

SMD 0805, Glass Protected NTC Thermistors



FEATURES

- TCR ranging from - 6 %/K at - 40 °C to - 2 %/K at 150 °C
- Tolerance on R_{25} down to 1 %, and on $B_{25/85}$ down to 1 %
- Suitable for wave or reflow soldering
- NiSn terminations
- Fully glass coated and protected
- cUL recognized for safety applications (file E148885)
- AEC-Q200 qualified
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912

APPLICATIONS

- Temperature sensing, protection and compensation in automotive, industrial, telecom and consumer applications. Examples are:
 - Battery chargers
 - Power suppliers
 - Office equipment
 - LCD compensation
 - In-car entertainment

DESCRIPTION

Size 0805 chip thermistors with a negative temperature coefficient. The device has no marking.

PACKAGING

Available in 8 mm punched paper tape on reel package of 4000 units.

DESIGN-IN SUPPORT

For complete Curve Computation, visit:

www.vishay.com/resistors-non-linear/curve-computation-list/

QUICK REFERENCE DATA		
PARAMETER	VALUE	UNIT
Resistance value at 25 °C	2.2K to 680K	Ω
Tolerance on R_{25} -value	± 1; ± 2; ± 3; ± 5	%
$B_{25/85}$ -value	3430 to 4125	K
Tolerance on $B_{25/85}$ -value	± 1; ± 3	%
Maximum dissipation at 25 °C	210	mW
Thermal time constant τ	≈ 10	s
Dissipation factor D	3.5	mW/K
Operating temperature range at zero power	- 40 to + 150	°C
Weight	≈ 0.008	g

ELECTRICAL DATA AND ORDERING INFORMATION				
R_{25} -VALUE (kΩ)	$B_{25/85}$ -VALUE (K)	TOLERANCE ON $B_{25/85}$ (%)	SAP MATERIAL AND ORDERING NUMBER NTCS0805E3... (1)	12NC OLD MATERIAL NUMBER 2381 615 5... (2)
2.2	3600	± 1	222*MT	*222
4.7	3500	± 1	472*MT	*472
10	3430	± 3	103*LT	-
10	3570	± 3	103*MT	*103
10	3940	± 1	103*HT	-
15	3700	± 1	153*MT	*153
22	3800	± 1	223*HT	*223
33	3920	± 1	333*HT	*333
47	3960	± 1	473*HT	*473
68	4100	± 1	683*XT	*683
100	3590	± 1	104*MT	-
100	4100	± 1	104*XT	*104
330	3930	± 1	334*HT	*334
470	4025	± 1	474*XT	*474
680	4125	± 1	684*XT	*684

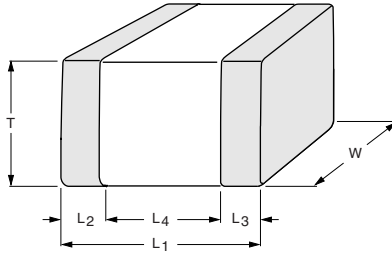
Notes

(1) Replace * in SAP by J for 5 %, H for 3 %, G for 2 %, F for 1 % tolerance on R_{25}

(2) Replace * in 12NC by 3 for 5 %, 6 for 3 %, 4 for 2 %, 5 for 1 % tolerance on R_{25}



DIMENSIONS in millimeters



L ₁	W	T	L ₂ AND L ₃ MIN.	L ₄ MIN.
2.0 ± 0.2	1.25 ± 0.15	0.8 ± 0.15	0.2	0.55

For complete Curve Computation, visit: www.vishay.com/resistors-non-linear/curve-computation-list/

