

SINOCHIP ELECTRONICS CO., LTD.

APPROVAL SHEET

CUSTOMER _____

PART NAME MF54 Temp Measurement (special for electrical thermometer) NTC Thermistor

PART NUMBER MF54 503 F 3950

DATE _____

CONFIRM

CLIENT
QUALITY
DEP.: _____
Produce
Dep.: _____
Engineering
Dep.: _____

MANUFACTOR
Design: _____
Check: <u>Jack Wang</u>
Approval: _____

SINOCHIP ELECTRONICS CO., LTD.

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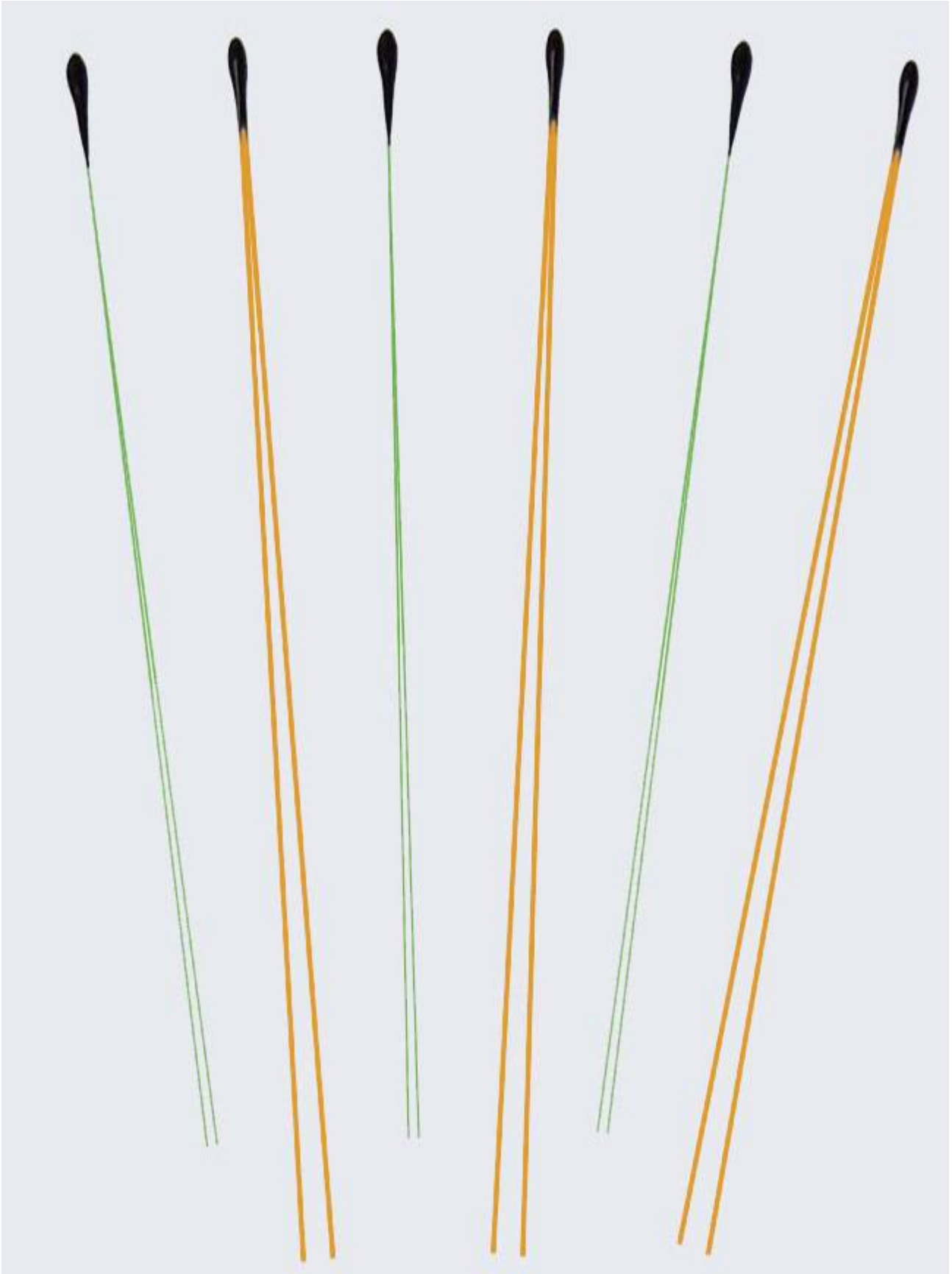
TEL: 86-25-52153215/52153380

FAX: 86-25-52157065

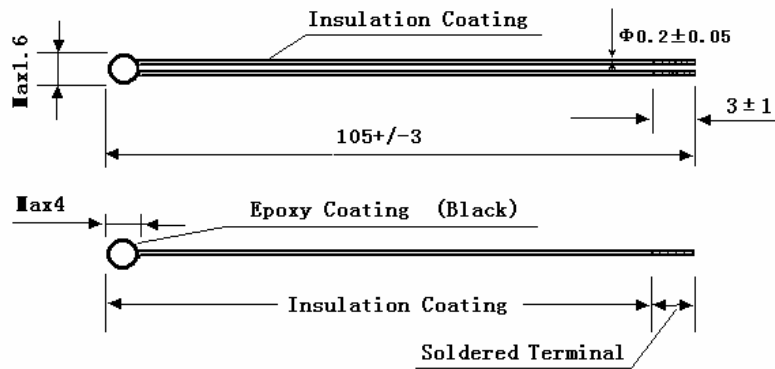
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SPECIFICATIONS FOR NTC THERMISTOR



1) Dimensions(mm)



2、Materials

Coating		Lead wire	
Material	Color	Material	Color
Epoxy Resin	Black	Enameled wire	Red

