

NTC thermistors for temperature measurement

Glass-encapsulated sensors, standard type

Series/Type: B57540G, B57540G1

The following products presented in this data sheet are being withdrawn.

Ordering Code		Date of Withdrawal	Deadline Last Orders	Last Shipments
B57540G0145*	B57540G1104*	2012-03-23	2012-06-28	2012-09-28
B57540G0234*	B57540G1104*	2012-03-23	2012-06-28	2012-09-28

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B57540G, B57540G1

Glass-encapsulated sensors

G540/G1540

Applications

■ Temperature measurement

Features

- Glass-encapsulated, heat-resistive and highly stable
- For temperature measurement up to 250 °C
- Very short response time
- Small dimensions
- Leads: dumet wires (copper-clad FeNi)

Options

- Leads: nickel-plated dumet wires
- Alternative dimensions available on request

Delivery mode

Climatic category

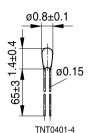
Bulk

General technical data

Max. power	(at 25 °C)	P ₂₅
Resistance tolerance		$\Delta R_R/R_R$
Rated temperature		T_R
Dissipation factor	(in air)	δ_{th}
Thermal cooling time constant	(in air)	$ au_{ m c}$
Heat capacity		C_{th}

(IEC 60068-1)

Dimensional drawing



Dimensions in mm

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B57540G, B57540G1

Glass-encapsulated sensors

G540/G1540

Electrical specification and ordering codes

No. of R/T	B _{25/85}	B _{0/100}	B _{25/100}	Ordering code
characteristic	K	K	K	
8402	3480	3450 ±1%	3497	B57540G0502+000
8402	3480	3450 ±1%	3497	B57540G0502+002
7003	3612	3586	3625 ±1%	B57540G1103+005
7003	3612	3586	3625 ±1%	B57540G1103+007
8307	3478	3450	3492 ±1%	B57540G1103+000
8307	3478	3450	3492 ±1%	B57540G1103+002
8415	3992	3970 ±1%	4006	B57540G0203+000
8415	3992	3970 ±1%	4006	B57540G0203+002
7002	3973	3944	3988 ±1%	B57540G1303+005
7002	3973	3944	3988 ±1%	B57540G1303+007
8403	3992	3970 ±1%	4006	B57540G0503+000
8403	3992	3970 ±1%	4006	B57540G0503+002
8304	4072	4036	4092 ±1%	B57540G1104+000
8304	4072	4036	4092 ±1%	B57540G1104+002
8405	4240	4537 ±2%1)	4264	B57540G0234+000
8405	4240	4537 ±2%1)	4264	B57540G0234+002
8406	4557	5133 ±2% ²⁾	4581	B57540G0145+000
8406	4557	5133 ±2% ²⁾	4581	B57540G0145+002
	characteristic 8402 8402 7003 7003 8307 8307 8415 8415 7002 7002 8403 8403 8403 8304 8304 8405 8405 8406	characteristic K 8402 3480 8402 3480 7003 3612 7003 3612 8307 3478 8307 3478 8415 3992 8415 3992 7002 3973 7002 3973 8403 3992 8403 3992 8304 4072 8405 4240 8406 4557	characteristic K K 8402 3480 3450 ±1% 8402 3480 3450 ±1% 7003 3612 3586 7003 3612 3586 8307 3478 3450 8307 3478 3450 8415 3992 3970 ±1% 8415 3992 3970 ±1% 7002 3973 3944 7002 3973 3944 8403 3992 3970 ±1% 8403 3992 3970 ±1% 8403 4072 4036 8304 4072 4036 8405 4240 4537 ±2%¹¹ 8405 4240 4537 ±2%¹¹ 8406 4557 5133 ±2%²²	characteristic K K K 8402 3480 3450 ±1% 3497 8402 3480 3450 ±1% 3497 7003 3612 3586 3625 ±1% 7003 3612 3586 3625 ±1% 8307 3478 3450 3492 ±1% 8307 3478 3450 3492 ±1% 8415 3992 3970 ±1% 4006 8415 3992 3970 ±1% 4006 7002 3973 3944 3988 ±1% 7002 3973 3944 3988 ±1% 8403 3992 3970 ±1% 4006 8403 3992 3970 ±1% 4006 8304 4072 4036 4092 ±1% 8405 4240 4537 ±2%¹¹) 4264 8405 4240 4537 ±2%¹¹) 4264 8406 4557 5133 ±2%²) 4581

+ = Resistance tolerance

 $F = \pm 1\%$

 $G = \pm 2\%$

 $H = \pm 3\%$

The last three digits of the ordering code denote:

