



# NTC THERMISTORS: TYPE BR11/14/16/23

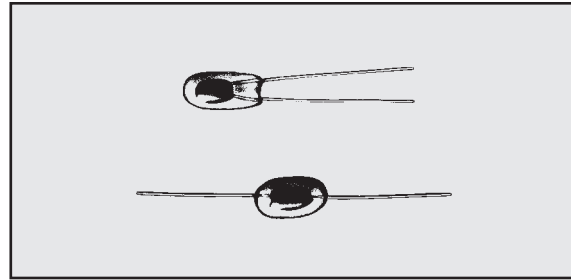
## GLASS ENCAPSULATED BEAD THERMISTOR

### DESCRIPTION:

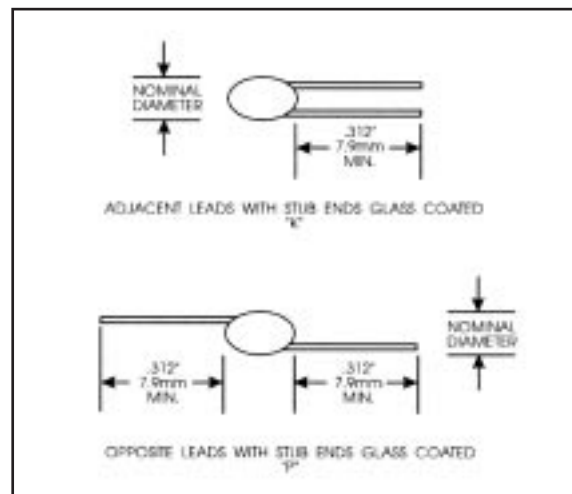
Small glass encapsulated bead thermistors on fine diameter alloy lead-wires.

### FEATURES:

- Suitable for most low cost temperature measurement, control or compensation applications
- Very fast thermal response times
- Rugged glass encapsulation provides hermetic seal and better strain relief than small glass coated bead thermistors
- Long term stability is better than small glass coated bead thermistors.
- Suitable for self-heated applications such as liquid level sensing or gas flow measurement
- Recommended for all applications where the customer will perform further assembly operations
- Normal operating/storage temperatures range from -80°C to:
  - 105°C for Material system E0
  - 200°C for Material systems A1 through A4
  - 300°C for Material systems A5 through D17
- Unaffected by severe environmental exposures, including nuclear radiation.
- Intermittent operation to 600°C is permissible, however, stability will be degraded.



### DIMENSIONS:

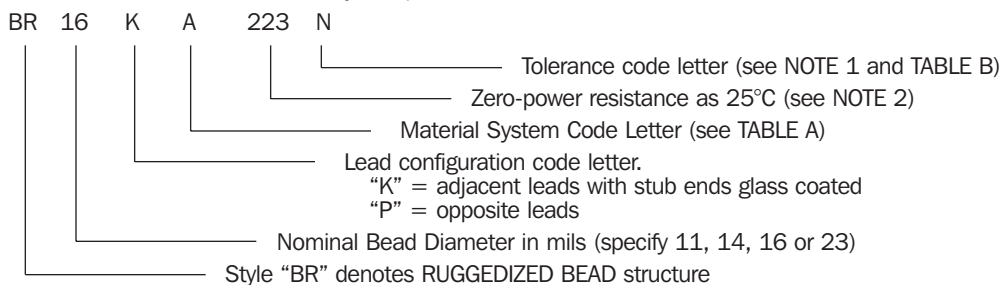


### OPTIONS:

- Non-standard resistance tolerances
- Non-standard resistance values
- Reference temperature(s) other than 25°C - specify
- Mounting in special housings or enclosures
- Longer continuous leads
- Welded or soldered extension leads - specify lead material, diameter, length and insulation, if any.
- Solderable or weldable/solderable leads
- Leads can be pre-tinned or treated for improved soldering
- Calibration - specify temperature(s)
- Interchangeable pairs or sets, R-vs-T curve matching – specify temperature range(s) and tolerance(s)
- Special aging and conditioning for high reliability applications

### CODING:

The code number to be ordered may be specified as follows:



**NOTE 1:** Special tolerances are available upon request. Consult factory for special resistance tolerances, non-standard resistances and/or non-standard temperatures.

**NOTE 2:** The zero-power resistance at 25°C, expressed in Ohms, is identified by a three digit code number. The first two digits represent significant figures, and the last digit specifies the number of zeros to follow. Example: 22k Ohms = "223". The standard resistance values are from the 24-Value series decade as specified in Military Standard MS90178.

1.0 / 1.1 / 1.2 / 1.3 / 1.5 / 1.6 / 1.8 / 2.0 / 2.2 / 2.4 / 2.7 / 3.0  
 3.3 / 3.6 / 3.9 / 4.3 / 4.7 / 5.1 / 5.6 / 6.2 / 6.8 / 7.5 / 8.2 / 9.1

**TABLE A: THERMAL AND ELECTRICAL PROPERTIES:**

The following table lists the THERMAL and ELECTRICAL properties for all SMALL RUGGEDIZED THERMISTORS. All definitions and test methods are per MIL-PRF-23648.

