High Stability Miniature Thermistor

ATH100KR8

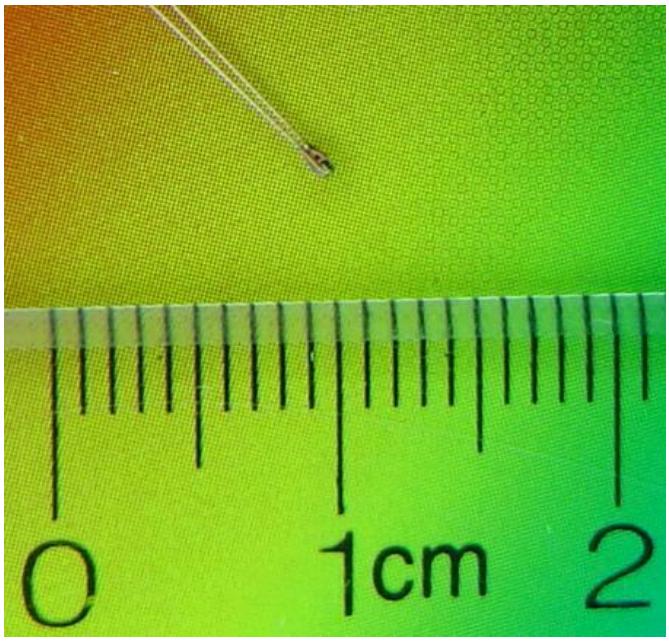

Figure 1.1. The physical photo of ATH100KR8

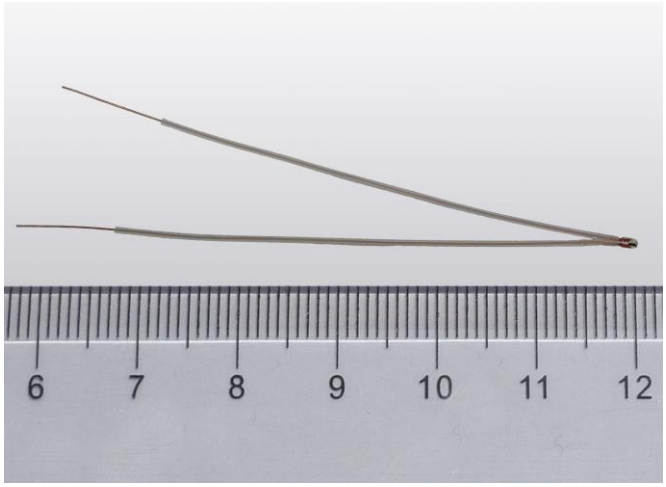

Figure 1.2. The physical photo of ATH100KR8T63

MAIN FEATURES

Glass Encapsulated for Long Term Stability & Reliability
High Stability: <0.1°C/Y
Small Size: ϕ0.8mm×1.4mm
High Resistance Accuracy: 1%
Quick Response Time
Wide Temp. Range: –55°C to 250°C
100 % Lead (Pb)-free and RoHS Compliant

APPLICATIONS

Temperature sensing for laser diodes, optical components, etc.

DESCRIPTION

The ATH100KR8 series thermistor is consisted of three versions, ATH100KR8 as shown in Figure 1.1, ATH100KR8T63 shown in Figure 1.2 and ATH100KR8T63S. The ATH100KR8 has bear leads coated with copper, the ATH100KR8T63S has the leads covered by high temperature plastic tubing and sealed by epoxy, while the ATH100KR8T63 is the non-sealed version.

The ATH100KR8 is a high precision glass encapsulated thermistor. Comparing with conventional epoxy encapsulated thermistors, ATH100KR8 presents higher long term stability and wider temperature range. In addition, it has a small size and short response time. In addition, there are two insulation versions available, one of which comes with leads covered by plastic tubing, the ATH100KR8T63, and the other one, the ATH100KR8T63S, is sealed between the head and the tubing. They can work under up to 140°C temperature and the latter is of liquid resistant.

The ATH100KR8 can be used to measure the temperatures for laser diodes, optical components, etc., with high accuracy and long term stability.

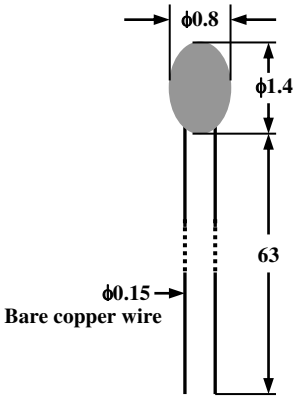

Figure 2. Side View of ATH100KR8

SPECIFICATIONS

Parameters	Value
Nominal Resistance @ 25°C	100K ± 1%
B Value @ 25°C /85°C	4066K ± 1%
B Value @ 0°C /100°C	4036K ± 1%
B Value @ 25°C /100°C	4085K ± 1%
Thermistor Diameter	0.8 ± 0.1mm
Thermistor Length	1.4 ± 0.4mm
Lead Diameter	0.15mm
Lead Length	63 ± 3mm
Dissipation Factor	0.4mW/K
Heat Capacity	1.3mJ/K
Maximum Power @ 25°C	18mW
Time Constant	0.14s (in water) 2~2.2s (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.