3、Ordering information

MF5	4	503	F	3950
Temp Measurement NTC Thermistor	Special for electrical thermometer	Resistance	Tolerance	B-value (25/50)
		$50 \times 10^3 = 50K\Omega$	$\pm 1\%$	3950K

4、Resistance calibration table

Rated zero-power resistance $R_{37} (1-32) \pm 0.09\% (37.00^\circ C)$

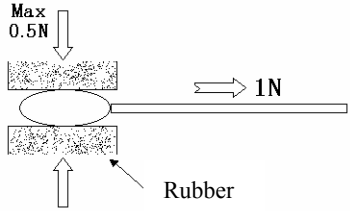
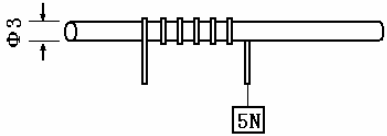
1—29.111KΩ	9—29.535KΩ	17—29.964KΩ	25—30.401KΩ
2—29.164KΩ	10—29.588KΩ	18—30.019KΩ	26—30.456KΩ
3—29.216KΩ	11—29.641KΩ	19—30.073KΩ	27—30.511KΩ
4—29.269KΩ	12—29.695KΩ	20—30.128KΩ	28—30.566KΩ
5—29.322KΩ	13—29.749KΩ	21—30.182KΩ	29—30.622KΩ
6—29.375KΩ	14—29.802KΩ	22—30.237KΩ	30—30.677KΩ
7—29.428KΩ	15—29.856KΩ	23—30.291KΩ	31—30.731KΩ
8—29.481KΩ	16—29.910KΩ	24—30.346KΩ	32—30.785KΩ

Remark: the resistance values may vary slightly as the testing temperature is $\pm 0.01^{\circ}\text{C}$ in accuracy, the flowing rate will be varied with the accuracy .

5、Electrical characteristics

	Item	Symbol	Test conditions	Unit	Specification
5.1	Zero Power Resistance at 25°C	R ₂₅	T _a =25±0.05°C Test Power≤0.05mW Test in fluid liquid	KΩ	50±1%
5.2	Zero Power Resistance at 37°C	R ₃₇	T _a =37±0.01°C Test Power≤0.05mW Test in fluid liquid	KΩ	Mid value of group
5.3	B ₁ -value	B _{25/50}	$B=[(T_a \times T_b)/(T_b - T_a)] \times \ln(R_a/R_b)$	K	3950±1%
5.4	B ₂ -value	B _{30/45}	$B=[(T_a \times T_b)/(T_b - T_a)] \times \ln(R_a/R_b)$	K	3953 ± 0.5%
5.5	Thermal dissipation Coefficient	δ	T _b =50°C ± 0.1°C	mW/°C	In still air≥0.7
5.6	Thermal time constant	τ	T _b =50°C ± 0.1°C	sec	In still air≤2.8
5.7	Insulation resistance	/	100DC, 1min	MΩ	≥100
5.8	The resistance flowing rate of zero power at room temperature	/	T _a =25 ± 0.05°C, Time: 365 days	%/year	≤0.1
5.9	Operating temperature	/	/	°C	-40~100
5.10	R&T characteristics	/	/	/	See attached table 1

6、Reliability

	Item	Test conditions and methods	Technical requirements
6.1	Withstand Soldering heat	The lead wire shall be dipped into solder bath of $260\pm 5^{\circ}\text{C}$ for 10 ± 1 secs with 6mm space from the body.	No obvious damage, $\Delta R/R \leq \pm 1\%$, Δ $B/B \leq \pm 1\%$
6.2	Terminal strength	Pull 1N static weight in the direction of lead axis for 1 minute. 	No obvious damage, $\Delta R/R \leq \pm 1\%$, Δ $B/B \leq \pm 1\%$
6.3	Temperature cycle	-20°C 5min \rightarrow 25°C 3min \rightarrow 100°C 5min \rightarrow 25°C 1min, 5cycles	No obvious damage, $\Delta R/R \leq \pm 1\%$, Δ $B/B \leq \pm 1\%$
6.4	Load test at high temperature	Temperature: $100 \pm 5^{\circ}\text{C}$, DC: $0.1 \pm 10\%$ mA Time: 1000 ± 24 hours	No obvious damage, $\Delta R/R \leq \pm 1\%$, Δ $B/B \leq \pm 1\%$
6.5	Dry heat	Temperature: $100 \pm 5^{\circ}\text{C}$, Time: 1000 ± 24 hours	No obvious damage, $\Delta R/R \leq \pm 1\%$, Δ $B/B \leq \pm 1\%$
6.6	Steady damp heat	Temperature: $40 \pm 2^{\circ}\text{C}$, humidity: $95 \pm 2\%$, Time: 1000 ± 24 hours	No obvious damage, $\Delta R/R \leq \pm 1\%$, Δ $B/B \leq \pm 1\%$ Insulating resistance $\geq 100\text{M}\Omega$
6.7	The resistance flowing rate of zero power at room temperature	At temperature $25 \pm 15^{\circ}\text{C}$, storage in safe air and dry sealed container for 1 year.	$\Delta R/R \leq \pm 1\%$, $\Delta B/B \leq \pm 1\%$
6.8	Resin coating strength	The lead-wire shall be firmly wrapped on the cylinder with the diameter of 3mm, then a down word tension shall be applied to the lead wire and increased to 5N. 	No obvious damage,
6.9	Free fall	Natural fall to a maple board from 1 m high	No obvious damage,

7、Soldering conditions


When soldering, space between iron tip and thermistor body must be more than 6mm, temperature should be

less than 300℃, and soldering time should be as short as possible.

8、Storage conditions

- 7.1 Storage temp: -10℃ ~ 40℃;
- 7.2 Storage humidity : ≤75% RH;
- 7.3 Avoid air corrosion or sunlight
- 7.4 Remake sealed storage after package opening.

