High Stability Miniature Thermistor

ATH100KR8B3K

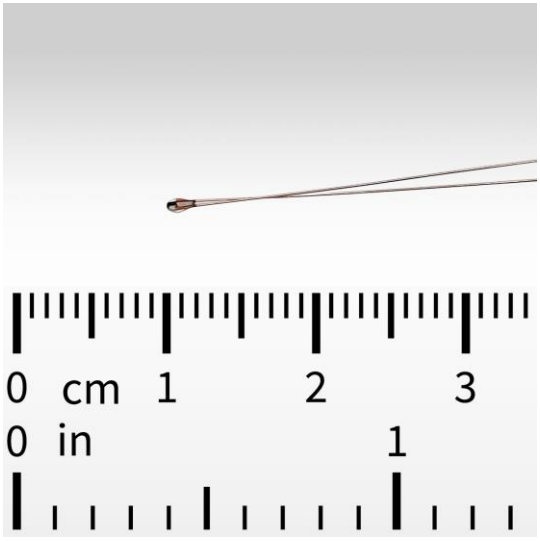

Figure 1.1. The physical photo of ATH100KR8B3K

MAIN FEATURES

Glass Encapsulated for Long Term Stability & Reliability
High Stability: <0.1°C/Y
Small Size: ϕ0.8mm×1.8mm
High Resistance Accuracy: 1%
Quick Response Time
Wide Temp. Range: –40°C to 300°C
100% Lead (Pb)-free and RoHS Compliant

APPLICATIONS

Temperature sensing for laser diodes, optical components, etc.

DESCRIPTION

The ATH100KR8B3K thermistor is shown in Figure 1. The ATH100KR8B3K is a high precision glass encapsulated thermistor. Comparing with conventional epoxy encapsulated thermistors, ATH100KR8B3K presents higher long term stability and wider temperature range. In addition, it has a small size and short response time.

The ATH100KR8B3K can be used to measure the temperatures for laser diodes, optical components, etc., with high accuracy and long term stability.

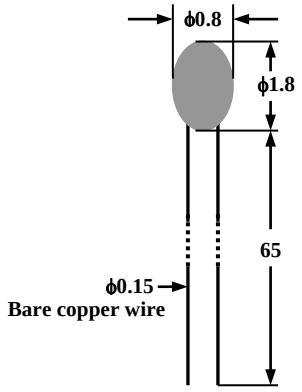

Figure 2. Side View of ATH100KR8B3K

SPECIFICATIONS

Parameters	Value
Nominal Resistance @ 25°C	100K ± 1%
B Value @ 25°C /50°C	3950K ± 1%
Thermistor Diameter	0.8 ± 0.2mm
Thermistor Length	1.8 ± 0.5mm
Lead Diameter	0.15± 0.05mm
Lead Length	65 ± 2mm
Insulation Resistance	>100MΩ
Thermal Dissipation Coefficient	1.4mW/°C
Maximum Power @ 25°C	50mW
Time Constant	14s (in still air @5~25°C)

APPLICATION

Drill a hole on the object for which the temperature needs to be measured and use thermally conductive epoxy to pot the thermistor inside the hole. The hole diameter should be between 1.2 to 1.4mm and the depth should between 2 to 2.5mm. When a deeper hole is needed, drill a 2 stage hole to prevent mounting epoxy bobbles trapped inside which would cause temperature measurement errors. Figure 3 shows the section view of the 2 stage hole.

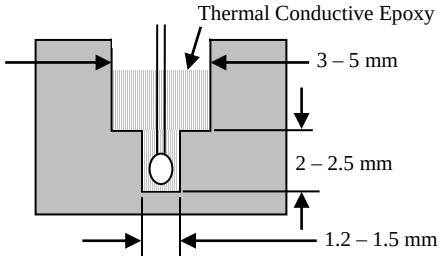

Figure 3. Section View of the 2 Stage Hole

The worst mounting result is that there are air bubbles trapped inside the thermistor mounting hole. These bubbles cause thermal sensing time delay and sensing temperature errors. To avoid the bubbles, use thin epoxy, vibrate the assembly before curing, and cure the epoxy inside the mounting hole at high temperature, 80°C to 150°C, depending on the epoxy used and the maximum temperature assembly components allow.

The thermistor lead wires are made of plain copper and there is no insulation coating on them, please make sure that they do not touch each other after mounting the thermistor.

Some thermal conductive epoxies are also electrically conductive and such epoxies should not be used for mounting the thermistors, since the lead wires are conductive.

Notice: Glass encapsulated cannot be used in water or other liquid directly.