000 and 005 = dumet wires

002 and 007 = nickel-plated wires

¹⁾ B_{100/200}

²⁾ B_{200/300}



Temperature measurement	B57540G, B57540G1
Glass-encansulated sensors	G540/G1540

Reliability data

Test	Standard	Test conditions	$\Delta R_{25}/R_{25}$ (typical)	Remarks
Storage in dry heat	IEC 60068-2-2	Storage at upper category temperature T: 250 °C t: 1000 h	< 3%	No visible damage
Storage in damp heat, steady state	IEC 60068-2-67	Temperature of air: 85 °C Relative humidity of air: 85% Duration: 56 days	< 2%	No visible damage
Rapid temperature cycling	IEC 60068-2-14	Lower test temperature: -55 °C Upper test temperature: 200 °C Number of cycles: 1000	< 2%	No visible damage

B57540G, B57540G1

Glass-encapsulated sensors

G540/G1540

R/T characteristics

R/T No.	7002		7003		8304		
T (°C)	B _{25/100} = 3988 K	(B _{25/100} = 3625 K	B _{25/100} = 3625 K		B _{25/100} = 4092 K	
	R _T /R ₂₅	α (%/K)	R _T /R ₂₅	α (%/K)	R _T /R ₂₅	α (%/K)	
-55.0	96.33	7.4	63.225	6.7	100.11	7.4	
-50.0	66.866	7.2	45.46	6.5	69.56	7.2	
-45.0	47.037	6.9	33.07	6.3	48.945	6.9	
-40.0	33.508	6.7	24.324	6.0	34.853	6.7	
-35.0	24.156	6.4	18.081	5.8	25.102	6.5	
-30.0	17.613	6.2	13.575	5.6	18.275	6.2	
-25.0	12.98	6.0	10.29	5.4	13.443	6.0	
-20.0	9.6643	5.8	7.8716	5.3	9.9853	5.9	
-15.0	7.2656	5.6	6.0739	5.1	7.4867	5.7	
-10.0	5.5129	5.4	4.7258	4.9	5.6636	5.5	
-5.0	4.22	5.3	3.7062	4.8	4.3212	5.3	
0.0	3.2575	5.1	2.9287	4.6	3.324	5.2	
5.0	2.5348	4.9	2.3311	4.5	2.5769	5.0	
10.0	1.9876	4.8	1.8684	4.4	2.0127	4.9	
15.0	1.5699	4.6	1.5075	4.2	1.5834	4.7	
20.0	1.2488	4.5	1.224	4.1	1.2542	4.6	
25.0	1.0000	4.4	1.0000	4.0	1.0000	4.5	
30.0	0.80594	4.3	0.82176	3.9	0.80239	4.3	
35.0	0.65355	4.1	0.67909	3.8	0.64776	4.2	
40.0	0.53312	4.0	0.56422	3.7	0.52598	4.1	
45.0	0.43735	3.9	0.47122	3.6	0.4295	4.0	
50.0	0.36074	3.8	0.3955	3.5	0.35262	3.9	
55.0	0.29911	3.7	0.33355	3.4	0.291	3.8	
60.0	0.24925	3.6	0.2826	3.3	0.24136	3.7	
65.0	0.20872	3.5	0.24049	3.2	0.20114	3.6	
70.0	0.17558	3.4	0.20553	3.1	0.16841	3.5	
75.0	0.14837	3.3	0.17637	3.0	0.14164	3.4	
80.0	0.12592	3.2	0.15195	2.9	0.11963	3.3	
85.0	0.10731	3.2	0.13141	2.9	0.10147	3.3	
90.0	0.091816	3.1	0.11406	2.8	0.086407	3.2	
95.0	0.078862	3.0	0.099352	2.7	0.073867	3.1	
100.0	0.067988	2.9	0.086837	2.7	0.063383	3.0	
105.0	0.058824	2.9	0.076149	2.6	0.054584	3.0	
110.0	0.051071	2.8	0.066989	2.5	0.04717	2.9	
115.0	0.044489	2.7	0.059112	2.5	0.040901	2.8	
120.0	0.03888	2.7	0.052316	2.4	0.035581	2.8	
125.0	0.034084	2.6	0.046433	2.4	0.03105	2.7	
130.0	0.02997	2.5	0.041327	2.3	0.027179	2.6	
135.0	0.02643	2.5	0.03688	2.3	0.023861	2.6	
140.0	0.023373	2.4	0.032998	2.2	0.021008	2.5	
145.0	0.020727	2.4	0.029598	2.2	0.018548	2.5	
150.0	0.018429	2.3	0.026612	2.1	0.016419	2.4	
155.0	0.016427	2.3	0.023984	2.1	0.014573	2.4	