9. Certificate

- 9.1 Quality Control System Certification ISO9001: 2000 (01110Q20002R3M)
- 9.2 Environment Management System Certification ISO14001: 2004 (01110E20031R1M)
- 9.3 Environment Test Report RoHS (RLSHC000335190002C)
- 9.4  The Hi&Tech Product of Jiangsu Province (090115G0148N)

Attached table 1

R-T Chart

Group: 1 R37=29.111KΩ tolerance:±0.09% B30/45=3953K tolerance:±0.5%

temperature(℃)	resistance(Ω)			RESISST-TOL (%)		TEMP-TOL (℃)	
	Min	Center	Max	ΔR	-ΔR	ΔT	-ΔT
34	32.917	32.959	33.000	0.12	-0.12	0.03	-0.03
35	31.577	31.613	31.649	0.11	-0.11	0.02	-0.02
36	30.300	30.330	30.360	0.10	-0.10	0.02	-0.02
37	29.085	29.111	29.137	0.09	-0.09	0.02	-0.02
38	27.911	27.939	27.967	0.10	-0.10	0.02	-0.02
39	26.796	26.826	26.856	0.11	-0.11	0.02	-0.02
40	25.731	25.763	25.795	0.12	-0.12	0.03	-0.03
41	24.715	24.749	24.783	0.14	-0.14	0.03	-0.03
42	23.746	23.781	23.816	0.15	-0.15	0.03	-0.03

Group: 2 R37=29.164KΩ tolerance:±0.09% B30/45=3953K tolerance:±0.5%

temperature(℃)	resistance(Ω)			RESISST-TOL (%)		TEMP-TOL (℃)	
	Min	Center	Max	ΔR	-ΔR	ΔT	-ΔT
34	32.977	33.018	33.059	0.12	-0.12	0.03	-0.03
35	31.635	31.670	31.706	0.11	-0.11	0.02	-0.02
36	30.354	30.385	30.415	0.10	-0.10	0.02	-0.02
37	29.138	29.164	29.189	0.09	-0.09	0.02	-0.02
38	27.962	27.990	28.018	0.10	-0.10	0.02	-0.02
39	26.844	26.874	26.904	0.11	-0.11	0.02	-0.02
40	25.778	25.810	25.842	0.12	-0.12	0.03	-0.03
41	24.760	24.794	24.828	0.14	-0.14	0.03	-0.03
42	23.789	23.824	23.860	0.15	-0.15	0.03	-0.03

Group: 3 R37=29.216K Ω tolerance: $\pm 0.09\%$

B30/45=3953K tolerance: $\pm 0.5\%$

temperature(°C)	resistance(Ω)			RESISST-TOL (%)		TEMP-TOL (°C)	
	Min	Center	Max	ΔR	$-\Delta R$	ΔT	$-\Delta T$
34	33.035	33.076	33.117	0.12	-0.12	0.03	-0.03
35	31.690	31.726	31.761	0.11	-0.11	0.02	-0.02
36	30.407	30.438	30.468	0.10	-0.10	0.02	-0.02
37	29.190	29.216	29.242	0.09	-0.09	0.02	-0.02
38	28.011	28.039	28.067	0.10	-0.10	0.02	-0.02
39	26.891	26.921	26.951	0.11	-0.11	0.02	-0.02
40	25.823	25.855	25.887	0.12	-0.12	0.03	-0.03
41	24.803	24.837	24.871	0.14	-0.14	0.03	-0.03
42	23.830	23.866	23.901	0.15	-0.15	0.03	-0.03

Group: 4 R37=29.269K Ω tolerance: $\pm 0.09\%$

B30/45=3953K tolerance: $\pm 0.5\%$

temperature(°C)	resistance(Ω)			RESISST-TOL (%)		TEMP-TOL (°C)	
	Min	Center	Max	ΔR	$-\Delta R$	ΔT	$-\Delta T$
34	33.096	33.137	33.179	0.12	-0.12	0.03	-0.03
35	31.748	31.784	31.820	0.11	-0.11	0.02	-0.02
36	30.464	30.494	30.525	0.10	-0.10	0.02	-0.02
37	29.243	29.269	29.294	0.09	-0.09	0.02	-0.02
38	28.062	28.091	28.119	0.10	-0.10	0.02	-0.02
39	26.941	26.971	27.001	0.11	-0.11	0.02	-0.02
40	25.871	25.903	25.935	0.12	-0.12	0.03	-0.03
41	24.849	24.883	24.917	0.14	-0.14	0.03	-0.03
42	23.875	23.910	23.945	0.15	-0.15	0.03	-0.03

Group: 5 R37=29.322K Ω tolerance: $\pm 0.09\%$

B30/45=3953K tolerance: $\pm 0.5\%$

temperature(°C)	resistance(Ω)			RESISST-TOL (%)		TEMP-TOL (°C)	
	Min	Center	Max	ΔR	$-\Delta R$	ΔT	$-\Delta T$
34	33.156	33.197	33.239	0.12	-0.12	0.03	-0.03
35	31.806	31.842	31.878	0.11	-0.11	0.02	-0.02
36	30.519	30.550	30.580	0.10	-0.10	0.02	-0.02
37	29.295	29.322	29.348	0.09	-0.09	0.02	-0.02
38	28.114	28.142	28.170	0.10	-0.10	0.02	-0.02
39	26.990	27.020	27.050	0.11	-0.11	0.02	-0.02
40	25.918	25.950	25.982	0.12	-0.12	0.03	-0.03
41	24.895	24.929	24.963	0.14	-0.14	0.03	-0.03
42	23.918	23.954	23.989	0.15	-0.15	0.03	-0.03