THERMISTOR SERIES:			BR11	BR14	BR16	BR23
<b>BODY DIMENSIONS:</b>						
	Nom. Diameter:		.011" (.28 mm)	.014" (.36 mm)	.016" (.41 mm)	.023" (.58 mm)
	Max. Diameter:		.012" (.30 mm)	.016" (.41 mm)	.017" (.43 mm)	.025" (.63 mm)
	Max. Length:		.024" (.61 mm)	.032" (.81 mm)	.034" (.86 mm)	.056" (1.4 mm)
<b>lead-wires:</b>						
	Nom. Diameter:		.0007" (.02 mm)	.0011" (.03 mm)	.0011" (.03 mm)	.002" (.05 mm)
	Minimum Lead Length:		.312" (7.9 mm)	.312" (7.9 mm)	.312" (7.9 mm)	.312" (7.9 mm)
	Lead Material:		Platinum Alloy	Platinum Alloy	Platinum Alloy	Platinum Alloy
	Available Cuts:		"K" adjacent "P" opposite	"K" adjacent "P" opposite	"K" adjacent "P" opposite	"K" adjacent "P" opposite
<b>MATERIAL SYSTEM:</b>						
<b>CODE LETTER</b>	<b>R-vs-T CURVE</b>	<b>25/125 RATIO</b>	<b>Nominal Resistance Range @ 25°C</b>	<b>Nominal Resistance Range @ 25°C</b>	<b>Nominal Resistance Range @ 25°C</b>	<b>Nominal Resistance Range @ 25°C</b>
E	0	5.0	—	—	—	—
A	1	11.8	1.0 kΩ – 1.5 kΩ	300 Ω – 680 Ω	300 Ω – 680 Ω	300 Ω – 680 Ω
A	2	12.5	1.5 kΩ – 3.6 kΩ	680 Ω – 1.6 Ω	680 Ω – 1.6 Ω	680 Ω – 1.6 Ω
A	3	14.0	3.6 kΩ – 7.5 kΩ	1.6 kΩ – 3.6 kΩ	1.6 kΩ – 3.6 kΩ	1.6 kΩ – 3.6 kΩ
A	4	16.9	7.5 kΩ – 15 kΩ	3.6 kΩ – 6.8 kΩ	3.6 kΩ – 6.8 kΩ	3.6 kΩ – 6.8 kΩ
A	5	19.8	15 kΩ – 51 kΩ	6.8 kΩ – 27 kΩ	6.8 kΩ – 27 kΩ	6.8 VΩ – 27 kΩ
A	6	22.1	—	—	—	—
A	7	22.7	51 kΩ – 150 kΩ	27 kΩ – 75 kΩ	27 kΩ – 75 kΩ	27 kΩ – 75 kΩ
B	8	29.4	150 kΩ – 270 kΩ	75 kΩ – 130 kΩ	75 kΩ – 130 kΩ	75 kΩ – 130 kΩ
B	9	30.8	270 kΩ – 470 kΩ	130 kΩ – 240 kΩ	130 kΩ – 240 kΩ	130 kΩ – 240 kΩ
B	10	32.3	470 kΩ – 750 kΩ	240 kΩ – 360 kΩ	240 kΩ – 360 kΩ	240 kΩ – 360 kΩ
B	11	35.7	750 kΩ – 1.6 MΩ	360 kΩ – 820 kΩ	360 kΩ – 820 kΩ	360 kΩ – 820 kΩ
B	12	38.1	1.6 MΩ – 2.7 MΩ	820 kΩ – 1.3 MΩ	820 kΩ – 1.3 MΩ	820 kΩ – 1.3 MΩ
B	13	45.0	2.7 MΩ – 6.8 MΩ	1.3 MΩ – 3.3 MΩ	1.3 MΩ – 3.3 MΩ	1.3 MΩ – 3.3 MΩ
B	14	48.1	6.8 MΩ – 10 MΩ	3.3 MΩ – 6.8 MΩ	3.3 MΩ – 6.8 MΩ	3.3 MΩ – 6.8 MΩ
B	15	56.5	—	6.8 MΩ – 10 MΩ	6.8 MΩ – 10 MΩ	6.8 MΩ – 10 MΩ
D	16	75.6	—	—	—	—
D	17	81.0	—	—	—	—
<b>THERMAL TIME CONSTANT:</b>						
	Still Air at 25°C:		0.8 sec	1.0 sec	1.2 sec	1.7 sec
	Plunge into Water:		12 msec	14 msec	16 msec	40 msec
<b>DISSIPATION CONSTANT:</b>						
	Still Air at 25°C:		.065 mW/°C	.10 mW/°C	.12 mW/°C	.18 mW/°C
	Still Water at 25°C:		.33 mW/°C	.50 mW/°C	.60 mW/°C	.90 mW/°C
<b>POWER RATING: (in air)</b>						
	Maximum Power Rating:		.007 Watts	.015 Watts	.015 Watts	.020 Watts
	100% Max. Power to:		125°C	125°C	125°C	125°C
	Derated to 0% at:		300°C	300°C	300°C	300°C

RESISTANCE -VS- TEMPERATURE CHARACTERISTICS: The nominal resistance range for the zero-power resistance at 25°C is shown for each THERMISTOR Type and each available Material System. Each Material System is denoted by an ordering Code Letter, a referenced Curve number and the nominal 25°C/125°C resistance ratio.

**TABLE B: STANDARD TOLERANCES:**

Tolerance Code Letter	F	G	J	K	L	M	N	P	Q	R	S
± % Tolerance at 25°C	1	2	5	10	15	20	25	30	40	50	Non-standard – consult factory

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