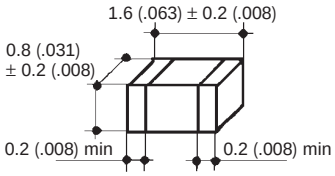
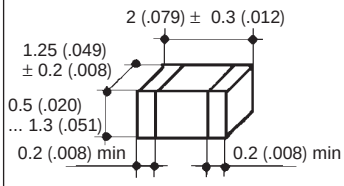
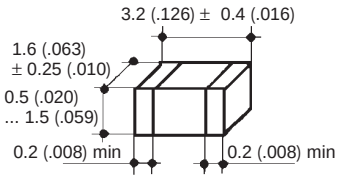
NTC SMD Thermistors

With Nickel Barrier Termination NB 12 - NB 20 - NB 21

Chip thermistors are high quality and low cost devices especially developed for surface mounting applications. They are widely used for temperature compensation but can also achieve temperature control of printed circuits.

A nickel barrier metallization provides outstanding qualities of solderability and enables this chip to meet the requirements of the most severe soldering processes.

Types	NB 21 IEC SIZE : 06-03	NB 12 IEC SIZE : 08-05	NB 20 IEC SIZE : 12-06
DIMENSIONS: **millimeters (inches)**			
Terminations	Nickel Barrier		
Marking	On packaging only		
Climatic category	40/125/56		
Operating temperature	-55°C to +150°C		
Tolerance on Rn (25°C)	±5%, ±10%, ±20%		
Maximum dissipation at 25°C	0.7 W	0.12 W	0.24 W
Thermal dissipation factor	1 mW/°C	2 mW/°C	4 mW/°C
Thermal time constant	4 s	5 s	7s

Resistance - Temperature characteristics: pages 32 to 35.

APPLICATIONS

- LCD compensation
- Battery packs
- Mobile phones
- CD players
- Heating systems
- Air-conditioning systems
- Temperature control of Switch Mode Power Supplies
- Compensation of pressure sensors
- Protection of power transistors in various electronic circuits

HOW TO ORDER

NB 20	K 0	0103	M	BA
Type	**Material Code** K (See tables page 13)	**Resistance** 10,000 Ω	**Tolerance** M (±20%)	**Suffix: Packaging** – –: Bulk BA: Super 8 plastic tape BE: Super 8 plastic tape (1/2 reel)

NTC SMD Thermistors

With Nickel Barrier Termination NB 12 – NB 20 – NB 21

TABLE OF VALUES

NB 12 IEC SIZE : 08-05				
Types	Rn at 25°C ( )	Material Code	B (K) (ΔB/B (1) ± 5% (2) ± 3%)	α at 25°C (%/°C)
NB 12 KC 0 180 NB 12 KC 0 220 NB 12 KC 0 270 NB 12 KC 0 330 NB 12 KC 0 390 NB 12 KC 0 470 NB 12 KC 0 560 NB 12 KC 0 680 NB 12 KC 0 820 NB 12 KC 0 101	18 22 27 33 39 47 56 68 82 100	KC	3470 (1)	– 3.9
NB 12 MC 0 121 NB 12 MC 0 151 NB 12 MC 0 181 NB 12 MC 0 221 NB 12 MC 0 271 NB 12 MC 0 331 NB 12 MC 0 391 NB 12 MC 0 471 NB 12 MC 0 561 NB 12 MC 0 681 NB 12 MC 0 821 NB 12 MC 0 102 NB 12 MC 0 122 NB 12 MC 0 152 NB 12 MC 0 182 NB 12 MC 0 222 NB 12 MC 0 272 NB 12 MC 0 332	120 150 180 220 270 330 390 470 560 680 820 1,000 1,200 1,500 1,800 2,200 2,700 3,300	MC	3910 (1)	– 4.4
NB 12 J 5 0 392 NB 12 J 5 0 472	3,900 4,700	J5	3480 (1)	– 3.9
NB 12 K 0 0562 NB 12 K 0 0682 NB 12 K 0 0822 NB 12 K 0 0103	5,600 6,800 8,200 10,000	K	3630 (1)	– 4.0
NB 12 L 0 0123 NB 12 L 0 0153	12,000 15,000	L	3790 (2)	– 4.2
NB 12 M 0 0183 NB 12 M 0 0223 NB 12 M 0 0273 NB 12 M 0 0333	18,000 22,000 27,000 33,000	M	3950 (2)	– 4.4
NB 12 N 0 0393 NB 12 N 0 0473 NB 12 N 0 0563	39,000 47,000 56,000	N	4080 (2)	– 4.6
NB 12 N 5 0683 NB 12 N 5 0823	68,000 82,000	N5	4160 (2)	-4.7
NB 12 P 0 0104 NB 12 P 0 0124 NB 12 P 0 0154 NB 12 P 0 0184	100,000 120,000 150,000 180,000	P	4220 (2)	– 4.7