Group: 6

R37=29.375K Ω tolerance: $\pm 0.09\%$

B30/45=3953K tolerance: $\pm 0.5\%$

temperature(°C)	resistance(Ω)			RESISST-TOL (%)		TEMP-TOL (°C)	
	Min	Center	Max	ΔR	$-\Delta R$	ΔT	$-\Delta T$
34	33.216	33.257	33.299	0.12	-0.12	0.03	-0.03
35	31.864	31.900	31.935	0.11	-0.11	0.02	-0.02
36	30.574	30.605	30.636	0.10	-0.10	0.02	-0.02
37	29.349	29.375	29.400	0.09	-0.09	0.02	-0.02
38	28.164	28.192	28.221	0.10	-0.10	0.02	-0.02
39	27.039	27.069	27.099	0.11	-0.11	0.02	-0.02
40	25.964	25.997	26.029	0.12	-0.12	0.03	-0.03
41	24.939	24.974	25.008	0.14	-0.14	0.03	-0.03
42	23.961	23.997	24.032	0.15	-0.15	0.03	-0.03

Group: 7

R37=29.428K Ω tolerance: $\pm 0.09\%$

B30/45=3953K tolerance: $\pm 0.5\%$

temperature(°C)	resistance(Ω)			RESISST-TOL (%)		TEMP-TOL (°C)	
	Min	Center	Max	ΔR	$-\Delta R$	ΔT	$-\Delta T$
34	33.276	33.317	33.359	0.12	-0.12	0.03	-0.03
35	31.921	31.957	31.993	0.11	-0.11	0.02	-0.02
36	30.630	30.660	30.691	0.10	-0.10	0.02	-0.02
37	29.402	29.427	29.453	0.09	-0.09	0.02	-0.02
38	28.215	28.243	28.272	0.10	-0.10	0.02	-0.02
39	27.087	27.118	27.148	0.11	-0.11	0.02	-0.02
40	26.011	26.044	26.076	0.12	-0.12	0.03	-0.03
41	24.985	25.019	25.053	0.14	-0.14	0.03	-0.03
42	24.004	24.040	24.076	0.15	-0.15	0.03	-0.03

Group: 8

R37=29.481K Ω tolerance: $\pm 0.09\%$

B30/45=3953K tolerance: $\pm 0.5\%$

temperature(°C)	resistance(Ω)			RESISST-TOL (%)		TEMP-TOL (°C)	
	Min	Center	Max	ΔR	$-\Delta R$	ΔT	$-\Delta T$
34	33.336	33.377	33.419	0.12	-0.12	0.03	-0.03
35	31.979	32.015	32.051	0.11	-0.11	0.02	-0.02
36	30.685	30.715	30.746	0.10	-0.10	0.02	-0.02
37	29.455	29.481	29.507	0.09	-0.09	0.02	-0.02
38	28.266	28.294	28.323	0.10	-0.10	0.02	-0.02
39	27.136	27.167	27.197	0.11	-0.11	0.02	-0.02
40	26.058	26.091	26.123	0.12	-0.12	0.03	-0.03
41	25.030	25.064	25.098	0.14	-0.14	0.03	-0.03
42	24.048	24.083	24.119	0.15	-0.15	0.03	-0.03

Group: 9

R37=29.535K Ω tolerance: $\pm 0.09\%$

B30/45=3953K tolerance: $\pm 0.5\%$

temperature(°C)	resistance(Ω)			RESISST-TOL(%)		TEMP-TOL(°C)	
	Min	Center	Max	ΔR	$-\Delta R$	ΔT	$-\Delta T$
34	33.397	33.439	33.480	0.12	-0.12	0.03	-0.03
35	32.037	32.073	32.109	0.11	-0.11	0.02	-0.02
36	30.741	30.772	30.802	0.10	-0.10	0.02	-0.02
37	29.508	29.535	29.561	0.09	-0.09	0.02	-0.02
38	28.318	28.346	28.374	0.10	-0.10	0.02	-0.02
39	27.186	27.216	27.247	0.11	-0.11	0.02	-0.02
40	26.106	26.138	26.171	0.12	-0.12	0.03	-0.03
41	25.075	25.110	25.144	0.14	-0.14	0.03	-0.03
42	24.092	24.128	24.163	0.15	-0.15	0.03	-0.03

Group: 10

R37=29.588K Ω tolerance: $\pm 0.09\%$

B30/45=3953K tolerance: $\pm 0.5\%$

temperature(°C)	resistance(Ω)			RESISST-TOL(%)		TEMP-TOL(°C)	
	Min	Center	Max	ΔR	$-\Delta R$	ΔT	$-\Delta T$
34	33.457	33.499	33.540	0.12	-0.12	0.03	-0.03
35	32.095	32.131	32.167	0.11	-0.11	0.02	-0.02
36	30.796	30.827	30.858	0.10	-0.10	0.02	-0.02
37	29.562	29.588	29.614	0.09	-0.09	0.02	-0.02
38	28.369	28.397	28.425	0.10	-0.10	0.02	-0.02
39	27.235	27.265	27.296	0.11	-0.11	0.02	-0.02
40	26.153	26.185	26.218	0.12	-0.12	0.03	-0.03
41	25.120	25.155	25.189	0.14	-0.14	0.03	-0.03
42	24.135	24.171	24.207	0.15	-0.15	0.03	-0.03

Group: 11

R37=29.641K Ω tolerance: $\pm 0.09\%$

B30/45=3953K tolerance: $\pm 0.5\%$

temperature(°C)	resistance(Ω)			RESISST-TOL(%)		TEMP-TOL(°C)	
	Min	Center	Max	ΔR	$-\Delta R$	ΔT	$-\Delta T$
34	33.518	33.560	33.602	0.12	-0.12	0.03	-0.03
35	32.153	32.190	32.226	0.11	-0.11	0.02	-0.02
36	30.852	30.883	30.914	0.10	-0.10	0.02	-0.02
37	29.615	29.641	29.667	0.09	-0.09	0.02	-0.02
38	28.420	28.449	28.477	0.10	-0.10	0.02	-0.02
39	27.284	27.315	27.346	0.11	-0.11	0.02	-0.02
40	26.201	26.233	26.266	0.12	-0.12	0.03	-0.03
41	25.166	25.201	25.235	0.14	-0.14	0.03	-0.03
42	24.179	24.215	24.251	0.15	-0.15	0.03	-0.03

