

Figure 1. The Physical Photo of ATH50K1R8B3950K

## MAIN FEATURES

Glass Encapsulated for Long Term Stability & Reliability  
 High Stability:  $<0.1^{\circ}\text{C}/\text{year}$   
 Small Size:  $\phi 1.8\text{mm} \times 3.7\text{mm}$   
 High Resistance Accuracy: 1%  
 Quick Response Time:  $\leq 20\text{s}$   
 Wide Temp. Range:  $-55^{\circ}\text{C}$  to  $250^{\circ}\text{C}$   
 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 ATH50K1R8B3950K thermistor with its dimensions marked. In contrast to conventional epoxy-encapsulated thermistors, the ATH50K1R8B3950K offers superior long-term stability and a wider temperature range. Moreover, it has a compact size and a quick response time.

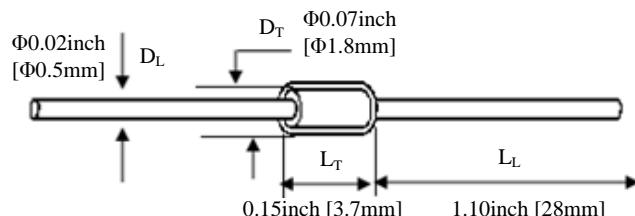


Figure 2. Side View of ATH50K1R8B3950K

## SPECIFICATIONS

Parameters	Symbol	Value
Nominal Resistance @ $25^{\circ}\text{C}$	$R_{25}$	$50\text{K} \pm 1\%$
B Value @ $25^{\circ}\text{C} / 50^{\circ}\text{C}$	$B_{25/50}$	$3950\text{K} \pm 1\%$
Thermistor Diameter	$D_T$	$1.8 \pm 0.2\text{mm}$
Thermistor Length	$L_T$	$3.7 \pm 0.3\text{mm}$
Lead Diameter	$D_L$	$0.5 \pm 0.05\text{mm}$
Lead Length	$L_L$	$28 \pm 1\text{mm}$
Dissipation Factor	$\delta_{\text{th}}$	$2\text{mW}/^{\circ}\text{C}$
Insulation Resistance	$R_{\text{is}}$	$\geq 500\text{M}\Omega$
Maximum Power @ $25^{\circ}\text{C}$	$P_{\text{max}}$	$50\text{mW}$
Time Constant	$\tau_c$	$\leq 20\text{s}$ (in still air) @ $5\text{~}25^{\circ}\text{C}$

## APPLICATION

Comparing with glass encapsulated bead or radial leded thermistors, this axial leded thermistor, ATH50K1R8B3950K, offers improved mechanical stability, enhanced heat dissipation, and higher power ratings and is suitable for use in quomotive electronics, industrial electronics, and home appliances where cost-sensitive temperature sensing is required.

Axial leded 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 leded 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 leded 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 leded 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 leded 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