NB 20 IEC SIZE : 12-06				
Types	Rn at 25°C ( )	Material Code	B (K) (ΔB/B (1) ± 5% (2) ± 3%)	α at 25°C (%/°C)
NB 20 J 0 0472 NB 20 J 0 0562	4,700 5,600	J	3480 (1)	– 3.9
NB 20 J 5 0682 NB 20 J 5 0822	6,800 8,200	J5	3480 (2)	-3.9
NB 20 K 0 0103 NB 20 K 0 0123	10,000 12,000	K	3630 (1)	– 4.0
NB 20 L 0 0153 NB 20 L 0 0183	15,000 18,000	L	3790 (2)	– 4.2
NB 20 M 0 0223 NB 20 M 0 0273 NB 20 M 0 0333 NB 20 M 0 0393	22,000 27,000 33,000 39,000	M	3950 (2)	– 4.4
NB 20 N 0 0473 NB 20 N 0 0563 NB 20 N 0 0683 NB 20 N 0 0823	47,000 56,000 68,000 82,000	N	4080 (2)	– 4.6
NB 20 N 5 0104	100,000	N5	4160 (2)	-4.7
NB 20 P 0 0124 NB 20 P 0 0154 NB 20 P 0 0184	120,000 150,000 180,000	P	4220 (2)	– 4.7
NB 20 Q 0 0224 NB 20 Q 0 0274 NB 20 Q 0 0334 NB 20 Q 0 0394 NB 20 Q 0 0474 NB 20 Q 0 0564	220,000 270,000 330,000 390,000 470,000 560,000	Q	4300 (2)	– 4.7
NB 20 R 0 0684 NB 20 R 0 0824 NB 20 R 0 0105	680,000 820,000 1,000,000	R	4400 (2)	– 4.8

NB 21 IEC SIZE : 06-03				
Types	Rn at 25°C ( )	Material Code	B (K) (ΔB/B (1) ± 5% (2) ± 3%)	α at 25°C (%/°C)
NB 21 PC 0472	4,700	PC	4200 (1)	– 4.7
NB 21 J 5 0103	10,000	J5	3480 (1)	– 3.9
NB 21 K 0 0153	15,000	K	3630 (2)	– 4.0
NB 21 L 0 0223	22,000	L	3790 (2)	– 4.2
NB 21 M 0 0473	47,000	M	3950 (2)	– 4.4
NB 21 N 5 0104	100,000	N5	4160 (2)	– 4.7
NB 21 P 0 0154	150,000	P	4220 (2)	– 4.7

Resistance

Temperature Characteristics

T (°C)	Material code B (K) F 2800 R (T) / R25	F 2800 TF (%)	F 2800 α (%/°C)	G 3030 R (T) / R25	G 3030 TF (%)	G 3030 α (%/°C)	H 3160 R (T) / R25	H 3160 TF (%)	H 3160 α (%/°C)	T (°C)
- 55	29.51	27.5	5.81	33.43	29.7	5.81	38.50	31.0	6.03	- 55
- 50	22.33	23.7	5.56	25.27	25.7	5.59	28.80	26.8	5.81	- 50
- 45	17.09	20.4	5.33	19.29	22.1	5.39	21.76	23.0	5.60	- 45
- 40	13.12	17.4	5.11	14.87	18.9	5.20	16.60	19.7	5.41	- 40
- 35	10.45	14.8	4.90	11.56	16.0	5.02	12.78	16.7	5.22	- 35
- 30	8.160	12.5	4.71	9.069	13.5	4.84	9.930	14.1	5.04	- 30
- 25	6.499	10.4	4.52	7.171	11.3	4.68	7.779	11.8	4.87	- 25
- 20	5.221	8.6	4.35	5.715	9.3	4.52	6.143	9.7	4.70	- 20
- 15	4.228	7.0	4.19	4.589	7.6	4.37	4.889	7.9	4.55	- 15
- 10	3.450	5.6	4.03	3.711	6.1	4.22	3.919	6.3	4.40	- 10
- 5	2.836	4.4	3.89	3.021	4.7	4.09	3.164	4.9	4.26	- 5
0	2.348	3.3	3.75	2.476	3.6	3.96	2.572	3.7	4.12	0
5	1.956	2.4	3.62	2.042	2.6	3.83	2.104	2.7	3.99	5
10	1.640	1.6	3.49	1.694	1.8	3.71	1.732	1.8	3.87	10
15	1.383	1.0	3.38	1.413	1.1	3.60	1.434	1.1	3.75	15
20	1.173	.4	3.26	1.186	.5	3.49	1.194	.5	3.63	20
25	1.0000	0.0	3.16	1.0000	0.0	3.38	1.0000	0.0	3.53	25
30	.8570	.4	3.06	.8476	.5	3.28	.8417	.5	3.42	30
35	.7381	.9	2.96	.7220	1.0	3.18	.7121	1.0	3.32	35
40	.6386	1.4	2.87	.6178	1.6	3.09	.6053	1.6	3.22	40
45	.5550	2.0	2.78	.5310	2.2	3.00	.5169	2.3	3.13	45
50	.4844	2.7	2.69	.4584	2.9	2.92	.4434	3.0	3.04	50
55	.4245	3.3	2.61	.3973	3.6	2.83	.3820	3.7	2.96	55
60	.3734	4.0	2.54	.3458	4.3	2.76	.3305	4.5	2.87	60
65	.3297	4.7	2.46	.3021	5.1	2.68	.2870	5.3	2.80	65
70	.2922	5.5	2.39	.2648	5.9	2.61	.2502	6.2	2.72	70
75	.2598	6.3	2.33	.2330	6.8	2.54	.2189	7.1	2.65	75
80	.2318	7.1	2.26	.2057	7.6	2.47	.1923	8.0	2.58	80
85	.2074	7.9	2.20	.1822	3.5	2.40	.1694	8.9	2.51	85
90	.1861	8.7	2.14	.1619	9.4	2.34	.1498	9.8	2.44	90
95	.1676	9.5	2.08	.1443	10.3	2.38	.1328	10.8	2.38	95
100	.1513	10.4	2.03	.1290	11.2	2.22	.1181	11.7	2.32	100
105	.1369	11.2	1.97	.1156	12.2	2.17	.1054	12.7	2.26	105
110	.1242	12.1	1.92	.1039	13.1	2.11	.09430	13.7	2.21	110
115	.1130	13.0	1.87	.09365	14.0	2.06	.08460	14.6	2.15	115
120	.1030	13.9	1.83	.08461	15.0	2.01	.07610	15.6	2.10	120
125	.09417	14.7	1.78	.07663	15.9	1.96	.06863	16.6	2.05	125
130	.08625	15.6	1.74	.06957	16.9	1.92	.06204	17.6	2.00	130
135	.07917	16.5	1.70	.06330	17.9	1.87	.05623	18.6	1.95	135
140	.07282	17.4	1.66	.05772	18.8	1.83	.05107	19.6	1.91	140
145	.06711	18.3	1.62	.05275	19.8	1.78	.04649	20.6	1.86	145
150	.06197	19.2	1.58	.04831	20.7	1.74	.04242	21.6	1.82	150

