

Temperature Measurement NTC Thermistor



Features

- High testing precision
- Steady operating for long time
- Reflow soldering possible
- Short response time

Applications

- Temperature measurement
- Battery chargers
- Temperature sensing, protection and compensation in industrial, telecom and consumer applications
- Inrush current limiting, e.g. in switch-mode power supplies, soft-start motors

PART NUMBER

Example: RND 155MF52A2 474J4450

RND 155MF52A2	474	J	4450
Type	Zero Power Resistance @ 25 °C 474 = 470 kΩ	Tolerance F = ± 1% G = ± 2% H = ± 3% J = ± 5%	B Constant 3470 = 3470 K 3950 = 3950 K 4200 = 4200 K 4450 = 4450 K

Electrical Characteristics

	Item	Symbol	Test conditions	Unit	Specification
1.1	Zero Power Resistance at 25°C	R25	Ta=25±0.05°C Test Power≤0.1mW	kΩ	470±5%
1.2	B-value	B25/50	$B = \frac{(Ta \times Tb)}{(Tb - Ta)} \times \ln(Ra/Rb)$ Tb=50°C±0.01°C	K	4450±1%
1.3	Thermal dissipation Coefficient	δ	In still air	mW/°C	≥2
1.4	Thermal time constant	τ	In still air	sec	≤7
1.5	Insulation resistance	/	100V/DC 1min	MΩ	≥100
1.6	Operating temperature	/	/	°C	-55°C ~ 125°C
1.7	Maximum rated power	Pmax	/	mW	50
1.8	R&T-table	/	/	/	See attached table
1.9	Resistance tolerance	/	/	/	See attached curve

Reliability

	Item	Test conditions and methods	Technical requirements
2.1	Terminal strength	Fixed resistor end, Pull strength : 5±1 N time: 10±1 sec	No obvious damage, R25 ΔR/R≤±2%
2.2	Solderability	Temperature : 245±5°C for 2-3sec	coverage area ≥ 95%
2.3	Welding heat resistant	Tin pan temperature: 260°C ±5°C, immersion depth is apart from the body resistance 6 mm, time 5±1 sec	R25 ΔR/R≤±2%,
2.4	Steady humidity and heat	Temp: 40°C±2°C, Humidity: 93±2%, Time : 500hrs	R25 ΔR/R≤±2%,
2.5	Rapid changes in temperature	-55°C30min→25°C5min→1 25°C30min→25°C5min , 5cycles	R25 ΔR/R≤±2%
2.6	High temperature storage	Temp : 125°C±5°C, Time :1000hrs	R25 ΔR/R≤±2%
2.7	Low temperature storage	Temp : -55°C, Time :1000hrs	R25 ΔR/R≤±2%

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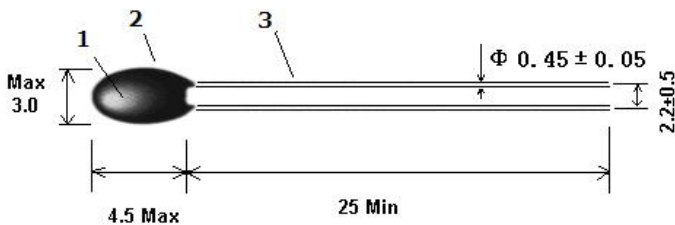
Caution

- 3.1 This product USES: Temperature measurement and control;
- 3.2 Avoid measurement error when current through the thermistor chip resulted in heating element itself;
- 3.3 When the soldering iron welding, the welding place at least 2 mm space from coating layer and the welding temperature should be lower than 300 °C, welding time < 3 sec.
- 3.4 Storage temp : -10°C ~ 40°C ; storage humidity : ≤75% RH;
- 3.5 Avoid air corrosion or sunlight;
- 3.6 Remake sealed storage after package opening

Certificate

Quality Control System Certification ISO9001 : 2008 (01112Q20216R4M)
Environment Management System Certification ISO14001:2015(01116E30085R3M)
Environment Test Report RoHS
CQC Safe Certification