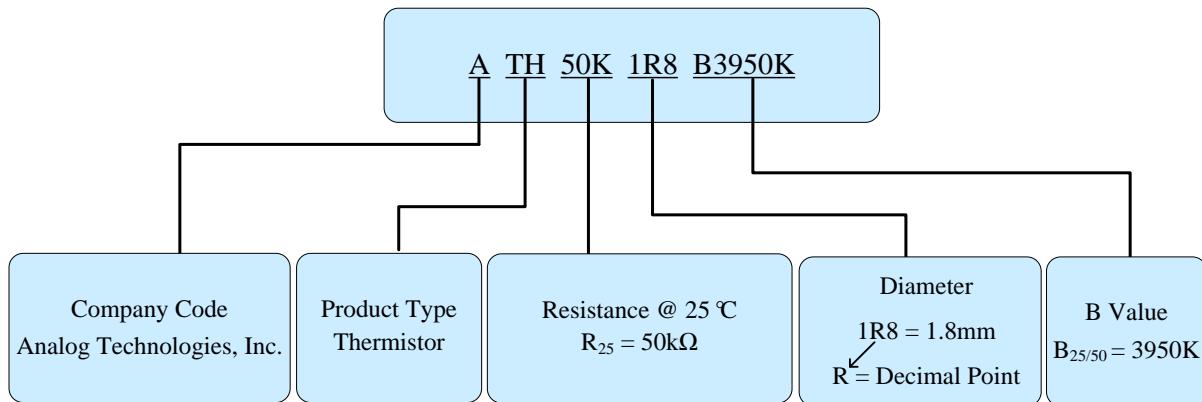


Figure 3. Part Number Convention of ATH50K1R8B3950K

### 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: $5 \pm 1\text{N}$ , Time Duration: $10 \pm 1\text{s}$	No Obvious Appearance Damage $\Delta R_{25}/R_{25} \leq \pm 2\%$
2	Solderability	IEC60068-2-20	Temperature: $245^\circ\text{C} \pm 5^\circ\text{C}$ Time Duration: $2 \sim 3\text{s}$	Coverage area $\geq 95\%$ .
3	Withstand Soldering Temperature	IEC60068-2-20	Solder Pot Temperature: $260^\circ\text{C} \pm 5^\circ\text{C}$ Immerse leads 6mm away from thermistor body Time Duration: $5 \pm 1\text{s}$	$\Delta R_{25}/R_{25} \leq \pm 2\%$
4	Humidity and Heat Sustainability	IEC60068-2-78	Temperature: $40^\circ\text{C} \pm 2^\circ\text{C}$ Humidity: $93\% \pm 2\%$ Time Duration: 500hrs	$\Delta R_{25}/R_{25} \leq \pm 2\%$
5	Thermal Cycling Sustainability	IEC60068-2-14	$-55^\circ\text{C} 30\text{min} \rightarrow 25^\circ\text{C} 5\text{min} \rightarrow 250^\circ\text{C} 30\text{min} \rightarrow 25^\circ\text{C} 5\text{min}$ , 5 cycles	$\Delta R_{25}/R_{25} \leq \pm 2\%$
6	High Temperature Storage Sustainability	IEC60068-2-2	Temperature: $250^\circ\text{C} \pm 5^\circ\text{C}$ Time Duration: 1000hrs	$\Delta R_{25}/R_{25} \leq \pm 2\%$
7	Low Temperature Storage Sustainability	IEC60068-2-1	Temperature: $-55^\circ\text{C}$ Time Duration: 1000hrs	$\Delta R_{25}/R_{25} \leq \pm 2\%$