T (°C)	Material code B (K) I 3250 R (T) / R25	I 3250 TF (%)	I 3250 α (%/°C)	J-J5 3480 R (T) / R25	J-J5 3480 TF (%)	J-J5 3480 α (%/°C)	K 3630 R (T) / R25	K 3630 TF (%)	K 3630 α (%/°C)	T (°C)
- 55	42.35	21.9	5.98	51.74	34.1	6.43	56.26	35.6	6.46	- 55
- 50	31.48	20.0	5.78	37.97	29.5	6.21	41.21	30.8	6.26	- 50
- 45	23.63	18.1	5.59	28.15	25.3	6.01	30.47	26.4	6.06	- 45
- 40	17.91	16.3	5.41	21.07	21.7	5.81	22.73	22.6	5.88	- 40
- 35	13.70	14.6	5.23	15.91	18.4	5.62	17.11	19.2	5.70	- 35
- 30	10.58	13.1	5.06	12.13	15.5	5.44	12.98	16.2	5.53	- 30
- 25	8.232	11.6	4.90	9.320	12.9	5.26	9.930	13.5	5.36	- 25
- 20	6.460	10.1	4.74	7.221	10.7	5.10	7.654	11.2	5.21	- 20
- 15	5.110	8.8	4.59	5.640	8.7	4.94	5.945	9.1	5.05	- 15
- 10	4.072	7.5	4.45	4.438	7.0	4.78	4.650	7.3	4.91	- 10
- 5	3.268	6.3	4.31	3.517	5.4	4.64	3.663	5.7	4.76	- 5
0	2.641	5.1	4.18	2.807	4.1	4.50	2.905	4.3	4.63	0
5	2.148	4.0	4.05	2.255	3.0	4.36	2.319	3.1	4.50	5
10	1.759	2.9	3.92	1.824	2.0	4.23	1.862	2.1	4.37	10
15	1.449	1.9	3.81	1.484	1.2	4.10	1.505	1.3	4.25	15
20	1.200	0.9	3.69	1.215	.5	3.98	1.223	.6	4.13	20
25	1.000	0.0	3.58	1.0000	0.0	3.87	1.0000	0.0	4.01	25
30	0.8377	0.9	3.48	.8278	.5	3.76	.8219	.6	3.90	30
35	0.7054	1.8	3.38	.6889	1.1	3.65	.6792	1.2	3.80	35
40	0.5969	2.6	3.28	.5763	1.8	3.55	.5641	1.9	3.69	40
45	0.5076	3.5	3.19	.4845	2.5	3.45	.4708	2.6	3.59	45
50	0.4336	4.3	3.10	.4092	3.3	3.35	.3949	3.4	3.50	50
55	0.3720	5.1	3.01	.3473	4.1	3.26	.3327	4.3	3.41	55
60	0.3206	5.9	2.93	.2960	5.0	3.17	.2816	5.2	3.32	60
65	0.2774	6.6	2.85	.2534	5.9	3.09	.2393	6.1	3.23	65
70	0.2410	7.4	2.77	.2178	6.8	3.01	.2043	7.1	3.14	70
75	0.2102	8.1	2.70	.1879	7.8	2.93	.1751	8.1	3.06	75
80	0.1839	8.8	2.63	.1628	8.8	2.85	.1507	9.1	2.99	80
85	0.1616	9.5	2.56	.1415	9.8	2.78	.1301	10.2	2.91	85
90	0.1424	10.2	2.49	.1235	10.8	2.70	.1128	11.3	2.84	90
95	0.1259	10.9	2.43	.1081	11.8	2.64	.09812	12.4	2.77	95
100	0.1117	11.5	2.36	.09500	12.9	2.57	.08565	13.5	2.70	100
105	0.09938	12.2	2.30	.08373	14.0	2.50	.07502	14.6	2.63	105
110	0.08869	12.8	2.25	.07403	15.0	2.44	.06592	15.7	2.57	110
115	0.07938	13.4	2.19	.06565	16.1	2.38	.05810	16.8	2.50	115
120	0.07124	14.0	2.14	.05838	17.2	2.33	.05137	18.0	2.44	120
125	0.06410	14.6	2.08	.05207	18.3	2.27	.04555	19.1	2.39	125
130	0.05783	15.2	2.03	.04567	19.4	2.22	.04050	20.3	2.33	130
135	0.05230	15.7	1.98	.04175	20.5	2.16	.03611	21.4	2.27	135
140	0.04741	16.3	1.94	.03753	21.6	2.11	.03229	22.5	2.22	140
145	0.04308	16.8	1.89	.03382	22.7	2.06	.02894	23.7	2.17	145
150	0.03924	17.4	1.85	.03055	23.8	2.02	.02600	24.9	2.12	150

