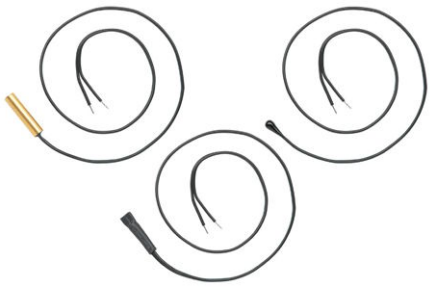
NTC Thermistors, Special Long Lead Sensors



FEATURES

- Accurate over wide temperature range
- High stability
- Excellent price/performance ratio
- High adhesive strength between PVC wire and the encapsulating laquer
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC

Pb e3 RoHS COMPLIANT

APPLICATIONS

Temperature measurement, sensing and control in remote locations and for various environmental conditions.

DESCRIPTION

These sensors exist of a small NTC chip reflow soldered between two AWG24 UL-2468 wires. They are lacquered and insulated with black epoxy (NTCLE400 type), sleeved (NTCLS100 type) or potted into a brass pipe (NTCLP100 type).

MARKING

UL mark on wire, no mark on body.

PACKAGING

The thermistors are packed in cardboard boxes; each box containing 500 pieces.

DESIGN-IN SUPPORT

Other wire length and wire type (UL-2651 PVC 105 °C) are available on request. The products can be provided with a connector on request.
For complete curve computation, visit:
www.vishay.com/resistors-non-linear/curve-computation-list/

MOUNTING

By soldering or clamping the wire ends, in any position. Body can be inserted or taped attached. Not intended for fluid immersed applications.

QUICK REFERENCE DATA

PARAMETER	VALUE	UNIT
Resistance value at 25 °C (R_{25})	2.2K to 100K	Ω
Tolerance on R_{25}-value (2)	± 3	%
$B_{25/85}$-value	3977 to 4190	K
Tolerance on $B_{25/85}$-value	± 0.75 to ± 1.5	%
Operating temperature range: At zero dissipation (continuously) At maximum dissipation	 - 40 to + 85 0 to + 55	°C
Maximum power dissipation at 55 °C	250	mW
Dissipation factor: NTCLE400... NTCLS100... NTCLP100...	 6.0 8.0 6.0	mW/K
Response time (1): NTCLE400... NTCLS100... NTCLP100...	 ≈ 7 ≈ 15 ≈ 10	s
Climatic category (LCT/UCT/days)	40/085/56	
Weight NTCLE400... NTCLS100... NTCLP100...	 ≈ 4 ≈ 6 ≈ 6	g

Notes

(1) Response time in silicone oil MS 200/50. This is the time needed for the sensor to reach 63.2 % of the total temperature difference when subjected to a temperature change from 25 °C in air to 85 °C in oil.

(2) Tighter tolerances on R_{25} are available upon request.

ELECTRICAL DATA AND ORDERING INFORMATION

R_{25} (kΩ)	$B_{25/85}$-VALUE	SAP MATERIAL AND ORDERING NUMBER (3)(4)			OLD 12NC CODE 2381 641		
		EPOXY TYPE	SLEEVED TYPE	PIPE TYPE	EPOXY-COATED TYPE	SLEEVED TYPE	BRASS-PIPE TYPE
2.2	3977K ± 0.75 %	NTCLE400E3222H	NTCLS100E3222H	NTCLP100E3222H	26222	36222	46222
4.7	3977K ± 0.75 %	NTCLE400E3472H	NTCLS100E3472H	NTCLP100E3472H	26472	36472	46472
5	3977K ± 0.75 %	NTCLE400E3502H	NTCLS100E3502H	NTCLP100E3502H	26502	36502	46502
10	3977K ± 0.75 %	NTCLE400E3103H	NTCLS100E3103H	NTCLP100E3103H	26103	36103	46103
47	4090K ± 1.5 %	NTCLE400E3473H	NTCLS100E3473H	NTCLP100E3473H	26473	36473	46473
100	4190K ± 1.5 %	NTCLE400E3104H	NTCLS100E3104H	NTCLP100E3104H	26104	36104	46104

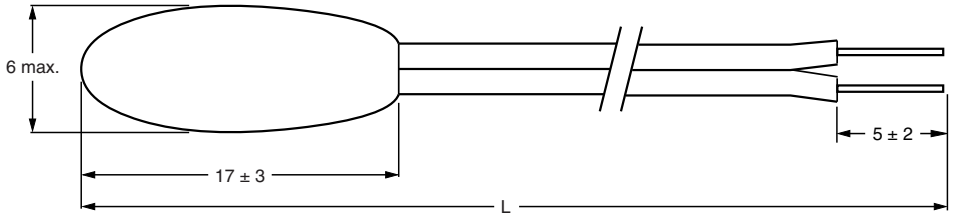
Notes

(3) Other values and tolerances based on the NTCC100E4 series are available on request. (www.vishay.com/doc?29058)

(4) The specified catalog numbers refer to products with L = 400 mm, without connector and adopt UL-2468.AWG24 wire.