Analog Technologies

Ultra-Stable Axial Leaded Thermistor

ATH50K1R8B3950K

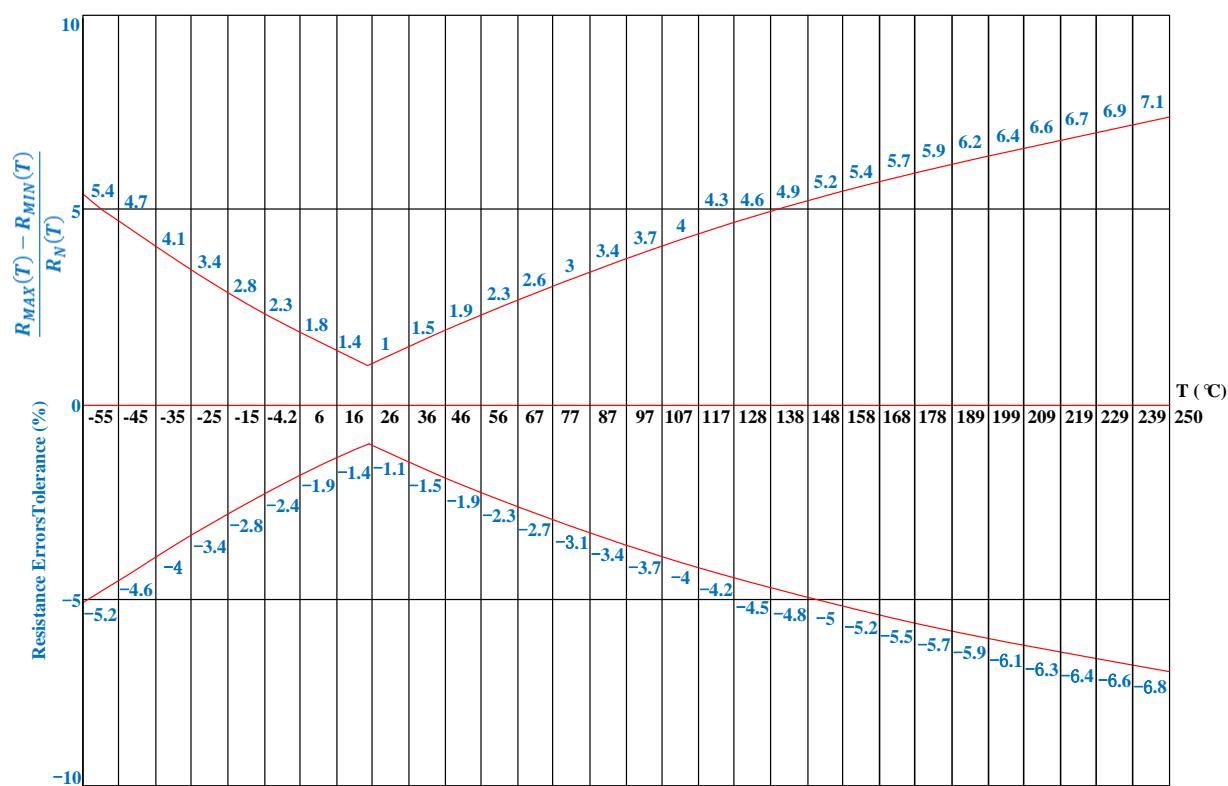


Figure 4. Resistance Tolerance vs. Temperature

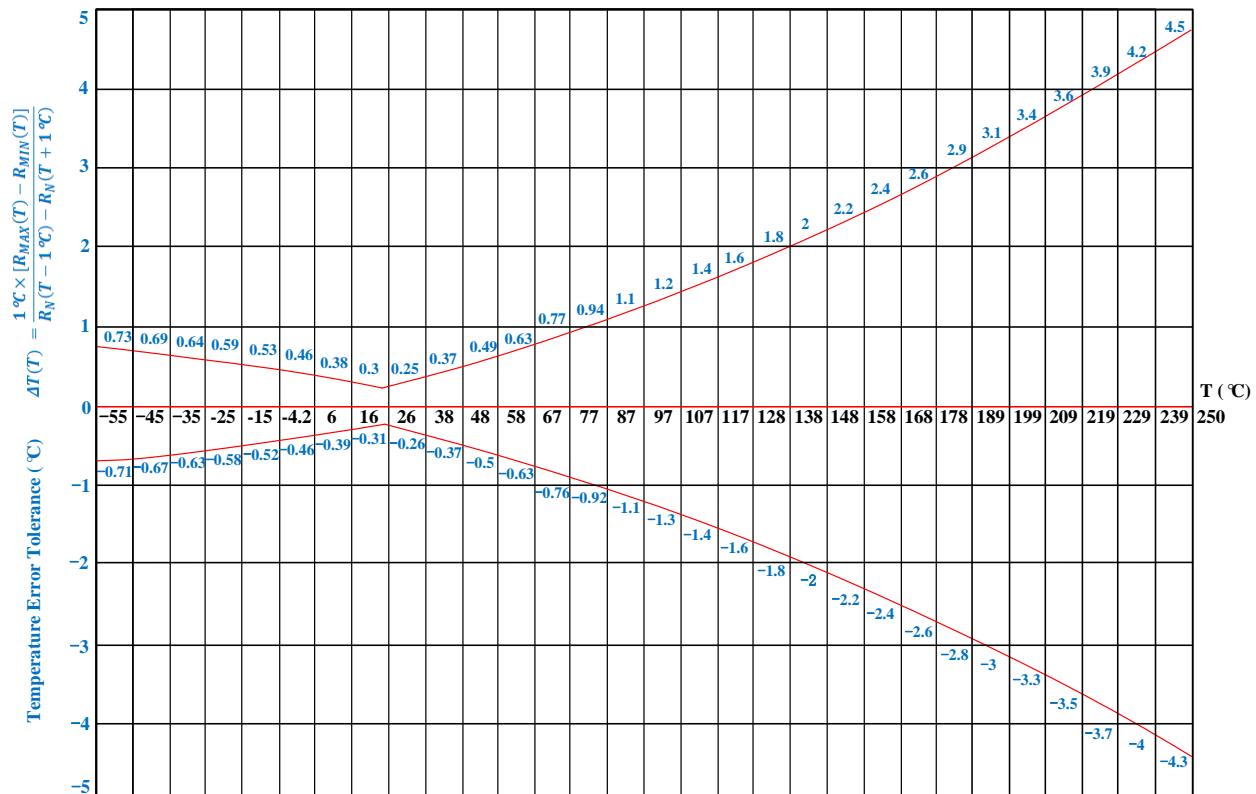


Figure 5. Temperature Tolerance vs. Temperature



Analog Technologies

Ultra-Stable Axial Leaded Thermistor

ATH50K1R8B3950K

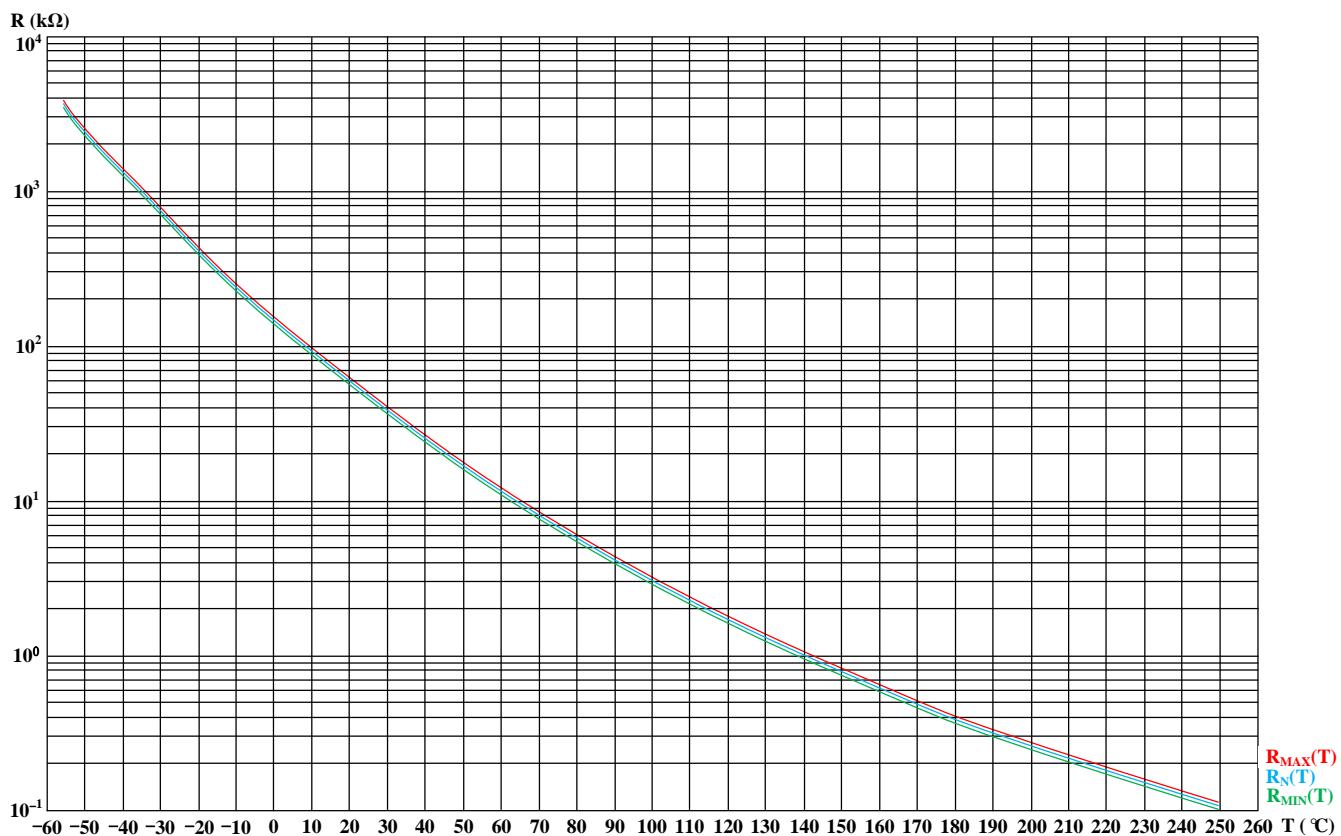


Figure 6. Resistance Tolerance vs. Temperature



*Analog Technologies*

Ultra-Stable Axial Leaded Thermistor

ATH50K1R8B3950K

### RESISTANCE TEMPERATURE CHARACTERISTICS

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

T (°C)	Thermistor Resistance (kΩ)			Relative Resistance Variation at a Specific Temperature $\frac{\Delta R_T(T)}{R_N(T)} (\pm\%)$	Temperature Measurement Error at a Specific Temperature $\Delta T(T) (\pm^\circ\text{C})$	Temperature Coefficient $\alpha (\%/\text{°C})$
	Minimum Value	Nominal Value	Maximum Value			
	$R_{MIN}(T)$	$R_N(T)$	$R_{MAX}(T)$			
-55	3609.121	3807.001	4015.321	5.33	0.26	9.29
-54	3278.061	3454.421	3639.911	5.24	0.28	9.26
-53	3007.851	3166.921	3334.081	5.15	0.31	8.32
-52	2782.571	2927.421	3079.511	5.07	0.33	7.57
-51	2590.741	2723.641	2863.081	5.00	0.36	6.99
-50	2424.031	2546.681	2675.261	4.93	0.38	6.55
-49	2276.361	2390.021	2509.091	4.87	0.39	6.23
-48	2143.271	2248.911	2359.521	4.81	0.40	6.01