RESISTANCE VALUES AT INTERMEDIATE TEMPERATURES WITH R₂₅ AT 2.2 kΩ AND 4.7 kΩ					
T _{OPER} (°C)	PART NUMBER NTCS0805E3222*MT		PART NUMBER NTCS0805E3472*MT		ΔR/R DUE TO B _{tol.} (± %)
	R _T (Ω)	TCR (%/K)	R _T (Ω)	TCR (%/K)	
-40	57 658	- 6.26	101 275	- 5.75	7.58
-35	42 410	- 6.03	76 325	- 5.57	6.83
-30	31 537	- 5.82	58 034	- 5.39	6.13
-25	23 698	- 5.61	44 505	- 5.22	5.45
-20	17 986	- 5.42	34 413	- 5.06	4.80
-15	13 782	- 5.23	26 821	- 4.91	4.18
-10	10 657	- 5.06	21 065	- 4.76	3.58
-5	8312.0	- 4.89	16 667	- 4.61	3.01
0	6537.1	- 4.72	13 280	- 4.47	2.46
5	5182.1	- 4.57	10 654	- 4.34	1.93
10	4139.2	- 4.42	8603.2	- 4.21	1.42
15	3330.1	- 4.28	6991.1	- 4.09	0.93
20	2697.8	- 4.14	5715.6	- 3.97	0.46
25	2200.0	- 4.02	4700.0	- 3.86	0.00
30	1805.5	- 3.89	3886.6	- 3.75	0.22
35	1490.7	- 3.77	3231.2	- 3.64	0.43
40	1237.9	- 3.66	2700.3	- 3.54	0.64
45	1033.7	- 3.55	2267.9	- 3.44	0.84
50	867.85	- 3.45	1913.9	- 3.35	1.03
55	732.31	- 3.35	1622.6	- 3.26	1.22
60	620.96	- 3.25	1381.7	- 3.17	1.40
65	529.02	- 3.16	1181.7	- 3.09	1.58
70	452.73	- 3.07	1014.7	- 3.01	1.75
75	389.13	- 2.99	874.85	- 2.93	1.92
80	335.85	- 2.90	757.13	- 2.85	2.08
85	291.02	- 2.83	657.67	- 2.78	2.23
90	253.15	- 2.75	573.31	- 2.71	2.54
95	221.03	- 2.68	501.48	- 2.64	2.85
100	193.66	- 2.61	440.10	- 2.58	3.14
105	170.27	- 2.54	387.47	- 2.52	3.43
110	150.20	- 2.48	342.18	- 2.46	3.71
115	132.91	- 2.41	303.09	- 2.40	3.98
120	117.98	- 2.35	269.24	- 2.34	4.24
125	105.03	- 2.20	239.83	- 2.29	4.50
130	93.766	- 2.24	214.20	- 2.23	4.76
135	83.943	- 2.19	191.82	- 2.18	5.00
140	75.349	- 2.13	172.20	- 2.13	5.25
145	67.807	- 2.08	154.96	- 2.09	5.48
150	61.172	- 2.04	139.78	- 2.04	5.71



For complete Curve Computation, visit: www.vishay.com/resistors-non-linear/curve-computation-list/