Resistance

Temperature Characteristics

T (°C)	Material code B (K) L 3790 R (T) / R25	L 3790 TF (%)	L 3790 α (%/°C)	M 3950 R (T) / R25	M 3950 TF (%)	M 3950 α (%/°C)	N 4080 R (T) / R25	N 4080 TF (%)	N 4080 α (%/°C)	T (°C)
- 55	82.52	22.3	7.38	99.56	23.2	7.71	110.1	24.0	7.81	- 55
- 50	58.01	19.3	7.11	68.95	20.1	7.42	75.90	20.7	7.53	- 50
- 45	41.30	16.6	6.84	48.38	17.3	7.15	52.98	17.8	7.26	- 45
- 40	29.75	14.2	6.60	34.37	14.8	6.89	37.43	15.2	7.01	- 40
- 35	21.67	12.0	6.36	24.71	12.5	6.64	26.75	12.9	6.77	- 35
- 30	15.96	10.1	6.13	17.96	10.6	6.41	19.33	10.9	6.54	- 30
- 25	11.88	8.5	5.92	13.20	8.8	6.18	14.12	9.1	6.32	- 25
- 20	8.930	7.0	5.72	9.803	7.3	5.97	10.41	7.5	6.10	- 20
- 15	6.776	5.7	5.32	7.351	5.9	5.77	7.758	6.1	5.90	- 15
- 10	5.188	4.5	5.34	5.585	4.7	5.57	5.834	4.9	5.71	- 10
- 5	4.007	3.6	5.16	4.251	3.7	5.39	4.426	3.8	5.53	- 5
0	3.120	2.7	4.99	3.275	2.8	5.21	3.387	2.9	5.35	0
5	2.449	2.0	4.83	2.544	2.0	5.04	2.614	2.1	5.18	5
10	1.937	1.3	4.68	1.992	1.4	4.88	2.033	1.4	5.02	10
15	1.543	.8	4.53	1.572	.8	4.73	1.593	.9	4.87	15
20	1.238	.4	4.39	1.249	.4	4.58	1.258	.4	4.72	20
25	1.0000	0.0	4.25	1.0000	0.0	4.44	1.0000	0.0	4.57	25
30	.8129	.3	4.12	.8057	.4	4.30	.8004	.4	4.44	30
35	.6648	.7	4.00	.6534	.8	4.17	.6448	.8	4.31	35
40	.5409	1.2	3.88	.5331	1.2	4.05	.5228	1.3	4.18	40
45	.4525	1.6	3.77	.4376	1.7	3.93	.4264	1.8	4.06	45
50	.3765	2.2	3.66	.3612	2.2	3.81	.3497	2.3	3.94	50
55	.3148	2.7	3.55	.2998	2.8	3.71	.2885	2.9	3.83	55
60	.2646	3.3	3.45	.2501	3.4	3.60	.2392	3.5	3.72	60
65	.2235	3.8	3.36	.2097	4.0	3.50	.1994	4.1	3.62	65
70	.1896	4.5	3.26	.1767	4.6	3.40	.1671	4.8	3.52	70
75	.1616	5.1	3.17	.1496	5.3	3.31	.1406	5.5	3.42	75
80	.1383	5.7	3.09	.1272	6.0	3.22	.1189	6.2	3.33	80
85	.1189	6.4	3.00	.1087	6.7	3.13	.1010	6.9	3.24	85
90	.1026	7.1	2.92	.09321	7.4	3.05	.08617	7.6	3.16	90
95	.08889	7.7	2.85	.08027	8.1	2.97	.07381	8.3	3.07	95
100	.07729	8.4	2.77	.06939	8.8	2.89	.06347	9.1	2.99	100
105	.06745	9.1	2.70	.06020	9.5	2.82	.05480	9.8	2.92	105
110	.05906	9.8	2.63	.05243	10.2	2.75	.04148	10.6	2.84	110
115	.05189	10.5	2.57	.04581	11.0	2.68	.04129	11.3	2.77	115
120	.04573	11.3	2.50	.04017	11.7	2.61	.03603	12.1	2.70	120
125	.04043	12.0	2.44	.03533	12.5	2.55	.03155	12.9	2.64	125
130	.03585	12.7	2.38	.03117	13.2	2.48	.02771	13.7	2.57	130
135	.03188	13.4	2.33	.02759	14.0	2.42	.02442	14.4	2.51	135
140	.02843	14.1	2.27	.02449	14.7	2.37	.02158	15.2	2.45	140
145	.02543	14.8	2.22	.02180	15.5	2.31	.01913	16.0	2.39	145
150	.02279	15.6	2.17	.01945	16.2	2.26	.01700	16.8	2.34	150

