Nickel-Metal Hydride Battery Sample Agreement

Model：3×AAA600mAh 3.6V

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Specification Changed Records List

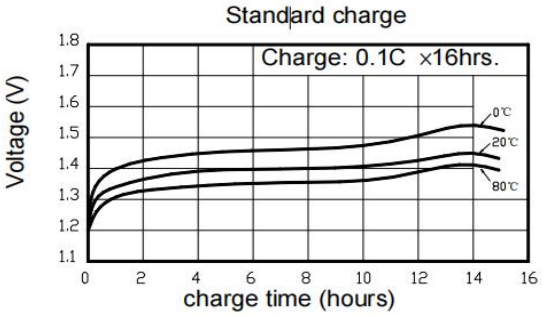
Issue.	Date	Item	Content changed	Cause
V4/0	2023-11-08		Complete the first draft	

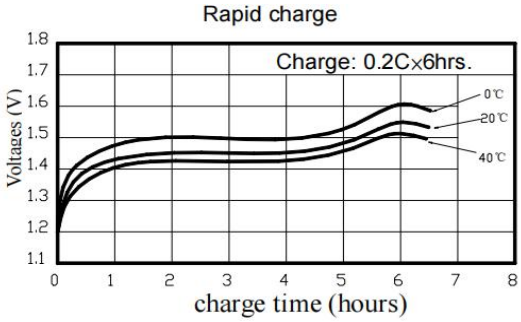
Internal model number：WT44AAA600P

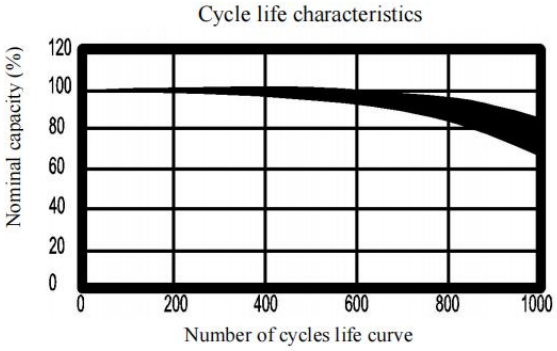
Specifications of single cell

Nominal voltage			1.2V
Capacity			0.2C Discharge
	Minimum		300min
	Typical		315min
Dimensions	Diameter		mm
			10.5-0.7
	Height		44.0-1.0
Weight(Approximately)			gram
			12.2
Internal Impedance At 1000 Hz			16mΩ(Max) (After Charge)
Charge	Standard		60mA(0.1C)×16hrs
	Rapid		120mA(0.2C)×6hrs
Ambient temperature	Charge	standard	℃
			-20℃to70℃
		Rapid	-20℃to70℃
	Discharge		-40℃to85℃
	Storage		-20℃to30℃

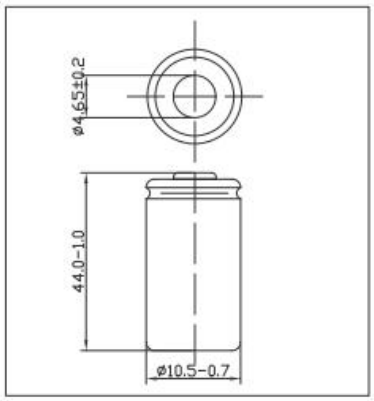
Typical characteristics

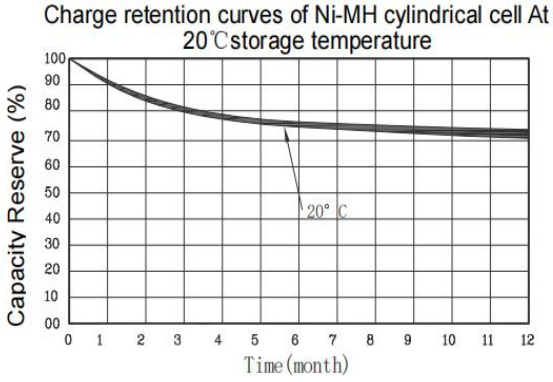






Dimensions of a single battery, including the PVC casing (Dimensions with tube)





Note:

- The rated capacity refers to the discharge capacity at 0.2C at 20℃.
- Capacity is for reference only
- Weight and internal resistance are also taken into account
- Lifetime testing in accordance with IEC standards

1.PREFACE

The specification is suitable for the performance of NI-MH rechargeable battery produced by the VTC POWER CO., LTD.

2.MODEL

3×AAA600mAh 3.6V

3.APPEARANCE

There shall be no such details as discoloration or electrolyte leakage or 0 voltage.