Resistance Temperature Characteristics

R=100kΩ, Tolerance: ± 1%, B25/50=3950K									
Temp (˚C)	Resistance (kΩ)			Temperature Coefficient (%/˚C)	Temp (˚C)	Resistance (kΩ)			Temperature Coefficient (%/˚C)
	Min	Typ	Max			Min	Typ	Max	
–40	3011.237	3152.027	3292.818	4.47	6	236.298	241.153	246.008	2.01
–39	2827.807	2958.37	3088.932	4.41	7	225.182	229.684	234.186	1.96
–38	2656.509	2777.613	2898.717	4.36	8	214.643	218.815	222.987	1.91
–37	2496.485	2608.839	2721.193	4.31	9	204.649	208.5134	212.378	1.85
–36	2346.939	2451.197	2555.455	4.25	10	195.17	198.747	202.324	1.80
–35	2207.138	2303.902	2400.666	4.20	11	186.177	189.487	192.796	1.75
–34	2076.4	2166.226	2256.052	4.15	12	177.645	180.705	183.765	1.69
–33	1954.095	2037.496	2120.898	4.09	13	169.549	172.376	175.203	1.64
–32	1839.639	1917.09	1994.54	4.04	14	161.865	164.4751	167.085	1.59
–31	1732.493	1804.43	1876.366	3.99	15	154.572	156.9793	159.386	1.53
–30	1632.154	1698.981	1765.807	3.93	16	147.649	149.8667	152.085	1.48
–29	1538.158	1600.247	1662.337	3.88	17	141.075	143.1167	145.158	1.43
–28	1450.073	1507.771	1565.468	3.83	18	134.832	136.7095	138.587	1.37
–27	1367.501	1421.125	1474.749	3.77	19	128.902	130.6265	132.351	1.32
–26	1290.069	1339.914	1389.759	3.72	20	123.269	124.85	126.431	1.27
–25	1217.434	1263.772	1310.11	3.67	21	117.915	119.363	120.811	1.21
–24	1149.274	1192.358	1235.442	3.61	22	112.825	114.15	115.474	1.16
–23	1085.293	1125.356	1165.419	3.56	23	107.986	109.1941	110.403	1.11
–22	1025.216	1062.473	1099.73	3.51	24	103.382	104.4823	105.583	1.05
–21	968.784	1003.436	1038.088	3.45	25	99	100	101	1.00
–20	916.441	948.697	980.953	3.40	26	94.752	95.7341	96.716	1.03
–19	867.529	897.5673	927.606	3.35	27	90.708	91.6718	92.635	1.05
–18	821.028	848.9881	876.948	3.29	28	86.856	87.8012	88.746	1.08
–17	776.955	802.9709	828.987	3.24	29	83.184	84.1107	85.037	1.10
–16	735.278	759.4801	783.682	3.19	30	79.681	80.5894	81.498	1.13
–15	695.935	718.4468	740.958	3.13	31	76.337	77.2269	78.117	1.15
–14	658.843	679.78	700.717	3.08	32	73.141	74.0134	74.885	1.18
–13	623.9	643.3725	662.845	3.03	33	70.086	70.9394	71.793	1.20
–12	590.998	609.1089	627.22	2.97	34	67.16	67.9961	68.832	1.23
–11	560.026	576.8705	593.715	2.92	35	64.357	65.175	65.993	1.25
–10	530.871	546.538	562.205	2.87	36	61.736	62.5367	63.337	1.28
–9	503.421	517.9941	532.567	2.81	37	59.237	60.0205	60.804	1.31
–8	477.571	491.1256	504.681	2.76	38	56.853	57.6198	58.387	1.33
–7	453.216	465.824	478.433	2.71	39	54.578	55.3282	56.079	1.36
–6	430.261	441.988	453.716	2.65	40	52.406	53.1399	53.874	1.38
–5	408.614	419.521	430.429	2.60	41	50.331	51.0493	51.768	1.41
–4	388.189	398.333	408.477	2.55	42	48.349	49.0513	49.754	1.43
–3	368.907	378.341	387.774	2.49	43	46.454	47.141	47.828	1.46
–2	350.695	359.466	368.237	2.44	44	44.642	45.314	45.986	1.48
–1	333.484	341.638	349.792	2.39	45	42.909	43.566	44.223	1.51
0	317.212	324.79	332.368	2.33	46	41.25	41.893	42.536	1.53
1	301.818	308.86	315.902	2.28	47	39.663	40.2915	40.92	1.56
2	287.251	293.793	300.335	2.23	48	38.143	38.7579	39.372	1.59
3	273.46	279.535	285.61	2.17	49	36.688	37.2891	37.89	1.61
4	260.398	266.038	271.678	2.12	50	35.295	35.882	36.469	1.64
5	248.024	253.258	258.492	2.07	51	33.96	34.5338	35.108	1.66