Group: 12

R37=29.695K Ω tolerance: $\pm 0.09\%$

B30/45=3953K tolerance: $\pm 0.5\%$

temperature($^{\circ}\text{C}$)	resistance(Ω)			RESISST-TOL(%)		TEMP-TOL($^{\circ}\text{C}$)	
	Min	Center	Max	ΔR	$-\Delta R$	ΔT	$-\Delta T$
34	33.578	33.620	33.662	0.12	-0.12	0.03	-0.03
35	32.211	32.247	32.283	0.11	-0.11	0.02	-0.02
36	30.907	30.938	30.969	0.10	-0.10	0.02	-0.02
37	29.668	29.695	29.721	0.09	-0.09	0.02	-0.02
38	28.471	28.500	28.528	0.10	-0.10	0.02	-0.02
39	27.333	27.364	27.394	0.11	-0.11	0.02	-0.02
40	26.247	26.280	26.313	0.12	-0.12	0.03	-0.03
41	25.211	25.246	25.280	0.14	-0.14	0.03	-0.03
42	24.222	24.258	24.294	0.15	-0.15	0.03	-0.03

Group: 13

R37=29.749K Ω tolerance: $\pm 0.09\%$

B30/45=3953K tolerance: $\pm 0.5\%$

temperature($^{\circ}\text{C}$)	resistance(Ω)			RESISST-TOL(%)		TEMP-TOL($^{\circ}\text{C}$)	
	Min	Center	Max	ΔR	$-\Delta R$	ΔT	$-\Delta T$
34	33.639	33.681	33.723	0.12	-0.12	0.03	-0.03
35	32.269	32.306	32.342	0.11	-0.11	0.02	-0.02
36	30.964	30.995	31.026	0.10	-0.10	0.02	-0.02
37	29.722	29.748	29.775	0.09	-0.09	0.02	-0.02
38	28.523	28.552	28.580	0.10	-0.10	0.02	-0.02
39	27.383	27.414	27.444	0.11	-0.11	0.02	-0.02
40	26.295	26.328	26.361	0.12	-0.12	0.03	-0.03
41	25.257	25.292	25.326	0.14	-0.14	0.03	-0.03
42	24.266	24.302	24.338	0.15	-0.15	0.03	-0.03

Group: 14

R37=29.802K Ω tolerance: $\pm 0.09\%$

B30/45=3953K tolerance: $\pm 0.5\%$

temperature($^{\circ}\text{C}$)	resistance(Ω)			RESISST-TOL(%)		TEMP-TOL($^{\circ}\text{C}$)	
	Min	Center	Max	ΔR	$-\Delta R$	ΔT	$-\Delta T$
34	33.7	33.742	33.784	0.12	-0.12	0.03	-0.03
35	32.328	32.364	32.401	0.11	-0.11	0.02	-0.02
36	31.02	31.051	31.082	0.10	-0.10	0.02	-0.02
37	29.776	29.802	29.828	0.09	-0.09	0.02	-0.02
38	28.575	28.603	28.632	0.10	-0.10	0.02	-0.02
39	27.433	27.463	27.494	0.11	-0.11	0.02	-0.02
40	26.343	26.376	26.408	0.12	-0.12	0.03	-0.03
41	25.303	25.337	25.372	0.14	-0.14	0.03	-0.03
42	24.31	24.346	24.383	0.15	-0.15	0.03	-0.03

Group: 15

R37=29.856K Ω tolerance: $\pm 0.09\%$

B30/45=3953K tolerance: $\pm 0.5\%$

temperature(°C)	resistance(Ω)			RESISST-TOL(%)		TEMP-TOL(°C)	
	Min	Center	Max	ΔR	$-\Delta R$	ΔT	$-\Delta T$
34	33.761	33.803	33.845	0.12	-0.12	0.03	-0.03
35	32.387	32.423	32.459	0.11	-0.11	0.02	-0.02
36	31.076	31.107	31.138	0.10	-0.10	0.02	-0.02
37	29.829	29.856	29.883	0.09	-0.09	0.02	-0.02
38	28.626	28.655	28.684	0.10	-0.10	0.02	-0.02
39	27.482	27.513	27.544	0.11	-0.11	0.02	-0.02
40	26.391	26.423	26.456	0.12	-0.12	0.03	-0.03
41	25.349	25.383	25.418	0.14	-0.14	0.03	-0.03
42	24.354	24.391	24.427	0.15	-0.15	0.03	-0.03

Group: 16

R37=29.910K Ω tolerance: $\pm 0.09\%$

B30/45=3953K tolerance: $\pm 0.5\%$

temperature(°C)	resistance(Ω)			RESISST-TOL(%)		TEMP-TOL(°C)	
	Min	Center	Max	ΔR	$-\Delta R$	ΔT	$-\Delta T$
34	33.821	33.863	33.906	0.12	-0.12	0.03	-0.03
35	32.444	32.481	32.517	0.11	-0.11	0.02	-0.02
36	31.131	31.162	31.194	0.10	-0.10	0.02	-0.02
37	29.884	29.910	29.936	0.09	-0.09	0.02	-0.02
38	28.677	28.706	28.735	0.10	-0.10	0.02	-0.02
39	27.531	27.562	27.593	0.11	-0.11	0.02	-0.02
40	26.437	26.470	26.503	0.12	-0.12	0.03	-0.03
41	25.394	25.428	25.463	0.14	-0.14	0.03	-0.03
42	24.398	24.434	24.470	0.15	-0.15	0.03	-0.03