4.RATINGS

Description	Unit	Specification	Condition
Nominal Voltage	V	3.6	Unit pack
Typical Capacity	min	308	Standard Charge/Discharge
Nominal Capacity	mAh	600	Standard Charge/Discharge
Minimum Capacity	min	294	Standard Charge/ Discharge
Standard Charge	mA	60 (0.1C)	Ta=-20~70℃ (see note 1)
	hour	16	
Fast Charge	mA	120 (0.2C) with charge termination control	-△V= 15mV/pack Timer cutoff=110%input capacity Temp. cutoff=0~40℃ dT/dt=0.8℃/min(0.5 to 1.0C); 0.8~1℃/min(1C)
	hour	6.0 approx.(0.2C)	
Trickle Charge	mA	12(0.02C）~30(0.05C)	Ta=0~65℃ (see note 1)
Discharge Cut-off Voltage	V	3.0	Unit pack
Maximum Discharging Current	A	1.9	Ta=-40~85℃ 2.4v cut off
Storage Temperature	℃	-20~+25(within 1 year) -20~+30(within 3 month) -20~+40(within 1 month) -20~+50(within 1 week)	*
Typical Weight	g	38 approx	*

5.PERFORMANCE

Before proceed the following tests, the cells should be discharged at 0.2C to 1.0V cutoff. Unless otherwise stated, tests should be done within one month of delivery under the following conditions:

- Ambient temperature: 20℃±5℃
- Relative Humidity:65±20%

Note Standard Charge/Discharge Conditions:

- Charge:60mA(0.1C)× 16hrs
- Discharge: 120mA(0.2C) to 1.0V/cell

Test	Unit	Specification	Condition	Remarks
Capacity	Min	≥294	Standard Charge / Discharge	Up to 3 cycles are allowed
Open circuit Voltage (OCV)	V	≥3.75	Within 1 hr after standard charge	Unit pack
Internal Impedance (Ri)	mΩ	≤200	Upon fully charge at 1kHz	*
High Rate Discharge (2.0C)	min	≥25	Standard Charge/rest 30min discharge at 2.0C to 2.4V	Up to 3 cycles are allowed
High Temperature Discharge	min	≥180	0. 1C Charge 16hrs at 25±5℃ 0.2C discharge to 3.0V storage 3hrs at 85±2℃	Up to 3 cycles are allowed
Low Temperature Discharge	min	≥180	0.1C Charge 16hrs at 25±5℃ 0.2C discharge to 2.1V storage 3hrs at-40±2℃	2. 1V/pack Cut-off
Over charge	N/A	No conspicuous deformation and /or leakage	0.1C charge for 48hrs or 1C charge for 120mins	*
Charge Retention	mAh	≥70% (First capacity)	Standard charge Storage at 20 degree:1 year Standard discharge (0.2C)	3.0V Cut-off
IEC Cycle Life Test	Cycle	≥1000	IEC61951-2 ED3.0	

Accelerated life testing methods	Cycle	≥300	1C Charge 72mins -△V=15mV/pack rest 10～30min 1C discharge	3.0VCut-off
High Humidity Testing	N/A	No leakage	Standard charged, stand for 14 days at 33±3℃and 80±5% of relative humidity	*
External Short Circuit	N/A	No fire and no explosion	After standard charge,short-circuit the cell at 20℃±5℃until the cell temperature returns to ambient temperature.(cross section of the wire or connector should be more than 0.75mm²)	*
Over-discharge test	N/A	No explosion	Forced discharge at 0.2C to a final voltage of 0V,then the current be increased to 1C and forced discharge continue for 60min	Leakage of electrolyte and Deformation are acceptable
Free falling(drop)	N/A	△V<0.02V/cell △Ri<5%/cell	Charge at 0. 1C for 16hrs,and then leave for 24hrs,check battery before / after drop Height: 50 cm Thickness of wooden board: 30mm Direction is not specified Test for 3 times	*

Notes:

- Ta: Ambient Temperature
- Approximate charge time from discharged state, for reference only.
- Please activate the battery once every 1 year according to the following method. Otherwise, may cause the battery capacity attenuation, reducing the battery service life and so on.Charge at 0. 1C for 16 hrs, rest 10 min, then discharge with 0.2C to 1.0V/cell,rest 10 min, then charge at 0.2C to 150min.

6.PRECAUTIONS TO ENSURE THE SAFETY ON BANDING BATTERY

- Batteries should be charged prior to use.
- When using a new battery for the first time or after long term storage, please fully charge the battery before use.
- For charging methods please referrence to our technical handbook.
- Use the correct charger for Ni-Cd or Ni-MH batteries.
- Do not reverse charge batteries.
- Do not short circuit batteries, permanent damage to batteries may result.
- Do not incinerate or mutilate batteries, may burst or release toxic material.
- Do not solder directly to cells or batteries.
- Do not subject batteries to adverse condition such as extreme temperature, deep cycling and excessive overcharge/over discharge.
- Store batteries in a cool dry place.
- Do not mix VTC batteries with other battery brands or batteries of a different chemistry such as alkaline and zinc carbon.
- Do not mix new batteries in use with semi-used batteries, over discharge may occur.
- Avoid batteries being used in an airtight compartment. Ventilation should be provided inside the battery compartment; otherwise batteries may generate hydrogen gas, which could cause an explosion if exposed to an ignition source.
- When connecting a battery pack to a charger, ensure correct polarity
- If find any noise, excessive temperature or leakage from a battery, please stop its use.
- When the battery is hot, please do not touch it and handle it, until it has cooled down.
- Do not remove the outer sleeve from a battery pack nor cut into its housing.
- When find battery power down during use, please switch off the device to avoid over discharge.
- When not using a battery, disconnect it from the device.
- Unplug a battery by holding the connector itself and not by pulling at its cord.

