



Figure 1.1. The physical photo of ATH10KR8B

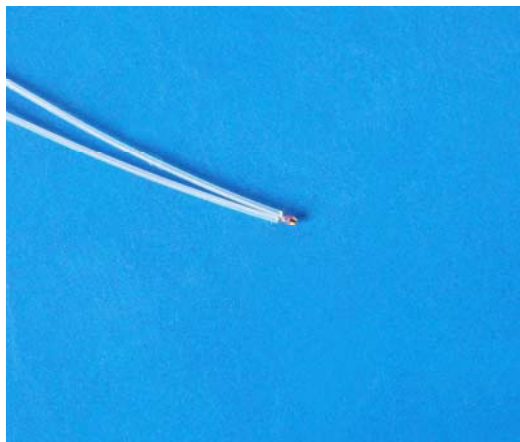


Figure 1.2 The physical photo of ATH10KR8BT65

### MAIN FEATURES

- Glass Encapsulated for Long Term Stability & Reliability
- High Stability:  $<0.1^{\circ}\text{C}/\text{Y}$
- Small Size:  $\phi 0.8\text{mm} \times 1.4\text{mm}$
- High Resistance Accuracy: 1%
- Short Response Time
- Wide Temp. Range:  $-55^{\circ}\text{C}$  to  $250^{\circ}\text{C}$
- 100 % Lead (Pb)-free and RoHS Compliant

### APPLICATIONS

Temperature sensing for laser diodes, optical components, etc.

### DESCRIPTION

The ATH10KR8B series thermistor is consisted of three versions, ATH10KR8B as shown in Figure 1.1, ATH10KR8BT65 shown in Figure 1.2 and ATH10KR8BT65S. The ATH10KR8B has bear leads coated with copper, the ATH10KR8BT65S has the leads covered by high temperature plastic tubing and sealed by epoxy, while the ATH10KR8BT65 is the non-sealed version.

**Note:** This thermistor ATH10KR8B is a replacement for ATH10KR8.

The ATH10KR8B is a high precision glass encapsulated thermistor. Comparing with conventional epoxy encapsulated thermistors, ATH10KR8B 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 ATH10KR8BT65, and the other one, the ATH10KR8BT65S, is sealed between the head and the tubing. They can work under up to  $140^{\circ}\text{C}$  temperature and the latter is of liquid resistant.

The ATH10KR8B series can be used to measure the temperatures for laser diodes, optical components, etc., with high accuracy and long term stability.

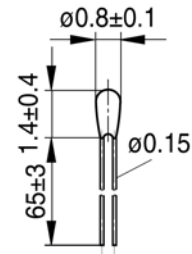


Figure 2. Side View of ATH10KR8B

### SPECIFICATIONS

Parameters	Value	
	ATH10KR8B	ATH10KR8
Nominal Resistance @ $25^{\circ}\text{C}$	$10\text{K} \pm 1\%$	$10\text{K} \pm 1\%$
B Value @ $25^{\circ}\text{C} / 85^{\circ}\text{C}$	$3478\text{K} \pm 1\%$	$3480\text{K} \pm 1\%$
B Value @ $0^{\circ}\text{C} / 100^{\circ}\text{C}$	$3450\text{K} \pm 1\%$	$3450\text{K} \pm 1\%$
B Value @ $25^{\circ}\text{C} / 100^{\circ}\text{C}$	$3492\text{K} \pm 1\%$	$3497\text{K} \pm 1\%$
Thermistor Diameter	$0.8 \pm 0.1\text{mm}$	$0.8 \pm 0.1\text{mm}$
Thermistor Length	$1.4 \pm 0.4\text{mm}$	$1.4 \pm 0.4\text{mm}$
Lead Diameter	0.15mm	0.15mm
Lead Length	$65 \pm 3\text{mm}$	$63 \pm 3\text{mm}$
Dissipation Factor	0.4mW/K	0.4mW/K
Heat Capacity	1.3mJ/K	1.3mJ/K
Maximum Power @ $25^{\circ}\text{C}$	18mW	18mW
Time Constant	0.14s (in water)	0.14s (in water)
	2~2.2s (in still air @ $5\sim 25^{\circ}\text{C}$ )	2~2.2s (in still air @ $5\sim 25^{\circ}\text{C}$ )