RESISTANCE VALUES AT INTERMEDIATE TEMPERATURES WITH R ₂₅ AT 10 kΩ							
T _{OPER} (°C)	PART NUMBER NTCS0805E3103*LT		PART NUMBER NTCS0805E3103*MT		PART NUMBER NTCS0805E3103*HT		ΔR/R DUE TO B _{tol.} (± %)
	R _T (Ω)	TCR (%/K)	R _T (Ω)	TCR (%/K)	R _T (Ω)	TCR (%/K)	
- 40	182 928	- 5.47	232 634	- 5.92	335 922	- 6.60	11.22
- 35	139 839	- 5.28	173 538	- 5.71	242 721	- 6.40	10.14
- 30	107 902	- 5.10	130 769	- 5.51	177 179	- 6.19	9.10
- 25	83 986	- 4.93	99 489	- 5.33	130 625	- 6.00	8.11
- 20	65 904	- 4.77	76 385	- 5.15	97 234	- 5.81	7.15
- 15	52 111	- 4.62	59 157	- 4.98	73 056	- 5.63	6.24
- 10	41 501	- 4.48	46 194	- 4.82	55 387	- 5.45	5.35
- 5	33 276	- 4.35	36 356	- 4.67	42 358	- 5.28	4.50
0	26 851	- 4.23	28 829	- 4.52	32 666	- 5.11	3.68
5	21 799	- 4.11	23 025	- 4.38	25 396	- 4.96	2.89
10	17 798	- 4.00	18 515	- 4.25	19 898	- 4.80	2.13
15	14 612	- 3.89	14 986	- 4.12	15 708	- 4.66	1.40
20	12 058	- 3.79	12 205	- 4.00	12 490	- 4.51	0.69
25	10 000	- 3.69	10 000	- 3.88	10 000	- 4.38	0.00
30	8332.5	- 3.60	8240.3	- 3.77	8060.1	- 4.25	0.66
35	6974.6	- 3.51	6827.5	- 3.66	6538.4	- 4.12	1.31
40	5863.2	- 3.43	5686.6	- 3.56	5336.7	- 4.00	1.93
45	4949.5	- 3.35	4760.3	- 3.46	4381.9	- 3.88	2.53
50	4194.8	- 3.27	4004.2	- 3.37	3618.5	- 3.77	3.11
55	3568.8	- 3.19	3383.8	- 3.28	3004.5	- 3.67	3.68
60	3047.5	- 3.12	2872.3	- 3.19	2507.9	- 3.56	4.23
65	2611.5	- 3.05	2448.5	- 3.11	2104.1	- 3.46	4.76
70	2245.5	- 2.99	2095.9	- 3.03	1774.0	- 3.37	5.28
75	1937.2	- 2.92	1801.2	- 2.95	1502.7	- 3.27	5.78
80	1676.6	- 2.86	1553.8	- 2.88	1278.7	- 3.18	6.27
85	1455.4	- 2.80	1345.3	- 2.81	1092.8	- 3.10	6.74
90	1267.2	- 2.74	1168.9	- 2.74	937.89	- 3.02	7.20
95	1106.5	- 2.68	1019.2	- 2.67	808.21	- 2.94	7.65
100	968.83	- 2.63	891.48	- 2.61	699.18	- 2.86	8.09
105	850.57	- 2.53	782.28	- 2.54	607.15	- 2.79	8.51
110	748.69	- 2.53	688.56	- 2.48	529.14	- 2.71	8.93
115	660.67	- 2.48	607.85	- 2.43	462.78	- 2.65	9.33
120	584.42	- 2.43	538.14	- 2.37	406.10	- 2.58	9.73
125	518.20	- 2.38	477.73	- 2.32	357.54	- 2.52	10.11
130	460.53	- 2.34	425.24	- 2.26	315.77	- 2.45	10.48
135	410.19	- 2.29	379.49	- 2.21	279.73	- 2.39	10.85
140	366.15	- 2.25	339.51	- 2.17	248.53	- 2.34	11.20
145	327.52	- 2.21	304.47	- 2.12	221.44	- 2.28	11.55
150	293.56	- 2.17	273.69	- 2.07	197.84	- 2.23	11.89



For complete Curve Computation, visit: www.vishay.com/resistors-non-linear/curve-computation-list/

