	39.85	31.01	-5.40	4.65
-22	48.11	37.95	29.64	-5.35	4.62
-21	45.67	36.15	28.33	-5.30	4.59
-20	43.37	34.448	27.09	-5.24	4.56
-19	41.20	32.83	25.90	-5.18	4.52
-18	39.15	31.30	24.78	-5.12	4.49
-17	37.21	29.85	23.70	-5.06	4.45
-16	35.37	28.47	22.68	-5.00	4.41
-15	33.63	27.16	21.71	-4.94	4.37
-14	31.98	25.91	20.78	-4.87	4.33
-13	30.42	24.73	19.90	-4.81	4.29
-12	28.94	23.60	19.06	-4.75	4.26
-11	27.54	22.53	18.25	-4.69	4.22
-10	26.22	21.52	17.49	-4.63	4.18
-9	24.96	20.55	16.75	-4.56	4.14
-8	23.769	19.635	16.058	-4.50	4.10
-7	22.640	18.762	15.393	-4.44	4.06
-6	21.570	17.932	14.759	-4.38	4.02
-5	20.556	17.143	14.154	-4.33	3.98
-4	19.595	16.393	13.577	-4.27	3.95
-3	18.683	15.679	13.026	-4.21	3.91
-2	17.819	15.000	12.501	-4.15	3.87
-1	16.999	14.354	11.999	-4.09	3.83
0	16.222	13.740	11.521	-4.04	3.79
1	15.484	13.155	11.064	-3.98	3.76
2	14.784	12.598	10.628	-3.93	3.72
3	14.119	12.068	10.211	-3.87	3.68
4	13.488	11.563	9.814	-3.81	3.64

R - T Table

Part no.:NTSA0502KZ088

R25 =5 KΩ ± 10%

B25/50 = 3375 K ± 7%

Temperature	Rmax.	Rnor.	Rmin.	Temperature Tol.	
5	12.889	11.083	9.434	-3.76	3.60
6	12.320	10.625	9.071	-3.70	3.56
7	11.780	10.189	8.724	-3.65	3.52
8	11.266	9.773	8.392	-3.59	3.48
9	10.778	9.376	8.075	-3.54	3.44
10	10.314	8.999	7.772	-3.48	3.40
11	9.873	8.638	7.482	-3.42	3.36
12	9.453	8.294	7.205	-3.37	3.32
13	9.053	7.966	6.939	-3.31	3.28
14	8.673	7.653	6.685	-3.26	3.23
15	8.310	7.354	6.442	-3.20	3.19
16	7.965	7.068	6.209	-3.14	3.15
17	7.637	6.795	5.986	-3.08	3.10
18	7.323	6.534	5.772	-3.03	3.06
19	7.025	6.285	5.566	-2.97	3.01
20	6.740	6.046	5.370	-2.91	2.97
21	6.468	5.818	5.181	-2.85	2.92
22	6.209	5.600	5.000	-2.79	2.87
23	5.962	5.391	4.827	-2.73	2.82
24	5.726	5.191	4.660	-2.67	2.78
25	5.500	5.000	4.500	-2.61	2.73
26	5.312	4.817	4.324	-2.70	2.81
27	5.132	4.641	4.155	-2.79	2.89
28	4.959	4.473	3.994	-2.89	2.97
29	4.792	4.312	3.840	-2.98	3.05
30	4.632	4.157	3.693	-3.07	3.13
31	4.478	4.009	3.552	-3.17	3.21
32	4.330	3.866	3.418	-3.26	3.29
33	4.188	3.730	3.289	-3.36	3.37
34	4.051	3.599	3.165	-3.45	3.45
35	3.919	3.473	3.0472	-3.55	3.53
36	3.7925	3.3526	2.9341	-3.65	3.61
37	3.6704	3.2367	2.8257	-3.74	3.69
38	3.5529	3.1254	2.7219	-3.84	3.78
39	3.4398	3.0185	2.6224	-3.94	3.86
40	3.3308	2.9158	2.5270	-4.04	3.94