Group: 17

R37=29.964K Ω tolerance: $\pm 0.09\%$

B30/45=3953K tolerance: $\pm 0.5\%$

temperature(°C)	resistance(Ω)			RESISST-TOL(%)		TEMP-TOL(°C)	
	Min	Center	Max	ΔR	$-\Delta R$	ΔT	$-\Delta T$
34	33.882	33.924	33.967	0.12	-0.12	0.03	-0.03
35	32.503	32.539	32.576	0.11	-0.11	0.02	-0.02
36	31.187	31.219	31.250	0.10	-0.10	0.02	-0.02
37	29.937	29.964	29.991	0.09	-0.09	0.02	-0.02
38	28.729	28.758	28.787	0.10	-0.10	0.02	-0.02
39	27.581	27.612	27.643	0.11	-0.11	0.02	-0.02
40	26.485	26.518	26.551	0.12	-0.12	0.03	-0.03
41	25.440	25.474	25.509	0.14	-0.14	0.03	-0.03
42	24.442	24.478	24.514	0.15	-0.15	0.03	-0.03

Group: 18

R37=30.019K Ω tolerance: $\pm 0.09\%$

B30/45=3953K tolerance: $\pm 0.5\%$

temperature(°C)	resistance(Ω)			RESISST-TOL(%)		TEMP-TOL(°C)	
	Min	Center	Max	ΔR	$-\Delta R$	ΔT	$-\Delta T$
34	33.944	33.987	34.029	0.12	-0.12	0.03	-0.03
35	32.562	32.599	32.636	0.11	-0.11	0.02	-0.02
36	31.245	31.276	31.307	0.10	-0.10	0.02	-0.02
37	29.992	30.019	30.045	0.09	-0.09	0.02	-0.02
38	28.782	28.811	28.839	0.10	-0.10	0.02	-0.02
39	27.631	27.662	27.694	0.11	-0.11	0.02	-0.02
40	26.534	26.567	26.600	0.12	-0.12	0.03	-0.03
41	25.486	25.521	25.556	0.14	-0.14	0.03	-0.03
42	24.487	24.523	24.559	0.15	-0.15	0.03	-0.03

Group: 19

R37=30.073K Ω tolerance: $\pm 0.09\%$

B30/45=3953K tolerance: $\pm 0.5\%$

temperature(°C)	resistance(Ω)			RESISST-TOL(%)		TEMP-TOL(°C)	
	Min	Center	Max	ΔR	$-\Delta R$	ΔT	$-\Delta T$
34	34.005	34.048	34.090	0.12	-0.12	0.03	-0.03
35	32.621	32.658	32.694	0.11	-0.11	0.02	-0.02
36	31.301	31.332	31.364	0.10	-0.10	0.02	-0.02
37	30.046	30.073	30.100	0.09	-0.09	0.02	-0.02
38	28.834	28.862	28.891	0.10	-0.10	0.02	-0.02
39	27.681	27.712	27.743	0.11	-0.11	0.02	-0.02
40	26.582	26.615	26.648	0.12	-0.12	0.03	-0.03
41	25.532	25.567	25.602	0.14	-0.14	0.03	-0.03
42	24.531	24.567	24.604	0.15	-0.15	0.03	-0.03

Group: 20

R37=30.128K Ω tolerance: $\pm 0.09\%$

B30/45=3953K tolerance: $\pm 0.5\%$

temperature(°C)	resistance(Ω)			RESISST-TOL(%)		TEMP-TOL(°C)	
	Min	Center	Max	ΔR	$-\Delta R$	ΔT	$-\Delta T$
34	34.067	34.110	34.153	0.12	-0.12	0.03	-0.03
35	32.681	32.717	32.754	0.11	-0.11	0.02	-0.02
36	31.358	31.389	31.421	0.10	-0.10	0.02	-0.02
37	30.101	30.128	30.154	0.09	-0.09	0.02	-0.02
38	28.886	28.915	28.944	0.10	-0.10	0.02	-0.02
39	27.732	27.763	27.794	0.11	-0.11	0.02	-0.02
40	26.630	26.663	26.696	0.12	-0.12	0.03	-0.03
41	25.579	25.614	25.649	0.14	-0.14	0.03	-0.03
42	24.575	24.612	24.648	0.15	-0.15	0.03	-0.03

Group: 21

R37=30.182K Ω tolerance: $\pm 0.09\%$

B30/45=3953K tolerance: $\pm 0.5\%$

temperature($^{\circ}$ C)	resistance(Ω)			RESISST-TOL(%)		TEMP-TOL($^{\circ}$ C)	
	Min	Center	Max	Δ R	$-\Delta$ R	Δ T	$-\Delta$ T
34	34.128	34.171	34.214	0.12	-0.12	0.03	-0.03
35	32.739	32.776	32.813	0.11	-0.11	0.02	-0.02
36	31.414	31.446	31.477	0.10	-0.10	0.02	-0.02
37	30.155	30.182	30.209	0.09	-0.09	0.02	-0.02
38	28.938	28.967	28.996	0.10	-0.10	0.02	-0.02
39	27.781	27.813	27.844	0.11	-0.11	0.02	-0.02
40	26.678	26.711	26.744	0.12	-0.12	0.03	-0.03
41	25.625	25.660	25.695	0.14	-0.14	0.03	-0.03
42	24.620	24.656	24.693	0.15	-0.15	0.03	-0.03