Temp (˚C)	Resistance (kΩ)			Temperature Coefficient (%/˚C)	Resistance (kΩ)	Resistance (kΩ)			Temperature Coefficient (%/˚C)
	Min	Typ	Min			Min	Typ	Max	
52	32.681	33.2418	33.803	1.69	103	5.85	6.0302	6.21	2.99
53	31.455	32.0035	32.552	1.71	104	5.68	5.8561	6.032	3.01
54	30.281	30.8165	31.352	1.74	105	5.515	5.6876	5.86	3.04
55	29.155	29.6786	30.202	1.76	106	5.355	5.5246	5.694	3.06
56	28.076	28.5877	29.099	1.79	107	5.201	5.3668	5.532	3.09
57	27.042	27.5417	28.041	1.81	108	5.052	5.2142	5.377	3.11
58	26.05	26.539	27.027	1.84	109	4.907	5.066	5.225	3.14
59	25.1	25.5769	26.054	1.87	110	4.767	4.9232	5.079	3.16
60	24.188	24.6545	25.121	1.89	111	4.632	4.7848	4.937	3.19
61	23.314	23.7699	24.225	1.92	112	4.501	4.6507	4.8	3.21
62	22.476	22.9214	23.366	1.94	113	4.374	4.5209	4.667	3.24
63	21.673	22.1075	22.542	1.97	114	4.252	4.3955	4.539	3.27
64	20.902	21.3268	21.752	1.99	115	4.133	4.2741	4.415	3.29
65	20.162	20.5777	20.993	2.02	116	4.019	4.1569	4.295	3.32
66	19.453	19.8591	20.265	2.04	117	3.908	4.0436	4.179	3.34
67	18.773	19.1694	19.566	2.07	118	3.802	3.9342	4.067	3.37
68	18.12	18.5075	18.895	2.09	119	3.699	3.829	3.959	3.39
69	17.493	17.8722	18.251	2.12	120	3.6	3.727	3.854	3.42
70	16.892	17.262	17.633	2.15	121	3.513	3.638	3.763	3.44
71	16.314	16.6764	17.038	2.17	122	3.425	3.5481	3.671	3.47
72	15.76	16.1138	16.468	2.20	123	3.337	3.4582	3.579	3.49
73	15.227	15.5732	15.919	2.22	124	3.251	3.3698	3.488	3.52
74	14.715	15.0536	15.392	2.25	125	3.1654	3.2818	3.3982	3.55
75	14.223	14.5541	14.885	2.27	126	3.082	3.1961	3.3102	3.57
76	13.75	14.0736	14.397	2.30	127	0	3.1116	0	3.60
77	13.295	13.6113	13.928	2.32	128	2.9202	3.0299	3.1396	3.62
78	12.857	13.1663	13.476	2.35	129	2.8421	2.9497	3.0573	3.65
79	12.435	12.7377	13.04	2.37	130	2.7669	2.8724	2.9779	3.67
80	12.029	12.3248	12.621	2.40	131	2.692	2.7954	2.8988	3.70
81	11.641	11.9306	12.22	2.43	132	2.6214	2.7228	2.8242	3.72
82	11.266	11.5495	11.833	2.45	133	2.5524	2.6518	2.7512	3.75
83	10.904	11.1811	11.458	2.48	134	2.486	2.5835	2.681	3.77
84	10.554	10.8253	11.096	2.50	135	2.4212	2.5168	2.6124	3.80
85	10.217	10.482	10.747	2.53	136	2.3585	2.4523	2.5461	3.83
86	9.892	10.1509	10.41	2.55	137	2.2983	2.3904	2.4825	3.85
87	9.578	9.8315	10.085	2.58	138	2.2398	2.3301	2.4204	3.88
88	9.276	9.5238	9.772	2.60	139	2.1837	2.2724	2.3611	3.90
89	8.985	9.227	9.47	2.63	140	2.1292	2.2162	2.3032	3.93
90	8.704	8.9412	9.179	2.65	141	2.0763	2.1618	2.2473	3.95
91	8.433	8.6657	8.898	2.68	142	2.0257	2.1096	2.1935	3.98
92	8.173	8.4002	8.627	2.71	143	1.9762	2.0586	2.141	4.00
93	7.922	8.1443	8.367	2.73	144	1.9282	2.0092	2.0902	4.03
94	7.68	7.8975	8.115	2.76	145	1.882	1.9615	2.041	4.05
95	7.447	7.6596	7.873	2.78	146	1.8364	1.9145	1.9926	4.08
96	7.221	7.43	7.639	2.81	147	1.7927	1.8695	1.9463	4.11
97	7.004	7.2086	7.413	2.83	148	1.7502	1.8256	1.901	4.13
98	6.795	6.9948	7.195	2.86	149	1.7089	1.783	1.8571	4.16
99	6.593	6.788	6.984	2.88	150	1.6683	1.7411	1.8139	4.18
100	6.397	6.589	6.781	2.91	151	1.629	1.7005	1.772	4.21
101	6.209	6.3964	6.584	2.93	152	1.5907	1.661	1.7313	4.23
102	6.026	6.2102	6.394	2.96	153	1.5531	1.6222	1.6913	4.26