- After use, if the battery is hot, before recharging it, allow it to cool in a well-ventilated place out of direct sunlight.
- Never put a battery into water or seawater.
- During long term storage, battery should be charged and discharged once every 1 year .
- Do not attempt to take batteries apart or subject them to pressure or impact. Heat may be generated or fire may result. The alkaline electrolyte is harmful to eyes and skin, and it may damage clothing upon contact.
- Keep away from children. If swallowed, contact a physician at once.
- Battery failure, may not be thrown away, please recycling
- Storaged or transport, please let the battery apart and fixed, to prevent external short circuit

7.Append: IEC61951-2 ED3.0 Endurance in cycles

Before the endurance in cycles test, the cell shall be discharged at 0.2 1_tA to a final voltage of 1.0V/sell. The following endurance test shall then be carried out, irrespective of cell designation, in an ambient temperature of 20℃±5℃.Charge and discharge shall be carried out at constant current throughout, using the conditions specified in table 5.Precautions shall be taken to prevent the cell-case temperature from rising above 35℃during the test, by providing a forced air draught if necessary.

NOTE-Actual cell temperature, not the ambient temperature, determines cell performance.

Table 5-Endurance in cycles

Cycle number	Charge	Stand in Charged condition	Discharge
1	0. 1CtA for 16 h	None	0.25 CtA for 2 h 20 min2)
2 to 48	0.25 CtA for 3 h 10 min	None	0.25 CtA for 2 h 20 min2)
49	0.25 CtA for 3 h 10 min	None	0.25 CtA to 1.0V/cell
50	0.1 CtA for 16 h	1h to 4h	0.2 C5A to 1.0V/cell
● It is permissible to allow sufficient open-circuit rest time after the completion of discharge at cycle 50,so as to start cycle 51 at an exact two-week internal. A similar procedure may be adopted at cycles 100, 150,200,250,300,350,400and 450. ● If cell discharge voltage drops below 1.0V/cell,discharge may be discontinued.			

Cycles 1 to 50 shall be repeated until the discharge duration on any 50th cycle becomes less than 3h at this stage, a further cycle as specified for cycle 50 shall be carried out.The endurance test is considered complete when two such successive cycles give a discharge duration less than 3h.The number of cycles obtained when the test is completed shall be not less than 1000.

8.ENVIRONMENTAL PROTECTION REQUIREMENT

8.1.It is hereby certified by VTC that there is neither RoHS (EU Directive2002/95/EC,2011/65/EU,2015/863) restricted substance nor such use, for materials to be used for unit parts,for packing/packaging materials, and for additives and the like in the manufacturing processes.

8.2.Battery Cells restricted substance conform to the requirements of the Battery Directive (EU Directive 2006/66/EC,2013/56/EU)

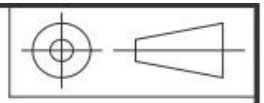
8.3.VTC is not responsible for the collection and recycling of the waste battery as required in Battery Directive (EU Directive 2006/66/EC, 2013/56/EU)

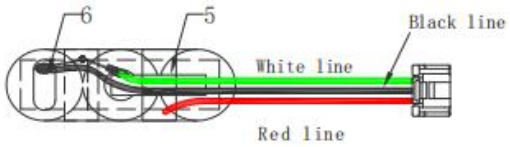
8.4.If there are other environmental protection requirements, the quality agreement signed by both parties shall prevail

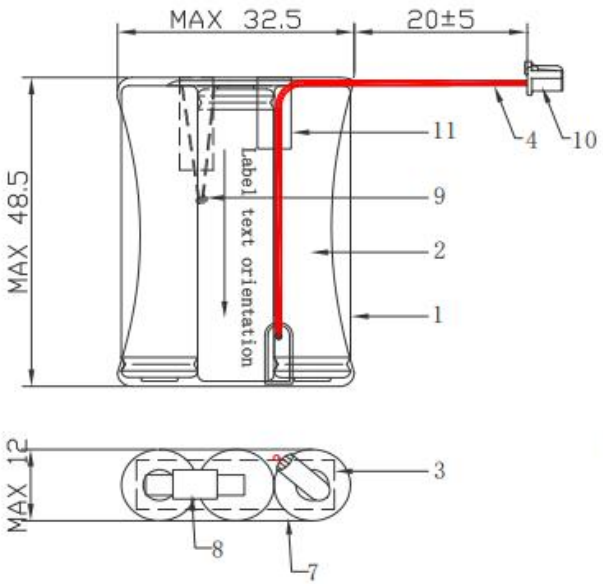
9.WARRANTY

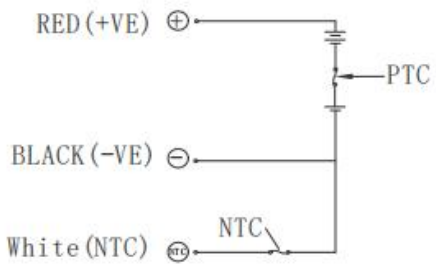
The battery packs are warranted to conform to the specification for 12 months from the ex-factory date. VTC’s warranty shall not be applicable in the cases where customer improperly handle, operate, test, install, service and disassemble the battery packs or fails to follow the instructions, cautions, warnings, notes provided in the specifications.