-47	2021.501	2119.881	2222.831	4.75	0.41	5.86
-46	1908.701	2000.431	2096.361	4.69	0.41	5.78
-45	1803.181	1888.751	1978.191	4.63	0.40	5.74
-44	1703.741	1783.581	1866.971	4.58	0.40	5.74
-43	1609.561	1684.021	1761.741	4.52	0.39	5.76
-42	1520.081	1589.481	1661.881	4.46	0.38	5.80
-41	1434.921	1499.561	1566.951	4.40	0.38	5.85
-40	1353.841	1414.001	1476.671	4.34	0.37	5.90
-39	1276.681	1332.611	1390.861	4.28	0.36	5.95
-38	1203.321	1255.291	1309.371	4.22	0.35	6.00
-37	1133.691	1181.941	1232.121	4.16	0.34	6.04
-36	1067.701	1112.461	1158.991	4.10	0.34	6.07
-35	1005.271	1046.791	1089.911	4.04	0.33	6.10
-34	946.342	984.820	1024.751	3.98	0.33	6.11
-33	890.788	926.441	963.424	3.92	0.32	6.11
-32	838.511	871.538	905.776	3.86	0.32	6.11
-31	789.387	819.980	851.673	3.80	0.31	6.09
-30	743.287	771.624	800.962	3.74	0.31	6.07
-29	700.072	726.322	753.480	3.68	0.30	6.04
-28	659.596	683.916	709.063	3.62	0.30	6.00
-27	621.711	644.250	667.539	3.56	0.30	5.96
-26	586.270	607.164	628.739	3.50	0.30	5.91
-25	553.125	572.501	592.496	3.44	0.29	5.86
-24	522.131	540.106	558.644	3.38	0.29	5.80
-23	493.148	509.831	527.026	3.32	0.29	5.74
-22	466.041	481.532	497.488	3.27	0.29	5.69
-21	440.680	455.071	469.885	3.21	0.29	5.63
-20	416.944	430.319	444.079	3.15	0.28	5.57
-19	394.717	407.154	419.941	3.10	0.28	5.51



