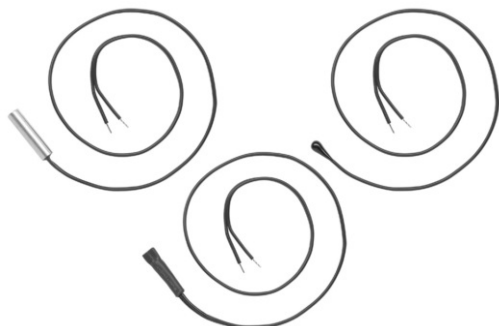


NTC Thermistors, Special Long Lead Sensors



QUICK REFERENCE DATA

PARAMETER	VALUE	UNIT
Resistance value at 25 °C (R_{25})	2.2 to 100	k Ω
Tolerance on R_{25} - value	± 3	%
Tolerance on $B_{25/85}$ - value	± 1.5 or ± 0.75	%
Maximum dissipation	250	mW
Dissipation factor:		
2381 641 2....	6.0	mW/K
2381 641 3....	8.0	mW/K
2381 641 4....	6.0	mW/K
Response time; note 1:		
2381 641 2....	≈ 7	s
2381 641 3....	≈ 15	s
2381 641 4....	≈ 10	s
Operating temperature range:		
at zero dissipation (continuously)	- 40 to + 85	°C
at maximum dissipation	0 to + 50	°C
Climatic category	40/085/56	
Lead wire; note 2	UL-2468.AWG24 wire	
Mass:		
2381 641 2....	≈ 4	g
2381 641 3....	≈ 6	g
2381 641 4....	≈ 6	g

Notes

- 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.
- Wire length and wire type are optional on request. The products can be provided with a connector on request.
- Tighter tolerances on R_{25} are available upon request.

ELECTRICAL DATA AND ORDERING INFORMATION

R_{25} (k Ω)	$B_{25/85}$ - VALUE	CATALOG NUMBER 2381 641 ⁽²⁾			SAP PART NUMBER		
		EPOXY-COATED TYPE	SLEEVED TYPE	BRASS-PIPE TYPE	EPOXY TYPE	SLEEVED TYPE	PIPE TYPE
2.2	3977K ± 0.75 %	26222	36222	46222	NTCLE400E3222H	NTCLS100E3222H	NTCLP100E3222H
4.7	3977K ± 0.75 %	26472	36472	46472	NTCLE400E3472H	NTCLS100E3472H	NTCLP100E3472H
5	3977K ± 0.75 %	26502	36502	46502	NTCLE400E3502H	NTCLS100E3502H	NTCLP100E3502H
10	3977K ± 0.75 %	26103	36103	46103	NTCLE400E3103H	NTCLS100E3103H	NTCLP100E3103H
47	4090K ± 1.5 %	26473	36473	46473	NTCLE400E3473H	NTCLS100E3473H	NTCLP100E3473H
100	4190K ± 1.5 %	26104	36104	46104	NTCLE400E3104H	NTCLS100E3104H	NTCLP100E3104H

Notes

- Other values based on the 2381 640 0.... series are available on request.
- The specified catalog numbers refer to products with L = 400 mm, without connector and adopt UL-2468.AWG24 wire.

FEATURES

- Accurate over wide temperature range
- High stability
- Excellent price/performance ratio
- High adhesive strength between PVC wire and the encapsulating laquer
- Old part number was 2322 641 2/3/4....
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC

APPLICATIONS

Temperature sensing and control

These thermistors have a negative temperature coefficient.

The epoxy-coated type (2381 641 2....) consists of a chip with UL wire and is lacquered and insulated with black epoxy.

The sleeved type (2381 641 3....) and the brass-pipe type (2381 641 4....) are suitable for application in various environmental conditions.

MARKING

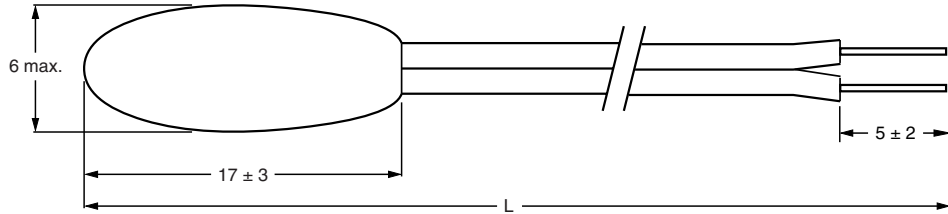
UL mark on wire, no mark on body.