B57540G, B57540G1

Glass-encapsulated sensors

G540/G1540

R/T No.	7002		7003	7003		8304	
T (°C)	B _{25/100} = 3988 K	<u>C</u>	B _{25/100} = 3625 K		B _{25/100} = 4092 K	<u> </u>	
	R _T /R ₂₅	α (%/K)	R _T /R ₂₅	α (%/K)	R _T /R ₂₅	α (%/K)	
160.0 165.0	0.014679 0.013149	2.2 2.2	0.021665 0.019613	2.0 2.0	0.012967 0.011566	2.3 2.3	
170.0 175.0 180.0 185.0 190.0	0.011806 0.010623 0.0095804 0.0086582 0.0078408	2.1 2.1 2.0 2.0 2.0	0.017793 0.016176 0.014735 0.013448 0.012297	1.9 1.9 1.8 1.8	0.010341 0.0092664 0.0083224 0.0074907 0.0067564	2.2 2.2 2.1 2.1 2.0	
195.0 200.0 205.0 210.0 215.0	0.0071148 0.0064685 0.005892 0.0053767 0.0049152	1.9 1.9 1.8 1.8	0.011265 0.010338 0.009504 0.0087516 0.0080718	1.7 1.7 1.7 1.6 1.6	0.0061064 0.0055299 0.0050175 0.0045611 0.0041537	2.0 2.0 1.9 1.9	
220.0 225.0 230.0 235.0 240.0	0.0045011 0.0041287 0.0037934 0.0034908 0.0032173	1.7 1.7 1.7 1.6 1.6	0.0074567 0.0068989 0.0063925 0.0059318 0.005512	1.6 1.5 1.5 1.5	0.0037895 0.0034631 0.0031701 0.0029067 0.0026693	1.8 1.8 1.8 1.7 1.7	
245.0 250.0 255.0 260.0 265.0	0.0029697 0.0027451 0.0025412 0.0023556 0.0021865	1.6 1.6 1.5 1.5	0.005129 0.004779 0.0044586 0.004165 0.0038955	1.4 1.4 1.4 1.3	0.0024551 0.0022615 0.0020862 0.0019273 0.0017829	1.7 1.6 1.6 1.6 1.5	
270.0 275.0 280.0 285.0 290.0	0.0020323 0.0018913 0.0017623 0.0016441 0.0015357	1.5 1.4 1.4 1.4 1.4	0.0036478 0.0034199 0.0032098 0.003016 0.002837	1.3 1.3 1.3 1.2 1.2	0.0016516 0.0015319 0.0014228 0.0013231 0.0012319	1.5 1.5 1.5 1.4 1.4	
295.0 300.0	0.001436 0.0013444	1.3 1.3	0.0026714 0.002518	1.2 1.2	0.0011483 0.0010716	1.4 1.4	