*Analog Technologies*

# Ultra-Stable Axial Leaded Thermistor

**ATH50K1R8B3950K**

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

T (°C)	Thermistor Resistance (kΩ)			Relative Resistance Variation at a Specific Temperature $\frac{\Delta R_T(T)}{R_N(T)} (\pm\%)$	Temperature Measurement Error at a Specific Temperature $\Delta T(T) (\pm\text{°C})$	Temperature Coefficient α (%/°C)
	Minimum Value	Nominal Value	Maximum Value			
	R <sub>MIN</sub> (T)	R <sub>N</sub> (T)	R <sub>MAX</sub> (T)			
-18	373.890	385.460	397.347	3.04	0.28	5.45
-17	354.362	365.130	376.187	2.99	0.28	5.39
-16	336.039	346.064	356.352	2.93	0.27	5.34
-15	318.833	328.170	337.747	2.88	0.27	5.29
-14	302.662	311.362	320.280	2.83	0.27	5.24
-13	287.452	295.561	303.868	2.78	0.27	5.19
-12	273.134	280.694	288.435	2.73	0.27	5.14
-11	259.644	266.695	273.909	2.67	0.26	5.10
-10	246.924	253.501	260.226	2.62	0.26	5.06
-9	234.920	241.055	247.326	2.57	0.26	5.02
-8	223.583	229.308	235.155	2.52	0.25	4.98
-7	212.868	218.210	223.663	2.47	0.25	4.95
-6	202.733	207.718	212.804	2.42	0.25	4.91
-5	193.140	197.792	202.536	2.38	0.24	4.88
-4	184.054	188.395	192.820	2.33	0.24	4.86
-3	175.443	179.494	183.621	2.28	0.24	4.83
-2	167.277	171.058	174.906	2.23	0.23	4.80
-1	159.530	163.057	166.646	2.18	0.23	4.78
0	152.176	155.467	158.813	2.13	0.22	4.76
1	145.192	148.261	151.380	2.09	0.22	4.74
2	138.556	141.419	144.326	2.04	0.22	4.72
3	132.250	134.919	137.627	1.99	0.21	4.70
4	126.254	128.741	131.264	1.95	0.21	4.68
5	120.552	122.869	125.218	1.90	0.20	4.66
6	115.127	117.285	119.472	1.85	0.20	4.64
7	109.964	111.974	114.009	1.81	0.20	4.63
8	105.051	106.921	108.814	1.76	0.19	4.61
9	100.373	102.113	103.873	1.71	0.18	4.71
10	95.690	97.303	98.932	1.67	0.18	4.59
11	91.677	93.181	94.700	1.62	0.18	4.44
12	87.636	89.034	90.444	1.58	0.17	4.55
13	83.787	85.084	86.393	1.53	0.17	4.53
14	80.119	81.323	82.537	1.49	0.16	4.51
15	76.625	77.741	78.866	1.44	0.16	4.50
16	73.294	74.329	75.370	1.40	0.16	4.48
17	70.120	71.077	72.041	1.35	0.15	4.47
18	67.093	67.980	68.871	1.31	0.15	4.45
19	64.209	65.028	65.851	1.26	0.14	4.43
20	61.458	62.214	62.974	1.22	0.14	4.42
21	58.835	59.533	60.233	1.17	0.13	4.40
22	56.333	56.977	57.622	1.13	0.13	4.38



*Analog Technologies*

# Ultra-Stable Axial Leaded Thermistor

**ATH50K1R8B3950K**

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

T (°C)	Thermistor Resistance (kΩ)			Relative Resistance Variation at a Specific Temperature $\frac{\Delta R_T(T)}{R_N(T)} (\pm\%)$	Temperature Measurement Error at a Specific Temperature $\Delta T(T) (\pm\text{°C})$	Temperature Coefficient α (%/°C)
	Minimum Value	Nominal Value	Maximum Value			
	R <sub>MIN</sub> (T)	R <sub>N</sub> (T)	R <sub>MAX</sub> (T)			
23	53.948	54.540	55.133	1.09	0.12	4.36
24	51.672	52.216	52.761	1.04	0.12	4.35
25	49.501	50.001	50.501	1.00	0.12	4.33
26	47.388	47.887	48.387	1.04	0.12	4.31
27	45.374	45.872	46.370	1.09	0.13	4.29
28	43.453	43.949	44.445	1.13	0.13	4.28
29	41.621	42.114	42.608	1.17	0.14	4.26
30	39.874	40.363	40.854	1.21	0.14	4.24
31	38.207	38.692	39.180	1.26	0.15	4.22
32	36.617	37.097	37.580	1.30	0.15	4.20
33	35.099	35.575	36.053	1.34	0.16	4.18
34	33.651	34.121	34.594	1.38	0.17	4.16
35	32.268	32.733	33.200	1.42	0.17	4.15
36	30.948	31.406	31.868	1.46	0.18	4.13
37	29.688	30.140	30.595	1.50	0.18	4.11
38	28.484	28.929	29.379	1.55	0.19	4.09
39	27.333	27.772	28.216	1.59	0.20	4.07
40	26.235	26.667	27.103	1.63	0.20	4.05
41	25.185	25.610	26.040	1.67	0.21	4.04
42	24.181	24.599	25.022	1.71	0.21	4.02
43	23.222	23.633	24.049	1.75	0.22	4.00
44	22.305	22.708	23.117	1.79	0.22	3.98
45	21.427	21.824	22.226	1.83	0.23	3.96
46	20.589	20.978	21.373	1.87	0.24	3.95
47	19.786	20.168	20.556	1.91	0.24	3.93
48	19.018	19.393	19.773	1.95	0.25	3.91
49	18.283	18.651	19.024	1.99	0.26	3.89
50	17.580	17.941	18.307	2.03	0.26	3.88
51	16.907	17.260	17.619	2.06	0.27	3.86
52	16.262	16.608	16.960	2.10	0.27	3.84
53	15.645	15.984	16.329	2.14	0.28	3.82
54	15.053	15.386	15.724	2.18	0.29	3.81
55	14.487	14.812	15.143	2.21	0.29	3.79
56	13.944	14.263	14.587	2.25	0.30	3.77
57	13.424	13.736	14.053	2.29	0.30	3.76
58	12.925	13.230	13.542	2.33	0.31	3.74
59	12.447	12.746	13.051	2.37	0.32	3.72
60	11.989	12.281	12.580	2.41	0.32	3.70
61	11.550	11.836	12.127	2.44	0.33	3.69
62	11.128	11.408	11.694	2.48	0.34	3.67
63	10.724	10.998	11.277	2.51	0.34	3.66
64	10.336	10.604	10.877	2.55	0.35	3.64
65	9.964	10.226	10.493	2.59	0.36	3.62



