Ultra-Stable Axial Leaded Thermistor

ATH20K1R8B3950K

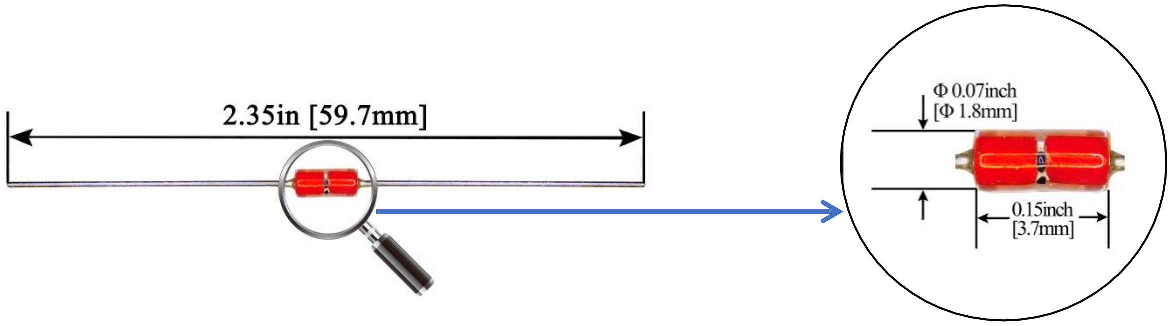

Figure 1. The Physical Photo of ATH20K1R8B3950K

MAIN FEATURES

Glass Encapsulated for Long Term Stability & Reliability
High Stability: <0.1°C/year
Small Size: ϕ1.8mm × 3.7mm
High Resistance Accuracy: 1%
Quick Response Time: ≤20s
Wide Temp. Range: −55°C to 250°C
Leads: Tin-plated Copper- Clad Steel Wire. For maximized strength and conductivity, and optimized thermal expansion matching with glass casing
100% Lead (Pb)-free and RoHS Compliant

DESCRIPTION

Figure 1 shows the ATH20K1R8B3950K thermistor with its dimensions marked. In contrast to conventional epoxy-encapsulated thermistors, the ATH20K1R8B3950K offers superior long-term stability and a wider temperature range. Moreover, it has a compact size and a quick response time.

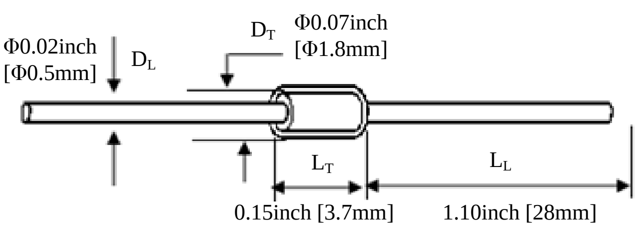

Figure 2. Side View of ATH20K1R8B3950K

SPECIFICATIONS

Parameters	Symbol	Value
Nominal Resistance @ 25°C	R_{25}	20K ± 1%
B Value @ 25°C /50°C	$B_{25/50}$	3950K ± 1%
Thermistor Diameter	D_T	1.8 ± 0.2mm
Thermistor Length	L_T	3.7 ± 0.3mm
Lead Diameter	D_L	0.5± 0.05mm
Lead Length	L_L	28 ± 1mm
Dissipation Factor	δ_{th}	2mW/°C
Insulation Resistance	R_{is}	≥500MΩ
Maximum Power @ 25°C	P_{max}	50mW
Time Constant	τ_c	≤20s (in still air @5~25°C)

APPLICATION

Comparing with glass encapsulated bead or radial leaded thermistors, this axial leaded thermistor, ATH20K1R8B3950K, offers improved mechanical stability, enhanced heat dissipation, and higher power ratings and is suitable for use in automotive electronics, industrial electronics, and home appliances where cost-sensitive temperature sensing is required.

Axial leaded thermistors are widely employed for temperature measurement in electronic circuits, offering accurate and reliable temperature sensing capabilities. They can be seamlessly integrated into temperature measurement systems, digital thermometers, and other devices that require precise temperature readings.

In addition to temperature measurement, axial leaded thermistors find use in temperature compensation applications within electronic circuits. By incorporating them into temperature-sensitive components or circuits, their temperature-dependent resistance changes can be harnessed to adjust and compensate for temperature variations, ensuring stable operation.

Temperature control systems also benefit from the utilization of axial leaded thermistors. These thermistors serve as temperature sensors, providing valuable feedback for regulating heating or cooling elements in diverse applications like thermostats, ovens, incubators, and environmental chambers.

Axial leaded thermistors are indispensable in power electronics, particularly for thermal protection purposes. They monitor the temperature of power devices such as transistors, MOSFETs, and power modules. If the temperature surpasses a predefined threshold, the thermistor's resistance decreases, triggering a protection circuit to limit power or activate cooling mechanisms.

The automotive industry extensively employs axial leaded thermistors for temperature sensing and control. They play a crucial role in engine management systems, climate control systems, and various other automotive applications that demand precise temperature monitoring and regulation.

Battery temperature monitoring is another vital domain where axial leaded thermistors prove their value. Integrated into battery management systems (BMS), they accurately measure the temperature of battery packs. This information aids in monitoring battery health, preventing overheating, and optimizing charging and discharging processes.

Axial leaded thermistors also find widespread use in consumer electronics for temperature sensing and control. They are commonly present in smartphones, laptops, tablets, and other electronic devices that require reliable temperature monitoring to ensure safe and efficient operation.

These are just a few examples of the numerous applications where axial leaded thermistors excel. Their compact size, accuracy, and sensitivity to temperature changes make them highly suitable for a broad range of temperature sensing and control needs across various industries.