RESISTANCE VALUES AT INTERMEDIATE TEMPERATURES WITH R₂₅ AT 15 kΩ, 22 kΩ AND 47 kΩ							
T _{OPER} (°C)	PART NUMBER NTCS0805E3153*MT		PART NUMBER NTCS0805E3223*HT		PART NUMBER NTCS0805E3333*MT		ΔR/R DUE TO B _{tol.} (± %)
	R _T (Ω)	TCR (%/K)	R _T (Ω)	TCR (%/K)	R _T (Ω)	TCR (%/K)	
- 40	391 251	- 6.14	641 004	- 6.40	1 104 739	- 6.79	7.58
- 35	289 245	- 5.94	468 038	- 6.18	793 249	- 6.53	6.83
- 30	215 960	- 5.75	345 469	- 5.97	576 683	- 6.28	6.13
- 25	162 779	- 5.56	257 644	- 5.77	424 161	- 6.05	5.45
- 20	123 815	- 5.38	194 045	- 5.57	315 430	- 5.84	4.80
- 15	95 001	- 5.21	147 521	- 5.39	237 022	- 5.63	4.18
- 10	73 505	- 5.05	113 159	- 5.22	179 865	- 5.44	3.58
- 5	57 329	- 4.89	87 544	- 5.05	137 767	- 5.26	3.01
0	45 058	- 4.74	68 281	- 4.89	106 459	- 5.08	2.46
5	35 674	- 4.60	53 672	- 4.74	82 958	- 4.92	1.93
10	28 445	- 4.46	42 503	- 4.59	65 162	- 4.76	1.42
15	22 834	- 4.33	33 898	- 4.46	51 572	- 4.61	0.93
20	18 450	- 4.20	27 220	- 4.32	41 112	- 4.47	0.46
25	15 000	- 4.08	22 000	- 4.20	33 000	- 4.34	0.00
30	12 268	- 3.96	17 892	- 4.07	26 663	- 4.21	0.22
35	10 092	- 3.85	14 638	- 3.96	21 678	- 4.08	0.43
40	8347.4	- 3.74	12 045	- 3.84	17 730	- 3.97	0.64
45	6941.1	- 3.64	9965.0	- 3.74	14 585	- 3.86	0.84
50	5801.1	- 3.54	8288.3	- 3.63	12 063	- 3.75	1.03
55	4872.1	- 3.44	6928.4	- 3.54	10 030	- 3.65	1.22
60	4111.1	- 3.35	5819.8	- 3.44	8381.6	- 3.55	1.40
65	3484.7	- 3.26	4911.4	- 3.35	7037.8	- 3.45	1.58
70	2966.6	- 3.18	4163.4	- 3.26	5936.8	- 3.36	1.75
75	2536.2	- 3.09	3544.6	- 3.18	5030.3	- 3.27	1.92
80	2176.9	- 3.02	3030.2	- 3.10	4280.4	- 3.19	2.08
85	1875.8	- 2.94	2600.9	- 3.02	3657.2	- 3.11	2.23
90	1622.5	- 2.87	2241.0	- 2.94	3137.1	- 3.03	2.54
95	1408.4	- 2.79	1938.0	- 2.87	2701.2	- 2.96	2.85
100	1226.8	- 2.73	1682.0	- 2.80	2334.4	- 2.89	3.14
105	1072.3	- 2.66	1464.9	- 2.73	2024.4	- 2.82	3.43
110	940.20	- 2.60	1280.0	- 2.67	1761.6	- 2.75	3.71
115	827.00	- 2.54	1122.0	- 2.60	1538.0	- 2.69	3.98
120	729.62	- 2.48	986.60	- 2.54	1346.9	- 2.63	4.24
125	645.60	- 2.42	870.11	- 2.48	1183.23	- 2.57	4.50
130	572.86	- 2.36	769.60	- 2.43	1042.4	- 2.51	4.76
135	509.71	- 2.31	682.59	- 2.37	921.02	- 2.45	5.00
140	454.71	- 2.26	607.05	- 2.32	815.99	- 2.40	5.25
145	406.69	- 2.21	541.28	- 2.27	724.85	- 2.35	5.48
150	364.64	- 2.16	483.86	- 2.22	645.54	- 2.30	5.71

For complete Curve Computation, visit: www.vishay.com/resistors-non-linear/curve-computation-list/



RESISTANCE VALUES AT INTERMEDIATE TEMPERATURES WITH R25 AT 47 kΩ, 68 kΩ AND 100 kΩ

Table with 10 columns: Toper (°C), Part Number (NTCS0805E3473*HT, NTCS0805E3683*XT, NTCS0805E3104*MT, NTCS0805E3104*XT), RT (Ω), TCR (%/K), and ΔR/R Due to Btot. (± %). Rows range from -40°C to 150°C.



