High Stability Miniature Thermistor

ATH10K1R0



Figure 1. The physical photo of ATH10K1R0

MAIN FEATURES

Glass Encapsulated for Long Term Stability & Reliability

High Stability: <0.1°C/Y

Small Size: ϕ0.95mm×1.4mm

High Resistance Accuracy: 1%

Quick Response Time: 4s in still air

Wide Temp. Range: −55°C to 250°C

100 % Lead (Pb)-free and RoHS Compliant

APPLICATIONS

Temperature sensing for laser diodes, optical components, industrial process control, etc., where high temperature sensitivity, long term stability, and/or high temperature sensing are required.

DESCRIPTION

The ATH10K1R0 series thermistor is encapsulated by glass, with two coated leads. The glass ensures long term stability, and coated leads prevent them from shorting with each other.

Comparing with conventional epoxy encapsulated thermistors, ATH10K1R0 features smaller size, quicker response time, better long term stability, and wider temperature range. The ATH10K1R0 is sealed between the head and leads, it can work up to 250°C temperature liquid resistant.

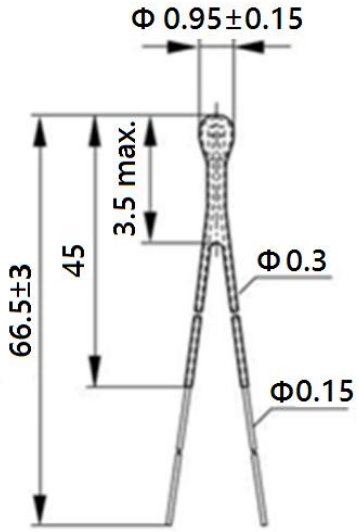




Figure 2. Side View of ATH10K1R0

1161 Ringwood Ct, #110, San Jose, CA 95131, U. S. A. Tel.: (408) 748-9100, Fax: (408) 770-9187 www.analogtechnologies.com

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SPECIFICATIONS

Parameters	Value
Nominal Resistance @ 25°C	10K ± 1%
B Value @ 25°C /85°C	3478K ± 1%
B Value @ 0°C /100°C	3450K ± 1%
B Value @ 25°C /100°C	3492K ± 1%
Thermistor Diameter	0.95 ± 0.15mm
Thermistor Length	1.4 ± 0.4mm
Bare Lead Diameter	0.15mm
Coated Lead Diameter	0.3mm
Lead Length	66.5 ± 3mm
Dissipation Factor	0.5mW/K
Heat Capacity	2mJ/K
Maximum Power @ 25°C	18mW
Insulation resistance	≥100 MΩ
Test voltage	500V DC
Resistance tolerance	±1%
Rated temperature	25°C
Time Constant	4s (in still air @5~25°C)
Operation Temperature Range	–55°C to 300°C

APPLICATION

When sensing a liquid temperature, dip the sensor at an appropriate depth into the liquid, make sure that the bare lead will not get wet by the liquid sensed. If longer lead wires are required, contact us, custom length leads can be made, provided there is enough volume to make this effort worth doing.

When sensing solid block, 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 1.4mm to 1.6mm and the depth should between 2.5 to 3mm. When a deeper hole is needed, drill a 2 stage hole to prevent air bobbles trapped inside the potting epoxy which would cause temperature measurement errors and longer response time. Figure 3 shows the section view of the 2 stage hole.

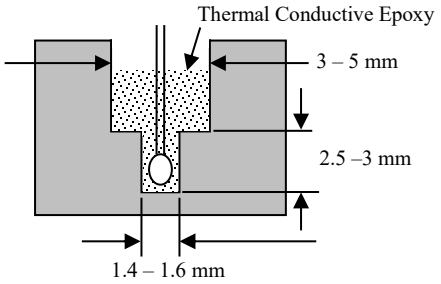


Figure 3. Section View of the 2 Stage Hole

To further avoid the air 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 the assembly components can stand.

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Resistance Temperature Characteristics

Table 1.

T (°C)	R_nom [kΩ]	T (°C)	R_nom [kΩ]	T (°C)	R_nom [kΩ]	T (°C)	R_nom [kΩ]
−55.0	526.24	**35.0**	6.8954	**125.0**	0.51794	**215.0**	0.094181
−50.0	384.52	**40.0**	5.7703	**130.0**	0.46259	**220.0**	0.087144
−45.0	284.01	**45.0**	4.8525	**135.0**	0.4142	**225.0**	0.080751
−40.0	211.94	**50.0**	4.1	**140.0**	0.37179	**230.0**	0.074933
−35.0	159.72	**55.0**	3.4798	**145.0**	0.33451	**235.0**	0.069631
−30.0	121.49	**60.0**	2.9663	**150.0**	0.30166	**240.0**	0.064791
−25.0	93.246	**65.0**	2.5392	**155.0**	0.27264	**245.0**	0.060366
−20.0	72.181	**70.0**	2.1824	**160.0**	0.24694	**250.0**	0.056316
−15.0	56.332	**75.0**	1.883	**165.0**	0.22414	**255.0**	0.052602
−10.0	44.308	**80.0**	1.6307	**170.0**	0.20385	**260.0**	0.049193
−5.0	35.112	**85.0**	1.4174	**175.0**	0.18577	**265.0**	0.046059
0.0	28.024	**90.0**	1.2362	**180.0**	0.16961	**270.0**	0.043173
5.0	22.52	**95.0**	1.0818	**185.0**	0.15514	**275.0**	0.040514
10.0	18.216	**100.0**	0.94973	**190.0**	0.14216	**280.0**	0.03806
15.0	14.827	**105.0**	0.8364	**195.0**	0.13049	**285.0**	0.035793
20.0	12.142	**110.0**	0.73881	**200.0**	0.11999	**290.0**	0.033696
25.0	**10.000**	**115.0**	0.6545	**205.0**	0.11051	**295.0**	0.031753
30.0	8.2818	**120.0**	0.58144	**210.0**	0.101942	**300.0**	0.029952

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Table 2. Vibration Test

No.	Initial resistance value @25°C	Equivalent to after 14,000 hours (1.6 years) @25°C	Stability(ΔT)	Stability(ΔR)
	kΩ	kΩ	°C	kΩ
1	9.945	9.905	0.00071	−0.000402%
2	9.907	9.948	−0.00072	0.000414%
3	9.946	9.898	0.00085	−0.000483%
4	9.924	9.965	−0.00072	0.000413%
5	10.025	9.996	0.00051	−0.000289%
6	10.046	10.089	0.00075	0.000428%
7	9.987	10.023	0.00063	0.000360%
8	10.031	10.002	0.00051	−0.000289%
9	10.078	10.037	0.0007	−0.000407%
10	10.064	10.013	0.00089	−0.000507%
11	10.057	10.096	0.00068	0.000388%
12	9.983	10.031	0.00084	0.000481%
13	9.975	9.932	−0.00076	−0.000431%
14	9.953	10.002	−0.00086	0.000492%
15	10.073	10.025	0.00084	−0.000477%
16	10.021	9.981	0.0007	−0.000399%
17	10.079	10.023	0.00098	−0.000556%
18	9.989	10.004	−0.00026	0.000150%
19	9.958	9.993	−0.00062	0.000351%
20	9.979	10.015	−0.00063	0.000361%

ORDERING INFORMATIONS

Table 2. Part Number of the Thermistors

Part #	Description
ATH10K1R0	High stability miniature 1mm glass thermistor with insulation coating

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