Group: 22

R37=30.237K Ω tolerance: $\pm 0.09\%$

B30/45=3953K tolerance: $\pm 0.5\%$

temperature($^{\circ}$ C)	resistance(Ω)			RESISST-TOL(%)		TEMP-TOL($^{\circ}$ C)	
	Min	Center	Max	Δ R	$-\Delta$ R	Δ T	$-\Delta$ T
34	34.191	34.233	34.276	0.12	-0.12	0.03	-0.03
35	32.799	32.836	32.873	0.11	-0.11	0.02	-0.02
36	31.471	31.503	31.534	0.10	-0.10	0.02	-0.02
37	30.210	30.237	30.263	0.09	-0.09	0.02	-0.02
38	28.991	29.020	29.049	0.10	-0.10	0.02	-0.02
39	27.832	27.863	27.895	0.11	-0.11	0.02	-0.02
40	26.726	26.760	26.793	0.12	-0.12	0.03	-0.03
41	25.671	25.706	25.741	0.14	-0.14	0.03	-0.03
42	24.664	24.701	24.738	0.15	-0.15	0.03	-0.03

Group: 23

R37=30.291K Ω tolerance: $\pm 0.09\%$

B30/45=3953K tolerance: $\pm 0.5\%$

temperature($^{\circ}$ C)	resistance(Ω)			RESISST-TOL(%)		TEMP-TOL($^{\circ}$ C)	
	Min	Center	Max	Δ R	$-\Delta$ R	Δ T	$-\Delta$ T
34	34.252	34.295	34.337	0.12	-0.12	0.03	-0.03
35	32.857	32.894	32.931	0.11	-0.11	0.02	-0.02
36	31.528	31.559	31.591	0.10	-0.10	0.02	-0.02
37	30.264	30.291	30.318	0.09	-0.09	0.02	-0.02
38	29.043	29.072	29.101	0.10	-0.10	0.02	-0.02
39	27.882	27.913	27.944	0.11	-0.11	0.02	-0.02
40	26.774	26.808	26.841	0.12	-0.12	0.03	-0.03
41	25.717	25.752	25.788	0.14	-0.14	0.03	-0.03
42	24.708	24.745	24.782	0.15	-0.15	0.03	-0.03

Group: 24

R37=30.346K Ω tolerance: $\pm 0.09\%$

B30/45=3953K tolerance: $\pm 0.5\%$

temperature(°C)	resistance(Ω)			RESISST-TOL(%)		TEMP-TOL(°C)	
	Min	Center	Max	ΔR	$-\Delta R$	ΔT	$-\Delta T$
34	34.314	34.357	34.400	0.12	-0.12	0.03	-0.03
35	32.917	32.954	32.991	0.11	-0.11	0.02	-0.02
36	31.585	31.617	31.648	0.10	-0.10	0.02	-0.02
37	30.319	30.346	30.373	0.09	-0.09	0.02	-0.02
38	29.095	29.124	29.154	0.10	-0.10	0.02	-0.02
39	27.932	27.964	27.995	0.11	-0.11	0.02	-0.02
40	26.823	26.856	26.890	0.12	-0.12	0.03	-0.03
41	25.764	25.799	25.834	0.14	-0.14	0.03	-0.03
42	24.753	24.790	24.827	0.15	-0.15	0.03	-0.03

Group: 25

R37=30.401K Ω tolerance: $\pm 0.09\%$

B30/45=3953K tolerance: $\pm 0.5\%$

temperature(°C)	resistance(Ω)			RESISST-TOL(%)		TEMP-TOL(°C)	
	Min	Center	Max	ΔR	$-\Delta R$	ΔT	$-\Delta T$
34	34.376	34.419	34.462	0.12	-0.12	0.03	-0.03
35	32.977	33.014	33.051	0.11	-0.11	0.02	-0.02
36	31.642	31.674	31.706	0.10	-0.10	0.02	-0.02
37	30.374	30.401	30.428	0.09	-0.09	0.02	-0.02
38	29.148	29.177	29.206	0.10	-0.10	0.02	-0.02
39	27.983	28.014	28.046	0.11	-0.11	0.02	-0.02
40	26.871	26.905	26.938	0.12	-0.12	0.03	-0.03
41	25.811	25.846	25.881	0.14	-0.14	0.03	-0.03
42	24.798	24.835	24.872	0.15	-0.15	0.03	-0.03

Group: 26

R37=30.456K Ω tolerance: $\pm 0.09\%$

B30/45=3953K tolerance: $\pm 0.5\%$

temperature(°C)	resistance(Ω)			RESISST-TOL(%)		TEMP-TOL(°C)	
	Min	Center	Max	ΔR	$-\Delta R$	ΔT	$-\Delta T$
34	34.438	34.481	34.524	0.12	-0.12	0.03	-0.03
35	33.036	33.074	33.111	0.11	-0.11	0.02	-0.02
36	31.700	31.731	31.763	0.10	-0.10	0.02	-0.02
37	30.429	30.456	30.483	0.09	-0.09	0.02	-0.02
38	29.201	29.230	29.259	0.10	-0.10	0.02	-0.02
39	28.034	28.065	28.097	0.11	-0.11	0.02	-0.02
40	26.920	26.954	26.987	0.12	-0.12	0.03	-0.03
41	25.857	25.893	25.928	0.14	-0.14	0.03	-0.03
42	24.843	24.880	24.917	0.15	-0.15	0.03	-0.03

Group: 27

R37=30.511K Ω tolerance: $\pm 0.09\%$

B30/45=3953K tolerance: $\pm 0.5\%$

temperature($^{\circ}\text{C}$)	resistance(Ω)			RESISST-TOL(%)		TEMP-TOL($^{\circ}\text{C}$)	
	Min	Center	Max	ΔR	$-\Delta R$	ΔT	$-\Delta T$
34	34.501	34.544	34.587	0.12	-0.12	0.03	-0.03
35	33.096	33.133	33.171	0.11	-0.11	0.02	-0.02
36	31.757	31.789	31.820	0.10	-0.10	0.02	-0.02
37	30.484	30.511	30.538	0.09	-0.09	0.02	-0.02
38	29.254	29.283	29.312	0.10	-0.10	0.02	-0.02
39	28.084	28.116	28.147	0.11	-0.11	0.02	-0.02
40	26.969	27.002	27.036	0.12	-0.12	0.03	-0.03
41	25.904	25.939	25.975	0.14	-0.14	0.03	-0.03
42	24.888	24.925	24.962	0.15	-0.15	0.03	-0.03