Dimensions



No.	Name	Material specifications	Quantity	note
1	element	NTC Thermistor (chip)	1	
2	Modified resin	Coating types of resin	1	Black
3	Lead wire	CP wire	2	Silver

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R&T Table

R25=470KΩ TOLERANCE:±5%				B25/50=4450K TOLERANCE:±1% P181-3			
TEMP(°C)	RESISTANCE(KΩ)			RESISST-TOL(%)		TEMP-TOL(°C)	
	MIN	CENTER	MAX	△R	-△R	△T	-△T
-55	41781.300	46043.600	50613.800	9.925	-9.257	1.267	-1.181
-54	40722.600	44865.200	49305.700	9.897	-9.233	1.260	-1.176
-53	39523.500	43531.000	47825.000	9.864	-9.206	1.254	-1.170
-52	38210.100	42070.100	46204.200	9.826	-9.175	1.248	-1.165
-51	36807.100	40510.100	44474.100	9.785	-9.140	1.243	-1.161
-50	35337.700	38876.900	42663.500	9.740	-9.103	1.238	-1.157
-49	33823.200	37194.100	40798.800	9.691	-9.063	1.233	-1.153
-48	32282.500	35483.300	38903.800	9.639	-9.020	1.228	-1.149
-47	30732.900	33763.200	36999.500	9.585	-8.975	1.224	-1.146
-46	29189.000	32050.300	35104.200	9.528	-8.927	1.220	-1.143
-45	27663.500	30358.800	33233.500	9.469	-8.878	1.216	-1.140
-44	26167.000	28700.400	31400.400	9.407	-8.827	1.213	-1.138
-43	24708.300	27084.800	29615.600	9.344	-8.774	1.209	-1.136
-42	23294.300	25519.600	27887.600	9.279	-8.719	1.206	-1.133
-41	21930.500	24010.900	26222.900	9.212	-8.664	1.203	-1.131
-40	20620.800	22563.000	24626.200	9.144	-8.607	1.200	-1.130
-39	19368.100	21178.800	23100.900	9.075	-8.549	1.197	-1.128
-38	18174.000	19860.300	21648.800	9.005	-8.490	1.195	-1.126
-37	17039.400	18608.300	20270.800	8.934	-8.431	1.192	-1.125
-36	15964.200	17422.600	18966.700	8.862	-8.370	1.190	-1.124
-35	14947.800	16302.600	17735.700	8.790	-8.309	1.187	-1.123
-34	13989.300	15246.900	16576.100	8.717	-8.248	1.185	-1.121
-33	13086.900	14253.900	15486.100	8.644	-8.186	1.183	-1.120
-32	12239.000	13321.300	14463.100	8.570	-8.124	1.181	-1.119
-31	11443.400	12446.900	13504.600	8.497	-8.062	1.179	-1.119
-30	10697.900	11628.100	12607.600	8.423	-7.999	1.177	-1.118
-29	10000.200	10862.400	11769.300	8.349	-7.936	1.175	-1.117
-28	9347.910	10146.900	10986.600	8.275	-7.874	1.173	-1.116
-27	8738.510	9478.950	10256.400	8.202	-7.811	1.172	-1.116