T (°C)	Material code B (K) P 4220 R (T) / R25	P 4220 TF (%)	P 4220 α (%/°C)	Q 4300 R (T) / R25	Q 4300 TF (%)	Q 4300 α (%/°C)	R 4400 R (T) / R25	R 4400 TF (%)	R 4400 α (%/°C)	T (°C)
- 55	121.3	24.8	7.88	98.02	25.5	7.14	113.9	25.9	7.42	- 55
- 50	83.32	21.4	7.61	69.51	22.0	6.95	79.69	22.4	7.22	- 50
- 45	57.91	18.4	7.36	49.72	18.9	6.77	56.29	19.2	7.03	- 45
- 40	40.71	15.8	7.11	35.86	16.2	6.59	40.12	16.4	6.84	- 40
- 35	28.95	13.4	6.88	26.08	13.7	6.42	28.85	14.0	6.66	- 35
- 30	20.80	11.3	6.66	19.12	11.6	6.26	20.92	11.8	6.48	- 30
- 25	15.10	9.4	6.44	14.12	9.7	6.10	15.29	9.8	6.31	- 25
- 20	11.07	7.8	6.24	10.51	8.0	5.94	11.27	8.1	6.14	- 20
- 15	8.196	6.3	6.04	7.876	6.5	5.79	8.367	6.6	5.98	- 15
- 10	6.123	5.1	5.85	5.946	5.2	5.64	6.260	5.3	5.83	- 10
- 5	4.615	4.0	5.67	4.520	4.1	5.50	4.719	4.1	5.67	- 5
0	3.507	3.0	5.49	3.460	3.1	5.36	3.583	3.1	5.53	0
5	2.688	2.2	5.33	2.666	2.2	5.23	2.739	2.3	5.38	5
10	2.078	1.5	5.16	2.067	1.5	5.09	2.108	1.5	5.24	10
15	1.616	.9	5.01	1.613	.9	4.96	1.634	.9	5.11	15
20	1.267	.4	4.86	1.266	.4	4.84	1.274	.4	4.97	20
25	1.0000	0.0	4.72	1.0000	0.0	4.72	1.0000	0.0	4.84	25
30	.7949	.4	4.58	.7944	.4	4.60	.7897	.4	4.72	30
35	.6360	.8	4.45	.6347	.8	4.48	.6273	.9	4.60	35
40	.5120	1.3	4.32	.5099	1.3	4.37	.5012	1.4	4.48	40
45	.4148	1.8	4.20	.4119	1.9	4.26	.4026	1.9	4.36	45
50	.3380	2.4	4.06	.3345	2.5	4.15	.3255	2.5	4.25	50
55	.2769	3.0	3.96	.2730	3.1	4.05	.2644	3.1	4.14	55
60	.2282	3.6	3.86	.2239	3.7	3.95	.2159	3.8	4.04	60
65	.1890	4.3	3.75	.1846	4.4	3.85	.1772	4.5	3.03	65
70	.1573	5.0	3.65	.1529	5.1	3.75	.1462	5.2	3.83	70
75	.1316	5.7	3.55	.1272	5.8	3.66	.1212	5.9	3.74	75
80	.1106	6.4	3.45	.1063	6.5	3.57	.1009	6.7	3.64	80
85	.09338	7.1	3.36	.08928	7.3	3.48	.08441	7.4	3.55	85
90	.07919	7.9	3.28	.07527	8.1	3.39	.07093	8.2	3.46	90
95	.06744	8.6	3.19	.06373	8.8	3.31	.05985	9.0	3.38	95
100	.05767	9.4	3.11	.05417	9.6	3.23	.05072	9.8	3.29	100
105	.04951	10.2	3.03	.04623	10.4	3.15	.04315	10.6	3.21	105
110	.04267	10.9	2.95	.03961	11.2	3.07	.03686	11.4	3.13	110
115	.03691	11.7	2.88	.03405	12.0	3.00	.03160	12.2	3.06	115
120	.03204	12.5	2.81	.02939	12.9	2.93	.02720	13.1	2.98	120
125	.02791	13.3	2.74	.02545	13.7	2.86	.02349	13.9	2.91	125
130	.02440	14.1	2.67	.02211	14.5	2.79	.02036	14.7	2.84	130
135	.02139	14.9	2.61	.01928	15.3	2.72	.01771	15.6	2.77	135
140	.01882	15.7	2.55	.01686	16.1	2.66	.01545	16.4	2.71	140
145	.01660	16.5	2.49	.01479	17.0	2.60	.01353	17.2	2.64	145
150	.01469	17.3	2.43	.01302	17.8	2.54	.01188	18.1	2.58	150

