

## NTC Thermistors, Micro Chip Sensor Insulated Leads



### FEATURES

- Flexible insulated leads for special mounting or assembly
- Miniature sized very fast reacting
- Accurate over a wide temperature range
- High stability over a long life
- Exceptional withstanding in thermal shocks
- AEC-Q200 qualified
- Compliant to RoHS directive 2002/95/EC and in accordance to WEEE 2002/96/EC
- Fulfils the ELV 2000/53/EC



**RoHS**  
COMPLIANT

QUICK REFERENCE DATA		
PARAMETER	VALUE	UNIT
Resistance value at 25 °C	2060 to 10 000	Ω
Accuracy of temperature measurement	± 0.5 between 25 and 85 ± 1.0 between - 40 and + 125	°C
B <sub>25/85</sub> - value	3511 to 3984	K
Tolerance on B <sub>25/85</sub>	± 0.5 to ± 1	%
Maximum dissipation	50	mW
Dissipation factor δ (in still air)	≈ 0.8	mW/K
Response time (in stirred air) (in oil)	≈ 3 ≈ 0.7	s
Operating temperature range	- 40 to 125	°C
Climatic category	40/125/56	
Minimum dielectric withstanding voltage between leads and coated body (tested according to IEC 60539 §4.7.2 method 1)	100	V <sub>RMS</sub>
Weight	0.05	g

### APPLICATIONS

- Temperature measurement, sensing and control in automotive and industrial applications

### DESCRIPTION

These negative temperature coefficient thermistors consist of a micro NTC chip with two insulated solid silver plated nickel wires and coated with a ochre-colored epoxy lacquer.

### PACKAGING

The thermistors are packed in cardboard boxes; the smallest packing quantity is 1000 pieces.

### MARKING

The components are not marked.

### DESIGN IN SUPPORT

R(T) tables spreadsheet available on request at [nlr@vishay.com](mailto:nlr@vishay.com).

### MOUNTING

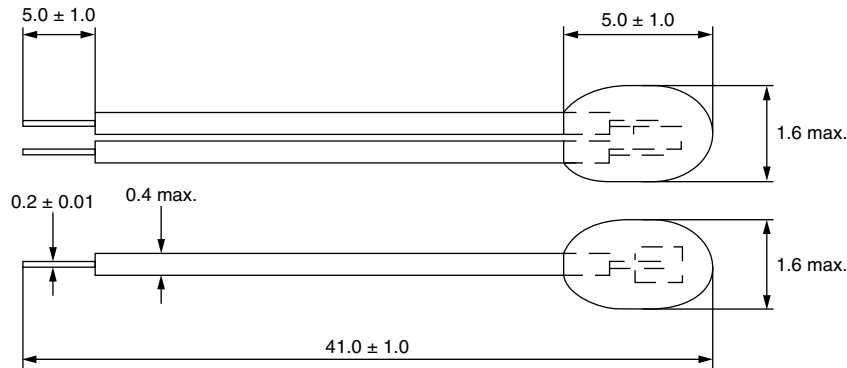
By soldering or welding in any position.  
The parts can be potted in suitable resins.

ELECTRICAL DATA AND ORDERING INFORMATION							
SAP PART AND ORDERING NUMBER	R <sub>25</sub> <sup>(1)</sup> (Ω)	α (25 °C) (%/K)	R <sub>25</sub> Tol. (%)	B <sub>25/85</sub> <sup>(1)</sup> (K)	B <sub>25/85</sub> Tol. (%)	ΔT <sub>max.</sub> <sup>(2)</sup> 25 to 85 (°C)	ΔT <sub>max.</sub> <sup>(2)</sup> - 40 to 125 (°C)
NTCLE305E4202SB	2060	- 3.85	1.93	3511	1.0	± 0.5	± 1
NTCLE305E4502SB	5000	- 4.39	2.2	3984	0.5	± 0.5	± 1
NTCLE305E4103SB	10 000	- 4.39	2.2	3984	0.5	± 0.5	± 1

#### Notes

<sup>(1)</sup> Other R<sub>25</sub> and B-values available on request.

<sup>(2)</sup> ΔT is the temperature measurement accuracy in the defined temperature ranges.