B57540G, B57540G1

Glass-encapsulated sensors

G540/G1540

R/T characteristics

R/T No.	8307		8402		8403	
T (°C)	B _{25/100} = 3492 K	(B _{0/100} = 3450 K		B _{0/100} = 3970 K	
	R _T /R ₂₅	α (%/K)	R _T /R ₂₅	α (%/K)	R _T /R ₂₅	α (%/K)
-55.0	52.624	6.4	51.991	6.4	103.29	7.6
-50.0	38.452	6.2	37.989	6.2	71.079	7.3
-45.0	28.401	6.0	28.07	5.9	49.619	7.1
-40.0	21.194	5.8	20.96	5.7	35.108	6.8
-35.0	15.972	5.6	15.809	5.5	25.158	6.5
-30.0	12.149	5.4	12.037	5.4	18.245	6.3
-25.0	9.3246	5.2	9.2484	5.2	13.383	6.1
-20.0	7.2181	5.0	7.1668	5.0	9.9221	5.9
-15.0	5.6332	4.9	5.5993	4.9	7.4316	5.7
-10.0	4.4308	4.7	4.4087	4.7	5.6202	5.5
-5.0	3.5112	4.6	3.4971	4.6	4.2894	5.3
0.0	2.8024	4.4	2.7936	4.4	3.3024	5.2
5.0	2.252	4.3	2.2468	4.3	2.5607	5.0
10.0	1.8216	4.2	1.8187	4.2	2.0017	4.8
15.0	1.4827	4.1	1.4813	4.0	1.5768	4.7
20.0	1.2142	3.9	1.2136	3.9	1.2513	4.6
25.0	1.0000	3.8	1.0000	3.8	1.0000	4.4
30.0	0.82818	3.7	0.82845	3.7	0.80451	4.3
35.0	0.68954	3.6	0.68991	3.6	0.65139	4.2
40.0	0.57703	3.5	0.57742	3.5	0.53064	4.0
45.0	0.48525	3.4	0.4856	3.4	0.43481	3.9
50.0	0.41	3.3	0.41026	3.3	0.35828	3.8
55.0	0.34798	3.2	0.34816	3.2	0.29681	3.7
60.0	0.29663	3.2	0.29673	3.2	0.24715	3.6
65.0	0.25392	3.1	0.25393	3.1	0.20682	3.5
70.0	0.21824	3.0	0.21817	3.0	0.17389	3.4
75.0	0.1883	2.9	0.18816	2.9	0.14687	3.3
80.0	0.16307	2.8	0.16288	2.8	0.12459	3.2
85.0	0.14174	2.8	0.1415	2.8	0.10614	3.2
90.0	0.12362	2.7	0.12335	2.7	0.09078	3.1
95.0	0.10818	2.6	0.10788	2.6	0.077949	3.0
100.0	0.094973	2.6	0.094659	2.6	0.067183	2.9
105.0	0.08364	2.5	0.083313	2.5	0.058113	2.9
110.0	0.073881	2.5	0.073547	2.5	0.050443	2.8
115.0	0.06545	2.4	0.065114	2.4	0.043932	2.7
120.0	0.058144	2.3	0.05781	2.4	0.038386	2.7
125.0	0.051794	2.3	0.051464	2.3	0.033645	2.6
130.0	0.046259	2.2	0.045936	2.2	0.029579	2.5
135.0	0.04142	2.2	0.041106	2.2	0.02608	2.5
140.0	0.037179	2.1	0.036875	2.1	0.02306	2.4
145.0	0.033451	2.1	0.033159	2.1	0.020446	2.4
150.0	0.030166	2.0	0.029886	2.1	0.018176	2.3
155.0	0.027264	2.0	0.026998	2.0	0.016199	2.3



B57540G, B57540G1

Glass-encapsulated sensors

G540/G1540

R/T No.	8307		8402		8403	
T (°C)	B _{25/100} = 3492 K	(B _{0/100} = 3450 K		B _{0/100} = 3970 K	
	R _T /R ₂₅	α (%/K)	R _T /R ₂₅	α (%/K)	R _T /R ₂₅	α (%/K)
160.0 165.0	0.024694 0.022414	2.0 1.9	0.024442 0.022175	2.0 1.9	0.014473 0.012962	2.2 2.2
170.0 175.0 180.0 185.0 190.0	0.020385 0.018577 0.016961 0.015514 0.014216	1.9 1.8 1.8 1.8 1.7	0.02016 0.018365 0.016762 0.015328 0.014043	1.9 1.8 1.8 1.8	0.011636 0.010469 0.0094395 0.0085294 0.0077229	2.1 2.1 2.0 2.0 2.0
195.0 200.0 205.0 210.0 215.0	0.013049 0.011999 0.011051 0.010194 0.0094181	1.7 1.7 1.6 1.6 1.6	0.012888 0.011849 0.010913 0.010067 0.0093013	1.7 1.7 1.6 1.6	0.0070067 0.0063691 0.0058005 0.0052924 0.0048373	1.9 1.9 1.9 1.8 1.8
220.0 225.0 230.0 235.0 240.0	0.0087144 0.0080751 0.0074933 0.0069631 0.0064791	1.5 1.5 1.5 1.5 1.4	0.0086075 0.0079777 0.007405 0.0068833 0.0064075	1.5 1.5 1.5 1.4 1.4	0.004429 0.004062 0.0037315 0.0034333 0.0031639	1.7 1.7 1.7 1.6 1.6
245.0 250.0 255.0 260.0 265.0	0.0060366 0.0056316 0.0052602 0.0049193 0.0046059	1.4 1.4 1.4 1.3 1.3	0.0059728 0.0055751 0.0052107 0.0048764 0.0045692	1.4 1.4 1.3 1.3	0.00292 0.0026988 0.002498 0.0023153 0.0021489	1.6 1.6 1.5 1.5
270.0 275.0 280.0 285.0 290.0	0.0043173 0.0040514 0.003806 0.0035793 0.0033696	1.3 1.3 1.2 1.2 1.2	0.0042866 0.0040263 0.0037862 0.0035645 0.0033595	1.3 1.2 1.2 1.2 1.2	0.0019971 0.0018584 0.0017316 0.0016153 0.0015087	1.5 1.4 1.4 1.4 1.4
295.0 300.0	0.0031753 0.0029952	1.2 1.2	0.0031697 0.0029938	1.2 1.1	0.0014107 0.0013207	1.3 1.3