Temp (˚C)	Resistance (kΩ)			Temperature Coefficient (%/˚C)	Temp (˚C)	Resistance (kΩ)			Temperature Coefficient (%/˚C)
	Min	Typ	Max			Min	Typ	Max	
154	1.5164	1.5843	1.6522	4.28	205	0.5063	0.5362	0.5661	5.58
155	1.4809	1.5476	1.6143	4.31	206	0.4991	0.5288	0.5585	5.61
156	1.4463	1.5118	1.5773	4.33	207	0.4893	0.5185	0.5477	5.63
157	1.4122	1.4766	1.541	4.36	208	0.4798	0.5086	0.5374	5.66
158	1.3795	1.4428	1.5061	4.39	209	0.4715	0.4999	0.5283	5.68
159	1.347	1.4092	1.4714	4.41	210	0.464	0.4921	0.5202	5.71
160	1.3156	1.3767	1.4378	4.44	211	0.4562	0.4839	0.5116	5.73
161	1.2851	1.3451	1.4051	4.46	212	0.4468	0.4741	0.5014	5.76
162	1.2557	1.3147	1.3737	4.49	213	0.4388	0.4657	0.4926	5.79
163	1.2268	1.2848	1.3428	4.51	214	0.4325	0.4592	0.4859	5.81
164	1.1989	1.2559	1.3129	4.54	215	0.4244	0.4507	0.477	5.84
165	1.1718	1.2278	1.2838	4.56	216	0.4168	0.4428	0.4688	5.86
166	1.1461	1.2012	1.2563	4.59	217	0.4094	0.435	0.4606	5.89
167	1.1209	1.1751	1.2293	4.61	218	0.4015	0.4267	0.4519	5.91
168	1.0964	1.1497	1.203	4.64	219	0.3936	0.4185	0.4434	5.94
169	1.0734	1.1259	1.1784	4.67	220	0.3865	0.411	0.4355	5.96
170	1.0509	1.1026	1.1543	4.69	221	0.3796	0.4038	0.428	5.99
171	1.0244	1.0751	1.1258	4.72	222	0.3729	0.3968	0.4207	6.01
172	0.9989	1.0486	1.0983	4.74	223	0.3664	0.3899	0.4134	6.04
173	0.9766	1.0255	1.0744	4.77	224	0.3599	0.3831	0.4063	6.07
174	0.955	1.0031	1.0512	4.79	225	0.3536	0.3765	0.3994	6.09
175	0.9331	0.9803	1.0275	4.82	226	0.3473	0.3699	0.3925	6.12
176	0.9144	0.9609	1.0074	4.84	227	0.3412	0.3635	0.3858	6.14
177	0.8956	0.9414	0.9872	4.87	228	0.3353	0.3573	0.3793	6.17
178	0.8779	0.9231	0.9683	4.89	229	0.3294	0.3511	0.3728	6.19
179	0.8584	0.9028	0.9472	4.92	230	0.3236	0.3451	0.3666	6.22
180	0.8441	0.888	0.9319	4.95	231	0.318	0.3392	0.3604	6.24
181	0.8236	0.8667	0.9098	4.97	232	0.3125	0.3334	0.3543	6.27
182	0.8093	0.8519	0.8945	5.00	233	0.3072	0.3278	0.3484	6.29
183	0.7938	0.8358	0.8778	5.02	234	0.3018	0.3222	0.3426	6.32
184	0.7768	0.8181	0.8594	5.05	235	0.2967	0.3168	0.3369	6.35
185	0.7607	0.8014	0.8421	5.07	236	0.2917	0.3115	0.3313	6.37
186	0.7451	0.7851	0.8251	5.10	237	0.2867	0.3063	0.3259	6.40
187	0.7284	0.7677	0.807	5.12	238	0.2819	0.3012	0.3205	6.42
188	0.717	0.7559	0.7948	5.15	239	0.2772	0.2963	0.3154	6.45
189	0.6993	0.7375	0.7757	5.17	240	0.2725	0.2914	0.3103	6.47
190	0.6854	0.723	0.7606	5.20	241	0.268	0.2866	0.3052	6.50
191	0.6704	0.7074	0.7444	5.23	242	0.2636	0.282	0.3004	6.52
192	0.6588	0.6953	0.7318	5.25	243	0.2593	0.2775	0.2957	6.55
193	0.6446	0.6805	0.7164	5.28	244	0.2551	0.273	0.2909	6.57
194	0.6315	0.6669	0.7023	5.30	245	0.251	0.2687	0.2864	0.251
195	0.6164	0.6511	0.6858	5.33	246	0.247	0.2645	0.282	6.63
196	0.604	0.6382	0.6724	5.35	247	0.243	0.2603	0.2776	6.65
197	0.5938	0.6275	0.6612	5.38	248	0.2392	0.2563	0.2734	6.68
198	0.581	0.6142	0.6474	5.40	249	0.2354	0.2523	0.2692	6.70
199	0.5694	0.6021	0.6348	5.43	250	0.2318	0.2485	0.2652	6.73
200	0.561	0.5934	0.6258	5.45	251	0.2273	0.2437	0.2602	6.75
201	0.5479	0.5797	0.6115	5.48	252	0.2236	0.2399	0.2561	6.78
202	0.5365	0.5678	0.5991	5.51	253	0.2201	0.2361	0.2522	6.80
203	0.526	0.5568	0.5876	5.53	254	0.2166	0.2324	0.2483	6.83
204	0.5163	0.5467	0.5771	5.56	255	0.2131	0.2288	0.2445	6.85