**DIMENSIONS** in millimeters

**RESISTANCE VALUES AT INTERMEDIATE TEMPERATURES**

SAP PART AND ORDERING NUMBER: NTCLE305E4202SB

Temperature (°C)	$R_T/R_{25}$	Resistance (Ω)	$\Delta R/R$ (%)	$\alpha$ (%/K)	$\Delta T$ (K)	$R_{min.}$ (Ω)	$R_{max.}$ (Ω)
-40	22.975	47 326	6.03	- 6.03	1.0	45 284	49 369
-35	17.089	35 203	5.81	- 5.81	1.0	33 796	36 610
-30	12.851	26 473	5.60	- 5.60	1.0	25 496	27 449
-25	9.7647	20 115	5.39	- 5.39	1.0	19 431	20 798
-20	7.4928	15 435	5.20	- 5.20	1.0	14 954	15 915
-15	5.8033	11 954	5.02	- 5.02	1.0	11 615	12 294
-10	4.5348	9341.4	4.85	- 4.85	1.0	9100.2	9582.6
-5	3.5736	7361.4	4.68	- 4.68	1.0	7189.8	7532.9
0	2.8388	5847.7	4.53	- 4.53	1.0	5725.6	5969.9
5	2.2724	4680.9	4.38	- 4.38	1.0	4594.1	4767.8
10	1.8323	3774.3	4.24	- 4.24	1.0	3712.8	3835.8
15	1.4877	3064.4	4.10	- 4.10	1.0	3021.1	3107.7
20	1.2159	2504.6	3.97	- 3.97	1.0	2474.5	2534.7
25	1.0000	2060.0	1.92	- 3.85	0.5	2039.4	2080.6
30	0.82743	1704.4	1.86	- 3.73	0.5	1684.1	1724.8
35	0.68863	1418.5	1.81	- 3.62	0.5	1398.9	1438.2
40	0.57617	1186.9	1.75	- 3.51	0.5	1168.2	1205.5
45	0.48445	997.92	1.70	- 3.41	0.5	980.48	1015.4
50	0.40917	842.86	1.65	- 3.31	0.5	826.67	859.04
55	0.34704	714.88	1.61	- 3.21	0.5	699.96	729.80
60	0.29550	608.71	1.56	- 3.12	0.5	595.01	622.40
65	0.25253	520.19	1.52	- 3.04	0.5	507.67	532.71
70	0.21654	446.06	1.48	- 2.95	0.5	434.64	457.47
75	0.18627	383.71	1.44	- 2.87	0.5	373.32	394.10
80	0.16072	331.07	1.40	- 2.79	0.5	321.63	340.51
85	0.13907	286.46	1.36	- 2.72	0.5	277.89	295.04
90	0.12065	248.53	2.65	- 2.65	1.0	240.76	256.31
95	0.10494	216.17	2.58	- 2.58	1.0	209.12	223.22
100	0.091500	188.48	2.52	- 2.52	1.0	182.09	194.87
105	0.079963	164.72	2.45	- 2.45	1.0	158.93	170.51
110	0.070035	144.27	2.39	- 2.39	1.0	139.02	149.52
115	0.061469	126.62	2.33	- 2.33	1.0	121.86	131.38
120	0.054060	111.36	2.28	- 2.28	1.0	107.05	115.67
125	0.047637	98.128	2.22	- 2.22	1.0	94.215	102.04

**Note**

- R(T) table spreadsheet available on request at [nlr@vishay.com](mailto:nlr@vishay.com)

## RESISTANCE VALUES AT INTERMEDIATE TEMPERATURES

SAP PART AND ORDERING NUMBER: NTCLE305E4502SB

Temperature (°C)	$R_T/R_{25}$	Resistance ( $\Omega$ )	$\Delta R/R$ (%)	$\alpha$ (%/K)	$\Delta T$ (K)	$R_{min.}$ ( $\Omega$ )	$R_{max.}$ ( $\Omega$ )
-40	33.427	167 137	6.63	- 6.63	1.0	156 057	178 217
-35	24.132	120 661	6.41	- 6.41	1.0	112 932	128 390
-30	17.613	88 066	6.19	- 6.19	1.0	82 613	93 519
-25	12.990	64 950	5.99	- 5.99	1.0	61 061	68 839
-20	9.6761	48 381	5.79	- 5.79	1.0	45 577	51 184
-15	7.2765	36 382	5.61	- 5.61	1.0	34 342	38 423
-10	5.5218	27 609	5.43	- 5.43	1.0	26 110	29 108
-5	4.2268	21 134	5.26	- 5.26	1.0	20 022	22 246
0	3.2624	16 312	5.10	- 5.10	1.0	15 480	17 144
5	2.5381	12 691	4.94	- 4.94	1.0	12 063	13 318
10	1.9897	9948.5	4.80	- 4.80	1.0	9471.4	10 426
15	1.5711	7855.6	4.65	- 4.65	1.0	7490.1	8221.2
20	1.2493	6246.4	4.52	- 4.52	1.0	5964.2	6528.5
25	1.0000	5000.0	2.19	- 4.39	0.5	4890.5	5109.5
30	0.80560	4028.0	2.13	- 4.26	0.5	3942.3	4113.7
35	0.65297	3264.9	2.07	- 4.14	0.5	3197.4	3332.4
40	0.53239	2661.9	2.01	- 4.03	0.5	2608.4	2715.4
45	0.43653	2182.6	1.95	- 3.92	0.5	2140.0	2225.3
50	0.35987	1799.4	1.90	- 3.81	0.5	1765.1	1833.6
55	0.29823	1491.1	1.85	- 3.71	0.5	1463.5	1518.7
60	0.24838	1241.9	1.80	- 3.61	0.5	1219.5	1264.3
65	0.20787	1039.3	1.75	- 3.51	0.5	1021.1	1057.6
70	0.17477	873.83	1.71	- 3.42	0.5	858.89	888.76
75	0.14759	737.96	1.67	- 3.34	0.5	725.67	750.25
80	0.12518	625.90	1.62	- 3.25	0.5	615.74	636.06
85	0.10661	533.06	1.58	- 3.17	0.5	524.62	541.49
90	0.0911586	455.79	3.09	- 3.09	1.0	441.70	469.89
95	0.0782458	391.23	3.02	- 3.02	1.0	379.42	403.03
100	0.067411	337.06	2.94	- 2.94	1.0	327.13	346.98
105	0.0582844	291.42	2.87	- 2.87	1.0	283.05	299.80
110	0.0505676	252.84	2.81	- 2.81	1.0	245.74	259.94
115	0.0440186	220.09	2.74	- 2.74	1.0	214.06	226.13
120	0.0384412	192.21	2.68	- 2.68	1.0	187.06	197.35
125	0.0336748	168.37	2.62	- 2.62	1.0	163.97	172.78