PART NUMBER CONVENTION

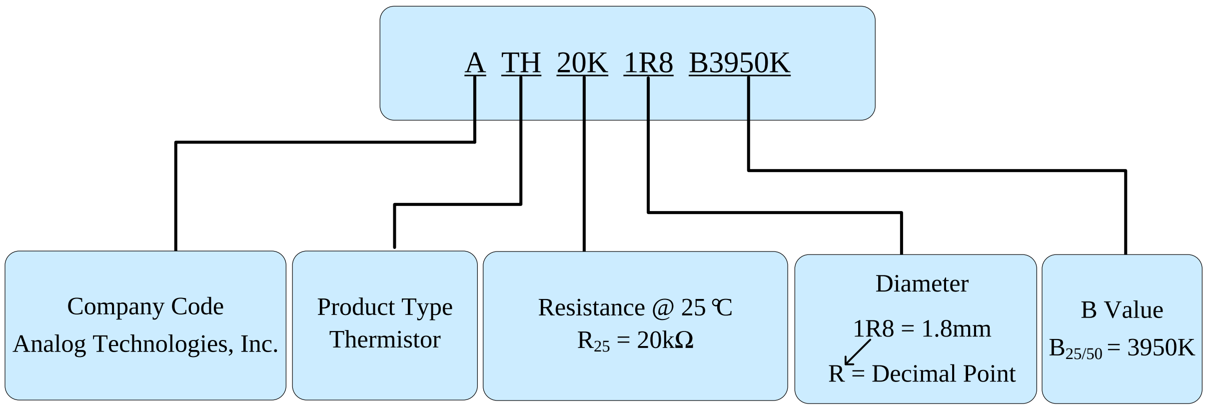

Figure 3. Part Number Convention of ATH20K1R8B3950K

RELIABILITY DATA

No.	Item	Standard	Test conditions and methods	Requirements
1	Terminal Pull Strength and Duration	IEC60068-2-21	Grip thermistor two leads Pull Strength：5±1N, Time Duration: 10±1s	No Obvious Appearance Damage $\Delta R_{25}/R_{25} \leq \pm 2\%$
2	Solderability	IEC60068-2-20	Temperature: 245°C ±5°C Time Duration: 2 ~ 3s	Coverage area ≥ 95%.
3	Withstand Soldering Temperature	IEC60068-2-20	Solder Pot Temperature: 260°C ±5°C Immerse leads 6mm away from thermistor body Time Duration: 5 ±1s	$\Delta R_{25}/R_{25} \leq \pm 2\%$
4	Humidity and Heat Sustainability	IEC60068-2-78	Temperature: 40°C ±2°C Humidity: 93% ±2% Time Duration: 500hrs	$\Delta R_{25}/R_{25} \leq \pm 2\%$
5	Thermal Cycling Sustainability	IEC60068-2-14	−55°C 30min→25°C 5min→250°C 30min→25°C 5min, 5 cycles	$\Delta R_{25}/R_{25} \leq \pm 2\%$
6	High Temperature Storage Sustainability	IEC60068-2-2	Temperature: 250°C ±5°C Time Duration: 1000hrs	$\Delta R_{25}/R_{25} \leq \pm 2\%$
7	Low Temperature Storage Sustainability	IEC60068-2-1	Temperature: −55°C Time Duration: 1000hrs	$\Delta R_{25}/R_{25} \leq \pm 2\%$

