

## NTC Thermistors, 2-Point 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

 AUTOMOTIVE  
GRADE

**RoHS**  
COMPLIANT

### QUICK REFERENCE DATA

PARAMETER	VALUE	UNIT
Resistance value at 25 °C	2.06K to 10K	Ω
Tolerance on $R_{25}$ -value	± 1.92; ± 2.19	%
$B_{25/85}$ -value	3511 to 3984	K
Tolerance on $B_{25/85}$	± 0.5 to ± 1	%
Accuracy of temperature measurement	± 0.5 between 25 and 85	°C
Operating temperature range	- 40 to + 125	°C
Maximum power dissipation at 55 °C	50	mW
Dissipation factor $\delta$ (in still air)	≈ 0.8	mW/K
Response time (in stirred air) (in oil)	≈ 3 ≈ 0.7	s
Climatic category (LCT/UCT/days)	40/125/56	
Minimum dielectric withstanding voltage between leads termination and coated body	100	$V_{RMS}$
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	$R_{25}$ <sup>(1)</sup> (Ω)	$\alpha$ (25 °C) (%/K)	$R_{25}$ TOL. (%)	$B_{25/85}$ <sup>(1)</sup> (K)	$B_{25/85}$ TOL. (%)	$\Delta T_{MAX.}$ <sup>(2)</sup> 25 TO 85 (°C)
NTCLE305E4202SB	2060	- 3.85	1.92	3511	1.0	± 0.5
NTCLE305E4502SB	5000	- 4.39	2.19	3984	0.5	± 0.5
NTCLE305E4103SB	10 000	- 4.39	2.19	3984	0.5	± 0.5

#### Notes

<sup>(1)</sup> Other  $R_{25}$  and B-values available on request

<sup>(2)</sup>  $\Delta T$  is the temperature measurement accuracy in the defined temperature range