Temp (˚C)	Resistance (kΩ)			Temperature Coefficient (%/˚C)	Temp (˚C)	Resistance (kΩ)			Temperature Coefficient (%/˚C)
	Min	Typ	Max			Min	Typ	Max	
256	0.2098	0.2253	0.2407	6.88	279	0.1476	0.1595	0.1714	7.47
257	0.2065	0.2218	0.2371	6.91	280	0.1455	0.1572	0.169	7.49
258	0.2032	0.2183	0.2335	6.93	281	0.1433	0.155	0.1666	7.52
259	0.2	0.215	0.2299	6.96	282	0.1413	0.1528	0.1643	7.54
260	0.1969	0.2117	0.2265	6.98	283	0.1392	0.1506	0.162	7.57
261	0.1939	0.2085	0.2231	7.01	284	0.1372	0.1485	0.1598	7.59
262	0.1909	0.2053	0.2197	7.03	285	0.1353	0.1464	0.1576	7.62
263	0.1879	0.2022	0.2165	7.06	286	0.1333	0.1444	0.1554	7.64
264	0.185	0.1991	0.2132	7.08	287	0.1314	0.1424	0.1533	7.67
265	0.1822	0.1961	0.2101	7.11	288	0.1296	0.1404	0.1512	7.69
266	0.1794	0.1932	0.207	7.13	289	0.1278	0.1384	0.1491	7.72
267	0.1767	0.1903	0.2039	7.16	290	0.126	0.1365	0.1471	7.75
268	0.174	0.1875	0.2009	7.19	291	0.1242	0.1347	0.1451	7.77
269	0.1714	0.1847	0.198	7.21	292	0.1225	0.1328	0.1432	7.80
270	0.1688	0.182	0.1951	7.24	293	0.1207	0.131	0.1412	7.82
271	0.1663	0.1793	0.1923	7.26	294	0.1191	0.1292	0.1393	7.85
272	0.1638	0.1767	0.1895	7.29	295	0.1174	0.1275	0.1375	7.87
273	0.1613	0.1741	0.1868	7.31	296	0.1158	0.1257	0.1357	7.90
274	0.1589	0.1715	0.1841	7.34	297	0.1142	0.124	0.1339	7.92
275	0.1566	0.169	0.1815	7.36	298	0.1126	0.1224	0.1321	7.95
276	0.1543	0.1666	0.1789	7.39	299	0.1111	0.1207	0.1304	7.97
277	0.152	0.1642	0.1764	7.41	300	0.1096	0.1191	0.1286	8.00
278	0.1498	0.1618	0.1739	7.44					

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