B57540G, B57540G1

Glass-encapsulated sensors

G540/G1540

R/T characteristics

R/T No.	8405		8406		8415	
T (°C)	B _{100/200} = 4537 I	<	B _{200/300} = 5133 l	K	B _{0/100} = 3970 K	
	R _T /R ₂₅	α (%/K)	R _T /R ₂₅	α (%/K)	R _T /R ₂₅	α (%/K)
-55.0	122.12	7.8	183.3	8.5	103.29	7.6
-50.0	83.306	7.5	120.69	8.2	71.079	7.3
-45.0	57.62	7.2	80.721	7.9	49.619	7.1
-40.0	40.378	7.0	54.792	7.6	35.108	6.8
-35.0	28.647	6.7	37.713	7.3	25.158	6.5
-30.0	20.563	6.5	26.301	7.1	18.245	6.3
-25.0	14.925	6.3	18.571	6.8	13.383	6.1
-20.0	10.947	6.1	13.269	6.6	9.9221	5.9
-15.0	8.1101	5.9	9.5865	6.4	7.4316	5.7
-10.0	6.0655	5.7	6.9997	6.2	5.6202	5.5
-5.0	4.5776	5.5	5.1625	6.0	4.2894	5.3
0.0	3.4845	5.4	3.844	5.8	3.3024	5.2
5.0	2.6743	5.2	2.8884	5.6	2.5607	5.0
10.0	2.0686	5.1	2.1892	5.5	2.0017	4.8
15.0	1.6121	4.9	1.673	5.3	1.5768	4.7
20.0	1.2654	4.8	1.2886	5.1	1.2513	4.6
25.0	1.0000	4.6	1.0000	5.0	1.0000	4.4
30.0	0.79548	4.5	0.78164	4.9	0.80451	4.3
35.0	0.63677	4.4	0.61516	4.7	0.65139	4.2
40.0	0.51279	4.3	0.48734	4.6	0.53064	4.0
45.0	0.41534	4.2	0.38851	4.5	0.43481	3.9
50.0	0.33828	4.1	0.3116	4.4	0.35828	3.8
55.0	0.27698	3.9	0.25136	4.2	0.29681	3.7
60.0	0.22795	3.8	0.2039	4.1	0.24715	3.6
65.0	0.18853	3.7	0.16629	4.0	0.20682	3.5
70.0	0.15666	3.7	0.1363	3.9	0.17389	3.4
75.0	0.13077	3.6	0.11228	3.8	0.14687	3.3
80.0	0.10964	3.5	0.092932	3.7	0.12459	3.2
85.0	0.092319	3.4	0.077268	3.6	0.10614	3.2
90.0	0.078049	3.3	0.064527	3.6	0.09078	3.1
95.0	0.066244	3.2	0.054116	3.5	0.077949	3.0
100.0	0.056439	3.2	0.045571	3.4	0.067183	2.9
105.0	0.048262	3.1	0.038526	3.3	0.058113	2.9
110.0	0.041416	3.0	0.032694	3.2	0.050443	2.8
115.0	0.035663	3.0	0.027847	3.2	0.043932	2.7
120.0	0.030811	2.9	0.023803	3.1	0.038386	2.7
125.0	0.026705	2.8	0.020416	3.0	0.033645	2.6
130.0	0.023218	2.8	0.017569	3.0	0.029579	2.5
135.0	0.020247	2.7	0.015167	2.9	0.02608	2.5
140.0	0.017707	2.7	0.013135	2.8	0.02306	2.4
145.0	0.01553	2.6	0.011409	2.8	0.020446	2.4
150.0	0.013658	2.5	0.0099385	2.7	0.018176	2.3
155.0	0.012043	2.5	0.0086821	2.7	0.016199	2.3