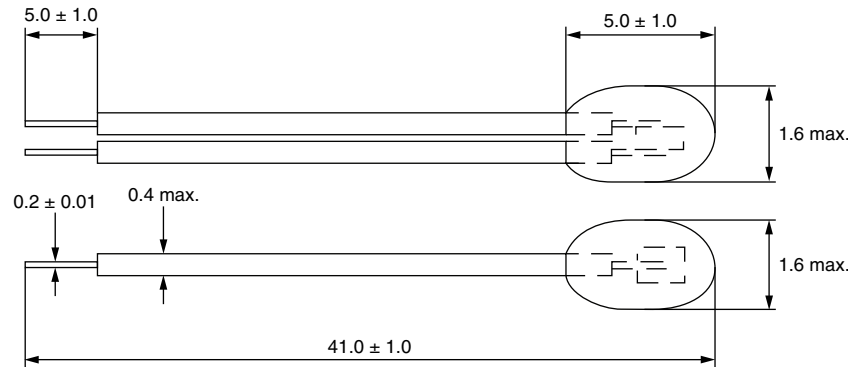
# NTCLE305E4...SB

Vishay BCcomponents

NTC Thermistors, 2-Point Micro Chip  
Sensor Insulated Leads



## DIMENSIONS in millimeters



## RESISTANCE VALUES AT INTERMEDIATE TEMPERATURES WITH $R_{25}$ AT 2060 $\Omega$

SAP PART AND ORDERING NUMBER: NTCLE305E4202SB

TEMPERATURE (°C)	RESISTANCE ( $\Omega$ )	$R/R_{25}$	$\Delta R/R$ (%)	$\alpha$ (%/K)	$\Delta T_{MAX.}$ ( $\pm$ °C)	$R_{MIN.}$ ( $\Omega$ )	$R_{MAX.}$ ( $\Omega$ )
-40.0	47 326	22.974	5.27	-6.03	0.87	44 832	49 820
-35.0	35 203	17.089	4.95	-5.81	0.85	33 461	36 945
-30.0	26 473	12.851	4.64	-5.60	0.83	25 245	27 700
-25.0	20 115	9.7643	4.34	-5.39	0.81	19 241	20 988
-20.0	15 435	7.4925	4.06	-5.20	0.78	14 808	16 061
-15.0	11 954	5.8031	3.78	-5.02	0.75	11 502	12 407
-10.0	9341.4	4.5347	3.52	-4.85	0.73	9012.6	9670.2
-5.0	7361.4	3.5735	3.27	-4.68	0.70	7120.9	7601.8
0.0	5847.7	2.8387	3.02	-4.53	0.67	5671.0	6024.5
5.0	4680.9	2.2723	2.79	-4.38	0.64	4550.5	4811.4
10.0	3774.3	1.8322	2.56	-4.24	0.60	3677.7	3870.9
15.0	3064.4	1.4876	2.34	-4.10	0.57	2992.7	3136.2
20.0	2504.6	1.2158	2.13	-3.97	0.54	2451.3	2557.9
25.0	2060.0	1.0000	1.92	-3.85	0.50	2020.4	2099.6
30.0	1704.5	0.82744	1.86	-3.73	0.50	1672.7	1736.3
35.0	1418.6	0.68864	1.81	-3.62	0.50	1392.9	1444.3
40.0	1186.9	0.57618	1.76	-3.52	0.50	1166.1	1207.8
45.0	997.97	0.48445	1.71	-3.42	0.50	980.90	1015.0
50.0	842.90	0.40917	1.67	-3.33	0.50	828.85	856.95
55.0	714.92	0.34705	1.63	-3.25	0.50	703.29	726.55
60.0	608.74	0.29550	1.59	-3.18	0.50	599.06	618.41
65.0	520.21	0.25253	1.55	-3.11	0.50	512.13	528.30
70.0	446.08	0.21654	1.52	-3.04	0.50	439.29	452.86
75.0	383.73	0.18628	1.49	-2.98	0.50	378.01	389.45
80.0	331.09	0.16072	1.46	-2.92	0.50	326.25	335.93
85.0	286.48	0.13907	1.43	-2.87	0.50	282.37	290.59
90.0	248.55	0.12065	1.57	-2.81	0.56	244.64	252.45
95.0	216.18	0.10494	1.70	-2.77	0.62	212.50	219.87
100.0	188.49	0.091501	1.83	-2.72	0.67	185.04	191.95
105.0	164.73	0.079964	1.96	-2.67	0.73	161.50	167.95
110.0	144.27	0.070036	2.08	-2.63	0.79	141.27	147.28
115.0	126.63	0.061470	2.20	-2.59	0.85	123.84	129.42
120.0	111.36	0.054061	2.32	-2.55	0.91	108.78	113.95
125.0	98.133	0.047637	2.43	-2.51	0.97	95.746	100.52

### Note

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



<b>RESISTANCE VALUES AT INTERMEDIATE TEMPERATURES WITH <math>R_{25}</math> AT 5 k<math>\Omega</math></b>							
<b>SAP PART AND ORDERING NUMBER: NTCLE305E4502SB</b>							
<b>TEMPERATURE (°C)</b>	<b>RESISTANCE (<math>\Omega</math>)</b>	<b><math>R/R_{25}</math></b>	<b><math>\Delta R/R</math> (%)</b>	<b><math>\alpha</math> (%/K)</b>	<b><math>\Delta T_{MAX.}</math> (<math>\pm</math> °C)</b>	<b><math>R_{MIN.}</math> (<math>\Omega</math>)</b>	<b><math>R_{MAX.}</math> (<math>\Omega</math>)</b>
-40	167 137	33.427	4.10	- 6.63	0.62	160 290	173 984
-35	120 661	24.132	3.91	- 6.41	0.61	115 939	125 383
-30	88 066	17.613	3.74	- 6.19	0.60	84 775	91 358
-25	64 950	12.990	3.57	- 5.99	0.60	62 632	67 268
-20	48 381	9.6761	3.41	- 5.79	0.59	46 732	50 029
-15	36 382	7.2765	3.25	- 5.61	0.58	35 199	37 565
-10	27 609	5.5218	3.10	- 5.43	0.57	26 753	28 465
-5	21 134	4.2268	2.96	- 5.26	0.56	20 509	21 759
0	16 312	3.2624	2.82	- 5.10	0.55	15 852	16 772
5	12 691	2.5381	2.68	- 4.94	0.54	12 350	13 031
10	9948.4	1.9897	2.55	- 4.80	0.53	9694.3	10 203
15	7855.6	1.5711	2.43	- 4.65	0.52	7664.7	8046.5
20	6246.4	1.2493	2.31	- 4.52	0.51	6102.1	6390.6
25	5000.0	1.0000	2.19	- 4.39	0.50	4890.3	5109.7
30	4028.0	0.80560	2.13	- 4.26	0.50	3942.2	4113.8
35	3264.9	0.65297	2.07	- 4.14	0.50	3197.3	3332.5
40	2661.9	0.53239	2.01	- 4.03	0.50	2608.4	2715.5
45	2182.6	0.43653	1.96	- 3.92	0.50	2139.9	2225.4
50	1799.4	0.35987	1.90	- 3.81	0.50	1765.1	1833.6
55	1491.1	0.29823	1.85	- 3.71	0.50	1463.5	1518.8
60	1241.9	0.24838	1.80	- 3.61	0.50	1219.5	1264.3
65	1039.3	0.20787	1.76	- 3.51	0.50	1021.1	1057.6
70	873.83	0.17477	1.71	- 3.42	0.50	858.87	888.79
75	737.96	0.14759	1.67	- 3.34	0.50	725.65	750.27
80	625.90	0.12518	1.63	- 3.25	0.50	615.72	636.08
85	533.05	0.10661	1.59	- 3.17	0.50	524.60	541.51
90	455.79	0.091159	1.66	- 3.09	0.54	448.21	463.37
95	391.23	0.078246	1.74	- 3.02	0.58	384.43	398.03
100	337.06	0.067411	1.81	- 2.94	0.62	330.95	343.16
105	291.42	0.058284	1.88	- 2.87	0.66	285.93	296.91
110	252.84	0.050568	1.95	- 2.81	0.70	247.90	257.78
115	220.09	0.044019	2.02	- 2.74	0.74	215.64	224.54
120	192.21	0.038441	2.09	- 2.68	0.78	188.19	196.22
125	168.37	0.033675	2.15	- 2.62	0.82	164.75	172.00