PACKAGING

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

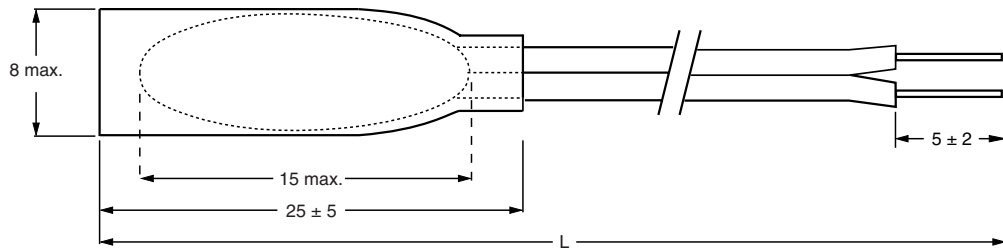
DIMENSIONS in millimeters

Epoxy-coated type 2381 641 2....



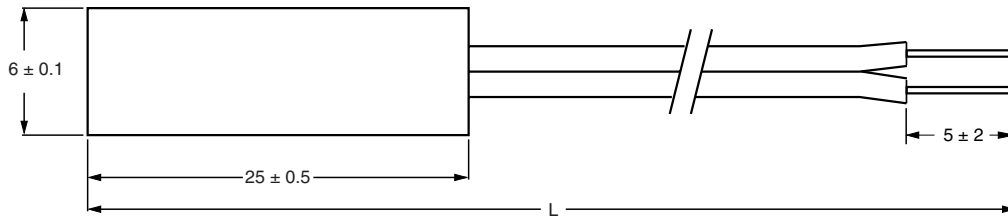
L = 400 mm + 15/- 0
Other wire lengths available on request.

Sleeved type 2381 641 3....



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

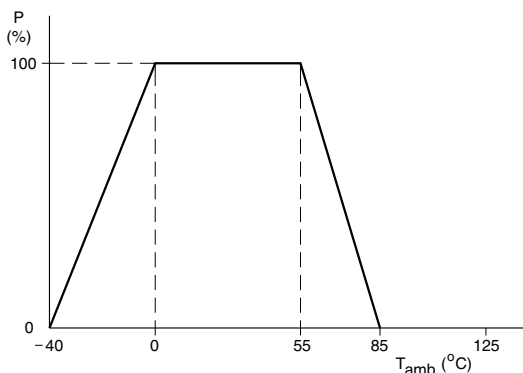
Brass-pipe type 2381 641 4....



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

DERATING

Power derating curve.



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12 NC 2381	SAP CODING	R ₂₅		B _{25/85}	
		KΩ	± %	K	± %
2381 641 46222	NTCLP100E3222H	2.2	3	3977	0.75

TEMP. (°C)	R _T /R ₂₅	RESISTANCE (Ω)	ΔR/R (%)	α (%/K)	D _T (K)	R _{MIN.} (Ω)	R _{MAX.} (Ω)
-40	33.209	73 061	5.87	- 6.62	0.89	68 770	77 351
-35	23.990	52 778	5.60	- 6.39	0.88	49 824	55 731
-30	17.520	38 544	5.33	- 6.18	0.86	36 489	40 599
-25	12.929	28 443	5.08	- 5.98	0.85	26 999	29 887
-20	9.636	21 199	4.83	- 5.78	0.84	20 175	22 223
-15	7.250	15 950	4.60	- 5.60	0.82	15 217	16 683
-10	5.505	12 110	4.37	- 5.42	0.81	11 581	12 639
-5	4.216	9275	4.15	- 5.25	0.79	8889	9660
0	3.255	7162	3.94	- 5.09	0.77	6880	7444
5	2.534	5574	3.74	- 4.93	0.76	5366	5783
10	1.987	4372	3.55	- 4.79	0.74	4217	4527
15	1.570	3454	3.36	- 4.64	0.72	3338	3570
20	1.249	2747	3.18	- 4.51	0.70	2660	2835
25	1.000	2200	3.00	- 4.38	0.69	2134	2266
30	0.806	1773	3.17	- 4.25	0.75	1717	1829
35	0.653	1438	3.33	- 4.13	0.81	1390	1486
40	0.533	1173	3.49	- 4.02	0.87	1132	1214
45	0.437	962	3.65	- 3.91	0.93	927	997
50	0.361	793	3.80	- 3.80	1.00	763	823
55	0.299	658	3.94	- 3.70	1.07	632	683
60	0.249	548	4.08	- 3.60	1.13	525	570
65	0.208	459	4.22	- 3.51	1.20	439	478
70	0.175	386	4.35	- 3.42	1.27	369	402
75	0.148	326	4.48	- 3.33	1.35	311	340
80	0.126	276	4.60	- 3.25	1.42	264	289
85	0.107	235	4.73	- 3.17	1.49	224	247