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-26	8169.650	8855.870	9575.730	8.128	-7.748	1.170	-1.115
-25	7638.970	8275.000	8941.570	8.055	-7.686	1.168	-1.115
-24	7144.150	7733.750	8351.070	7.982	-7.623	1.167	-1.114
-23	6682.960	7229.620	7801.450	7.909	-7.561	1.165	-1.114
-22	6253.260	6760.230	7290.030	7.837	-7.499	1.163	-1.113
-21	5852.980	6323.280	6814.280	7.765	-7.437	1.162	-1.113
-20	5480.170	5916.580	6371.760	7.693	-7.375	1.160	-1.112
-19	5132.980	5538.070	5960.190	7.622	-7.314	1.158	-1.112
-18	4809.640	5185.810	5577.410	7.551	-7.253	1.157	-1.111
-17	4508.510	4857.950	5221.390	7.481	-7.193	1.155	-1.111
-16	4228.040	4552.780	4890.220	7.411	-7.132	1.154	-1.110
-15	3966.760	4268.690	4582.110	7.342	-7.073	1.152	-1.110
-14	3723.320	4004.160	4295.410	7.273	-7.013	1.150	-1.109
-13	3496.450	3757.790	4028.570	7.205	-6.954	1.149	-1.109
-12	3284.970	3528.270	3780.130	7.138	-6.895	1.147	-1.108
-11	3087.760	3314.380	3548.750	7.071	-6.837	1.145	-1.108
-10	2903.800	3115.000	3333.190	7.004	-6.779	1.144	-1.107
-9	2732.150	2929.050	3132.300	6.938	-6.722	1.142	-1.106
-8	2571.910	2755.580	2944.990	6.873	-6.665	1.140	-1.106
-7	2422.260	2593.680	2770.280	6.808	-6.608	1.138	-1.105
-6	2282.450	2442.500	2607.240	6.744	-6.552	1.136	-1.104
-5	2151.760	2301.280	2455.040	6.681	-6.497	1.134	-1.103
-4	2029.550	2169.300	2312.870	6.618	-6.441	1.132	-1.102
-3	1915.220	2045.890	2180.010	6.555	-6.387	1.130	-1.101
-2	1808.190	1930.440	2055.800	6.493	-6.332	1.128	-1.100
-1	1707.960	1822.380	1939.610	6.432	-6.278	1.126	-1.099
0	1638.930	1748.000	1859.660	6.388	-6.239	1.113	-1.088
1	1526.000	1626.380	1729.030	6.311	-6.172	1.122	-1.097
2	1443.420	1537.500	1633.620	6.251	-6.119	1.119	-1.095
3	1365.920	1454.140	1544.190	6.192	-6.066	1.117	-1.094
4	1293.150	1375.920	1460.310	6.133	-6.014	1.114	-1.093
5	1224.800	1302.470	1381.600	6.075	-5.963	1.112	-1.091
6	1160.540	1233.470	1307.700	6.018	-5.912	1.109	-1.090
7	1100.120	1168.620	1238.280	5.960	-5.861	1.106	-1.088
8	1043.270	1107.630	1173.030	5.903	-5.810	1.104	-1.086
9	989.754	1050.250	1111.670	5.847	-5.760	1.101	-1.084
10	954.988	1013.000	1071.840	5.809	-5.726	1.077	-1.062
11	891.841	945.364	999.593	5.736	-5.661	1.095	-1.080
12	847.053	897.421	948.406	5.681	-5.612	1.092	-1.078
13	804.805	852.220	900.172	5.626	-5.563	1.088	-1.076
14	764.933	809.583	854.697	5.572	-5.515	1.085	-1.074
15	727.284	769.344	811.802	5.518	-5.467	1.082	-1.072
16	691.719	731.352	771.322	5.465	-5.419	1.078	-1.069