**Note**

- R(T) table spreadsheet available on request at [nlr@vishay.com](mailto:nlr@vishay.com)



RESISTANCE VALUES AT INTERMEDIATE TEMPERATURES							
SAP PART AND ORDERING NUMBER: NTCLE305E4103SB							
Temperature (°C)	$R_T/R_{25}$	Resistance (Ω)	$\Delta R/R$ (%)	$\alpha$ (%/K)	$\Delta T$ (K)	$R_{min.}$ (Ω)	$R_{max.}$ (Ω)
-40	33.427	334 274	6.63	- 6.63	1	312 114	356 434
-35	24.132	241 323	6.41	- 6.41	1	225 865	256 781
-30	17.613	176 133	6.19	- 6.19	1	165 226	187 039
-25	12.990	129 900	5.99	- 5.99	1	122 121	137 679
-20	9.6761	96 761	5.79	- 5.79	1	91 155	102 367
-15	7.2765	72 765	5.61	- 5.61	1	68 684	76 845
-10	5.5218	55 218	5.43	- 5.43	1	52 219	58 217
-5	4.2268	42 268	5.26	- 5.26	1	40 044	44 492
0	3.2624	32 624	5.10	- 5.10	1	30 961	34 288
5	2.5381	25 381	4.94	- 4.94	1	24 127	26 636
10	1.9897	19 897	4.80	- 4.80	1	18 943	20 851
15	1.5711	15 711	4.65	- 4.65	1	14 980	16 442
20	1.2493	12 493	4.52	- 4.52	1	11 928	13 057
25	1.0000	10 000	2.19	- 4.39	0.5	9781.0	10 219
30	0.80560	8056.0	2.13	- 4.26	0.5	7884.6	8227.3
35	0.65297	6529.7	2.07	- 4.14	0.5	6394.8	6664.7
40	0.53239	5323.9	2.01	- 4.03	0.5	5216.9	5430.9
45	0.43653	4365.3	1.95	- 3.92	0.5	4280.0	4450.6
50	0.35987	3598.7	1.90	- 3.81	0.5	3530.3	3667.2
55	0.29823	2982.3	1.85	- 3.71	0.5	2927.1	3037.5
60	0.24838	2483.8	1.80	- 3.61	0.5	2439.1	2528.6
65	0.20787	2078.7	1.75	- 3.51	0.5	2042.2	2115.1
70	0.17477	1747.7	1.71	- 3.42	0.5	1717.8	1777.5
75	0.14759	1475.9	1.67	- 3.34	0.5	1451.3	1500.5
80	0.12518	1251.8	1.62	- 3.25	0.5	1231.5	1272.1
85	0.10661	1066.1	1.58	- 3.17	0.5	1049.2	1083.0
90	0.091159	911.59	3.09	- 3.09	1	883.39	939.78
95	0.078246	782.46	3.02	- 3.02	1	758.85	806.07
100	0.067411	674.11	2.94	- 2.94	1	654.26	693.96
105	0.058285	582.85	2.87	- 2.87	1	566.09	599.60
110	0.050568	505.68	2.81	- 2.81	1	491.48	519.87
115	0.044019	440.19	2.74	- 2.74	1	428.12	452.25
120	0.038441	384.41	2.68	- 2.68	1	374.12	394.71
125	0.033675	336.75	2.62	- 2.62	1	327.93	345.56

Note

- R(T) table spreadsheet available on request at [nlr@vishay.com](mailto:nlr@vishay.com)



## Disclaimer

All product specifications and data are subject to change without notice.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained herein or in any other disclosure relating to any product.

Vishay disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Vishay products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Vishay for any damages arising or resulting from such use or sale. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.