NTC Thermistors, Special Long Lead Vishay BCcomponents
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12 NC 2381	SAP CODING	R ₂₅		B _{25/85}	
		KΩ	± %	K	± %
2381 641 46472	NTCLP100E3472H	4.7	3	3977	0.75

TEMP. (°C)	R _T /R ₂₅	RESISTANCE (Ω)	ΔR/R (%)	α (%/K)	D _T (K)	R _{MIN.} (Ω)	R _{MAX.} (Ω)
- 40	33.209	156 084	5.87	- 6.62	0.89	146 918	165 250
- 35	23.990	112 753	5.60	- 6.39	0.88	106 443	119 063
- 30	17.520	82 344	5.33	- 6.18	0.86	77 954	86 733
- 25	12.929	60 765	5.08	- 5.98	0.85	57 680	63 849
- 20	9.636	45 288	4.83	- 5.78	0.84	43 100	47 477
- 15	7.250	34 075	4.60	- 5.60	0.82	32 509	35 641
- 10	5.505	25 872	4.37	- 5.42	0.81	24 741	27 002
- 5	4.216	19 814	4.15	- 5.25	0.79	18 991	20 637
0	3.255	15 300	3.94	- 5.09	0.77	14 697	15 904
5	2.534	11 909	3.74	- 4.93	0.76	11 464	12 355
10	1.987	9340	3.55	- 4.79	0.74	9009	9671
15	1.570	7378	3.36	- 4.64	0.72	7131	7626
20	1.249	5869	3.18	- 4.51	0.70	5683	6056
25	1.000	4700	3.00	- 4.38	0.69	4559	4841
30	0.806	3788	3.17	- 4.25	0.75	3668	3908
35	0.653	3071	3.33	- 4.13	0.81	2969	3174
40	0.533	2505	3.49	- 4.02	0.87	2418	2593
45	0.437	2055	3.65	- 3.91	0.93	1980	2130
50	0.361	1694	3.80	- 3.80	1.00	1630	1759
55	0.299	1405	3.94	- 3.70	1.07	1349	1460
60	0.249	1170	4.08	- 3.60	1.13	1122	1218
65	0.208	980	4.22	- 3.51	1.20	938	1021
70	0.175	824	4.35	- 3.42	1.27	788	860
75	0.148	696	4.48	- 3.33	1.35	665	727
80	0.126	591	4.60	- 3.25	1.42	563	618
85	0.107	503	4.73	- 3.17	1.49	479	527

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12 NC 2381	SAP CODING	R ₂₅		B _{25/85}	
		KΩ	± %	K	± %
2381 641 46502	NTCLP100E3502H	5	3	3977	0.75

TEMP. (°C)	R _T /R ₂₅	RESISTANCE (Ω)	ΔR/R (%)	α (%/K)	D _T (K)	R _{MIN.} (Ω)	R _{MAX.} (Ω)
-40	33.209	166 047	5.87	-6.62	0.89	156 295	175 798
-35	23.990	119 950	5.60	-6.39	0.88	113 237	126 662
-30	17.520	87 600	5.33	-6.18	0.86	82 930	92 270
-25	12.929	64 643	5.08	-5.98	0.85	61 362	67 925
-20	9.636	48 179	4.83	-5.78	0.84	45 851	50 507
-15	7.250	36 250	4.60	-5.60	0.82	34 584	37 916
-10	5.505	27 523	4.37	-5.42	0.81	26 320	28 726
-5	4.216	21 078	4.15	-5.25	0.79	20 203	21 954
0	3.255	16 277	3.94	-5.09	0.77	15 635	16 919
5	2.534	12 669	3.74	-4.93	0.76	12 195	13 143
10	1.987	9936	3.55	-4.79	0.74	9584	10 288
15	1.570	7849	3.36	-4.64	0.72	7586	8113
20	1.249	6244	3.18	-4.51	0.70	6046	6442
25	1.000	5000	3.00	-4.38	0.69	4850	5150
30	0.806	4030	3.17	-4.25	0.75	3902	4157
35	0.653	3267	3.33	-4.13	0.81	3158	3376
40	0.533	2665	3.49	-4.02	0.87	2572	2758
45	0.437	2186	3.65	-3.91	0.93	2106	2266
50	0.361	1803	3.80	-3.80	1.00	1734	1871
55	0.299	1494	3.94	-3.70	1.07	1435	1553
60	0.249	1245	4.08	-3.60	1.13	1194	1296
65	0.208	1042	4.22	-3.51	1.20	998	1086
70	0.175	877	4.35	-3.42	1.27	838	915
75	0.148	740	4.48	-3.33	1.35	707	774
80	0.126	628	4.60	-3.25	1.42	599	657
85	0.107	535	4.73	-3.17	1.49	510	560