R - T Table

Part no.:NTSA0502KZ088

R25 =5 KΩ ± 10%

B25/50 = 3375 K ± 7%

Temperature	Rmax.	Rnor.	Rmin.	Temperature Tol.	
41	3.2258	2.8171	2.4356	-4.14	4.02
42	3.1247	2.7222	2.3479	-4.24	4.10
43	3.0272	2.6310	2.2639	-4.34	4.19
44	2.9332	2.5433	2.1832	-4.45	4.27
45	2.8426	2.4590	2.1058	-4.55	4.35
46	2.7553	2.3778	2.0316	-4.65	4.44
47	2.6711	2.2998	1.9603	-4.76	4.52
48	2.5898	2.2247	1.8918	-4.86	4.60
49	2.5115	2.1524	1.8261	-4.97	4.69
50	2.4359	2.0828	1.7630	-5.07	4.77
51	2.3629	2.0158	1.7024	-5.18	4.86
52	2.2925	1.9513	1.6442	-5.29	4.94
53	2.2246	1.8891	1.5882	-5.40	5.03
54	2.1589	1.8293	1.5345	-5.51	5.11
55	2.0956	1.7716	1.4828	-5.62	5.20
56	2.0344	1.7161	1.4331	-5.73	5.29
57	1.9753	1.6625	1.3853	-5.84	5.37
58	1.9182	1.6109	1.3393	-5.95	5.46
59	1.8631	1.5612	1.2951	-6.07	5.55
60	1.8097	1.5132	1.2526	-6.18	5.63
61	1.7582	1.4669	1.2116	-6.30	5.72
62	1.7084	1.4223	1.1722	-6.41	5.81
63	1.6603	1.3792	1.1343	-6.53	5.90
64	1.6137	1.3377	1.0978	-6.65	5.99
65	1.5687	1.2976	1.0626	-6.76	6.07
66	1.5252	1.2589	1.0288	-6.88	6.16
67	1.4831	1.2216	0.9962	-7.00	6.25
68	1.4423	1.1855	0.9647	-7.12	6.34
69	1.4029	1.1507	0.9344	-7.24	6.43
70	1.3647	1.1171	0.9053	-7.36	6.52
71	1.3278	1.0846	0.8771	-7.49	6.61
72	1.2920	1.0532	0.8500	-7.61	6.70
73	1.2574	1.0229	0.8238	-7.73	6.79
74	1.2239	0.9936	0.7986	-7.86	6.89
75	1.1914	0.9653	0.7743	-7.98	6.98
76	1.1599	0.9379	0.7508	-8.11	7.07

R - T Table

Part no.:NTSA0502KZ088

R25 =5 KΩ ± 10%

B25/50 = 3375 K ± 7%

Temperature	Rmax.	Rnor.	Rmin.	Temperature Tol.	
77	1.1295	0.9114	0.7282	-8.24	7.16
78	1.0999	0.8858	0.7063	-8.36	7.25
79	1.0713	0.8611	0.6852	-8.49	7.34
80	1.0436	0.8371	0.6648	-8.62	7.44
81	1.0167	0.8140	0.6451	-8.75	7.53
82	0.9906	0.7915	0.6262	-8.88	7.62
83	0.9653	0.7698	0.6078	-9.01	7.71
84	0.9408	0.7488	0.5901	-9.14	7.81
85	0.9170	0.7285	0.5729	-9.27	7.90
86	0.8940	0.7088	0.5564	-9.40	8.00
87	0.8716	0.6898	0.5404	-9.54	8.09
88	0.8499	0.6713	0.5249	-9.67	8.18
89	0.8288	0.6534	0.5100	-9.81	8.28
90	0.8083	0.6361	0.4955	-9.94	8.37
91	0.7885	0.6193	0.4816	-10.08	8.47
92	0.7692	0.6030	0.4680	-10.21	8.56
93	0.7505	0.5873	0.4549	-10.35	8.66
94	0.7323	0.5720	0.4423	-10.49	8.75
95	0.7146	0.5572	0.4300	-10.63	8.85
96	0.6975	0.5428	0.4182	-10.77	8.95
97	0.6808	0.5289	0.40672	-10.91	9.04
98	0.6646	0.51535	0.39561	-11.05	9.14
99	0.64890	0.50225	0.38486	-11.19	9.24
100	0.63361	0.48954	0.37445	-11.33	9.33
101	0.61876	0.47721	0.36436	-11.48	9.43
102	0.60431	0.46524	0.35459	-11.62	9.53
103	0.59028	0.45363	0.34513	-11.77	9.63
104	0.57663	0.44236	0.33597	-11.91	9.73
105	0.56336	0.43143	0.32709	-12.06	9.83
106	0.55045	0.42081	0.31848	-12.21	9.93
107	0.53790	0.41050	0.31014	-12.36	10.03
108	0.52570	0.40049	0.30206	-12.51	10.13
109	0.51382	0.39078	0.29422	-12.66	10.23
110	0.50227	0.38134	0.28663	-12.82	10.33
111	0.49104	0.37217	0.27926	-12.97	10.44
112	0.48011	0.36327	0.27212	-13.13	10.54

R - T Table

Part no.:NTSA0502KZ088

R25 =5 KΩ ± 10%

B25/50 = 3375 K ± 7%

Temperature	Rmax.	Rnor.	Rmin.	Temperature Tol.	
113	0.46947	0.35463	0.26520	-13.28	10.65
114	0.45912	0.34623	0.25848	-13.44	10.75
115	0.44905	0.33807	0.25197	-13.60	10.86
116	0.43925	0.33014	0.24565	-13.76	10.97
117	0.42971	0.32244	0.23952	-13.93	11.08
118	0.42042	0.31495	0.23358	-14.09	11.19
119	0.41138	0.30768	0.22781	-14.26	11.30
120	0.40259	0.30061	0.22221	-14.42	11.41
121	0.39402	0.29373	0.21678	-14.59	11.52
122	0.38568	0.28706	0.21151	-14.77	11.64
123	0.37756	0.28056	0.20640	-14.94	11.75
124	0.36966	0.27425	0.20144	-15.12	11.87
125	0.36196	0.26812	0.19662	-15.30	11.99

THINKING ELECTRONIC INDUSTRIAL CO.,LTD

THINKING P/N:NTSA0502KZ088

Safety Approvals (Model No：NTSA0502)

* UL 1434 recognized (File # E138827)

Certificates

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

Test Report

(1) RoHS test report