Versio	Changes made	Date amended
nA/0	Complete the first draft	









Note:
1. Apply a white shim to the bare surface;
2. Internal resistance ≤ 200 milliohms.

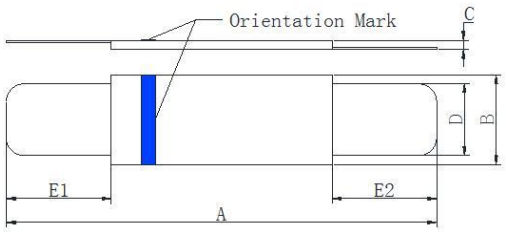
NO.	NAME	QTY	NOTE
11	Transparent tape	2	15mm width
10	plug	1	502351-0300 (plug) 50372-8000 (terminal)
9	NTC	1	MF52D103F3435 10K B/25/85=3435 1% (shiheng)
8	PTC	1	KT15-1900D-A
7	Heat-shrink tubing	2	Ø1.5/Ø2.0
6	Opening sequence	2	3*7/3*15*0.12Pure Nicke
5	Connecting plate	1	13*15*0.1Pure Nickel
4	lead	3	3385#24
3	kraft paper	2	7*26
2	Outer PVC sleeve	1	Apple Green
1	Nickel-metal hydride battery	3	AAA

VTC POWER CO.,LTD

DRAWING NO.

UNIT	mm	SCALE	
DRAWN	Ouyang Li	DATE	2023.06.02
CHECKD	Li Zhi	DATE	2023.06.02
APPRVD	Yang Kai	DATE	2023.06.02

Physical Dimensions: (mm)



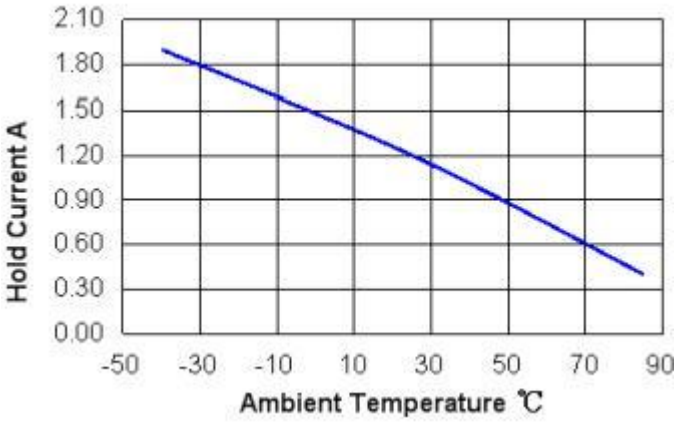
	A	B	C	D	E1	E2
Min	14.0	4.9	—	3.9	3.5	3.5
Max	17.0	5.2	1.0	4.1	7.0	7.0

Lead Material：1/4hNickel,0.10mminthickness(R0.5)

Encapsulation material:Polyester film,meetsUL94V-0requirements

Electrical Characteristics:

Part Number	I hold (A)	I trip (A)	V max (V)	I max (A)	T trip		R(mΩ)		R1max (mΩ)
					Current (A)	Time (s)	min	max	
KT15-1900D	1.9	3.9	15	100	9.5	<5.0	39	72	120



I hold = Hold Current: maximum current at which the device will not trip at 25℃still air.

I trip = Trip Current: minimum current at which the device will always trip at 25℃still air.

V max = Maximum voltage device can withstand without damage at rated current.

I max = Maximum fault current device can withstand without damage at rated voltage.

T trip = Maximum time to trip(s) at assigned current.

R 1max = Maximum Device resistance at 25℃, of device one hour after being tripped the first time.

1. Electrical Performance

	Projects	Symbol	Test conditions	Unit	Performance Requirements
1.1	Zero-power resistance value at 25℃	R25℃	Ta= 25 ± 0.01℃; test power ≤ 0.1mW	KΩ	10K Ω ± 1%
1.2	Bprice	B25/85	B= [(Ta ×Tb)/ (Tb-Ta)] ×ln (Ra/Rb) Ta=25±0.01℃ Tb=85℃±0.01℃	K	3435±1%
1.3	Dissipation coefficient	δ	In still air	mW/℃	≥2
1.4	Time constant	τ	In still air	sec	≤7
1.5	Insulation resistance	/	100V/DC 1min	MΩ	≥100
1.6	Operating temperature range	/	/	℃	-55℃~ 125℃
1.7	Maximum rated power	Pmax	/	mW	50
1.8	Temperature-dependent characteristics	/	/	/	See Table 1
1.9	Resistance error	/	/	/	See Table 2