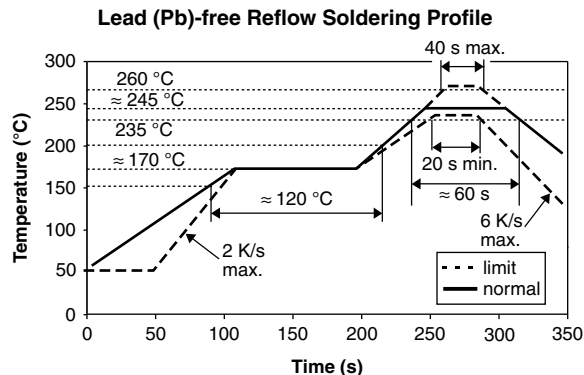
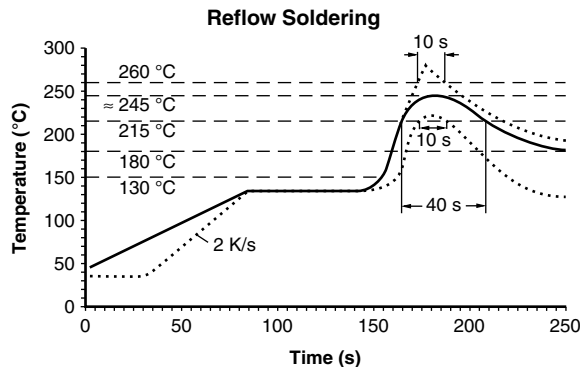
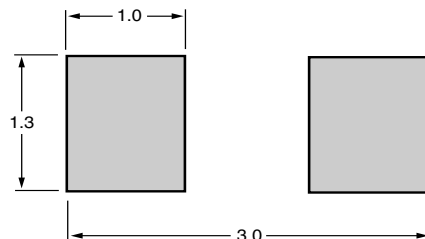
For complete Curve Computation, visit: www.vishay.com/resistors-non-linear/curve-computation-list/