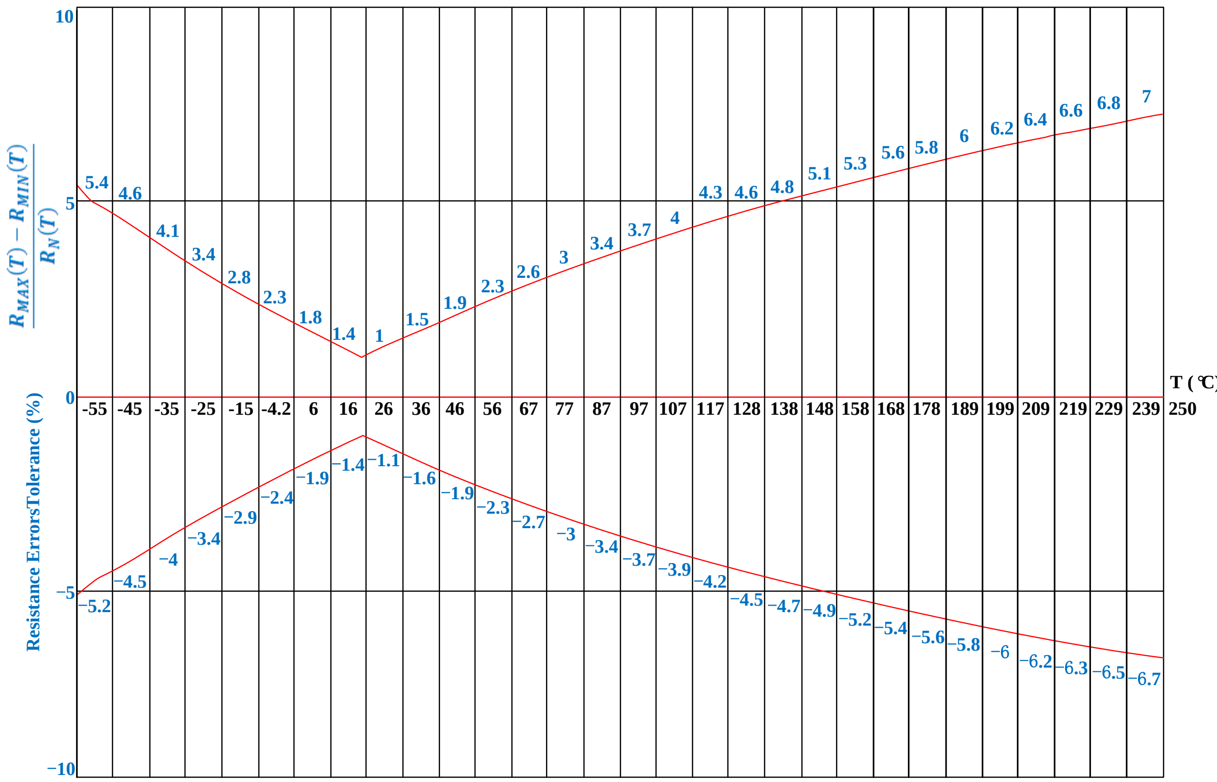

Figure 4. Resistance Tolerance vs. Temperature

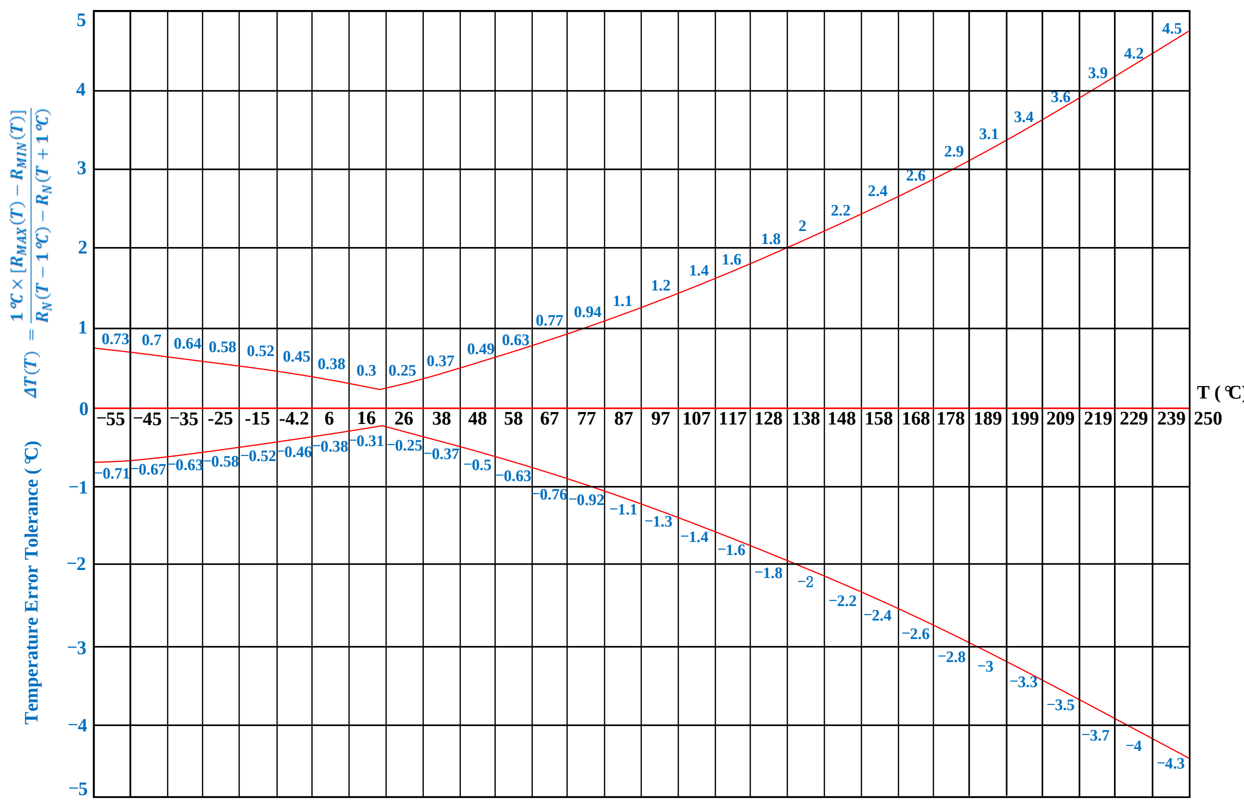

Figure 5. Temperature Tolerance vs. Temperature

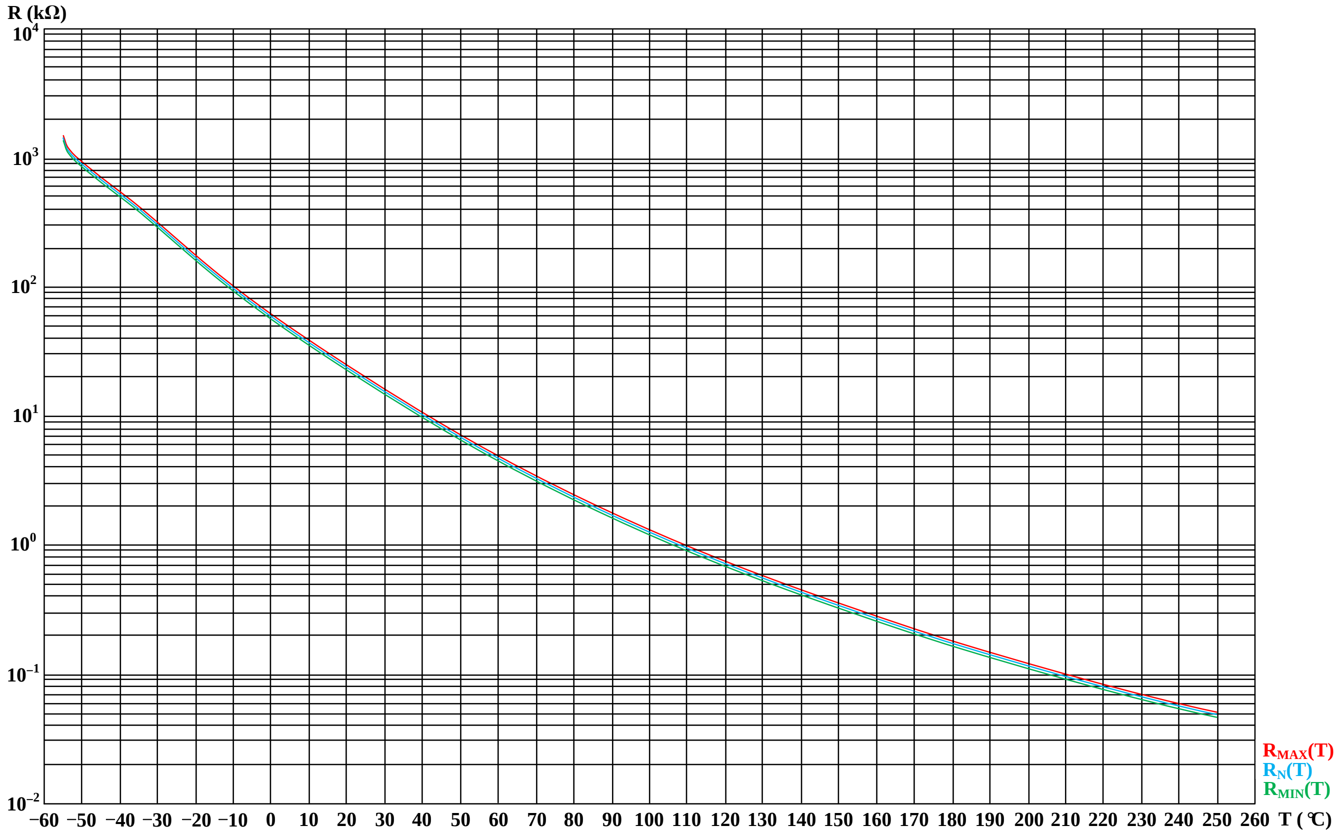

Figure 6. Resistance Tolerance vs. Temperature

RESISTANCE TEMPERATURE CHARACTERISTICS

$B_{25/50}$ = ln[R_N(25)/ R_N(50)]/[1/(25+273.15)-1/(50+273.15)]= 3950K, R_N(25) = 20kΩ, $\left|\frac{R_{MAX}(25)-R_{MIN}(25)}{R_N(25)}\right| \leq \pm 1\%$,