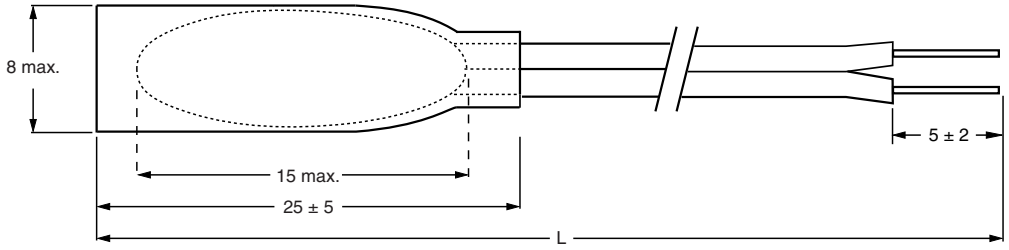
DIMENSIONS in millimeters

Epoxy-coated type NTCLE400E....



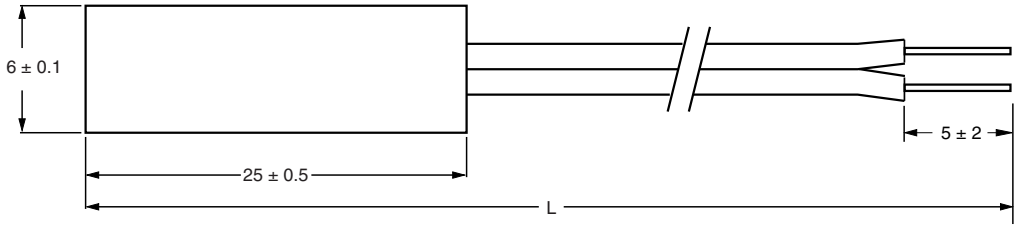
L = 400 mm + 15/- 0
Other wire lengths or connector attached available on request.

Sleeved type NTCLS100E....



L = 400 mm + 15/- 0
Other wire lengths or connector attached available on request.

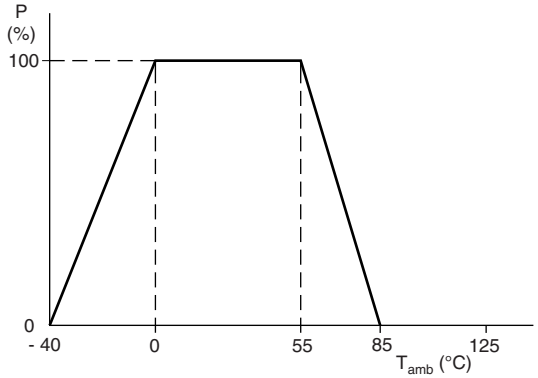
Brass-pipe type NTCLP100E....



L = 400 mm + 15/- 0
Other wire lengths or connector attached available on request.

DERATING

Power derating curve.



Note

- Zero power is considered as measuring power max. 1 % of max. power.

RESISTANCE VALUES AT INTERMEDIATE TEMPERATURES WITH R_{25} AT 2.2 kΩ, 4.7 kΩ, 5.0 kΩ , AND 10 kΩ							
T_{OPER} (°C)	PART NR. NTCL**00E3222H R_T (Ω)	PART NR. NTCL**00E3472H R_T (Ω)	PART NR. NTCL**00E3502H R_T (Ω)	PART NR. NTCL**00E3103H R_T (Ω)	$\Delta R/R$ (%)	TCR (%/K)	$\Delta T_{max.}$ (± K)
- 40	73 061	156 084	166 047	332 094	5.87	- 6.62	0.89
- 35	52 778	112 753	119 950	239 900	5.60	- 6.39	0.88
- 30	38 544	82 344	87 600	175 200	5.33	- 6.18	0.86
- 25	28 443	60 765	64 643	129 287	5.08	- 5.98	0.85
- 20	21 199	45 288	48 179	96 358	4.83	- 5.78	0.84
- 15	15 950	34 075	36 250	72 500	4.60	- 5.60	0.82
- 10	12 110	25 872	27 523	55 046	4.37	- 5.42	0.81
- 5	9275	19 814	21 078	42 157	4.15	- 5.25	0.79
0	7162	15 300	16 277	32 554	3.94	- 5.09	0.77
5	5574	11 909	12 669	25 339	3.74	- 4.93	0.76
10	4372	9340	9936	19 872	3.55	- 4.79	0.74
15	3454	7378	7849	15 698	3.36	- 4.64	0.72
20	2747	5869	6244	12 488	3.18	- 4.51	0.70
25	2200	4700	5000	10 000	3.00	- 4.38	0.69
30	1773	3788	4030	8059	3.17	- 4.25	0.75
35	1438	3071	3267	6535	3.33	- 4.13	0.81
40	1173	2505	2665	5330	3.49	- 4.02	0.87
45	961.8	2055	2186	4372	3.65	- 3.91	0.93
50	793.2	1694	1803	3605	3.80	- 3.80	1.00
55	657.5	1405	1494	2989	3.94	- 3.70	1.07
60	547.8	1170	1245	2490	4.08	- 3.60	1.13
65	458.6	979.7	1042	2084	4.22	- 3.51	1.20
70	385.7	823.9	876.5	1753	4.35	- 3.42	1.27
75	325.8	696.0	740.5	1481	4.48	- 3.33	1.35
80	276.4	590.5	628.2	1256	4.60	- 3.25	1.42
85	235.5	503.0	585.2	1070	4.73	- 3.17	1.49