Resistance

Temperature Characteristics

T (°C)	Material code B (K) S 4520 R (T) / R25	S 4520 TF (%)	S 4520 α (%/°C)	T 4630 R (T) / R25	T 4630 TF (%)	T 4630 α (%/°C)	U 4840 R (T) / R25	U 4840 TF (%)	U 4840 α (%/°C)	T (°C)
- 55	126.1	26.6	7.55	137.0	27.2	7.64	173.7	28.5	8.04	- 55
- 50	87.73	23.0	7.35	94.92	23.5	7.45	118.2	24.6	7.83	- 50
- 45	61.59	19.8	7.16	66.34	20.2	7.26	81.16	21.2	7.63	- 45
- 40	43.62	16.9	6.97	46.77	17.3	7.09	56.25	18.1	7.44	- 40
- 35	31.17	14.3	6.79	33.25	14.7	6.90	39.33	15.4	7.25	- 35
- 30	22.45	12.1	6.62	23.83	12.4	6.72	27.74	12.9	7.07	- 30
- 25	16.31	10.1	6.45	17.22	10.3	6.56	19.73	10.8	6.89	- 25
- 20	11.94	8.3	6.28	12.54	8.5	6.39	14.15	8.9	6.71	- 20
- 15	8.808	6.8	6.12	9.205	6.9	6.23	10.23	7.3	6.54	- 15
- 10	6.548	5.4	5.96	6.806	5.6	6.08	7.456	5.8	6.38	- 10
- 5	4.904	4.2	5.81	5.069	4.3	5.92	5.475	4.5	6.22	- 5
0	3.699	3.2	5.66	3.803	3.3	5.78	4.051	3.4	6.06	0
5	2.810	2.3	5.52	2.873	2.4	5.63	3.019	2.5	5.91	5
10	2.149	1.6	5.38	2.185	1.6	5.49	2.267	1.7	5.76	10
15	1.654	1.0	5.24	1.673	1.0	5.35	1.714	1.0	5.61	15
20	1.282	.4	5.10	1.289	.4	5.22	1.305	.5	5.47	20
25	1.0000	0.0	4.97	1.0000	0.0	5.09	1.0000	0.0	5.33	25
30	.7848	.4	4.85	.7805	.4	4.96	.7715	.4	5.20	30
35	.6196	.9	4.72	.6129	.9	4.83	.5991	.9	5.06	35
40	.4922	1.4	4.60	.4842	1.4	4.71	.4681	1.5	4.94	40
45	.3932	2.0	4.48	.3847	2.0	4.59	.3681	2.1	4.81	45
50	.3158	2.6	4.37	.3074	2.6	4.48	.2911	2.8	4.69	50
55	.2551	3.2	4.26	.2470	3.3	4.37	.2316	3.4	4.57	55
60	.2072	3.9	4.15	.1996	4.0	4.26	.1853	4.2	4.45	60
65	.1691	4.6	4.05	.1621	4.7	4.15	.1491	4.9	4.34	65
70	.1387	5.3	3.94	.1323	5.4	4.04	.1207	5.7	4.23	70
75	.1144	6.1	3.84	.1086	6.2	3.94	.09813	6.5	4.12	75
80	.09477	6.8	3.75	.08953	7.0	3.84	.08023	7.3	4.02	80
85	.07888	7.6	3.65	.07417	7.8	3.75	.06592	8.2	3.91	85
90	.06595	8.4	3.56	.06173	8.6	3.65	.05443	9.0	3.82	90
95	.05539	9.2	3.47	.05161	9.5	3.56	.04515	9.9	3.72	95
100	.04671	10.1	3.39	.04334	10.3	3.47	.03763	10.8	3.63	100
105	.03956	10.9	3.30	.03655	11.2	3.39	.03151	11.7	3.54	105
110	.03364	11.7	3.22	.03095	12.0	3.31	.02650	12.6	3.45	110
115	.02872	12.6	3.14	.02632	12.9	3.22	.02237	13.5	3.38	115
120	.02461	13.4	3.07	.02247	13.7	3.15	.01897	14.4	3.28	120
125	.02117	14.3	2.99	.01925	14.6	3.07	.01615	15.3	3.20	125
130	.01828	15.1	2.92	.01656	15.5	2.99	.01381	16.2	3.12	130
135	.01584	16.0	2.85	.01429	16.4	2.92	.01185	17.1	3.04	135
140	.01376	16.8	2.78	.01238	17.3	2.85	.01020	18.0	2.97	140
145	.01201	17.7	2.72	.01076	18.1	2.78	.00882	19.0	2.90	145
150	.01050	18.6	2.65	.00938	19.0	2.72	.00765	19.9	2.83	150

T (°C)	Material code B (K) KC 3470 R (T) / R25	KC 3470 TF (%)	KC 3470 α (%/°C)	MC 3910 R (T) / R25	MC 3910 TF (%)	MC 3910 α (%/°C)	N5 R (T) / R25	N5 TF (%)	N5 α (%/°C)	T (°C)
-55	60.08	34.0	7.00	100.6	38.3	7.88	115.8	16.3	7.83	-55
-50	43.19	29.4	6.71	69.29	33.1	7.55	79.70	14.1	7.56	-50
-45	31.42	25.3	6.44	48.41	28.5	7.24	55.53	12.1	7.30	-45
-40	23.13	21.6	6.18	34.27	24.3	6.96	39.14	10.4	7.06	-40
-35	17.22	18.4	5.94	24.57	20.7	6.68	27.90	8.8	6.82	-35
-30	12.95	15.5	5.71	17.83	17.4	6.42	20.11	7.4	6.60	-30
-25	9.842	12.9	5.49	13.09	14.5	6.18	14.64	6.2	6.38	-25
-20	7.550	10.7	5.29	9.714	12.0	5.95	10.77	5.1	6.17	-20
-15	5.845	8.7	5.10	7.283	9.8	5.73	7.995	4.2	5.97	-15
-10	4.564	6.9	4.91	5.515	7.8	5.53	5.991	3.3	5.78	-10
-5	3.594	5.4	4.74	4.215	6.1	5.33	4.529	2.6	5.60	-5
0	2.853	4.1	4.58	3.251	4.6	5.15	3.453	2.0	5.43	0
5	2.281	3.0	4.42	2.528	3.4	4.97	2.655	1.4	5.26	5
10	1.838	2.0	4.27	1.983	2.3	4.80	2.057	1.0	5.10	10
15	1.491	1.2	4.13	1.567	1.4	4.65	1.606	.6	4.95	15
20	1.217	0.5	4.00	1.247	0.6	4.49	1.263	.3	4.80	20
25	1.0000	0.0	3.90	1.0000	0.0	4.40	1.0000	0.0	4.65	25
30	0.8267	0.5	3.74	0.8072	0.6	4.21	.7973	.3	4.52	30
35	0.6873	1.1	3.63	0.6558	1.3	4.08	.6398	.5	4.39	35
40	0.5747	1.8	3.52	0.5361	2.0	3.96	.5167	.9	4.26	40
45	0.4830	2.5	3.41	0.4409	2.8	3.84	.4198	1.2	4.14	45
50	0.4081	3.3	3.31	0.3647	3.7	3.72	.3430	1.6	4.02	50
55	0.3465	4.1	3.21	0.3033	4.6	3.61	.2819	2.0	3.91	55
60	0.2955	5.0	3.12	0.2535	5.6	3.51	.2329	2.4	3.80	60
65	0.2532	5.9	3.03	0.2130	6.6	3.41	.1934	2.8	3.69	65
70	0.2179	6.8	2.94	0.1798	7.7	3.31	.1615	3.3	3.59	70
75	0.1883	7.8	2.86	0.1525	8.7	3.22	.1354	3.7	3.50	75
80	0.1634	8.7	2.78	0.1299	9.9	3.13	.1141	4.2	3.40	80
85	0.1423	9.7	2.71	0.1112	11.0	3.05	.09660	4.7	3.31	85
90	0.12441	10.8	2.63	0.09551	12.1	2.97	.08212	5.2	3.23	90
95	0.10915	11.8	2.56	0.08238	13.3	2.89	.07011	5.7	3.14	95
100	0.09608	12.9	2.50	0.07132	14.5	2.81	.06010	6.2	3.06	100
105	0.08486	13.9	2.43	0.06198	15.7	2.74	.05172	6.7	2.98	105
110	0.07519	15.0	2.37	0.05405	16.9	2.67	.04467	7.2	2.91	110
115	0.06683	16.1	2.31	0.04730	18.1	2.60	.03873	7.7	2.83	115
120	0.05957	17.2	2.25	0.04153	19.3	2.54	.03370	8.2	2.76	120
125	0.05325	18.3	2.20	0.03657	20.6	2.48	.02942	8.8	2.70	125
130	0.04774	19.4	2.14	0.03231	21.8	2.42	.02576	9.3	2.63	130
135	0.04290	20.5	2.09	0.02863	23.0	2.36	.02264	9.8	2.57	135
140	0.03866	21.6	2.04	0.02544	24.3	2.30	.01995	10.3	2.51	140
145	0.03492	22.7	1.99	0.02267	25.5	2.25	.01764	10.9	2.45	145
150	0.03162	23.8	1.95	0.02025	26.8	2.20	.01564	11.4	2.39	150