T (°C)	Thermistor Resistance (kΩ)			Relative Resistance Variation at a Specific Temperature $\frac{\Delta R_T(T)}{R_N(T)}$ (±%)	Temperature Measurement Error at a Specific Temperature $\Delta T(T)$ (±°C)	Temperature Coefficient α (%/°C)
	Minimum Value	Nominal Value	Maximum Value	$\frac{R_{MAX}(T)-R_{MIN}(T)}{R_N(T)}$	$\Delta T(T) = \frac{1℃ \times [R_{MAX}(T)-R_{MIN}(T)]}{R_N(T-1℃)-R_N(T+1℃)}$	$\alpha = \frac{R_N(T+1℃)-R_N(T-1℃)}{2℃ \times R_N(T)}$
	$R_{MIN}(T)$	$R_N(T)$	$R_{MAX}(T)$			
−55	5.331	0.001	0.001	5.33	0.17	15.1
−54	5.175	0.185	0.142	5.17	0.18	14.06
−53	5.056	0.236	0.109	5.05	0.23	10.77
−52	4.963	0.296	0.085	4.96	0.29	8.42
−51	4.889	0.361	0.069	4.89	0.36	6.79
−50	4.828	0.424	0.058	4.83	0.42	5.71
−49	4.775	0.475	0.051	4.77	0.47	5.03
−48	4.727	0.509	0.048	4.73	0.51	4.65
−47	4.682	0.523	0.046	4.68	0.52	4.48
−46	4.638	0.520	0.046	4.64	0.52	4.47
−45	4.593	0.505	0.047	4.59	0.50	4.55
−44	4.547	0.485	0.048	4.55	0.48	4.70
−43	4.499	0.462	0.050	4.50	0.46	4.88
−42	4.449	0.439	0.052	4.45	0.44	5.07
−41	4.397	0.418	0.054	4.40	0.42	5.27
−40	4.343	0.400	0.055	4.34	0.40	5.45
−39	4.288	0.383	0.057	4.29	0.38	5.61
−38	4.231	0.369	0.058	4.23	0.37	5.75
−37	4.173	0.357	0.060	4.17	0.36	5.86
−36	4.114	0.347	0.061	4.11	0.35	5.95
−35	4.054	0.338	0.061	4.05	0.34	6.02
−34	3.993	0.330	0.062	3.99	0.33	6.06
−33	3.933	0.324	0.062	3.93	0.32	6.08
−32	3.872	0.319	0.062	3.87	0.32	6.08
−31	3.811	0.315	0.062	3.81	0.31	6.07
−30	3.750	0.311	0.061	3.75	0.31	6.04
−29	3.690	0.308	0.061	3.69	0.31	6.01
−28	3.630	0.305	0.061	3.63	0.30	5.96
−27	3.571	0.303	0.060	3.57	0.30	5.91
−26	3.512	0.301	0.059	3.51	0.30	5.85
−25	3.454	0.299	0.059	3.45	0.30	5.79
−24	3.396	0.298	0.058	3.40	0.30	5.73
−23	3.339	0.296	0.058	3.34	0.29	5.66
−22	3.283	0.294	0.057	3.28	0.29	5.60
−21	3.227	0.292	0.056	3.23	0.29	5.53
−20	3.172	0.291	0.056	3.17	0.29	5.47
−19	3.118	0.289	0.055	3.12	0.29	5.42

$B_{25/50} = \ln[R_N(25)/R_N(50)]/[1/(25+273.15)-1/(50+273.15)] = 3950K$, $R_N(25) = 20k\Omega$, $\left|\frac{R_{MAX}(25)-R_{MIN}(25)}{R_N(25)}\right| \le \pm 1\%$,

T (°C)	Thermistor Resistance (kΩ)			Relative Resistance Variation at a Specific Temperature $\frac{\Delta R_T(T)}{R_N(T)}$ (±%)	Temperature Measurement Error at a Specific Temperature $\Delta T(T)$ (±°C)	Temperature Coefficient α (%/°C)
	Minimum Value	Nominal Value	Maximum Value	$\frac{R_{MAX}(T)-R_{MIN}(T)}{R_N(T)}$	$\Delta T(T) = \frac{1℃ \times [R_{MAX}(T)-R_{MIN}(T)]}{R_N(T-1℃)-R_N(T+1℃)}$	$\alpha = \frac{R_N(T+1℃)-R_N(T-1℃)}{2℃ \times R_N(T)}$
	$R_{MIN}(T)$	$R_N(T)$	$R_{MAX}(T)$			
−18	3.064	0.287	0.055	3.06	0.29	5.36
−17	3.011	0.284	0.054	3.01	0.28	5.31
−16	2.958	0.282	0.054	2.96	0.28	5.26
−15	2.906	0.280	0.053	2.90	0.28	5.21
−14	2.854	0.277	0.053	2.85	0.28	5.17
−13	2.802	0.274	0.052	2.80	0.27	5.13
−12	2.751	0.271	0.052	2.75	0.27	5.10
−11	2.700	0.268	0.052	2.70	0.27	5.06
−10	2.650	0.264	0.051	2.65	0.26	5.03
−9	2.600	0.261	0.051	2.60	0.26	5.01
−8	2.550	0.257	0.051	2.55	0.26	4.98
−7	2.500	0.253	0.051	2.50	0.25	4.96
−6	2.450	0.249	0.050	2.45	0.25	4.93
−5	2.401	0.245	0.050	2.40	0.24	4.91
−4	2.353	0.241	0.050	2.35	0.24	4.90
−3	2.304	0.237	0.050	2.30	0.24	4.88
−2	2.255	0.233	0.050	2.25	0.23	4.86
−1	2.206	0.229	0.049	2.21	0.23	4.85
0	2.158	0.224	0.049	2.16	0.22	4.83
1	2.110	0.220	0.049	2.11	0.22	4.82
2	2.062	0.216	0.049	2.06	0.21	4.80
3	2.014	0.211	0.049	2.01	0.21	4.79
4	1.965	0.207	0.049	1.96	0.21	4.77
5	1.918	0.202	0.049	1.92	0.20	4.76
6	1.871	0.198	0.048	1.87	0.20	4.74
7	1.824	0.194	0.048	1.82	0.19	4.73
8	1.777	0.189	0.048	1.78	0.19	4.71
9	1.729	0.185	0.048	1.73	0.18	4.69
10	1.683	0.181	0.048	1.68	0.18	4.68
11	1.636	0.176	0.048	1.64	0.17	4.68
12	1.589	0.172	0.047	1.59	0.17	4.65
13	1.543	0.167	0.047	1.54	0.17	4.63
14	1.497	0.163	0.047	1.50	0.16	4.61
15	1.449	0.159	0.047	1.45	0.16	4.59
16	1.404	0.154	0.047	1.40	0.15	4.58
17	1.359	0.150	0.047	1.36	0.15	4.56
18	1.314	0.146	0.046	1.31	0.14	4.54
19	1.268	0.141	0.046	1.27	0.14	4.52
20	1.224	0.137	0.046	1.22	0.14	4.50
21	1.178	0.132	0.046	1.18	0.13	4.48
22	1.133	0.128	0.046	1.13	0.13	4.46

