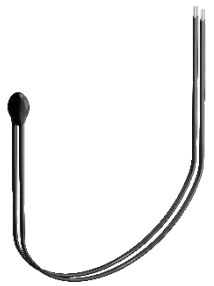
NTC thermistors for temperature measurement

Miniature sensors with bendable wires

Series/Type:	**L865/10k/A39**
Ordering code:	**B57865L0103A039**
Date:	2025-09-10
Version:	1

Applications

Temperature measurement



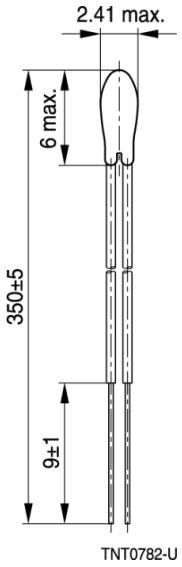
Features

- NTC soldered to wire and coated with epoxy
- Wire: AWG 28, 19 x 0.07 Cu-Ag insulated, color black

Delivery mode

Bulk

Dimensional drawing



Dimensions in mm

Ratings and characteristics

Climatic category (test without voltage)	(IEC 60068-1)		40/155/56	
Lower category temperature			–40	°C
Upper category temperature			155	°C
Rated resistance R_R // tolerance		R_R	10000 // ±1	Ω // %
Rated temperature		T_R	25	°C
B value: $B_{(25/100)}$ // tolerance		B	3988 // ±1	K // %
R/T curve no. // R_{25}			8016 // 10000	n // Ω
Max. power rating	(at 25 °C)	P_{25}	60	mW
Dissipation factor	(in air)	δ_{th}	approx. 2.9	mW/K
Thermal cooling time constant	(in air)	τ_C	approx. 14	s
Heat capacity		C_{th}	approx. 42	mJ/K

Reliability data

Testing of type representatives based on AEC Q200 Rev. E

Test	Standard	Test conditions	$\Delta R_{25}/R_{25}$ (typical)	Remarks
High temperature exposure (storage)	MIL-STD-202 method 108	Storage at T = 155 °C Duration: 1000 h	< 3%	No visible damage
Biased humidity	MIL-STD-202 method 103	T = 85 °C / 85% RH Voltage max. 0.3 V on NTC Duration: 1000 h	< 3%	No visible damage
Operational life	MIL-STD-202 method 108	T = 150 °C Voltage max. 0.3 V on NTC Duration: 1000 h	< 3%	No visible damage
Temperature cycling	JESD22-A104	Lower test temperature: –55 °C Upper test temperature: 125 °C Dwell time: 15 min / in air Duration: 1000 cycles	< 3%	No visible damage
Terminal strength leaded)	MIL-STD-202 method 211	Condition A / axial / weight 250 g on end of wire	< 1%	No visible damage
Mechanical shock	MIL-STD-202 method 213	max. acceleration 100 g / 6 ms / half sine Duration: 3 shocks in each of 6 directions	< 1%	No visible damage
Vibration	MIL-STD-202 method 204	5 *g* / 20 min / 10 … 2000 Hz 12 cycles in each of 3 orientations	< 1%	No visible damage

Note

- Contact of NTC thermistors with any liquids and solvents shall be prevented. It must be ensured that no water enters the NTC thermistors (e.g. through plug terminals).
- Avoid dewing and condensation unless the thermistor is specified for these conditions.

R/T characteristics

R/T curve	8016	$B_{(25/100)}$	3988 [K] ±1 [%]
R at 25 °C	10000 [Ω]	R_R at 25 °C	10000 [Ω] ±1 [%]

T [°C]	R nom [Ω]	R min [Ω]	R max [Ω]	ΔR [±%]	ΔT [±°C]
-40	336500	320420	352580	4.8	0.7
-35	242590	231870	253310	4.4	0.7
-30	177000	169790	184210	4.1	0.7
-25	130370	125490	135250	3.8	0.6
-20	97070	93743	100400	3.4	0.6
-15	72929	70652	75206	3.1	0.6
-10	55330	53765	56895	2.8	0.5
-5	42315	41237	43393	2.6	0.5
0	32650	31907	33393	2.3	0.4
5	25388	24877	25898	2.0	0.4
10	19900	19550	20250	1.8	0.4
15	15708	15470	15946	1.5	0.3
20	12490	12330	12650	1.3	0.3
25	**10000**	**9900.0**	**10100**	**1.0**	**0.2**
30	8057.0	7954.6	8159.4	1.3	0.3
35	6531.3	6434.4	6628.2	1.5	0.4
40	5327.0	5236.9	5417.1	1.7	0.4
45	4368.7	4286.1	4451.3	1.9	0.5
50	3603.0	3527.9	3678.1	2.1	0.6
55	2986.2	2918.3	3054.1	2.3	0.6
60	2488.0	2426.9	2549.1	2.5	0.7
65	2083.0	2028.2	2137.9	2.6	0.8
70	1752.0	1702.9	1801.1	2.8	0.8
75	1481.4	1437.4	1525.4	3.0	0.9
80	1258.0	1218.6	1297.4	3.1	1.0
85	1072.3	1037.1	1107.6	3.3	1.0
90	917.70	886.09	949.31	3.4	1.1
95	788.52	760.18	816.85	3.6	1.2
100	680.00	654.58	705.42	3.7	1.3
105	588.59	565.76	611.43	3.9	1.4
110	511.20	490.66	531.74	4.0	1.4
115	445.41	426.92	463.90	4.2	1.5
120	389.30	372.63	405.97	4.3	1.6
125	341.70	326.63	356.77	4.4	1.7
130	300.90	287.26	314.54	4.5	1.8
135	265.44	253.09	277.80	4.7	1.9
140	234.80	223.59	246.01	4.8	2.0
145	208.32	198.14	218.50	4.9	2.1
150	185.30	176.03	194.57	5.0	2.2
155	165.35	156.90	173.80	5.1	2.3