Temperature Measurement

NTC Thermistor



17	658.105	695.462	733.102	5.412	-5.371	1.075	-1.067
18	626.322	661.544	697.000	5.359	-5.324	1.071	-1.064
19	596.256	629.474	662.882	5.307	-5.277	1.068	-1.061
20	567.802	599.139	630.625	5.255	-5.230	1.064	-1.059
21	540.861	570.431	600.114	5.203	-5.183	1.060	-1.056
22	515.343	543.252	571.242	5.152	-5.137	1.056	-1.053
23	491.162	517.511	543.910	5.101	-5.091	1.052	-1.050
24	468.239	493.120	518.024	5.050	-5.045	1.048	-1.047
25	446.500	470.000	493.500	5.000	-5.000	1.044	-1.044
26	425.469	448.076	470.704	5.050	-5.045	1.060	-1.059
27	405.528	427.279	449.070	5.100	-5.090	1.077	-1.075
28	386.614	407.543	428.531	5.149	-5.135	1.094	-1.091
29	368.668	388.808	409.023	5.199	-5.179	1.111	-1.107
30	351.633	371.017	390.490	5.248	-5.224	1.128	-1.123
31	335.460	354.117	372.877	5.297	-5.268	1.145	-1.139
32	320.098	338.057	356.132	5.346	-5.312	1.162	-1.155
33	305.502	322.792	340.208	5.395	-5.356	1.179	-1.171
34	291.631	308.278	325.060	5.443	-5.399	1.196	-1.187
35	278.445	294.473	310.646	5.492	-5.443	1.214	-1.203
36	265.905	281.340	296.927	5.540	-5.486	1.231	-1.219
37	253.977	268.842	283.865	5.588	-5.529	1.248	-1.235
38	242.629	256.945	271.427	5.635	-5.571	1.266	-1.251
39	231.828	245.619	259.579	5.683	-5.614	1.283	-1.268
40	221.547	234.831	248.290	5.731	-5.656	1.301	-1.284
41	211.758	224.556	237.532	5.778	-5.699	1.318	-1.300
42	202.436	214.766	227.277	5.825	-5.741	1.336	-1.317
43	193.555	205.436	217.500	5.872	-5.782	1.354	-1.333
44	185.094	196.542	208.177	5.919	-5.824	1.372	-1.350
45	177.032	188.064	199.284	5.966	-5.866	1.390	-1.366
46	169.346	179.979	190.800	6.012	-5.907	1.408	-1.383
47	162.020	172.268	182.706	6.059	-5.948	1.426	-1.400
48	155.034	164.912	174.981	6.105	-5.989	1.444	-1.416
49	148.372	157.895	167.608	6.151	-6.030	1.462	-1.433
50	139.610	148.660	157.900	6.215	-6.087	1.463	-1.432
51	135.956	144.807	153.848	6.243	-6.111	1.499	-1.467
52	130.173	138.707	147.430	6.289	-6.152	1.517	-1.484
53	124.654	132.883	141.301	6.334	-6.192	1.535	-1.501
54	119.387	127.322	135.446	6.380	-6.232	1.554	-1.518
55	114.359	122.012	129.852	6.425	-6.272	1.573	-1.535
56	109.559	116.941	124.508	6.470	-6.312	1.591	-1.552
57	104.977	112.097	119.401	6.515	-6.351	1.610	-1.570
58	100.601	107.470	114.521	6.560	-6.391	1.629	-1.587
59	96.422	103.049	109.856	6.605	-6.430	1.648	-1.605