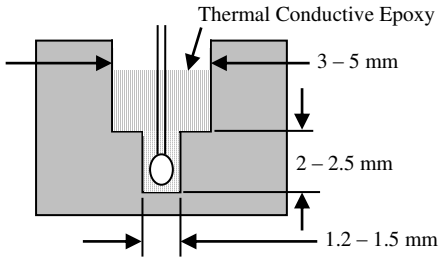

Figure 3. Section View of the 2 Stage Hole

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

T[°C]	R nom[Ω]	R min[Ω]	R max[Ω]	ΔR/R[±%]	ΔT[±%]	a[%/K]
-55	9877500	9271000	10484000	6.1	0.8	7.4
-50	6864800	6473400	7256200	5.7	0.8	7.1
-45	4833700	4578300	5089000	5.3	0.8	6.9
-40	3445800	3277400	3614100	4.9	0.7	6.7
-35	2485200	2373300	2597100	4.5	0.7	6.4
-30	1812400	1737300	1887400	4.1	0.7	6.2
-25	1335600	1285000	1386300	3.8	0.6	6.0
-20	994130	959740	1028500	3.5	0.6	5.8
-15	747000	723540	770460	3.1	0.6	5.6
-10	566390	550330	582440	2.8	0.5	5.4
-5	433140	422130	444150	2.5	0.5	5.3
0	333960	326420	341510	2.3	0.4	5.2
5	258500	253360	263640	2.0	0.4	5.0
10	201660	198180	205140	1.7	0.4	4.9
15	158500	156160	160840	1.5	0.3	4.7
20	125470	123920	127020	1.2	0.3	4.6
25	100000	99000	101000	1.0	0.2	4.5
30	80223	79239	81206	1.2	0.3	4.3
35	64759	63823	65695	1.4	0.3	4.2
40	52589	51718	53460	1.7	0.4	4.1
45	42951	42151	43751	1.9	0.5	4.0
50	35272	34544	36000	2.1	0.5	3.9
55	29119	28462	29776	2.3	0.6	3.8
60	24161	23570	24752	2.4	0.7	3.7
65	20144	19615	20674	2.6	0.7	3.6
70	16874	16400	17348	2.8	0.8	3.5
75	14198	13775	14622	3.0	0.9	3.4
80	11998	11620	12376	3.2	0.9	3.3
85	10181	9844	10519	3.3	1.0	3.2
90	8674	8373	8976	3.5	1.1	3.2
95	7419	7149	7688	3.6	1.2	3.1
100	6369	6128	6610	3.8	1.3	3.0
105	5487	5271	5703	3.9	1.3	2.9
110	4744	4550	4937	4.1	1.4	2.9
115	4115	3941	4288	4.2	1.5	2.8
120	3581	3425	3737	4.4	1.6	2.7
125	3126	2985	3266	4.5	1.7	2.7
130	2737	2610	2864	4.6	1.8	2.6
135	2404	2289	2518	4.8	1.8	2.6
140	2117	2013	2220	4.9	1.9	2.5
145	1869	1776	1963	5.0	2.0	2.5

T[°C]	R nom[Ω]	R min[Ω]	R max[Ω]	ΔR/R [±%]	ΔT [±%]	a[%/K]
150	1655	1570	1740	5.1	2.1	2.4
155	1469	1392	1546	5.2	2.2	2.4
160	1307	1237	1377	5.4	2.3	2.3
165	1166	1102	1230	5.5	2.4	2.3
170	1043	984.6	1101	5.6	2.5	2.2
175	934.5	881.4	987.5	5.7	2.6	2.2
180	839.3	790.7	887.8	5.8	2.7	2.1
185	755.4	710.9	799.9	5.9	2.8	2.1
190	681.3	640.5	722.2	6.0	2.9	2.0
195	615.8	578.3	653.3	6.1	3.0	2.0
200	557.6	523.1	592.1	6.2	3.1	2.0
205	505.9	474.1	537.7	6.3	3.3	1.9
210	459.9	430.6	489.2	6.4	3.4	1.9
215	418.8	391.7	445.8	6.5	3.5	1.9
220	382.0	357.0	407.0	6.6	3.6	1.8
225	349.1	325.9	372.2	6.6	3.7	1.8
230	319.5	298.0	341.0	6.7	3.8	1.8
235	292.9	273.0	312.9	6.8	4.0	1.7
240	269.0	250.4	287.5	6.9	4.1	1.7
245	247.3	230.1	264.6	7.0	4.2	1.7
250	227.8	211.7	243.9	7.1	4.3	1.6

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