2.Reliability

Projects	Test Conditions and Methods	Technical Requirements
Lead Strength	Fixed resistance end: tensile force: 5±1 N; duration: 10±1 seconds	Invisible damage R25 ΔR/R≤±2%
Solderability	Temperature: 245±5℃; Time: 2–3 seconds	Solder coverage≥95per cent
Resistant to welding heat	Temperature of the tin bath: 260±5°C; immersion depth: 6 mm from the heating element; duration: 5±1 seconds	R25 ΔR/R≤±2%
Steady-state humid heat	Temperature: 40℃±2℃, Humidity: 93 ±2 per cent, Duration: 500 hours	R25 ΔR/R≤±2%
Rapid temperature changes	-55℃for 30 minute→25℃for 5 minutes →125℃for 30 minutes→25℃for 5 minutes; repeat 5 times	R25 ΔR/R≤±2%
Storage at high temperatures	Temperature: 125℃±5℃ Duration: 1,000 hours	R25 ΔR/R≤±2%
Low-temperature storage	Temperature: -55℃ Duration: 1,000 hours	R25 ΔR/R≤±2%

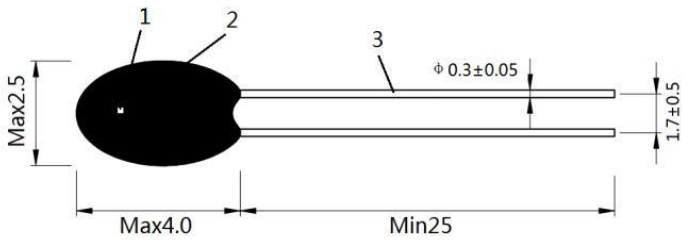
3.Precautions for Use

- Intended use of this product: temperature measurement and control;
- Avoid excessive current, which may cause the component to heat up and result in measurement errors;
- When soldering with a soldering iron, ensure the soldering point is at least 2 mm away from the encapsulated head; the soldering temperature should be below 360℃, and the soldering time should be less than 3 seconds;
- Storage temperature: −10℃to 40℃; storage humidity: ≤75% RH;
- Avoid storing in environments containing corrosive gases or exposed to direct light;
- Once the packaging has been opened, it must be resealed for storage. The shelf life is one year; after this period, the product may be retested in accordance with the items specified in this standard and may still be used if it meets the requirements;
- If heat-shrink tubing is required during processing, do not use a hair dryer to shrink it. The recommended shrinkage procedure is to place the product, with the heat-shrink tubing fitted, into a constant-temperature oven and shrink it at 110℃ for 10–12 minutes;

4.Certification

- Quality Management System Certification ISO9001:2015 IATF16949:2016
- Environmental Management System Certification ISO14001:2015
- NTC core components are UL-certified
- Environmental Testing Report ROH S
- CQC Certification for Products
- Jiangsu Province High-Tech Product Certification
- UL 1434 certification (File No. E240991)

5.Overall Dimension (Unit:mm)



No.	Name	Material Specifications	Quantity	Notes
1	Component	NTC thermistors (chips)	1	
2	Modified resins	Encapsulation resins	1	black
3	wire	Tin-plated copper-clad steel wire	2	Silver

6.Product Model Descriptions

MF52 A 103 F 3435 A1

① ② ③ ④ ⑤ ⑥

① MF52: Series of temperature-sensing NTC thermistors

② A1: Leads are tinned copper-clad steel wire

③ 103: Zero-power resistance value at 25℃:10 kΩ

④ F: Resistance tolerance code: F–±1 per cent, G–±2 per cent, H–±3 per cent, J–±5 per cent

⑤ 3435: B25/85 value: 3435 K

⑥ A1: Small end

Appendix 1

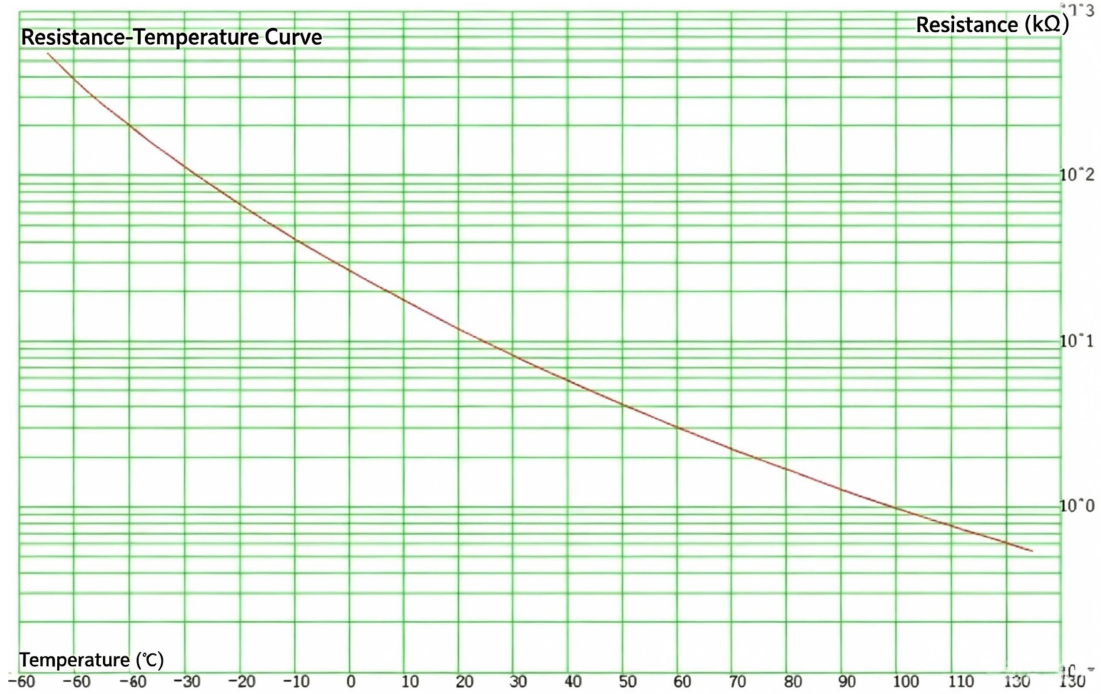
Resistance-Temperature Characteristics Table