Temperature Measurement

NTC Thermistor



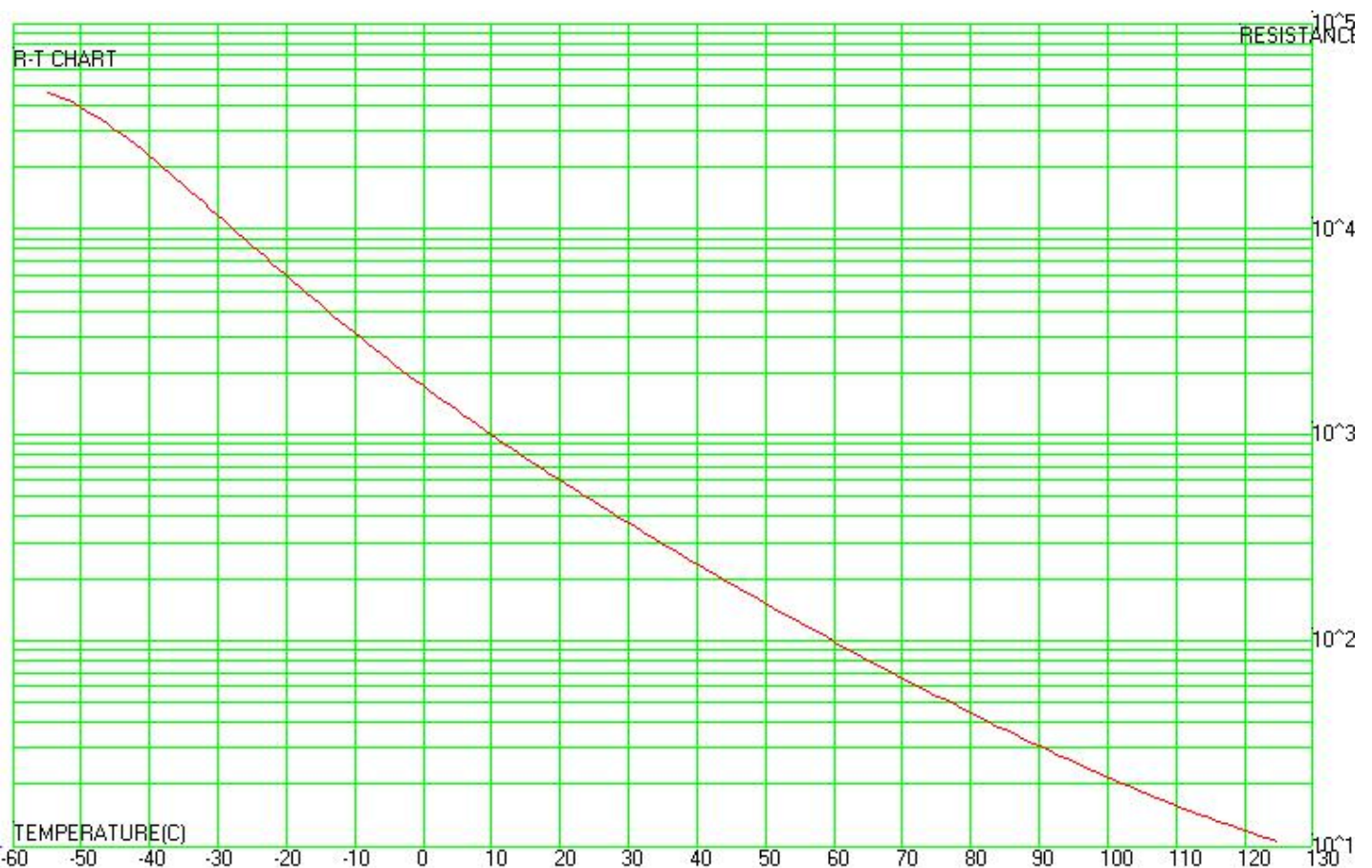
60	92.431	98.825	105.397	6.650	-6.469	1.667	-1.622
61	88.619	94.789	101.134	6.694	-6.508	1.687	-1.640
62	84.977	90.931	97.059	6.739	-6.547	1.706	-1.657
63	81.497	87.244	93.162	6.783	-6.586	1.725	-1.675
64	78.173	83.719	89.435	6.827	-6.624	1.745	-1.693
65	74.996	80.350	85.871	6.871	-6.663	1.764	-1.711
66	71.960	77.128	82.462	6.914	-6.701	1.784	-1.729
67	69.058	74.048	79.201	6.958	-6.739	1.804	-1.747
68	66.284	71.103	76.082	7.001	-6.777	1.824	-1.765
69	63.632	68.286	73.097	7.045	-6.815	1.844	-1.783
70	61.098	65.592	70.242	7.088	-6.852	1.864	-1.802
71	58.674	63.016	67.509	7.131	-6.889	1.884	-1.820
72	56.357	60.551	64.895	7.173	-6.926	1.904	-1.839
73	54.141	58.193	62.393	7.216	-6.963	1.925	-1.857
74	52.021	55.937	59.998	7.258	-7.000	1.945	-1.876
75	49.994	53.779	57.705	7.301	-7.037	1.966	-1.895
76	48.056	51.714	55.511	7.343	-7.073	1.987	-1.914
77	46.201	49.738	53.411	7.384	-7.109	2.008	-1.933
78	44.427	47.846	51.400	7.426	-7.145	2.029	-1.952
79	42.730	46.036	49.474	7.468	-7.181	2.050	-1.971
80	41.106	44.304	47.631	7.509	-7.217	2.071	-1.990
81	39.552	42.645	45.865	7.550	-7.252	2.092	-2.010
82	38.066	41.058	44.175	7.591	-7.287	2.114	-2.029
83	36.643	39.538	42.555	7.631	-7.322	2.135	-2.049
84	35.281	38.083	41.005	7.672	-7.357	2.157	-2.069
85	33.977	36.690	39.519	7.712	-7.392	2.179	-2.089
86	32.730	35.355	38.096	7.752	-7.426	2.201	-2.109
87	31.535	34.078	36.733	7.791	-7.460	2.223	-2.129
88	30.392	32.854	35.427	7.831	-7.494	2.246	-2.149
89	29.297	31.682	34.176	7.870	-7.527	2.268	-2.169
90	28.249	30.559	32.976	7.909	-7.561	2.291	-2.190
91	27.245	29.484	31.827	7.947	-7.594	2.313	-2.210
92	26.284	28.454	30.726	7.986	-7.627	2.336	-2.231
93	25.363	27.467	29.671	8.024	-7.659	2.359	-2.252
94	24.481	26.521	28.659	8.062	-7.692	2.382	-2.273
95	23.636	25.615	27.690	8.099	-7.724	2.406	-2.294
96	22.827	24.747	26.760	8.137	-7.756	2.429	-2.315
97	22.052	23.914	25.869	8.174	-7.787	2.453	-2.337
98	21.309	23.117	25.015	8.210	-7.818	2.477	-2.358
99	20.598	22.352	24.196	8.247	-7.849	2.501	-2.380
100	19.916	21.620	23.410	8.283	-7.880	2.525	-2.402
101	19.262	20.917	22.657	8.319	-7.911	2.549	-2.424
102	18.636	20.244	21.935	8.354	-7.941	2.573	-2.446