Resistance

Temperature Characteristics

T (°C)	Material code B (K) KA 3625 R (T) / R25	KA 3625 TF (%)	KA 3625 α (%/°C)	MA 3960 R (T) / R25	MA 3960 TF (%)	MA 3960 α (%/°C)	NA 4100 R (T) / R25	NA 4100 TF (%)	NA 4100 α (%/°C)	T (°C)
- 55	61.21	7.1	6.77	104.2	3.9	7.89	109.5	8.0	7.83	- 55
- 50	44.24	6.1	6.53	71.63	3.4	7.57	75.42	6.9	7.54	- 50
- 45	32.33	5.3	6.30	49.94	2.9	7.28	52.63	6.0	7.27	- 45
- 40	23.88	4.5	6.08	35.28	2.5	7.00	37.18	5.1	7.01	- 40
- 35	17.81	3.8	5.88	25.25	2.1	6.73	26.58	4.3	6.76	- 35
- 30	13.41	3.2	5.68	18.28	1.8	6.48	19.22	3.7	6.52	- 30
- 25	10.19	2.7	5.49	13.39	1.5	6.25	14.04	3.1	6.30	- 25
- 20	7.814	2.2	5.31	9.917	1.2	6.02	10.37	2.5	6.09	- 20
- 15	6.040	1.8	5.14	7.419	1.0	5.81	7.730	2.1	5.89	- 15
- 10	4.707	1.5	4.98	5.605	.8	5.61	5.817	1.6	5.70	- 10
- 5	3.696	1.1	4.83	4.275	.6	5.42	4.416	1.3	5.51	- 5
0	2.923	.9	4.68	3.289	.5	5.24	3.382	1.0	5.34	0
5	2.329	.6	4.53	2.552	.3	5.06	2.611	.7	5.17	5
10	1.867	.4	4.40	1.997	.2	4.90	2.032	.5	5.01	10
15	1.507	.3	4.27	1.574	.1	4.74	1.593	.3	4.86	15
20	1.224	.1	4.14	1.250	.1	4.59	1.258	.1	4.71	20
25	1.0000	0.0	4.02	1.0000	0.0	4.45	1.0000	0.0	4.57	25
30	.8217	.1	3.91	.8053	.1	4.31	.8004	.1	4.44	30
35	.6788	.2	3.80	.6527	.1	4.18	.6446	.3	4.31	35
40	.5638	.4	3.69	.5323	.2	4.06	.5224	.4	4.19	40
45	.4707	.5	3.59	.4367	.3	3.94	.4258	.6	4.07	45
50	.3948	.7	3.49	.3604	.4	3.82	.3491	.8	3.96	50
55	.3328	.9	3.40	.2990	.5	3.71	.2877	1.0	3.85	55
60	.2818	1.0	3.31	.2493	.6	3.61	.2383	1.2	3.74	60
65	.2396	1.2	3.22	.2090	.7	3.51	.1984	1.4	3.64	65
70	.2046	1.4	3.14	.1760	.8	3.41	.1660	1.6	3.55	70
75	.1754	1.6	3.06	.1489	.9	3.32	.1396	1.8	3.45	75
80	.1510	1.8	2.98	.1266	1.0	3.23	.1178	2.1	3.36	80
85	.1305	2.0	2.90	.1081	1.1	3.14	.09991	2.3	3.28	85
90	.1131	2.3	2.83	.09262	1.2	3.06	.08507	2.5	3.20	90
95	.09846	2.5	2.76	.07970	1.3	2.98	.07273	2.8	3.12	95
100	.08597	2.7	2.69	.06885	1.5	2.91	.06241	3.0	3.04	100
105	.07531	2.9	2.63	.05969	1.6	2.83	.05376	3.3	2.96	105
110	.06618	3.1	2.56	.05194	1.7	2.76	.04648	3.5	2.89	110
115	.05834	3.4	2.50	.04535	1.8	2.69	.04032	3.8	2.82	115
120	.05158	3.6	2.44	.03973	2.0	2.63	.03510	4.1	2.76	120
125	.04573	3.8	2.39	.03491	2.1	2.56	.03065	4.3	2.69	125
130	.04066	4.0	2.33	.03077	2.2	2.50	.02685	4.6	2.63	130
135	.03625	4.3	2.28	.02721	2.3	2.44	.02359	4.8	2.57	135
140	.03240	4.5	2.23	.02412	2.5	2.39	.02079	5.1	2.51	140
145	.02903	4.7	2.18	.02145	2.6	2.33	.01838	5.4	2.45	145
150	.02608	5.0	2.13	.01912	2.7	2.28	.01629	5.6	2.40	150