R25=10KΩ Accuracy: ±1% B25/50=3380K B25/85=3435K Accuracy: ±1% (P174-9A)

Temp(℃)	Resistor(KΩ)			Resistor accuracy(%)		Temperature accuracy (℃)	
	Min.	Typ.	Max.	△R	-△R	△T	-△T
-55	541.187	569.200	598.603	5.165	-4.921	0.748	-0.712
-54	499.752	525.197	551.883	5.081	-4.844	0.744	-0.710
-53	462.563	485.735	510.017	4.999	-4.770	0.741	-0.707
-52	429.057	450.209	472.357	4.919	-4.698	0.737	-0.704
-51	398.763	418.112	438.356	4.841	-4.627	0.734	-0.701
-50	371.279	389.014	407.555	4.766	-4.558	0.730	-0.699
-49	346.267	362.552	379.564	4.692	-4.491	0.727	-0.695
-48	323.438	338.416	354.052	4.620	-4.425	0.723	-0.692
-47	302.545	316.341	330.734	4.549	-4.361	0.719	-0.689
-46	283.373	296.100	309.367	4.480	-4.298	0.715	-0.686
-45	265.740	277.494	289.739	4.412	-4.235	0.711	-0.682
-44	249.485	260.354	271.670	4.346	-4.174	0.707	-0.679
-43	234.470	244.532	255.000	4.280	-4.114	0.702	-0.675
-42	220.573	229.897	239.591	4.216	-4.055	0.698	-0.671
-41	207.689	216.336	225.321	4.153	-3.997	0.694	-0.668
-40	195.722	203.750	212.085	4.090	-3.939	0.689	-0.664
-39	184.592	192.049	199.787	4.029	-3.882	0.685	-0.660
-38	174.223	181.156	188.345	3.968	-3.826	0.680	-0.656
-37	164.552	171.001	177.684	3.908	-3.771	0.676	-0.652
-36	155.519	161.522	167.739	3.849	-3.716	0.671	-0.648
-35	147.074	152.664	158.451	3.790	-3.661	0.666	-0.643
-34	139.168	144.377	149.767	3.732	-3.608	0.661	-0.639
-33	131.760	136.617	141.638	3.675	-3.554	0.656	-0.635
-32	124.813	129.343	134.023	3.618	-3.502	0.651	-0.630
-31	118.291	122.518	126.883	3.562	-3.449	0.646	-0.626
-30	112.164	116.110	120.182	3.507	-3.397	0.641	-0.621
-29	106.404	110.088	113.888	3.451	-3.346	0.636	-0.616
-28	100.983	104.425	107.972	3.397	-3.295	0.631	-0.612
-27	95.880	99.096	102.409	3.343	-3.244	0.625	-0.607
-26	91.072	94.078	97.172	3.289	-3.194	0.620	-0.602
-25	86.540	89.350	92.241	3.236	-3.144	0.614	-0.597
-24	82.265	84.892	87.595	3.183	-3.094	0.609	-0.592
-23	78.230	80.688	83.214	3.131	-3.045	0.603	-0.587
-22	74.420	76.720	79.082	3.079	-2.996	0.598	-0.582
-21	70.822	72.973	75.182	3.027	-2.948	0.592	-0.577