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R/T No.	8405		8406	8406		8415	
T (°C)	B _{100/200} = 4537 H	<	B _{200/300} = 5133 I	<	B _{0/100} = 3970 K		
	R _T /R ₂₅	α (%/K)	R _T /R ₂₅	α (%/K)	R _T /R ₂₅	α (%/K)	
160.0	0.010647	2.4	0.0076052	2.6	0.014473	2.2	
165.0	0.009436	2.4	0.0066796	2.6	0.012962	2.2	
170.0	0.0083831	2.3	0.0058817	2.5	0.011636	2.1	
175.0	0.0074652	2.3	0.005192	2.5	0.010469	2.1	
180.0	0.006663	2.3	0.0045943	2.4	0.0094395	2.0	
185.0	0.0059602	2.2	0.0040749	2.4	0.0085294	2.0	
190.0	0.0053431	2.2	0.0036225	2.3	0.0077229	2.0	
195.0	0.0047999	2.1	0.0032274	2.3	0.0070067	1.9	
200.0	0.0043208	2.1	0.0028817	2.2	0.0063691	1.9	
205.0	0.0038972	2.0	0.0025783	2.2	0.0058005	1.9	
210.0	0.0035219	2.0	0.0023116	2.2	0.0052924	1.8	
215.0	0.0031888	2.0	0.0020766	2.1	0.0048373	1.8	
220.0	0.0028925	1.9	0.0018691	2.1	0.004429	1.7	
225.0	0.0026284	1.9	0.0016854	2.0	0.004062	1.7	
230.0	0.0023925	1.9	0.0015226	2.0	0.0037315	1.7	
235.0	0.0021816	1.8	0.001378	2.0	0.0034333	1.6	
240.0	0.0019925	1.8	0.0012492	1.9	0.0031639	1.6	
245.0 250.0 255.0 260.0 265.0	0.0018227 0.00167 0.0015324 0.0014083 0.0012961	1.8 1.7 1.7 1.7	0.0011344 0.0010318 0.00094005 0.00085777 0.00078388	1.9 1.8 1.8 1.8	0.00292 0.0026988 0.002498 0.0023153 0.0021489	1.6 1.6 1.5 1.5	
270.0 275.0 280.0 285.0 290.0	0.0011946 0.0011025 0.0010189 0.00094294 0.00087373	1.6 1.6 1.5 1.5	0.00071742 0.00065754 0.00060352 0.0005547 0.00051051	1.8 1.7 1.7 1.7 1.6	0.0019971 0.0018584 0.0017316 0.0016153 0.0015087	1.5 1.4 1.4 1.4 1.4	
295.0	0.00081063	1.5	0.00047047	1.6	0.0014107	1.3	
300.0	0.00075301	1.5	0.00043412	1.6	0.0013207	1.3	



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Glass-encapsulated sensors	G540/G1540

Mounting instructions

1 Soldering

1.1 Leaded NTC thermistors

Leaded thermistors comply with the solderability requirements specified by CECC.

When soldering, care must be taken that the NTC thermistors are not damaged by excessive heat. The following maximum temperatures, maximum time spans and minimum distances have to be observed:

	Dip soldering	Iron soldering
Bath temperature	max. 260 °C	max. 360 °C
Soldering time	max. 4 s	max. 2 s
Distance from thermistor	min. 6 mm	min. 6 mm

Under more severe soldering conditions the resistance may change.

1.2 Leadless NTC thermistors

In case of NTC thermistors without leads, soldering is restricted to devices which are provided with a solderable metallization. The temperature shock caused by the application of hot solder may produce fine cracks in the ceramic, resulting in changes in resistance.

To prevent leaching of the metallization, solder with silver additives or with a low tin content should be used. In addition, soldering methods should be employed which permit short soldering times.

2 Clamp contacting

Pressure contacting by means of clamps is particularly suitable for applications involving frequent switching and high turn-on powers.

3 Robustness of terminations (leaded types)

The leads meet the requirements of IEC 60068-2-21. They may not be bent closer than 4 mm from the solder joint on the thermistor body or from the point at which they leave the feed-throughs. During bending, any mechanical stress at the outlet of the leads must be removed. The bending radius should be at least 0.75 mm.

Tensile strength: Test Ua1:

Leads $\emptyset \le 0.25 \text{ mm} = 1.0 \text{ N}$ $0.25 < \emptyset \le 0.35 \text{ mm} = 2.5 \text{ N}$ $0.35 < \emptyset \le 0.50 \text{ mm} = 5.0 \text{ N}$ $0.50 < \emptyset \le 0.80 \text{ mm} = 10.0 \text{ N}$ $0.80 < \emptyset < 1.25 \text{ mm} = 20.0 \text{ N}$



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Bending strength: Test Ub:

Two 90°-bends in opposite directions at a weight of 0.25 kg.