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	Minimum Value	Nominal Value	Maximum Value	$\frac{R_{MAX}(T)-R_{MIN}(T)}{R_N(T)}$	$\Delta T(T) = \frac{1℃ \times [R_{MAX}(T)-R_{MIN}(T)]}{R_N(T-1℃)-R_N(T+1℃)}$	$\alpha = \frac{R_N(T+1℃)-R_N(T-1℃)}{2℃ \times R_N(T)}$
	$R_{MIN}(T)$	$R_N(T)$	$R_{MAX}(T)$			
23	1.090	0.124	0.045	1.09	0.12	4.44
24	1.046	0.119	0.045	1.05	0.12	4.41
25	1.001	0.115	0.045	1.00	0.11	4.39
26	1.043	0.120	0.045	1.04	0.12	4.37
27	1.090	0.126	0.044	1.09	0.13	4.35
28	1.132	0.132	0.044	1.13	0.13	4.33
29	1.176	0.137	0.044	1.18	0.14	4.30
30	1.218	0.143	0.044	1.22	0.14	4.28
31	1.262	0.149	0.044	1.26	0.15	4.26
32	1.303	0.155	0.043	1.30	0.15	4.24
33	1.345	0.160	0.043	1.34	0.16	4.22
34	1.384	0.166	0.043	1.38	0.16	4.19
35	1.432	0.173	0.043	1.43	0.17	4.17
36	1.468	0.178	0.043	1.47	0.18	4.15
37	1.514	0.184	0.042	1.51	0.18	4.13
38	1.556	0.190	0.042	1.55	0.19	4.11
39	1.593	0.196	0.042	1.59	0.19	4.09
40	1.636	0.202	0.042	1.64	0.20	4.06
41	1.674	0.208	0.041	1.67	0.21	4.04
42	1.717	0.214	0.041	1.72	0.21	4.02
43	1.756	0.220	0.041	1.75	0.22	4.00
44	1.794	0.227	0.041	1.79	0.23	3.97
45	1.837	0.233	0.041	1.84	0.23	3.96
46	1.875	0.239	0.040	1.87	0.24	3.94
47	1.913	0.245	0.040	1.91	0.24	3.92
48	1.957	0.252	0.040	1.96	0.25	3.89
49	1.994	0.258	0.040	1.99	0.26	3.87
50	2.030	0.264	0.040	2.03	0.26	3.86
51	2.066	0.270	0.039	2.07	0.27	3.84
52	2.109	0.277	0.039	2.11	0.28	3.82
53	2.144	0.284	0.039	2.14	0.28	3.79
54	2.186	0.290	0.039	2.18	0.29	3.77
55	2.219	0.296	0.039	2.22	0.30	3.76
56	2.251	0.302	0.038	2.25	0.30	3.73
57	2.299	0.310	0.038	2.30	0.31	3.72
58	2.330	0.316	0.038	2.33	0.31	3.70
59	2.378	0.324	0.038	2.38	0.32	3.68
60	2.406	0.329	0.038	2.40	0.33	3.67
61	2.442	0.336	0.037	2.44	0.33	3.65
62	2.478	0.342	0.037	2.48	0.34	3.63
63	2.512	0.350	0.037	2.51	0.35	3.60
64	2.545	0.356	0.037	2.54	0.36	3.58
65	2.589	0.363	0.037	2.59	0.36	3.58

$B_{25/50}$ = ln[R_N(25)/ R_N(50)]/[1/(25+273.15)-1/(50+273.15)]= 3950K, R_N(25) = 20kΩ, $\left|\frac{R_{MAX}(25)-R_{MIN}(25)}{R_N(25)}\right| \le \pm 1\%$,