-20	67.420	69.434	71.500	2.976	-2.899	0.586	-0.571
-19	64.204	66.089	68.022	2.925	-2.851	0.581	-0.566
-18	61.162	62.926	64.735	2.874	-2.804	0.575	-0.561
-17	58.283	59.935	61.628	2.824	-2.756	0.569	-0.555
-16	55.557	57.104	58.689	2.775	-2.709	0.563	-0.550
-15	52.976	54.425	55.909	2.725	-2.663	0.557	-0.544
-14	50.530	51.888	53.277	2.676	-2.616	0.551	-0.538
-13	48.212	49.484	50.785	2.628	-2.570	0.544	-0.532
-12	46.015	47.206	48.424	2.579	-2.524	0.538	-0.527
-11	43.930	45.047	46.188	2.531	-2.478	0.532	-0.521
-10	41.953	43.000	44.068	2.483	-2.433	0.526	-0.515
-9	40.077	41.057	42.058	2.436	-2.388	0.519	-0.509
-8	38.295	39.214	40.151	2.389	-2.343	0.513	-0.503
-7	36.603	37.465	38.343	2.342	-2.299	0.506	-0.497
-6	34.997	35.804	36.626	2.296	-2.254	0.500	-0.491
-5	33.470	34.226	34.996	2.250	-2.210	0.493	-0.484
-4	32.018	32.727	33.449	2.204	-2.166	0.486	-0.478
-3	30.638	31.303	31.979	2.159	-2.123	0.480	-0.472
-2	29.326	29.949	30.582	2.113	-2.080	0.473	-0.465
-1	28.078	28.661	29.254	2.069	-2.036	0.466	-0.459
0	26.963	27.513	28.070	2.027	-1.996	0.458	-0.451
1	25.759	26.271	26.792	1.980	-1.951	0.452	-0.445
2	24.682	25.162	25.650	1.936	-1.909	0.445	-0.439
3	23.656	24.107	24.563	1.892	-1.867	0.438	-0.432
4	22.680	23.101	23.529	1.849	-1.825	0.431	-0.425
5	21.749	22.144	22.544	1.806	-1.783	0.423	-0.418
6	20.861	21.231	21.606	1.763	-1.742	0.416	-0.411
7	20.015	20.362	20.712	1.720	-1.701	0.409	-0.404
8	19.208	19.533	19.861	1.678	-1.660	0.401	-0.397
9	18.439	18.742	19.049	1.636	-1.619	0.394	-0.390
10	17.731	18.016	18.303	1.596	-1.581	0.386	-0.382
11	17.003	17.269	17.537	1.553	-1.539	0.379	-0.375
12	16.334	16.583	16.834	1.512	-1.499	0.371	-0.368
13	15.695	15.928	16.162	1.471	-1.459	0.364	-0.361
14	15.085	15.302	15.521	1.430	-1.420	0.356	-0.353
15	14.501	14.704	14.909	1.390	-1.381	0.348	-0.346
16	13.944	14.134	14.324	1.350	-1.341	0.340	-0.338
17	13.411	13.588	13.766	1.310	-1.303	0.332	-0.330
18	12.901	13.067	13.233	1.270	-1.264	0.324	-0.323
19	12.414	12.568	12.723	1.231	-1.226	0.316	-0.315
20	11.948	12.092	12.236	1.192	-1.187	0.308	-0.307

21	11.502	11.636	11.770	1.153	-1.149	0.300	-0.299
22	11.075	11.199	11.324	1.114	-1.112	0.292	-0.291
23	10.666	10.782	10.898	1.076	-1.074	0.283	-0.283
24	10.274	10.382	10.490	1.037	-1.037	0.275	-0.275
25	9.900	10.000	10.100	1.000	-1.000	0.267	-0.267
26	9.533	9.633	9.733	1.037	-1.036	0.278	-0.278
27	9.182	9.282	9.382	1.075	-1.073	0.290	-0.290
28	8.846	8.946	9.045	1.112	-1.110	0.302	-0.302
29	8.524	8.623	8.722	1.149	-1.146	0.314	-0.313
30	8.216	8.314	8.413	1.186	-1.182	0.326	-0.325
31	7.920	8.018	8.116	1.223	-1.218	0.339	-0.337
32	7.637	7.734	7.831	1.259	-1.254	0.351	-0.349
33	7.365	7.461	7.558	1.296	-1.289	0.363	-0.361
34	7.104	7.199	7.295	1.332	-1.324	0.376	-0.373
35	6.854	6.948	7.043	1.368	-1.359	0.388	-0.386
36	6.614	6.707	6.801	1.404	-1.394	0.401	-0.398
37	6.383	6.476	6.569	1.439	-1.429	0.413	-0.410
38	6.162	6.254	6.346	1.475	-1.463	0.426	-0.423
39	5.950	6.040	6.131	1.510	-1.497	0.439	-0.435
40	5.746	5.835	5.925	1.545	-1.531	0.452	-0.448
41	5.550	5.638	5.727	1.580	-1.565	0.464	-0.460
42	5.361	5.449	5.537	1.615	-1.599	0.478	-0.473
43	5.181	5.267	5.353	1.649	-1.632	0.491	-0.486
44	5.007	5.091	5.177	1.683	-1.665	0.504	-0.498
45	4.839	4.923	5.008	1.718	-1.698	0.517	-0.511
46	4.679	4.761	4.844	1.752	-1.731	0.530	-0.524
47	4.524	4.605	4.687	1.786	-1.764	0.544	-0.537
48	4.375	4.455	4.536	1.819	-1.797	0.557	-0.550
49	4.232	4.311	4.391	1.853	-1.829	0.571	-0.563
50	4.090	4.168	4.246	1.887	-1.862	0.584	-0.576
51	3.961	4.038	4.115	1.919	-1.893	0.598	-0.590
52	3.834	3.909	3.985	1.953	-1.925	0.612	-0.603
53	3.711	3.785	3.860	1.985	-1.957	0.626	-0.617
54	3.592	3.665	3.739	2.018	-1.988	0.640	-0.630
55	3.478	3.550	3.623	2.051	-2.019	0.654	-0.644
56	3.368	3.439	3.511	2.083	-2.050	0.668	-0.657
57	3.263	3.332	3.402	2.115	-2.081	0.682	-0.671
58	3.160	3.229	3.298	2.148	-2.112	0.696	-0.685
59	3.062	3.129	3.197	2.180	-2.143	0.710	-0.698
60	2.967	3.033	3.100	2.211	-2.173	0.725	-0.712
61	2.876	2.941	3.007	2.243	-2.204	0.739	-0.726