NTC Thermistors, Special Long Lead Vishay BCcomponents
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12 NC 2381	SAP CODING	R ₂₅		B _{25/85}	
		KΩ	± %	K	± %
2381 641 46103	NTCLP100E3103H	10	3	3977	0.75

TEMP. (°C)	R _T /R ₂₅	RESISTANCE (Ω)	ΔR/R (%)	α (%/K)	D _T (K)	R _{MIN.} (Ω)	R _{MAX.} (Ω)
- 40	33.209	332 094	5.87	- 6.62	0.89	312 591	351 597
- 35	23.990	239 900	5.60	- 6.39	0.88	226 475	253 325
- 30	17.520	175 200	5.33	- 6.18	0.86	165 860	184 539
- 25	12.929	129 287	5.08	- 5.98	0.85	122 724	135 850
- 20	9.636	96 358	4.83	- 5.78	0.84	91 702	101 014
- 15	7.250	72 500	4.60	- 5.60	0.82	69 168	75 833
- 10	5.505	55 046	4.37	- 5.42	0.81	52 640	57 452
- 5	4.216	42 157	4.15	- 5.25	0.79	40 406	43 908
0	3.255	32 554	3.94	- 5.09	0.77	31 271	33 838
5	2.534	25 339	3.74	- 4.93	0.76	24 391	26 286
10	1.987	19 872	3.55	- 4.79	0.74	19 168	20 577
15	1.570	15 698	3.36	- 4.64	0.72	15 171	16 226
20	1.249	12 488	3.18	- 4.51	0.70	12 091	12 884
25	1.000	10 000	3.00	- 4.38	0.69	9700	10 300
30	0.806	8059	3.17	- 4.25	0.75	7804	8315
35	0.653	6535	3.33	- 4.13	0.81	6317	6753
40	0.533	5330	3.49	- 4.02	0.87	5144	5516
45	0.437	4372	3.65	- 3.91	0.93	4212	4531
50	0.361	3605	3.80	- 3.80	1.00	3468	3742
55	0.299	2989	3.94	- 3.70	1.07	2871	3106
60	0.249	2490	4.08	- 3.60	1.13	2388	2592
65	0.208	2084	4.22	- 3.51	1.20	1996	2172
70	0.175	1753	4.35	- 3.42	1.27	1677	1829
75	0.148	1481	4.48	- 3.33	1.35	1415	1547
80	0.126	1256	4.60	- 3.25	1.42	1199	1314
85	0.107	1070	4.73	- 3.17	1.49	1020	1121

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12 NC 2381	SAP CODING	R ₂₅		B _{25/85}	
		KΩ	± %	K	± %
2381 641 46473	NTCLP100E3473H	47	3	4090	1.5