*Analog Technologies*

# Ultra-Stable Axial Leaded Thermistor

**ATH50K1R8B3950K**

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

T (°C)	Thermistor Resistance (kΩ)			Relative Resistance Variation at a Specific Temperature $\frac{\Delta R_T(T)}{R_N(T)} (\pm\%)$	Temperature Measurement Error at a Specific Temperature $\Delta T(T) (\pm\text{°C})$	Temperature Coefficient α (%/°C)
	Minimum Value	Nominal Value	Maximum Value			
	R <sub>MIN</sub> (T)	R <sub>N</sub> (T)	R <sub>MAX</sub> (T)			
66	9.607	9.863	10.124	2.62	0.36	3.61
67	9.264	9.514	9.770	2.66	0.37	3.59
68	8.935	9.180	9.430	2.70	0.38	3.57
69	8.619	8.858	9.103	2.73	0.38	3.56
70	8.316	8.550	8.789	2.77	0.39	3.54
71	8.025	8.253	8.487	2.80	0.40	3.53
72	7.745	7.968	8.197	2.84	0.40	3.51
73	7.476	7.694	7.918	2.87	0.41	3.49
74	7.218	7.431	7.650	2.91	0.42	3.47
75	6.970	7.178	7.392	2.94	0.43	3.46
76	6.731	6.935	7.144	2.98	0.43	3.44
77	6.502	6.701	6.905	3.01	0.44	3.42
78	6.282	6.476	6.676	3.04	0.45	3.40
79	6.070	6.260	6.455	3.08	0.45	3.39
80	5.866	6.052	6.243	3.11	0.46	3.37
81	5.670	5.852	6.038	3.14	0.47	3.36
82	5.482	5.659	5.841	3.17	0.47	3.34
83	5.300	5.474	5.652	3.22	0.48	3.32
84	5.126	5.295	5.470	3.25	0.49	3.31
85	4.958	5.124	5.294	3.28	0.50	3.29
86	4.796	4.958	5.125	3.32	0.51	3.28
87	4.641	4.799	4.962	3.34	0.51	3.25
88	4.491	4.646	4.805	3.38	0.52	3.24
89	4.347	4.498	4.654	3.41	0.53	3.22
90	4.208	4.356	4.508	3.44	0.54	3.20
91	4.075	4.219	4.368	3.47	0.54	3.19
92	3.946	4.087	4.232	3.50	0.55	3.17
93	3.822	3.960	4.102	3.54	0.56	3.16
94	3.702	3.837	3.976	3.57	0.57	3.14
95	3.587	3.719	3.855	3.60	0.58	3.12
96	3.476	3.605	3.738	3.63	0.58	3.11
97	3.369	3.495	3.625	3.66	0.59	3.09
98	3.266	3.389	3.516	3.69	0.60	3.08
99	3.166	3.286	3.411	3.73	0.61	3.06
100	3.070	3.188	3.309	3.75	0.62	3.04
101	2.977	3.092	3.211	3.78	0.62	3.04
102	2.888	3.000	3.117	3.82	0.63	3.02
103	2.802	2.911	3.025	3.83	0.64	2.99
104	2.718	2.826	2.937	3.87	0.65	2.97
105	2.638	2.743	2.852	3.90	0.66	2.97
106	2.560	2.663	2.770	3.94	0.67	2.95
107	2.485	2.586	2.690	3.96	0.67	2.94
108	2.413	2.511	2.613	3.98	0.68	2.93



*Analog Technologies*

# Ultra-Stable Axial Leaded Thermistor

**ATH50K1R8B3950K**

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

T (°C)	Thermistor Resistance (kΩ)			Relative Resistance Variation at a Specific Temperature $\frac{\Delta R_T(T)}{R_N(T)} (\pm\%)$	Temperature Measurement Error at a Specific Temperature $\Delta T(T) (\pm\text{°C})$	Temperature Coefficient α (%/°C)
	Minimum Value	Nominal Value	Maximum Value			
	R <sub>MIN</sub> (T)	R <sub>N</sub> (T)	R <sub>MAX</sub> (T)			
109	2.343	2.439	2.539	4.02	0.69	2.91
110	2.275	2.369	2.467	4.05	0.70	2.89
111	2.210	2.302	2.398	4.08	0.71	2.87
112	2.147	2.237	2.331	4.11	0.72	2.86
113	2.086	2.174	2.266	4.14	0.73	2.85
114	2.027	2.113	2.203	4.16	0.73	2.84
115	1.970	2.054	2.142	4.19	0.74	2.82
116	1.914	1.997	2.083	4.23	0.75	2.80
117	1.861	1.942	2.026	4.25	0.76	2.81
118	1.809	1.888	1.971	4.29	0.77	2.78
119	1.759	1.837	1.917	4.30	0.77	2.78
120	1.711	1.786	1.865	4.31	0.78	2.77
121	1.664	1.738	1.815	4.34	0.79	2.73
122	1.618	1.691	1.767	4.41	0.80	2.75
123	1.574	1.645	1.720	4.44	0.81	2.74
124	1.532	1.601	1.674	4.43	0.83	2.69
125	1.490	1.559	1.630	4.49	0.83	2.69
126	1.450	1.517	1.587	4.52	0.84	2.70
127	1.412	1.477	1.545	4.50	0.84	2.67
128	1.374	1.438	1.505	4.55	0.85	2.68
129	1.337	1.400	1.466	4.61	0.87	2.64
130	1.302	1.364	1.428	4.62	0.88	2.64
131	1.268	1.328	1.391	4.63	0.87	2.67
132	1.235	1.293	1.355	4.64	0.88	2.63
133	1.202	1.260	1.320	4.68	0.91	2.58
134	1.171	1.228	1.287	4.72	0.91	2.61
135	1.141	1.196	1.254	4.72	0.90	2.63
136	1.111	1.165	1.222	4.76	0.92	2.58
137	1.083	1.136	1.191	4.75	0.93	2.55
138	1.055	1.107	1.161	4.79	0.93	2.57
139	1.028	1.079	1.132	4.82	0.95	2.55
140	1.002	1.052	1.104	4.85	0.94	2.57
141	0.976	1.025	1.076	4.88	0.96	2.54
142	0.952	1.000	1.050	4.90	0.98	2.50
143	0.928	0.975	1.024	4.92	0.96	2.56
144	0.904	0.950	0.999	5.00	0.99	2.53
145	0.882	0.927	0.974	4.96	1.00	2.48
146	0.860	0.904	0.950	4.98	1.00	2.49
147	0.838	0.882	0.927	5.05	1.01	2.49
148	0.817	0.860	0.905	5.12	1.02	2.50
149	0.797	0.839	0.883	5.13	1.05	2.44
150	0.778	0.819	0.861	5.07	1.04	2.44
151	0.759	0.799	0.841	5.13	1.03	2.50