RESISTANCE VALUES AT INTERMEDIATE TEMPERATURES WITH R_{25} AT 47 kΩ				
T_{OPER} (°C)	PART NR. NTCL**00E3473H R_T (Ω)	$\Delta R/R$ (%)	TCR (%/K)	$\Delta T_{max.}$ (± K)
- 40	1 589 068	8.91	- 6.54	1.36
- 35	1 151 627	8.34	- 6.34	1.32
- 30	842 790	7.79	- 6.15	1.27
- 25	622 597	7.27	- 5.96	1.22
- 20	464 110	6.77	- 5.79	1.17
- 15	348 989	6.28	- 5.62	1.12
- 10	264 628	5.82	- 5.45	1.07
- 5	202 280	5.37	- 5.30	1.01
0	155 823	4.94	- 5.14	0.96
5	120 932	4.52	- 5.00	0.91
10	94 528	4.12	- 4.86	0.85
15	74 399	3.74	- 4.72	0.79
20	58 945	3.36	- 4.59	0.73
25	47 000	3.00	- 4.47	0.67
30	37 706	3.35	- 4.35	0.77
35	30 429	3.69	- 4.23	0.87
40	24 696	4.02	- 4.12	0.97
45	20 154	4.33	- 4.01	1.08
50	16 534	4.64	- 3.91	1.19
55	13 633	4.94	- 3.81	1.30
60	11 296	5.23	- 3.71	1.41
65	9404	5.51	- 3.62	1.52
70	7865	5.78	- 3.53	1.64
75	6607	6.04	- 3.44	1.75
80	5573	6.30	- 3.36	1.87
85	4721	6.55	- 3.28	2.00

RESISTANCE VALUES AT INTERMEDIATE TEMPERATURES WITH R_{25} AT 100 kΩ				
T_{OPER} (°C)	PART NR. NTCL**00E3104H R_T (Ω)	$\Delta R/R$ (%)	TCR (%/K)	$\Delta T_{max.}$ (± K)
- 40	3 666 299	9.05	- 6.69	1.35
- 35	2 637 588	8.47	- 6.49	1.31
- 30	1 916 576	7.91	- 6.29	1.26
- 25	1 406 111	7.37	- 6.10	1.21
- 20	1 041 184	6.86	- 5.92	1.16
- 15	777 846	6.36	- 5.75	1.11
- 10	586 097	5.89	- 5.58	1.06
- 5	445 257	5.43	- 5.42	1.00
0	340 942	4.99	- 5.26	0.95
5	263 054	4.56	- 5.11	0.89
10	204 446	4.15	- 4.97	0.84
15	160 014	3.75	- 4.83	0.78
20	126 087	3.37	- 4.70	0.72
25	100 000	3.00	- 4.57	0.66
30	79 808	3.36	- 4.45	0.75
35	64 077	3.70	- 4.33	0.86
40	51 745	4.04	- 4.22	0.96
45	42 021	4.36	- 4.11	1.06
50	34 308	4.68	- 4.00	1.17
55	28 156	4.98	- 3.90	1.28
60	23 222	5.28	- 3.80	1.39
65	19 246	5.57	- 3.71	1.50
70	16 025	5.85	- 3.62	1.62
75	13 402	6.12	- 3.53	1.73
80	11 258	6.38	- 3.45	1.85
85	9496	6.64	- 3.36	1.97

TESTS AND REQUIREMENTS

STABILITY TESTS			
IEC	TEST	PROCEDURE	DRIFT REQUIREMENT
60068-2-2	Endurance dry heat	85 °C; 1000 h	$\Delta R/R$ < 5 %
60068-2-1	Endurance cold	- 40 °C; 1000 h	$\Delta R/R$ < 5 %
60539	Endurance max. dissipation	250 mW; 55 °C; 1000 h	$\Delta R/R$ < 5 %
60068-2-3	Damp heat, steady state	56 days at 40 °C; 90 % to 95 % RH	$\Delta R/R$ < 7 %
60068-20-14	- 40 °C to + 85 °C; 50 cycles	Rapid change of temperature	$\Delta R/R$ < 5 %

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