TEMP. (°C)	R _T /R ₂₅	RESISTANCE (Ω)	ΔR/R (%)	α (%/K)	D _T (K)	R _{MIN.} (Ω)	R _{MAX.} (Ω)
-40	33.810	1 589 068	8.91	- 6.54	1.36	1 447 502	1 730 633
-35	24.503	1 151 627	8.34	- 6.34	1.32	1 055 584	1 247 669
-30	17.932	842 790	7.79	- 6.15	1.27	777 102	908 477
-25	13.247	622 597	7.27	- 5.96	1.22	577 331	667 862
-20	9.875	464 110	6.77	- 5.79	1.17	432 701	495 518
-15	7.425	348 989	6.28	- 5.62	1.12	327 058	370 920
-10	5.630	264 628	5.82	- 5.45	1.07	249 230	280 026
-5	4.304	202 280	5.37	- 5.30	1.01	191 416	213 145
0	3.315	155 823	4.94	- 5.14	0.96	148 126	163 520
5	2.573	120 932	4.52	- 5.00	0.91	115 461	126 403
10	2.011	94 528	4.12	- 4.86	0.85	90 630	98 425
15	1.583	74 399	3.74	- 4.72	0.79	71 620	77 178
20	1.254	58 945	3.36	- 4.59	0.73	56 964	60 927
25	1.000	47 000	3.00	- 4.47	0.67	45 590	48 410
30	0.802	37 706	3.35	- 4.35	0.77	36 443	38 969
35	0.647	30 429	3.69	- 4.23	0.87	29 307	31 551
40	0.525	24 696	4.02	- 4.12	0.97	23 705	25 688
45	0.429	20 154	4.33	- 4.01	1.08	19 281	21 027
50	0.352	16 534	4.64	- 3.91	1.19	15 767	17 301
55	0.290	13 633	4.94	- 3.81	1.30	12 960	14 306
60	0.240	11 296	5.23	- 3.71	1.41	10 706	11 887
65	0.200	9404	5.51	- 3.62	1.52	8887	9922
70	0.167	7865	5.78	- 3.53	1.64	7411	8320
75	0.141	6607	6.04	- 3.44	1.75	6208	7006
80	0.119	5573	6.30	- 3.36	1.87	5222	5925
85	0.100	4721	6.55	- 3.28	2.00	4412	5030



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12 NC 2381	SAP CODING	R ₂₅		B _{25/85}	
		KΩ	± %	K	± %
2381 641 46104	NTCLP100E3104H	100	3	4190	1.5

TEMP. (°C)	R _T /R ₂₅	RESISTANCE (Ω)	ΔR/R (%)	α (%/K)	D _T (K)	R _{MIN.} (Ω)	R _{MAX.} (Ω)
-40	36.663	3 666 299	9.05	- 6.69	1.35	3 334 382	3 998 217
-35	26.376	2 637 588	8.47	- 6.49	1.31	2 414 177	2 860 998
-30	19.166	1 916 576	7.91	- 6.29	1.26	1 764 950	2 068 202
-25	14.061	1 406 111	7.37	- 6.10	1.21	1 302 413	1 509 810
-20	10.412	1 041 184	6.86	- 5.92	1.16	969 762	1 112 605
-15	7.778	777 846	6.36	- 5.75	1.11	728 341	827 350
-10	5.861	586 097	5.89	- 5.58	1.06	551 588	620 605
-5	4.453	445 257	5.43	- 5.42	1.00	421 083	469 431
0	3.409	340 942	4.99	- 5.26	0.95	323 938	357 945
5	2.631	263 054	4.56	- 5.11	0.89	251 055	275 052
10	2.044	204 446	4.15	- 4.97	0.84	195 961	212 931
15	1.600	160 014	3.75	- 4.83	0.78	154 008	166 020
20	1.261	126 087	3.37	- 4.70	0.72	121 837	130 336
25	1.000	100 000	3.00	- 4.57	0.66	97 000	103 000
30	0.798	79 808	3.36	- 4.45	0.75	77 128	82 488
35	0.641	64 077	3.70	- 4.33	0.86	61 703	66 451
40	0.517	51 745	4.04	- 4.22	0.96	49 655	53 836
45	0.420	42 021	4.36	- 4.11	1.06	40 187	43 855
50	0.343	34 308	4.68	- 4.00	1.17	32 702	35 913
55	0.282	28 156	4.98	- 3.90	1.28	26 752	29 559
60	0.232	23 222	5.28	- 3.80	1.39	21 996	24 449
65	0.192	19 246	5.57	- 3.71	1.50	18 174	20 318
70	0.160	16 025	5.85	- 3.62	1.62	15 088	16 962
75	0.134	13 402	6.12	- 3.53	1.73	12 582	14 222
80	0.113	11 258	6.38	- 3.45	1.85	10 539	11 976
85	0.095	9496	6.64	- 3.36	1.97	8866	10 126

TESTS AND REQUIREMENTS

STABILITY TESTS				
IEC	CECC	TEST	PROCEDURE	DRIFT REQUIREMENT
	D3; 4.20.1	endurance	85 °C; 1000 hours	ΔR/R < 5 %
68-2-1		endurance	- 40 °C; 1000 hours	ΔR/R < 5 %
539		endurance	250 mW; 55 °C; 1000 hours	ΔR/R < 5 %
68-2-3	D1; 4.19	damp heat, steady state	56 days at 40 °C; 90 to 95 % RH	ΔR/R < 7 %
68-2-14	C2; 4.14	rapid change of temperature	- 40 to + 85 °C; 50 cycles	ΔR/R < 5 %



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