RESISTANCE VALUES AT INTERMEDIATE TEMPERATURES WITH R₂₅ AT 330 kΩ, 470 kΩ AND 680 kΩ							
T _{OPER} (°C)	PART NUMBER NTCS0805E3334*HT		PART NUMBER NTCS0805E3474*XT		PART NUMBER NTCS0805E3684*XT		ΔR/R DUE TO B _{tol.} (± %)
	R _T (Ω)	TCR (%/K)	R _T (Ω)	TCR (%/K)	R _T (Ω)	TCR (%/K)	
- 40	10 488	- 6.53	16 325	- 6.70	23 477	- 6.58	7.58
- 35	7608.4	- 6.31	11 742	- 6.48	16 980	- 6.38	6.83
- 30	5579.1	- 6.10	8539.8	- 6.26	12 404	- 6.18	6.13
- 25	4133.1	- 5.90	6276.8	- 6.05	9147.1	- 6.00	5.45
- 20	3092.0	- 5.71	4660.3	- 5.86	6807.4	- 5.82	4.80
- 15	2334.8	- 5.53	3493.6	- 5.67	5110.7	- 5.65	4.18
- 10	1778.8	- 5.35	2643.2	- 5.49	3869.3	- 5.48	3.58
- 5	1366.9	- 5.19	2017.4	- 5.32	2953.2	- 5.33	3.01
0	1058.9	- 5.03	1552.8	- 5.15	2271.5	- 5.17	2.46
5	826.75	- 4.87	1204.7	- 5.00	1760.2	- 5.03	1.93
10	650.33	- 4.73	941.99	- 4.85	1373.89	- 4.89	1.42
15	515.22	- 4.59	741.96	- 4.70	1079.7	- 4.75	0.93
20	410.99	- 4.45	588.54	- 4.56	854.12	- 4.62	0.46
25	330.00	- 4.33	470.00	- 4.43	680.00	- 4.50	0.00
30	266.64	- 4.20	377.77	- 4.31	544.69	- 4.38	0.22
35	216.75	- 4.08	305.53	- 4.18	438.89	- 4.26	0.43
40	177.22	- 3.97	248.58	- 4.07	355.64	- 4.15	0.64
45	145.70	- 3.86	203.40	- 3.96	289.76	- 4.04	0.84
50	120.43	- 3.76	167.35	- 3.85	237.33	- 3.94	1.03
55	100.06	- 3.66	138.42	- 3.75	195.38	- 3.84	1.22
60	83.541	- 3.56	115.06	- 3.65	161.62	- 3.75	1.40
65	70.081	- 3.47	96.120	- 3.55	134.33	- 3.65	1.58
70	59.059	- 3.38	80.672	- 3.46	112.16	- 3.56	1.75
75	49.989	- 3.29	68.012	- 3.37	94.052	- 3.48	1.92
80	42.491	- 3.21	57.588	- 3.29	79.204	- 3.39	2.08
85	36.265	- 3.13	48.966	- 3.20	66.973	- 3.31	2.23
90	31.074	- 3.05	41.803	- 3.12	56.855	- 3.24	2.54
95	26.726	- 2.98	35.826	- 3.05	48.449	- 3.16	2.85
100	23.070	- 2.91	30.819	- 2.97	41.439	- 3.09	3.14
105	19.985	- 2.84	26.608	- 2.90	35.569	- 3.02	3.43
110	17.371	- 2.77	23.053	- 2.83	30.636	- 2.95	3.71
115	15.149	- 2.71	20.039	- 2.77	26.474	- 2.89	3.98
120	13.253	- 2.64	17.477	- 2.70	22.952	- 2.82	4.24
125	11.630	- 2.58	15.290	- 2.64	19.961	- 2.76	4.50
130	10.236	- 2.52	13.417	- 2.58	17.412	- 2.70	4.76
135	9.0345	- 2.47	11.808	- 2.53	15.233	- 2.65	5.00
140	7.9963	- 2.41	10.422	- 2.47	13.364	- 2.59	5.25
145	7.0964	- 2.36	9.2239	- 2.42	11.757	- 2.54	5.48
150	6.3142	- 2.31	8.1851	- 2.36	10.371	- 2.48	5.71

SOLDERING CONDITIONS

This SMD thermistor is only suitable for wave or reflow soldering, in accordance with JEDEC J-STD-020. The maximum temperature of 260 °C during 40 s should not be exceeded.

Typical examples of a soldering processes that will provide reliable joints without damage, are shown below.


Dimensions of the solder lands

TESTS AND REQUIREMENTS

SOLDERABILITY AND RESISTANCE TO SOLDERING HEAT				
IEC 60068-2-58	TEST METHOD	TEST	PROCEDURE	REQUIREMENTS
6	T _C	Solderability	2 s at 235 °C	Min. 95 % of surface wetted
		Resistance to soldering heat	10 s at 260 °C	$\Delta R/R < 5 \%$

PACKAGING
TAPE SPECIFICATIONS

All tape specifications are in accordance with IEC 60286-3. Basic dimensions are given below. Carrier tape material is paper.

PAPER TAPE

DIMENSIONS OF PAPER TAPE in millimeters

PARAMETER	DIMENSION	TOLERANCE
A ₀ ⁽¹⁾	1.7	± 0.2
B ₀ ⁽¹⁾	2.35	± 0.1
W	8.0	± 0.2
E ₁	1.75	± 0.1
F	3.5	± 0.05
D ₀	1.55	± 0.05
P ₀ ⁽²⁾	4.0	± 0.1
P ₁	4.0	± 0.1
P ₂	2.0	± 0.05
T tape thickness	1.1	Max.
T ₁ cover tape	< 0.1	-

Notes

- (1) Measured 0.3 mm above base pocket
- (2) P₀ pitch cumulative error over any 10 pitches ± 1.0 mm



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. 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.