*Analog Technologies*

# Ultra-Stable Axial Leaded Thermistor

**ATH50K1R8B3950K**

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

T (°C)	Thermistor Resistance (kΩ)			Relative Resistance Variation at a Specific Temperature $\frac{\Delta R_T(T)}{R_N(T)} (\pm\%)$	Temperature Measurement Error at a Specific Temperature $\Delta T(T) (\pm^\circ\text{C})$	Temperature Coefficient α (%/°C)
	Minimum Value	Nominal Value	Maximum Value			
	R <sub>MIN</sub> (T)	R <sub>N</sub> (T)	R <sub>MAX</sub> (T)			
152	0.740	0.779	0.821	5.20	1.07	2.44
153	0.722	0.761	0.801	5.19	1.07	2.43
154	0.705	0.742	0.782	5.19	1.04	2.49
155	0.687	0.724	0.763	5.25	1.09	2.42
156	0.671	0.707	0.745	5.23	1.09	2.40
157	0.655	0.690	0.728	5.29	1.11	2.39
158	0.639	0.674	0.711	5.34	1.13	2.37
159	0.624	0.658	0.694	5.32	1.13	2.36
160	0.609	0.643	0.678	5.37	1.15	2.33
161	0.595	0.628	0.662	5.33	1.12	2.39
162	0.581	0.613	0.647	5.38	1.14	2.37
163	0.567	0.599	0.632	5.43	1.16	2.34
164	0.554	0.585	0.618	5.47	1.14	2.39
165	0.541	0.571	0.603	5.43	1.15	2.36
166	0.528	0.558	0.590	5.56	1.19	2.33
167	0.516	0.545	0.576	5.50	1.20	2.29
168	0.504	0.533	0.563	5.53	1.23	2.25
169	0.493	0.521	0.551	5.57	1.21	2.30
170	0.482	0.509	0.538	5.50	1.22	2.26
171	0.471	0.498	0.526	5.52	1.25	2.21
172	0.460	0.487	0.515	5.65	1.25	2.26
173	0.450	0.476	0.503	5.57	1.20	2.31
174	0.440	0.465	0.492	5.59	1.24	2.26
175	0.430	0.455	0.482	5.71	1.30	2.20
176	0.420	0.445	0.471	5.73	1.28	2.25
177	0.411	0.435	0.461	5.75	1.32	2.18
178	0.402	0.426	0.451	5.75	1.36	2.11
179	0.393	0.417	0.441	5.76	1.33	2.16
180	0.385	0.408	0.432	5.76	1.31	2.21
181	0.376	0.399	0.423	5.89	1.38	2.13
182	0.368	0.391	0.414	5.88	1.35	2.17
183	0.361	0.382	0.405	5.76	1.29	2.23
184	0.353	0.374	0.397	5.88	1.47	2.01
185	0.345	0.367	0.389	5.99	1.47	2.04
186	0.338	0.359	0.381	5.99	1.43	2.09
187	0.331	0.352	0.373	5.97	1.40	2.13
188	0.324	0.344	0.366	6.10	1.40	2.18
189	0.318	0.337	0.358	5.93	1.54	1.93
190	0.311	0.331	0.351	6.04	1.54	1.96
191	0.305	0.324	0.344	6.02	1.39	2.16
192	0.299	0.317	0.337	5.99	1.46	2.05
193	0.293	0.311	0.331	6.11	1.58	1.93
194	0.287	0.305	0.324	6.07	1.54	1.97