Group: 28

R37=30.566K Ω tolerance: $\pm 0.09\%$

B30/45=3953K tolerance: $\pm 0.5\%$

temperature($^{\circ}\text{C}$)	resistance(Ω)			RESISST-TOL(%)		TEMP-TOL($^{\circ}\text{C}$)	
	Min	Center	Max	ΔR	$-\Delta R$	ΔT	$-\Delta T$
34	34.563	34.606	34.649	0.12	-0.12	0.03	-0.03
35	33.156	33.193	33.230	0.11	-0.11	0.02	-0.02
36	31.814	31.846	31.878	0.10	-0.10	0.02	-0.02
37	30.539	30.566	30.593	0.09	-0.09	0.02	-0.02
38	29.306	29.336	29.365	0.10	-0.10	0.02	-0.02
39	28.135	28.167	28.198	0.11	-0.11	0.02	-0.02
40	27.017	27.051	27.085	0.12	-0.12	0.03	-0.03
41	25.951	25.986	26.022	0.14	-0.14	0.03	-0.03
42	24.933	24.970	25.007	0.15	-0.15	0.03	-0.03

Group: 29

R37=30.622K Ω tolerance: $\pm 0.09\%$

B30/45=3953K tolerance: $\pm 0.5\%$

temperature($^{\circ}\text{C}$)	resistance(Ω)			RESISST-TOL(%)		TEMP-TOL($^{\circ}\text{C}$)	
	Min	Center	Max	ΔR	$-\Delta R$	ΔT	$-\Delta T$
34	34.625	34.668	34.712	0.12	-0.12	0.03	-0.03
35	33.215	33.253	33.290	0.11	-0.11	0.02	-0.02
36	31.871	31.903	31.935	0.10	-0.10	0.02	-0.02
37	30.594	30.622	30.649	0.09	-0.09	0.02	-0.02
38	29.359	29.388	29.418	0.10	-0.10	0.02	-0.02
39	28.186	28.217	28.249	0.11	-0.11	0.02	-0.02
40	27.066	27.100	27.133	0.12	-0.12	0.03	-0.03
41	25.997	26.033	26.068	0.14	-0.14	0.03	-0.03
42	24.978	25.015	25.052	0.15	-0.15	0.03	-0.03

Group: 30

R37=30.677K Ω tolerance: $\pm 0.09\%$

B30/45=3953K tolerance: $\pm 0.5\%$

temperature(°C)	resistance(Ω)			RESISST-TOL(%)		TEMP-TOL(°C)	
	Min	Center	Max	ΔR	$-\Delta R$	ΔT	$-\Delta T$
34	34.688	34.732	34.775	0.12	-0.12	0.03	-0.03
35	33.276	33.314	33.351	0.11	-0.11	0.02	-0.02
36	31.930	31.962	31.993	0.10	-0.10	0.02	-0.02
37	30.650	30.677	30.703	0.09	-0.09	0.02	-0.02
38	29.413	29.442	29.472	0.10	-0.10	0.02	-0.02
39	28.237	28.269	28.301	0.11	-0.11	0.02	-0.02
40	27.115	27.149	27.183	0.12	-0.12	0.03	-0.03
41	26.045	26.081	26.116	0.14	-0.14	0.03	-0.03
42	25.023	25.060	25.098	0.15	-0.15	0.03	-0.03

Group: 31

R37=30.731K Ω tolerance: $\pm 0.09\%$

B30/45=3953K tolerance: $\pm 0.5\%$

temperature(°C)	resistance(Ω)			RESISST-TOL(%)		TEMP-TOL(°C)	
	Min	Center	Max	ΔR	$-\Delta R$	ΔT	$-\Delta T$
34	34.749	34.793	34.836	0.12	-0.12	0.03	-0.03
35	33.335	33.372	33.410	0.11	-0.11	0.02	-0.02
36	31.986	32.018	32.050	0.10	-0.10	0.02	-0.02
37	30.704	30.731	30.758	0.09	-0.09	0.02	-0.02
38	29.465	29.494	29.524	0.10	-0.10	0.02	-0.02
39	28.287	28.319	28.350	0.11	-0.11	0.02	-0.02
40	27.163	27.197	27.231	0.12	-0.12	0.03	-0.03
41	26.091	26.126	26.162	0.14	-0.14	0.03	-0.03
42	25.067	25.105	25.142	0.15	-0.15	0.03	-0.03

Group: 32

R37=30.785K Ω tolerance: $\pm 0.09\%$

B30/45=3953K tolerance: $\pm 0.5\%$

temperature(°C)	resistance(Ω)			RESISST-TOL(%)		TEMP-TOL(°C)	
	Min	Center	Max	ΔR	$-\Delta R$	ΔT	$-\Delta T$
34	34.810	34.854	34.897	0.12	-0.12	0.03	-0.03
35	33.393	33.431	33.468	0.11	-0.11	0.02	-0.02
36	32.042	32.074	32.106	0.10	-0.10	0.02	-0.02
37	30.759	30.785	30.811	0.09	-0.09	0.02	-0.02
38	29.516	29.546	29.575	0.10	-0.10	0.02	-0.02
39	28.336	28.368	28.400	0.11	-0.11	0.02	-0.02
40	27.211	27.245	27.279	0.12	-0.12	0.03	-0.03
41	26.137	26.172	26.208	0.14	-0.14	0.03	-0.03
42	25.111	25.149	25.186	0.15	-0.15	0.03	-0.03