Cautions and warnings

Storage

- Store thermistors only in original packaging. Do not open the package prior to processing.
- Storage conditions in original packaging: storage temperature −25 °C to +45 °C, relative humidity ≤ 75% annual mean, < 95% maximum 30 days per annum, dew precipitation is inadmissible.
- Do not store thermistors where they are exposed to heat or direct sunlight. Otherwise, the packing material may be deformed, or components may stick together, causing problems during mounting.
- Avoid contamination of thermistor surface during storage, handling and processing.
- Avoid storage of thermistors in harmful environments like corrosive gases (SOx, Cl etc).
- Use the components as soon as possible after opening the original packaging.
- Solder thermistors within the time specified after shipment from TDK.
  For leaded components this is 24 months.

Handling

- NTC thermistors must not be dropped. Chip-offs or any other damage must not be caused during handling of NTCs.
- Do not touch components with bare hands. Gloves are recommended.
- Avoid contamination of thermistor surface during handling.
- Washing processes may damage the product due to the possible static or cyclic mechanical loads (e.g. ultrasonic cleaning). They may cause cracks to develop on the product and its parts, which might lead to reduced reliability or lifetime.

Bending/ twisting leads

A lead (wire) may be bent at a minimum distance of twice the wire’s diameter plus 4 mm from the component head or housing. When bending, ensure the wire is mechanically relieved at the component head or housing. The bending radius should be at least 0.75 mm.

Soldering

- Use resin-type flux or non-activated flux.
- Insufficient preheating may cause ceramic cracks.
- Rapid cooling by dipping in solvent is not recommended.
- Complete removal of flux is recommended.

Mounting

- Ensure that no thermo-mechanical stress occurs due to production processes (curing or overmolding processes) when thermistors are sealed, potted or over-molded or during their subsequent operation. The maximum temperature of the thermistor must not be exceeded. Ensure that the materials used (sealing/potting compound and plastic material) are chemically neutral.
- Electrodes/contacts must not be scratched or damaged before/during/after the mounting process.
- Contacts and housing used for assembly with the thermistor must be clean before mounting.
- Ensure that adjacent materials are designed for operation at temperatures comparable to the surface temperature of the thermistor. Be sure that surrounding parts and materials can withstand the temperature.
- Avoid contamination of the thermistor surface during processing.
- The connections of sensors (e.g. cable end, wire end, plug terminal) may only be exposed to an environment with normal atmospheric conditions.
- Tensile forces on cables or leads must be avoided during mounting and operation.
- Bending or twisting of cables or leads directly on the thermistor body is not permissible.
- Avoid using chemical substances as mounting aids. It must be ensured that no water or other liquids enter the NTC thermistors (e.g. through plug terminals). In particular, water-based substances (e.g. soap suds) must not be used as mounting aids for sensors.
- The use of no-clean solder products is recommended. In any case mild, non-activated fluxes should be used. Flux residues after soldering should be minimized.

Operation

- Use thermistors only within the specified operating temperature range.
- Use thermistors only within the specified power range.
- Environmental conditions must not harm the thermistors. Only use the thermistors under normal atmospheric conditions or within the specified conditions.
- Contact of NTC thermistors with any liquids and solvents shall be prevented. It must be ensured that no water enters the NTC thermistors (e.g. through plug terminals). For measurement purposes (checking the specified resistance vs. temperature), the component must not be immersed in water but in suitable liquids (e.g. perfluoropolyethers such as Galden).
- Avoid dewing and condensation unless thermistor is specified for these conditions.
- Bending or twisting of cables and/or wires is not permissible during operation of the sensor in the application.
- Be sure to provide an appropriate fail-safe function to prevent secondary product damage caused by malfunction.

This listing does not claim to be complete, but merely reflects the experience of TDK.

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Important notes

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