*Analog Technologies*

# Ultra-Stable Axial Leaded Thermistor

ATH50K1R8B3950K

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

T (°C)	Thermistor Resistance (kΩ)			Relative Resistance Variation at a Specific Temperature $\frac{\Delta R_T(T)}{R_N(T)} (\pm\%)$	Temperature Measurement Error at a Specific Temperature $\Delta T(T) (\pm^\circ\text{C})$	Temperature Coefficient α (%/°C)
	Minimum Value	Nominal Value	Maximum Value			
	R <sub>MIN</sub> (T)	R <sub>N</sub> (T)	R <sub>MAX</sub> (T)			
195	0.281	0.299	0.318	6.19	1.54	2.01
196	0.276	0.293	0.312	6.14	1.64	1.88
197	0.270	0.288	0.306	6.25	1.64	1.91
198	0.265	0.282	0.300	6.21	1.59	1.95
199	0.260	0.277	0.294	6.14	1.70	1.81
200	0.255	0.272	0.289	6.25	1.55	2.02
201	0.250	0.266	0.284	6.39	1.55	2.07
202	0.246	0.261	0.278	6.13	1.78	1.72
203	0.241	0.257	0.273	6.23	1.78	1.75
204	0.237	0.252	0.268	6.15	1.55	1.98
205	0.232	0.247	0.263	6.28	1.72	1.82
206	0.228	0.243	0.259	6.38	1.72	1.85
207	0.224	0.238	0.254	6.30	1.67	1.89
208	0.220	0.234	0.250	6.41	1.88	1.71
209	0.216	0.230	0.245	6.30	1.81	1.74
210	0.212	0.226	0.241	6.42	1.81	1.77
211	0.208	0.222	0.237	6.53	1.81	1.80
212	0.205	0.218	0.233	6.42	1.75	1.83
213	0.201	0.214	0.229	6.54	2.00	1.64
214	0.197	0.211	0.225	6.64	2.00	1.66
215	0.194	0.207	0.221	6.52	1.69	1.93
216	0.191	0.203	0.217	6.40	1.86	1.72
217	0.187	0.200	0.213	6.50	2.17	1.50
218	0.184	0.197	0.210	6.60	1.86	1.78
219	0.181	0.193	0.206	6.48	1.79	1.81
220	0.178	0.190	0.203	6.58	2.08	1.58
221	0.175	0.187	0.200	6.68	2.08	1.60
222	0.172	0.184	0.196	6.52	2.00	1.63
223	0.169	0.181	0.193	6.63	2.00	1.66
224	0.166	0.178	0.190	6.74	2.00	1.69
225	0.163	0.175	0.187	6.86	2.00	1.71
226	0.161	0.172	0.184	6.69	1.92	1.74
227	0.158	0.169	0.181	6.80	1.92	1.78
228	0.155	0.166	0.178	6.93	1.92	1.81
229	0.153	0.163	0.175	6.75	2.20	1.53
230	0.150	0.161	0.172	6.83	2.20	1.55
231	0.148	0.158	0.169	6.65	1.75	1.90
232	0.145	0.155	0.166	6.77	1.75	1.94
233	0.142	0.152	0.163	6.91	2.10	1.64
234	0.140	0.150	0.160	6.67	2.00	1.67
235	0.138	0.147	0.158	6.80	2.00	1.70
236	0.135	0.145	0.155	6.90	2.00	1.72
237	0.133	0.142	0.152	6.69	1.90	1.76



*Analog Technologies*

Ultra-Stable Axial Leaded Thermistor

ATH50K1R8B3950K

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

T (°C)	Thermistor Resistance (kΩ)			Relative Resistance Variation at a Specific Temperature $\frac{\Delta R_T(T)}{R_N(T)} (\pm\%)$	Temperature Measurement Error at a Specific Temperature $\Delta T(T)$ (±°C)	Temperature Coefficient α (%/°C)
	Minimum Value	Nominal Value	Maximum Value			
	$R_{MIN}(T)$	$R_N(T)$	$R_{MAX}(T)$			
238	0.130	0.140	0.150	7.14	2.00	1.79
239	0.128	0.137	0.147	6.93	1.90	1.82
240	0.126	0.135	0.144	6.67	1.80	1.85
241	0.123	0.132	0.142	7.20	1.90	1.89
242	0.121	0.130	0.139	6.92	1.80	1.92
243	0.119	0.127	0.137	7.09	1.80	1.97
244	0.117	0.125	0.134	6.80	2.13	1.60
245	0.114	0.123	0.131	6.91	1.70	2.03
246	0.112	0.120	0.129	7.08	1.70	2.08
247	0.110	0.118	0.126	6.78	1.60	2.12
248	0.107	0.115	0.124	7.39	1.70	2.17
249	0.105	0.113	0.121	7.08	2.00	1.77
250	0.103	0.111	0.119	7.21	2.00	1.76



To ensure optimal performance and reliability, it is recommended to follow proper storage procedures for the ATH50K1R8B3950K 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  $-25^{\circ}\text{C}$  to  $+45^{\circ}\text{C}$ , 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 SO<sub>x</sub>, 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 ATH50K1R8B3950K 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.
3. This means that while ATI may provide information about the typical requirements and applications of their products, they cannot guarantee that their products will be suitable for all customer applications. It is the responsibility of the customer to evaluate whether an ATI product with the specified properties is appropriate for their particular application.
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.
5. ATI reserves the right to make changes or discontinue products or services without notice. Customers are advised to obtain the latest information before placing orders.
6. All products are sold subject to terms and conditions of sale, including those pertaining to warranty, patent infringement, and limitation of liability. Customers are responsible for their applications using ATI products, and ATI assumes no liability for applications assistance or customer product design.
7. ATI does not grant any license, either express or implied, under any patent right, copyright, mask work right, or other intellectual property right of ATI.
8. ATI's publication of information regarding third-party products or services does not constitute approval, warranty, or endorsement.



*Analog Technologies*

**Ultra-Stable Axial Leaded Thermistor**

**ATH50K1R8B3950K**

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.