62	2.788	2.851	2.916	2.275	-2.234	0.754	-0.740
63	2.702	2.765	2.829	2.306	-2.264	0.768	-0.754
64	2.620	2.682	2.745	2.337	-2.294	0.783	-0.768
65	2.541	2.602	2.663	2.368	-2.323	0.798	-0.783
66	2.465	2.524	2.585	2.399	-2.353	0.813	-0.797
67	2.391	2.449	2.509	2.430	-2.382	0.828	-0.811
68	2.320	2.377	2.436	2.461	-2.411	0.843	-0.826
69	2.251	2.307	2.365	2.491	-2.441	0.858	-0.840
70	2.185	2.240	2.296	2.522	-2.469	0.873	-0.855
71	2.120	2.175	2.230	2.552	-2.498	0.888	-0.869
72	2.058	2.112	2.166	2.582	-2.527	0.903	-0.884
73	1.999	2.051	2.105	2.612	-2.555	0.919	-0.899
74	1.941	1.992	2.045	2.642	-2.584	0.934	-0.913
75	1.885	1.935	1.987	2.672	-2.612	0.950	-0.928
76	1.831	1.880	1.931	2.701	-2.640	0.965	-0.943
77	1.779	1.827	1.877	2.731	-2.668	0.981	-0.958
78	1.728	1.776	1.825	2.760	-2.695	0.997	-0.973
79	1.679	1.726	1.775	2.789	-2.723	1.013	-0.989
80	1.632	1.678	1.726	2.818	-2.750	1.028	-1.004
81	1.587	1.632	1.678	2.847	-2.778	1.044	-1.019
82	1.542	1.587	1.633	2.876	-2.805	1.061	-1.034
83	1.500	1.543	1.588	2.904	-2.832	1.077	-1.050
84	1.458	1.501	1.545	2.933	-2.859	1.093	-1.065
85	1.418	1.461	1.504	2.961	-2.886	1.109	-1.081
86	1.380	1.421	1.464	2.989	-2.912	1.126	-1.097
87	1.342	1.383	1.425	3.017	-2.939	1.142	-1.112
88	1.306	1.346	1.387	3.045	-2.965	1.159	-1.128
89	1.271	1.310	1.350	3.073	-2.991	1.175	-1.144
90	1.237	1.275	1.315	3.101	-3.017	1.192	-1.160
91	1.204	1.242	1.281	3.128	-3.043	1.209	-1.176
92	1.172	1.209	1.247	3.156	-3.069	1.226	-1.192
93	1.141	1.178	1.215	3.183	-3.094	1.243	-1.208
94	1.111	1.147	1.184	3.210	-3.120	1.260	-1.224
95	1.082	1.117	1.154	3.237	-3.145	1.277	-1.240
96	1.054	1.089	1.124	3.264	-3.170	1.294	-1.257
97	1.027	1.061	1.096	3.290	-3.195	1.311	-1.273
98	1.001	1.034	1.068	3.317	-3.220	1.328	-1.290
99	0.975	1.008	1.042	3.344	-3.245	1.346	-1.306
100	0.950	0.983	1.016	3.370	-3.270	1.363	-1.323
101	0.926	0.958	0.990	3.396	-3.294	1.381	-1.339
102	0.903	0.934	0.966	3.422	-3.318	1.398	-1.356

103	0.880	0.911	0.942	3.448	-3.343	1.416	-1.373
104	0.859	0.889	0.919	3.474	-3.367	1.434	-1.390
105	0.837	0.867	0.897	3.499	-3.391	1.452	-1.407
106	0.817	0.846	0.876	3.525	-3.414	1.470	-1.424
107	0.797	0.825	0.855	3.550	-3.438	1.488	-1.441
108	0.777	0.805	0.834	3.575	-3.462	1.506	-1.458
109	0.759	0.786	0.814	3.601	-3.485	1.524	-1.475
110	0.740	0.767	0.795	3.626	-3.508	1.543	-1.493
111	0.723	0.749	0.777	3.650	-3.531	1.561	-1.510
112	0.705	0.732	0.758	3.675	-3.554	1.579	-1.528
113	0.689	0.714	0.741	3.700	-3.577	1.598	-1.545
114	0.673	0.698	0.724	3.724	-3.600	1.617	-1.563
115	0.657	0.682	0.707	3.748	-3.622	1.635	-1.580
116	0.642	0.666	0.691	3.772	-3.645	1.654	-1.598
117	0.627	0.651	0.675	3.796	-3.667	1.673	-1.616
118	0.612	0.636	0.660	3.820	-3.689	1.692	-1.634
119	0.598	0.622	0.645	3.844	-3.711	1.711	-1.652
120	0.585	0.608	0.631	3.867	-3.733	1.730	-1.670
121	0.572	0.594	0.617	3.891	-3.755	1.749	-1.688
122	0.559	0.581	0.604	3.914	-3.776	1.768	-1.706
123	0.546	0.568	0.590	3.937	-3.798	1.788	-1.724
124	0.534	0.556	0.578	3.960	-3.819	1.807	-1.743
125	0.523	0.544	0.565	3.983	-3.840	1.827	-1.761