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	Minimum Value $R_{MIN}(T)$	Nominal Value $R_N(T)$	Maximum Value $R_{MAX}(T)$	$\frac{R_{MAX}(T)-R_{MIN}(T)}{R_N(T)}$	$\Delta T(T) = \frac{1℃ \times [R_{MAX}(T)-R_{MIN}(T)]}{R_N(T-1℃)-R_N(T+1℃)}$	$\alpha = \frac{R_N(T+1℃)-R_N(T-1℃)}{2℃ \times R_N(T)}$
66	2.620	0.369	0.037	2.62	0.37	3.56
67	2.648	0.376	0.036	2.65	0.38	3.53
68	2.689	0.383	0.036	2.69	0.38	3.52
69	2.729	0.391	0.036	2.73	0.39	3.50
70	2.767	0.398	0.036	2.77	0.40	3.48
71	2.805	0.405	0.036	2.80	0.40	3.47
72	2.826	0.411	0.035	2.82	0.41	3.45
73	2.876	0.421	0.035	2.87	0.42	3.42
74	2.909	0.427	0.035	2.91	0.43	3.41
75	2.940	0.435	0.035	2.94	0.43	3.39
76	2.970	0.440	0.035	2.97	0.44	3.38
77	2.998	0.446	0.035	3.00	0.45	3.37
78	3.023	0.452	0.034	3.02	0.45	3.35
79	3.067	0.462	0.034	3.07	0.46	3.32
80	3.108	0.470	0.034	3.11	0.47	3.31
81	3.150	0.479	0.034	3.15	0.48	3.30
82	3.167	0.488	0.034	3.17	0.49	3.25
83	3.181	0.491	0.033	3.18	0.49	3.25
84	3.240	0.501	0.033	3.24	0.50	3.24
85	3.249	0.505	0.033	3.25	0.50	3.22
86	3.306	0.517	0.033	3.31	0.52	3.21
87	3.310	0.521	0.033	3.31	0.52	3.18
88	3.364	0.530	0.033	3.36	0.53	3.18
89	3.391	0.535	0.033	3.39	0.53	3.17
90	3.443	0.551	0.032	3.44	0.55	3.13
91	3.464	0.557	0.032	3.46	0.56	3.11
92	3.484	0.559	0.032	3.48	0.56	3.12
93	3.533	0.571	0.032	3.53	0.57	3.10
94	3.547	0.579	0.032	3.55	0.58	3.07
95	3.558	0.582	0.032	3.56	0.58	3.06
96	3.602	0.590	0.032	3.60	0.59	3.06
97	3.642	0.606	0.031	3.64	0.60	3.01
98	3.681	0.615	0.031	3.68	0.61	2.99
99	3.718	0.626	0.031	3.72	0.63	2.97
100	3.715	0.623	0.031	3.71	0.62	2.99
101	3.750	0.626	0.031	3.75	0.63	3.00
102	3.781	0.647	0.030	3.78	0.65	2.93
103	3.809	0.660	0.030	3.81	0.66	2.89
104	3.834	0.655	0.030	3.83	0.65	2.93
105	3.905	0.668	0.030	3.90	0.67	2.93
106	3.928	0.684	0.030	3.93	0.68	2.88
107	3.948	0.690	0.030	3.95	0.69	2.87
108	3.966	0.696	0.030	3.97	0.69	2.85

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	Minimum Value $R_{MIN}(T)$	Nominal Value $R_N(T)$	Maximum Value $R_{MAX}(T)$	$\frac{R_{MAX}(T)-R_{MIN}(T)}{R_N(T)}$	$\Delta T(T) = \frac{1℃ \times [R_{MAX}(T)-R_{MIN}(T)]}{R_N(T-1℃)-R_N(T+1℃)}$	$\alpha = \frac{R_N(T+1℃)-R_N(T-1℃)}{2℃ \times R_N(T)}$
109	3.981	0.703	0.029	3.98	0.70	2.84
110	3.993	0.710	0.029	3.99	0.71	2.81
111	4.054	0.727	0.029	4.05	0.73	2.79
112	4.059	0.722	0.029	4.06	0.72	2.81
113	4.121	0.741	0.029	4.12	0.74	2.78
114	4.120	0.751	0.028	4.12	0.75	2.75
115	4.119	0.746	0.029	4.12	0.74	2.76
116	4.233	0.779	0.028	4.23	0.78	2.72
117	4.225	0.774	0.028	4.22	0.77	2.73
118	4.216	0.787	0.028	4.21	0.79	2.68
119	4.261	0.794	0.028	4.26	0.79	2.69
120	4.314	0.801	0.028	4.31	0.80	2.70
121	4.358	0.830	0.027	4.36	0.83	2.63
122	4.333	0.825	0.027	4.33	0.82	2.63
123	4.374	0.834	0.027	4.37	0.83	2.62
124	4.417	0.844	0.027	4.42	0.84	2.62
125	4.456	0.854	0.027	4.45	0.85	2.61
126	4.496	0.865	0.027	4.50	0.86	2.60
127	4.451	0.860	0.027	4.45	0.86	2.59
128	4.569	0.888	0.027	4.57	0.89	2.57
129	4.515	0.884	0.027	4.51	0.88	2.56
130	4.546	0.868	0.027	4.55	0.87	2.62
131	4.579	0.912	0.026	4.58	0.91	2.51
132	4.597	0.927	0.026	4.60	0.93	2.48
133	4.624	0.908	0.026	4.62	0.91	2.55
134	4.740	0.943	0.026	4.74	0.94	2.51
135	4.664	0.941	0.026	4.66	0.94	2.48
136	4.777	0.980	0.025	4.78	0.98	2.44
137	4.689	0.939	0.026	4.69	0.94	2.50
138	4.809	0.979	0.026	4.81	0.98	2.46
139	4.706	0.978	0.025	4.70	0.98	2.41
140	4.822	0.978	0.026	4.82	0.98	2.47
141	4.829	1.001	0.025	4.83	1.00	2.41
142	4.825	1.026	0.025	4.82	1.03	2.35
143	4.820	1.001	0.025	4.82	1.00	2.41
144	4.816	0.976	0.026	4.81	0.98	2.47
145	4.938	1.027	0.025	4.94	1.03	2.41
146	5.053	1.084	0.024	5.05	1.08	2.33
147	4.908	1.029	0.025	4.91	1.03	2.39
148	5.028	1.089	0.024	5.03	1.09	2.31
149	5.001	1.126	0.023	5.00	1.13	2.22
150	5.115	1.060	0.025	5.11	1.06	2.41
151	5.103	1.095	0.024	5.10	1.09	2.33

$B_{25/50}$ = ln[R_N(25)/ R_N(50)]/[1/(25+273.15)-1/(50+273.15)]= 3950K, R_N(25) = 20kΩ, $\left|\frac{R_{MAX}(25)-R_{MIN}(25)}{R_N(25)}\right| \leq \pm 1\%$,