Torsional strength: Test Uc: severity 2

The lead is bent by 90° at a distance of 6 to 6.5 mm from the thermistor body. The bending radius of the leads should be approx. 0.75 mm. Two torsions of

180° each (severity 2).

When subjecting leads to mechanical stress, the following should be observed:

Tensile stress on leads

During mounting and operation tensile forces on the leads are to be avoided.

Bending of leads

Bending of the leads directly on the thermistor body is not permissible.

A lead may be bent at a minimum distance of twice the wire's diameter +2 mm from the solder joint on the thermistor body. During bending the wire must be mechanically relieved at its outlet. The bending radius should be at least 0.75 mm.

Twisting of leads

The twisting (torsion) by 180° of a lead bent by 90° is permissible at 6 mm from the bottom of the thermistor body.

4 Sealing and potting

When thermistors are sealed, potted or overmolded, there must be no mechanical stress caused by thermal expansion during the production process (curing / overmolding process) and during later operation. The upper category temperature of the thermistor must not be exceeded. Ensure that the materials used (sealing / potting compound and plastic material) are chemically neutral.

5 Cleaning

If cleaning is necessary, mild cleaning agents such as ethyl alcohol and cleaning gasoline are recommended. Cleaning agents based on water are not allowed. Ultrasonic cleaning methods are permissible.

6 Storage

In order to maintain their solderability, thermistors must be stored in a non-corrosive atmosphere. Humidity, temperature and container materials are critical factors.

Do not store SMDs where they are exposed to heat or direct sunlight. Otherwise, the packing material may be deformed or SMDs may stick together, causing problems during mounting. After opening the factory seals, such as polyvinyl-sealed packages, use the SMDs as soon as possible.



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The components should be left in the original packing. Touching the metallization of unsoldered thermistors may change their soldering properties.

Storage temperature: $-25~^{\circ}\text{C}$ up to 45 $^{\circ}\text{C}$

Relative humidity (without condensation): ≤75% annual mean

<95%, maximum 30 days per annum

Solder the thermistors listed in this data book after shipment from EPCOS within the time speci-

fied:

SMDs: 12 months Leaded components: 24 months



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Cautions and warnings General

See "Important notes" at the end of this document.

Storage

- Store thermistors only in original packaging. Do not open the package prior to storage.
- Storage conditions in original packaging: storage temperature −25 °C ... +45 °C, relative humidity ≤75% annual mean, <95% maximum 30 days per annum, dew precipitation is inadmissible.</p>
- Do not store thermistors where they are exposed to heat or direct sunlight. Otherwise, the packing material may be deformed or components may stick together, causing problems during mounting.
- Avoid contamination of thermistor surface during storage, handling and processing.
- Avoid storage of thermistors in harmful environments like corrosive gases (SO_x, Cl etc).
- Use the components as soon as possible after opening the factory seals, i.e. the polyvinyl-sealed packages.
- Solder thermistors within the time specified after shipment from EPCOS. For leaded components this is 24 months, for SMDs 12 months.

Handling

- NTC thermistors must not be dropped. Chip-offs or any other damage must not be caused during handling of NTCs.
- Do not touch components with bare hands. Gloves are recommended.
- Avoid contamination of thermistor surface during handling.

Bending / twisting leads

- A lead (wire) may be bent at a minimum distance of twice the wire's diameter plus 4 mm from the component head or housing. When bending ensure the wire is mechanically relieved at the component head or housing. The bending radius should be at least 0.75 mm.
- Twisting (torsion) by 180° of a lead bent by 90° is permissible at 6 mm from the bottom of the thermistor body.

Soldering

- Use resin-type flux or non-activated flux.
- Insufficient preheating may cause ceramic cracks.
- Rapid cooling by dipping in solvent is not recommended.
- Complete removal of flux is recommended.



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Mounting

- Ensure that no thermo-mechanical stress occurs due to production processes (curing or overmolding processes) when thermistors are sealed, potted or overmolded or during their subsequent operation. The maximum temperature of the thermistor must not be exceeded. Ensure that the materials used (sealing/potting compound and plastic material) are chemically neutral.
- Electrodes/contacts must not be scratched or damaged before/during/after the mounting process.
- Contacts and housing used for assembly with the thermistor must be clean before mounting.
- Ensure that adjacent materials are designed for operation at temperatures comparable to the surface temperature of the thermistor. Be sure that surrounding parts and materials can withstand the temperature.
- Avoid contamination of the thermistor surface during processing.
- The connections of sensors (e.g. cable end, wire end, plug terminal) may only be exposed to an environment with normal atmospheric conditions.
- Tensile forces on cables or leads must be avoided during mounting and operation.
- Bending or twisting of cables or leads directly on the thermistor body is not permissible.
- Avoid using chemical substances as mounting aids. It must be ensured that no water or other liquids enter the NTC thermistors (e.g. through plug terminals). In particular, water based substances (e.g. soap suds) must not be used as mounting aids for sensors.