**Note**

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

# NTCLE305E4...SB

Vishay BCcomponents

NTC Thermistors, 2-Point Micro Chip  
Sensor Insulated Leads



## RESISTANCE VALUES AT INTERMEDIATE TEMPERATURES WITH $R_{25}$ AT 10 k $\Omega$

SAP PART AND ORDERING NUMBER: NTCLE305E4103SB

TEMPERATURE (°C)	RESISTANCE ( $\Omega$ )	$R/R_{25}$	$\Delta R/R$ (%)	$\alpha$ (%/K)	$\Delta T_{MAX.}$ ( $\pm$ °C)	$R_{MIN.}$ ( $\Omega$ )	$R_{MAX.}$ ( $\Omega$ )
-40	334 274	33.427	4.10	-6.63	0.62	320 580	347 969
-35	241 323	24.132	3.91	-6.41	0.61	231 879	250 767
-30	176 133	17.613	3.74	-6.19	0.60	169 549	182 716
-25	129 900	12.990	3.57	-5.99	0.60	125 264	134 536
-20	96 761	9.6761	3.41	-5.79	0.59	93 465	100 058
-15	72 765	7.2765	3.25	-5.61	0.58	70 399	75 130
-10	55 218	5.5218	3.10	-5.43	0.57	53 506	56 931
-5	42 268	4.2268	2.96	-5.26	0.56	41 018	43 518
0	32 624	3.2624	2.82	-5.10	0.55	31 705	33 544
5	25 381	2.5381	2.68	-4.94	0.54	24 700	26 063
10	19 897	1.9897	2.55	-4.80	0.53	19 389	20 405
15	15 711	1.5711	2.43	-4.65	0.52	15 329	16 093
20	12 493	1.2493	2.31	-4.52	0.51	12 204	12 781
25	10 000	1.0000	2.19	-4.39	0.50	9780.7	10 219
30	8056.0	0.80560	2.13	-4.26	0.50	7884.3	8227.6
35	6529.7	0.65297	2.07	-4.14	0.50	6394.5	6664.9
40	5323.9	0.53239	2.01	-4.03	0.50	5216.7	5431.1
45	4365.3	0.43653	1.96	-3.92	0.50	4279.8	4450.7
50	3598.7	0.35987	1.90	-3.81	0.50	3530.2	3667.3
55	2982.3	0.29823	1.85	-3.71	0.50	2927.0	3037.6
60	2483.8	0.24838	1.80	-3.61	0.50	2439.0	2528.6
65	2078.7	0.20787	1.76	-3.51	0.50	2042.1	2115.2
70	1747.7	0.17477	1.71	-3.42	0.50	1717.7	1777.6
75	1475.9	0.14759	1.67	-3.34	0.50	1451.3	1500.5
80	1251.8	0.12518	1.63	-3.25	0.50	1231.4	1272.2
85	1066.1	0.10661	1.59	-3.17	0.50	1049.2	1083.0
90	911.59	0.091159	1.66	-3.09	0.54	896.42	926.75
95	782.46	0.078246	1.74	-3.02	0.58	768.85	796.06
100	674.11	0.067411	1.81	-2.94	0.62	661.89	686.33
105	582.84	0.058284	1.88	-2.87	0.66	571.86	593.83
110	505.68	0.050568	1.95	-2.81	0.70	495.79	515.56
115	440.19	0.044019	2.02	-2.74	0.74	431.28	449.09
120	384.41	0.038441	2.09	-2.68	0.78	376.38	392.44
125	336.75	0.033675	2.15	-2.62	0.82	329.50	344.00

### Note

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



## Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

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 in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and/or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk and agree to fully indemnify and hold Vishay and its distributors harmless from and against any and all claims, liabilities, expenses and damages arising or resulting in connection with such use or sale, including attorneys fees, even if such claim alleges that Vishay or its distributor was negligent regarding the design or manufacture of the part. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

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

## Material Category Policy

**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.**

**Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.**