T (°C)	Thermistor Resistance (kΩ)			Relative Resistance Variation at a Specific Temperature $\frac{\Delta R_T(T)}{R_N(T)}$ (±%)	Temperature Measurement Error at a Specific Temperature $\Delta T(T)$ (±°C)	Temperature Coefficient α (%/°C)
	Minimum Value $R_{MIN}(T)$	Nominal Value $R_N(T)$	Maximum Value $R_{MAX}(T)$	$\frac{R_{MAX}(T)-R_{MIN}(T)}{R_N(T)}$	$\Delta T(T) = \frac{1℃\times[R_{MAX}(T)-R_{MIN}(T)]}{R_N(T-1℃)-R_N(T+1℃)}$	$\alpha = \frac{R_N(T+1℃)-R_N(T-1℃)}{2℃\times R_N(T)}$
152	5.061	1.134	0.023	5.06	1.13	2.23
153	5.031	1.032	0.025	5.03	1.03	2.44
154	5.157	1.101	0.024	5.16	1.10	2.34
155	5.273	1.180	0.023	5.27	1.18	2.24
156	5.066	1.108	0.024	5.07	1.11	2.29
157	5.185	1.193	0.023	5.18	1.19	2.17
158	5.120	1.155	0.023	5.12	1.15	2.22
159	5.246	1.155	0.024	5.24	1.15	2.27
160	5.358	1.251	0.022	5.36	1.25	2.14
161	5.293	1.209	0.023	5.29	1.21	2.19
162	5.225	1.168	0.023	5.22	1.17	2.24
163	5.345	1.168	0.024	5.34	1.17	2.29
164	5.274	1.126	0.024	5.27	1.13	2.34
165	5.401	1.228	0.023	5.40	1.23	2.20
166	5.511	1.351	0.021	5.51	1.35	2.04
167	5.418	1.301	0.022	5.42	1.30	2.08
168	5.533	1.183	0.024	5.53	1.18	2.34
169	5.460	1.251	0.023	5.46	1.25	2.18
170	5.334	1.334	0.021	5.33	1.33	2.00
171	5.456	1.201	0.024	5.45	1.20	2.27
172	5.350	1.279	0.022	5.35	1.28	2.09
173	5.688	1.334	0.022	5.69	1.33	2.13
174	5.584	1.279	0.023	5.58	1.28	2.18
175	5.447	1.376	0.021	5.45	1.38	1.98
176	5.557	1.223	0.024	5.56	1.22	2.27
177	5.700	1.223	0.024	5.70	1.22	2.33
178	5.557	1.501	0.020	5.56	1.50	1.85
179	5.646	1.501	0.020	5.65	1.50	1.88
180	5.496	1.251	0.023	5.49	1.25	2.20
181	5.619	1.251	0.023	5.62	1.25	2.25
182	5.748	1.430	0.021	5.75	1.43	2.01
183	5.849	1.430	0.021	5.85	1.43	2.05
184	5.690	1.358	0.022	5.69	1.36	2.10
185	5.794	1.584	0.019	5.79	1.58	1.83
186	5.902	1.358	0.023	5.90	1.36	2.17
187	6.052	1.358	0.023	6.05	1.36	2.23
188	5.845	1.501	0.020	5.84	1.50	1.95
189	5.961	1.501	0.021	5.96	1.50	1.99
190	5.744	1.418	0.021	5.74	1.42	2.03
191	5.863	1.418	0.022	5.86	1.42	2.07
192	5.987	1.418	0.022	5.99	1.42	2.11
193	6.116	1.701	0.019	6.12	1.70	1.80
194	5.840	1.601	0.019	5.84	1.60	1.82

$B_{25/50}$ = ln[R_N(25)/ R_N(50)]/[1/(25+273.15)-1/(50+273.15)]= 3950K, R_N(25) = 20kΩ, $\left|\frac{R_{MAX}(25)-R_{MIN}(25)}{R_N(25)}\right| \le \pm 1\%$,

T (°C)	Thermistor Resistance (kΩ)			Relative Resistance Variation at a Specific Temperature $\frac{\Delta R_T(T)}{R_N(T)}$ (±%)	Temperature Measurement Error at a Specific Temperature $\Delta T(T)$ (±°C)	Temperature Coefficient α (%/°C)
	Minimum Value $R_{MIN}(T)$	Nominal Value $R_N(T)$	Maximum Value $R_{MAX}(T)$	$\frac{R_{MAX}(T)-R_{MIN}(T)}{R_N(T)}$	$\Delta T(T) = \frac{1℃ \times [R_{MAX}(T)-R_{MIN}(T)]}{R_N(T-1℃)-R_N(T+1℃)}$	$\alpha = \frac{R_N(T+1℃)-R_N(T-1℃)}{2℃ \times R_N(T)}$
195	5.971	1.334	0.023	5.97	1.33	2.24
196	6.108	1.601	0.020	6.11	1.60	1.91
197	6.203	1.601	0.020	6.20	1.60	1.94
198	5.953	1.501	0.021	5.95	1.50	1.98
199	6.049	1.876	0.017	6.05	1.88	1.61
200	6.149	1.501	0.021	6.15	1.50	2.05
201	6.304	1.501	0.022	6.30	1.50	2.10
202	5.984	1.751	0.018	5.98	1.75	1.71
203	6.088	1.401	0.023	6.09	1.40	2.17
204	6.251	1.401	0.023	6.25	1.40	2.23
205	5.910	1.626	0.019	5.91	1.63	1.82
206	6.020	1.626	0.020	6.02	1.63	1.85
207	6.133	1.626	0.020	6.13	1.63	1.89
208	6.251	1.626	0.020	6.25	1.63	1.92
209	6.374	1.626	0.021	6.37	1.63	1.96
210	6.501	2.168	0.016	6.50	2.17	1.50
211	6.062	2.001	0.016	6.06	2.00	1.52
212	6.187	1.501	0.022	6.19	1.50	2.06
213	6.317	1.501	0.022	6.32	1.50	2.11
214	5.915	1.834	0.017	5.91	1.83	1.61
215	6.523	2.001	0.017	6.52	2.00	1.63
216	6.668	1.501	0.023	6.67	1.50	2.22
217	6.251	1.834	0.018	6.25	1.83	1.70
218	6.898	2.001	0.018	6.90	2.00	1.72
219	6.472	1.834	0.019	6.47	1.83	1.76
220	6.549	1.834	0.019	6.55	1.83	1.79
221	6.708	1.834	0.019	6.71	1.83	1.83
222	6.174	1.668	0.020	6.17	1.67	1.85
223	6.963	1.834	0.020	6.96	1.83	1.90
224	6.411	2.501	0.014	6.41	2.50	1.28
225	6.495	1.668	0.020	6.49	1.67	1.95
226	6.001	1.501	0.021	6.00	1.50	2.00
227	6.758	2.501	0.015	6.76	2.50	1.35
228	6.850	2.501	0.015	6.85	2.50	1.37
229	6.251	1.501	0.022	6.25	1.50	2.08
230	6.430	1.501	0.022	6.43	1.50	2.14
231	6.523	2.251	0.015	6.52	2.25	1.45
232	6.619	2.251	0.016	6.62	2.25	1.47
233	6.717	2.251	0.016	6.72	2.25	1.49
234	6.062	2.001	0.016	6.06	2.00	1.52
235	6.155	2.001	0.016	6.15	2.00	1.54
236	6.251	2.001	0.017	6.25	2.00	1.56
237	6.350	2.001	0.017	6.35	2.00	1.59