T (°C)	Material code B (K) PA 4235 R (T) / R25	PA 4235 TF (%)	PA 4235 α (%/°C)	QA 4250 R (T) / R25	QA 4250 TF (%)	QA 4250 α (%/°C)	RA 4380 R (T) / R25	RA 4380 TF (%)	RA 4380 α (%/°C)	T (°C)
- 55	123.3	8.3	8.00	101.8	8.3	7.36	110.7	8.6	7.53	- 55
- 50	84.31	7.2	7.71	71.33	7.2	7.13	77.22	7.4	7.29	- 50
- 45	58.37	6.2	7.43	50.51	6.2	6.91	54.43	6.4	7.07	- 45
- 40	40.92	5.3	7.17	36.14	5.3	6.70	38.76	5.5	6.85	- 40
- 35	29.03	4.5	6.92	26.11	4.5	6.50	27.86	4.6	6.65	- 35
- 30	20.83	3.8	6.69	19.05	3.8	6.31	20.22	3.9	6.46	- 30
- 25	15.10	3.2	6.46	14.02	3.2	6.12	14.81	3.3	6.27	- 25
- 20	11.07	2.6	6.25	10.41	2.6	5.85	10.94	2.7	6.09	- 20
- 15	8.189	2.1	6.05	7.791	2.1	5.78	8.143	2.2	5.92	- 15
- 10	6.117	1.7	5.85	5.879	1.7	5.62	6.112	1.8	5.76	- 10
- 5	4.610	1.3	5.67	4.470	1.3	5.46	4.622	1.4	5.60	- 5
0	3.504	1.0	5.49	3.424	1.0	5.31	3.522	1.0	5.45	0
5	2.686	.7	5.32	2.642	.7	5.17	2.702	.8	5.31	5
10	2.075	.5	5.16	2.052	.5	5.03	2.087	.5	5.17	10
15	1.615	.3	5.01	1.605	.3	4.90	1.623	.3	5.03	15
20	1.266	.1	4.86	1.263	.1	4.77	1.270	.1	4.91	20
25	1.0000	0.0	4.72	1.0000	0.0	4.65	1.0000	0.0	4.78	25
30	.7949	.1	4.58	.7965	.1	4.53	.7920	.1	4.66	30
35	.6359	.3	4.45	.6380	.3	4.42	.6308	.3	4.55	35
40	.5119	.4	4.32	.5139	.4	4.31	.5052	.5	4.43	40
45	.4145	.6	4.20	.4162	.6	4.20	.4068	.6	4.33	45
50	.3376	.8	4.09	.3388	.8	4.10	.3292	.8	4.22	50
55	.2765	1.0	3.98	.2771	1.0	4.00	.2678	1.0	4.12	55
60	.2276	1.2	3.87	.2278	1.2	3.90	.2189	1.3	4.02	60
65	.1883	1.4	3.77	.1881	1.4	3.81	.1797	1.5	3.93	65
70	.1566	1.7	3.67	.1560	1.7	3.72	.1483	1.7	3.84	70
75	.1308	1.9	3.58	.1300	1.9	3.63	.1228	2.0	3.75	75
80	.1098	2.1	3.48	.1088	2.1	3.55	.1022	2.2	3.67	80
85	.09258	2.4	3.40	.0914	2.4	3.47	.08537	2.5	3.58	85
90	.07838	2.6	3.31	.07708	2.6	3.39	.07160	2.7	3.50	90
95	.06662	2.9	3.23	.06527	2.9	3.31	.06029	3.0	3.42	95
100	.05686	3.1	3.15	.05547	3.2	3.24	.05095	3.2	3.35	100
105	.04871	3.4	3.07	.04731	3.4	3.17	.04322	3.5	3.28	105
110	.04189	3.7	3.00	.04049	3.7	3.10	.03679	3.8	3.21	110
115	.03614	3.9	2.93	.03478	3.9	3.03	.03143	4.1	3.14	115
120	.03130	4.2	2.86	.02996	4.2	2.96	.02693	4.3	3.07	120
125	.02719	4.5	2.79	.02590	4.5	2.90	.02316	4.6	3.01	125
130	.02370	4.7	2.73	.02246	4.7	2.84	.01997	4.9	2.94	130
135	.02072	5.0	2.67	.01953	5.0	2.78	.01728	5.2	2.88	135
140	.01817	5.3	2.61	.01704	5.3	2.72	.01499	5.4	2.82	140
145	.01598	5.5	2.55	.01490	5.5	2.67	.01305	5.7	2.77	145
150	.01410	5.8	2.49	.01307	5.8	2.61	.01138	6.0	2.71	150