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103	18.036	19.598	21.242	8.389	-7.970	2.598	-2.468
104	17.460	18.979	20.578	8.424	-8.000	2.623	-2.491
105	16.909	18.385	19.940	8.458	-8.029	2.648	-2.513
106	16.380	17.816	19.329	8.493	-8.058	2.673	-2.536
107	15.873	17.270	18.742	8.526	-8.087	2.698	-2.559
108	15.387	16.746	18.180	8.560	-8.115	2.723	-2.582
109	14.921	16.244	17.640	8.593	-8.143	2.749	-2.605
110	14.474	15.762	17.122	8.626	-8.171	2.775	-2.628
111	14.046	15.300	16.625	8.658	-8.198	2.801	-2.652
112	13.635	14.857	16.148	8.690	-8.225	2.827	-2.676
113	13.240	14.431	15.690	8.721	-8.252	2.853	-2.700
114	12.862	14.023	15.251	8.753	-8.278	2.880	-2.724
115	12.500	13.632	14.829	8.783	-8.304	2.907	-2.748
116	12.152	13.256	14.425	8.814	-8.330	2.933	-2.772
117	11.819	12.896	14.037	8.844	-8.355	2.961	-2.797
118	11.499	12.550	13.664	8.873	-8.380	2.988	-2.822
119	11.192	12.219	13.307	8.903	-8.404	3.015	-2.847
120	10.897	11.900	12.963	8.931	-8.428	3.043	-2.872
121	10.615	11.595	12.634	8.960	-8.452	3.071	-2.897
122	10.344	11.302	12.318	8.987	-8.476	3.099	-2.923
123	10.084	11.021	12.015	9.015	-8.499	3.128	-2.948
124	9.835	10.751	11.723	9.042	-8.521	3.156	-2.974
125	9.596	10.493	11.444	9.068	-8.544	3.185	-3.000



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