$B_{25/50}$ = ln[R_N(25)/ R_N(50)]/[1/(25+273.15)-1/(50+273.15)]= 3950K, R_N(25) = 20kΩ, $\left\|\frac{R_{MAX}(25)-R_{MIN}(25)}{R_N(25)}\right\| \leq \pm 1\%$,						
T (°C)	Thermistor Resistance (kΩ)			Relative Resistance Variation at a Specific Temperature $\frac{\Delta R_T(T)}{R_N(T)}$ (±%)	Temperature Measurement Error at a Specific Temperature $\Delta T(T)$ (±°C)	Temperature Coefficient α (%/°C)
	Minimum Value	Nominal Value	Maximum Value	$\frac{R_{MAX}(T)-R_{MIN}(T)}{R_N(T)}$	$\Delta T(T) = \frac{1℃ \times [R_{MAX}(T)-R_{MIN}(T)]}{R_N(T-1℃)-R_N(T+1℃)}$	$\alpha = \frac{R_N(T+1℃)-R_N(T-1℃)}{2℃ \times R_N(T)}$
	$R_{MIN}(T)$	$R_N(T)$	$R_{MAX}(T)$			
238	6.453	2.001	0.017	6.45	2.00	1.61
239	6.558	2.001	0.017	6.56	2.00	1.64
240	6.668	2.001	0.018	6.67	2.00	1.67
241	6.781	2.001	0.018	6.78	2.00	1.69
242	6.898	2.001	0.018	6.90	2.00	1.72
243	7.019	2.001	0.019	7.02	2.00	1.75
244	7.144	2.001	0.019	7.14	2.00	1.79
245	6.365	3.501	0.010	6.36	3.50	0.91
246	6.365	3.501	0.010	6.36	3.50	0.91
247	7.408	2.001	0.020	7.41	2.00	1.85
248	7.548	2.001	0.020	7.55	2.00	1.89
249	6.732	1.751	0.020	6.73	1.75	1.92
250	6.864	0.068	0.511	6.86	1.72	1.91

To ensure optimal performance and reliability, it is recommended to follow proper storage procedures for the ATH20K1R8B3950K thermistor. Here are some guidelines:

1. Store the thermistors only in their original packaging and do not open the package before storage.
2. The recommended storage temperature is between –25 ℃ to +45 ℃, with a relative humidity of less than 75% on average and a maximum of 95%. Dew precipitation is not allowed.
3. Do not expose the thermistors to heat or direct sunlight during storage as this may cause deformation of the packing material or sticking of the thermistors, leading to difficulties during mounting.
4. Avoid contamination of the thermistor's surface during storage, handling, and processing.
5. Do not store the thermistor in harmful environments containing corrosive gases like SOx, Cl, etc.
6. After opening the factory seals, such as polyvinyl-sealed packages, it is recommended to use the thermistors as soon as possible.
7. For optimal soldering performance, it is recommended to solder the thermistors within 12 months for SMDs and 24 months for leaded components after shipment from the manufacturer, ATI.

When handling NTC thermistors, it is important to prevent them from being dropped, as this could cause chip-offs and damage to the components. To avoid any damage, components should not be touched with bare hands, and gloves are recommended. It is also important to prevent any contamination of the thermistor surface during handling to ensure accurate readings.

When soldering the ATH20K1R8B3950K thermistor, it is important to use a resin-type or non-activated flux. Insufficient preheating can cause ceramic cracks, so proper preheating is recommended. Rapid cooling by dipping in solvent is not recommended. It is also recommended to completely remove any flux residue after soldering to prevent contamination or damage to the thermistor.

NOTICE

1. It is important to carefully read and follow the warnings, cautions, and product-specific notes provided with electronic components. These instructions are designed to ensure the safe and proper use of the component and to prevent damage to the component or surrounding equipment. Failure to follow these instructions could result in malfunction or failure of the component, damage to surrounding equipment, or even injury or harm to individuals. Always take the necessary precautions and seek professional assistance if unsure about proper use or handling of electronic components.
2. Please note that the products and specifications described in this publication are subject to change without prior notice as we continuously improve our products. Therefore, we recommend checking the product descriptions and specifications before placing an order to ensure that they are still applicable. We also reserve the right to discontinue the production and delivery of certain products, which means that not all products named in this publication may always be available.
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4. ATI warrants its products to perform according to specifications for one year from the date of sale, except when damaged due to excessive abuse. If a product fails to meet specifications within one year of the sale, it can be exchanged free of charge.
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9. ATI retains ownership of all rights for special technologies, techniques, and designs for its products and projects, as well as any modifications, improvements, and inventions made by ATI.

10. Please note that despite operating the passive electronic components as specified, malfunctions or failures before the end of their usual service life may still occur in individual cases due to the current state of the art. Therefore, in customer applications that require a high level of operational safety, especially those in which the malfunction or failure of a passive electronic component could pose a threat to human life or health (such as in accident prevention or life-saving systems), it is essential to ensure through suitable design of the customer application or other measures taken by the customer (such as the installation of protective circuitry or redundancy) that no injury or damage is sustained by third parties in the event of a passive electronic component malfunction or failure.