### 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.

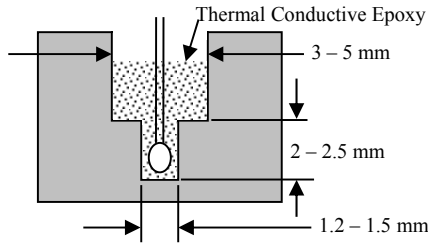


Figure 3. Section View of the 2 Stage Hole

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**

Table 1. ATH10KR8B vs. ATH10KR8

T (°C)	R <sub>nom</sub> (Ω)		T (°C)	R <sub>nom</sub> (Ω)	
	ATH10KR8B	ATH10KR8		ATH10KR8B	ATH10KR8
-55	526240	519911	50	4100	4103
-50	384520	379894	55	3479.8	3482
-45	284010	280697	60	2966.3	2967
-40	211940	209603	65	2539.2	2539
-35	159720	158088	70	2182.4	2182
-30	121490	120372	75	1883	1882
-25	93246	92484	80	1630.7	1629
-20	72181	71668	85	1417.4	1415
-15	56332	55993	90	1236.2	1234
-10	44308	44087	95	1081.8	1079
-5	35112	34971	100	949.73	946.6
0	28024	27936	105	836.4	833.1
5	22520	22468	110	738.81	735.5
10	18216	18187	115	654.5	651.1
15	14827	14813	120	581.44	578.1
20	12142	12136	125	517.94	514.6
25	10000	10000	130	462.59	459.4
30	8281.8	8284	135	414.2	411.1
35	6895.4	6899	140	371.79	368.8
40	5770.3	5774	145	334.51	331.6
45	4852.5	4856	150	301.66	298.9



T (°C)	R <sub>nom</sub> (Ω)		T (°C)	R <sub>nom</sub> (Ω)	
	ATH10KR8B	ATH10KR8		ATH10KR8B	ATH10KR8
155	272.64	270.0	205	110.51	109.1
160	246.94	244.4	210	101.94	100.7
165	224.14	221.7	215	94.181	93.01
170	203.85	201.6	220	87.144	86.08
175	185.77	183.6	225	807.51	79.78
180	169.61	167.6	230	74.933	74.05
185	155.14	153.3	235	69.631	68.83
190	142.16	140.4	240	64.791	64.08
195	130.49	128.9	245	60.366	59.73
200	119.99	118.5	250	56.316	55.75

Table 2. α (Temperature coefficient at T in %/K) – ATH10KR8B

T (°C)	α (%/K)	T (°C)	α (%/K)	T (°C)	α (%/K)
-55	6.4	50	3.3	155	2.0
-50	6.2	55	3.2	160	2.0
-45	6.0	60	3.2	165	1.9
-40	5.8	65	3.1	170	1.9
-35	5.6	70	3.0	175	1.8
-30	5.4	75	2.9	180	1.8
-25	5.2	80	2.8	185	1.8
-20	5.0	85	2.8	190	1.7
-15	4.9	90	2.7	195	1.7
-10	4.7	95	2.6	200	1.7
-5	4.6	100	2.6	205	1.6
0	4.4	105	2.5	210	1.6
5	4.3	110	2.5	215	1.6
10	4.2	115	2.4	220	1.5
15	4.1	120	2.3	225	1.5
20	3.9	125	2.3	230	1.5
25	3.8	130	2.2	235	1.5
30	3.7	135	2.2	240	1.4
35	3.6	140	2.1	245	1.4
40	3.5	145	2.1	250	1.4
45	3.4	150	2.0		



ORDERING INFORMATION

Table 2. Part Number of the Thermistors

Part #	Description
ATH10KR8B	High stability miniature thermistor with bare leads
ATH10KR8BT65	High stability miniature thermistor with leads covered by high temperature plastic tubing
ATH10KR8BT65S	High stability miniature thermistor with leads covered by high temperature plastic tubing and sealed by epoxy

Table 3. Unit Price

Quantity	1 - 9	10 - 49	50 - 199	200 - 499	≥500
ATH10KR8B	\$3.43	\$3.23	\$3.08	\$2.93	\$2.78
ATH10KR8BT65	\$3.63	\$3.43	\$3.28	\$3.13	\$2.98
ATH10KR8BT65S	\$3.83	\$3.63	\$3.48	\$3.32	\$3.18

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