Operation

- Use thermistors only within the specified operating temperature range.
- Use thermistors only within the specified power range.
- Environmental conditions must not harm the thermistors. Only use the thermistors under normal atmospheric conditions or within the specified conditions.
- Contact of NTC thermistors with any liquids and solvents should be prevented. It must be ensured that no water enters the NTC thermistors (e.g. through plug terminals). For measurement purposes (checking the specified resistance vs. temperature), the component must not be immersed in water but in suitable liquids (e.g. Galden).
- Avoid dewing and condensation unless thermistor is specified for these conditions.
- Bending or twisting of cables and/or wires is not permissible during operation of the sensor in the application.
- Be sure to provide an appropriate fail-safe function to prevent secondary product damage caused by malfunction.

This listing does not claim to be complete, but merely reflects the experience of EPCOS AG.



Temperature measurement	B5/540G, B5/540G1
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Symbols and terms

Symbol	English	German
A AWG	Area American Wire Gauge	Fläche Amerikanische Norm für Drahtquerschnitte
B B _{25/100}	B value B value determined by resistance measurement at 25 °C and 100 °C	B-Wert B-Wert, ermittelt durch Widerstands- messungen bei 25 °C und 100 °C
\mathbf{C}_{th}	Heat capacitance	Wärmekapazität
1	Current	Strom
N	Number (integer)	Anzahl (ganzzahliger Wert)
$egin{array}{l} P_{25} \ P_{diss} \ P_{el} \ P_{max} \end{array}$	Maximum power at 25 °C Power dissipation Electrical power Maximum power within stated temperature range	Maximale Leistung bei 25 °C Verlustleistung Elektrische Leistung Maximale Leistung im angegebenenTemperaturbereich
$\begin{array}{l} \Delta R_{\text{B}}/R_{\text{B}} \\ R_{\text{ins}} \\ R_{\text{P}} \\ R_{\text{R}} \\ \Delta R_{\text{R}}/R_{\text{R}} \\ R_{\text{S}} \\ R_{\text{T}} \end{array}$	Resistance tolerance caused by spread of B value Insulation resistance Parallel resistance Rated resistance Resistance tolerance Series resistance Resistance at temperature T (e.g. R ₂₅ = resistance at 25 °C)	Widerstandstoleranz, die durch die Streuung des B-Wertes verursacht wird Isolationswiderstand Parallelwiderstand Nennwiderstand Widerstandstoleranz Serienwiderstand Widerstand bei Temperatur T (z.B. R ₂₅ = Widerstand bei 25 °C)
$\begin{array}{c} T \\ \Delta T \\ t \\ T_A \\ T_{max} \end{array}$	Temperature Temperature tolerance Time Ambient temperature Upper category temperature Lower category temperature	Temperatur Temperaturtoleranz Zeit Umgebungstemperatur Obere Grenztemperatur (Kategorietemperatur) Untere Grenztemperatur (Kategorietemperatur)
T_{op} T_{R} T_{surf}	Operating temperature Rated temperature Surface temperature	Betriebstemperatur Nenntemperatur Oberflächentemperatur
V V _{ins} V _{op} V _{test}	Voltage Insulation test voltage Operating voltage Test voltage	Spannung Isolationsprüfspannung Betriebsspannung Prüfspannung



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Symbol	English	German
α	Temperature coefficient	Temperaturkoeffizient
Δ	Tolerance, change	Toleranz, Änderung
δ_{th}	Dissipation factor	Wärmeleitwert
$\tau_c \\ \tau_a$	Thermal cooling time constant Thermal time constant	Thermische Abkühlzeitkonstante Thermische Zeitkonstante

Abbreviations / Notes

Symbol	English	German
SMD	Surface-mounted devices	Oberflächenmontierbares Bauelement
*	To be replaced by a number in ordering codes, type designations etc.	Platzhalter für Zahl im Bestellnummern- code oder für die Typenbezeichnung.
+	To be replaced by a letter.	Platzhalter für einen Buchstaben.
	All dimensions are given in mm.	Alle Maße sind in mm angegeben.
	The commas used in numerical values denote decimal points.	Verwendete Kommas in Zahlenwerten bezeichnen Dezimalpunkte.



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