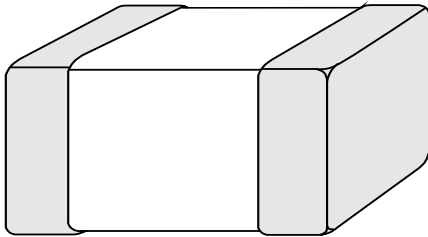


DATA SHEET



2322 615 2....

Surface mount NTC thermistors

Preliminary specification
Supersedes data of May 17th 1999
File under BCcomponents, BC02

2001 Jan 17

Surface mount NTC thermistors

2322 615 2....

FEATURES

- High sensitivity
- High accuracy over a wide temperature range
- Taped on reel
- Suitable for wave or reflow soldering.

APPLICATION

- Temperature compensation, sensing and protection in, for example:
 - Battery chargers
 - Consumer equipment
 - Office equipment.

DESCRIPTION

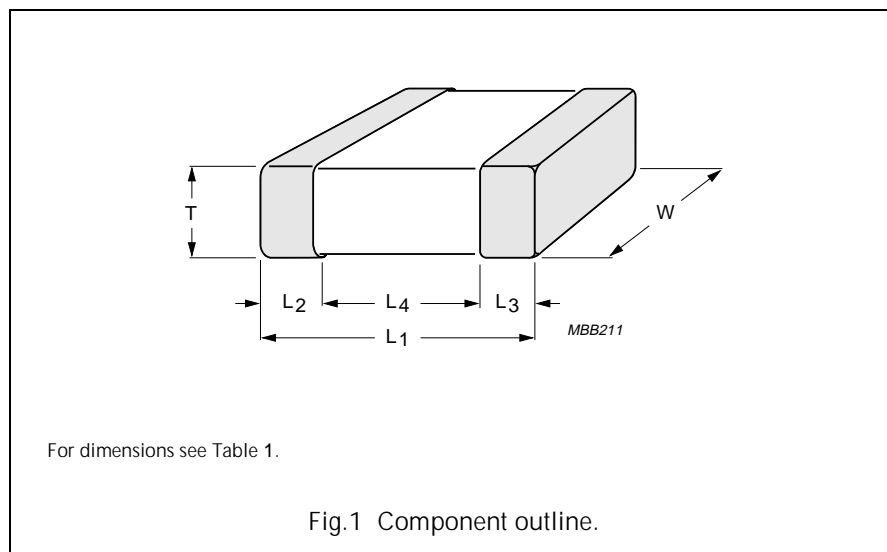
Size 0603 chip thermistors with a negative temperature coefficient and silver palladium contacts⁽¹⁾. The device has no marking.

QUICK REFERENCE DATA

PARAMETER	VALUE
Resistance value at 25 °C	4.7 kΩ to 100 kΩ
Tolerance on R ₂₅ -value	±3%; ±5%; ±10%
Tolerance on B _{25/85} -value	see Table 2
Maximum dissipation at 25 °C	125 mW
Operating temperature range	-55 to +150 °C
Climatic category	40/125/56
Mass	≈0.0075 g

MECHANICAL DATA

Outline



(1) NiSn contacts available on request.

PACKAGING

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

Table 1 Component dimensions; see Fig.1

L ₁ (mm)	W (mm)	T		L ₂ and L ₃ (mm)	L ₄ MIN. (mm)
		MIN. (mm)	MAX. (mm)		
1.6 ±0.1	0.8 ±0.15	0.5	1.0	0.45 ±0.2	0.2

Surface mount NTC thermistors

2322 615 2....

ELECTRICAL CHARACTERISTICS

Unless otherwise stated, measurements are in accordance with "IEC publication 60539"; see also Table 2.

PARAMETER	VALUE
Tolerance on R_{25}	$\pm 3\%$; $\pm 5\%$; $\pm 10\%$
Tolerance on $B_{25/85}$ -value	see Table 2
Climatic category	40/125/56
Maximum dissipation at 25 °C	125 mW
Thermal time constant τ	≈ 8 s
Operating temperature range	-55 to +150 °C
R/T values	see Tables 4 to 8

Table 2 R_{25} -values, $B_{25/85}$ -values and catalogue numbers; see Tables 4 to 8

R_{25} (Ω)	$B_{25/85}$ -VALUE (K)	TOLERANCE ON $B_{25/85}$ (%)	CATALOGUE NUMBER 2322 615 2....		
			$\pm 3\%$ TOL. ON R_{25}	$\pm 5\%$ TOL. ON R_{25}	$\pm 10\%$ TOL. ON R_{25}
4 700	3 560	± 3	6472	3472	2472
10 000	3 620	± 3	6103	3103	2103
47 000	3 977	± 3	6473	3473	2473
68 000	3 740	± 3	6683	3683	2683
100 000	3 650	± 3	6104	3104	2104

Table 3 Solderability and resistance to soldering heat

IEC 60068-2-20	TEST METHOD	TEST	PROCEDURE	REQUIREMENTS
6	Tc	solderability	3 s at 215 °C; 2 s at 235 °C	$\Delta R/R < 5\%$
		resistance to soldering heat	10 s at 260 °C	$\Delta R/R < 5\%$

Surface mount NTC thermistors

2322 615 2....

Table 4 Resistance values at intermediate temperatures with R_{25} at 4700 Ω ; see also Table 2

T_{oper} (°C)	CATALOGUE NUMBER 2322 615 2.472					
	R_T/R_{25}	TC (%/K)	R_T (Ω)	3% TOL. $\Delta R/R$ (%)	5% TOL. $\Delta R/R$ (%)	10% TOL. $\Delta R/R$ (%)
-40	21.9261	-5.75	103053	9.02	16.71	22.27
-35	16.5224	-5.57	77655	8.44	15.59	21.09
-30	12.5583	-5.40	59024	7.89	14.50	19.96
-25	9.6249	-5.24	45237	7.35	13.47	18.87
-20	7.4362	-5.08	34950	6.84	12.47	17.82
-15	5.7898	-4.93	27212	6.35	11.51	16.82
-10	4.5416	-4.78	21345	5.87	10.59	15.85
-5	3.5881	-4.64	16864	5.42	9.70	14.92
0	2.8545	-4.51	13416	4.98	8.85	14.03
5	2.2860	-4.38	10744	4.55	8.02	13.17
10	1.8425	-4.25	8659.5	4.14	7.23	12.33
15	1.4941	-4.13	7022.5	3.75	6.46	11.53
20	1.2189	-4.01	5728.7	3.37	5.72	10.75
25	1.0000	-3.90	4700.0	3.00	5.00	10.00
30	0.8249	-3.80	3877.2	3.36	5.69	10.73
35	0.6841	-3.69	3215.4	3.70	6.36	11.43
40	0.57025	-3.59	2680.2	4.04	7.01	12.11
45	0.47765	-3.50	2245.0	4.36	7.64	12.77
50	0.40198	-3.40	1889.3	4.67	8.25	13.41
55	0.33984	-3.31	1597.2	4.98	8.84	14.02
60	0.28856	-3.23	1356.2	5.26	9.41	14.62
65	0.24606	-3.15	1156.5	5.56	9.97	15.21
70	0.21067	-3.07	990.1	5.83	10.51	15.77
75	0.18108	-2.99	851.06	6.10	11.03	16.32
80	0.15623	-2.91	734.29	6.37	11.54	16.86
85	0.13529	-2.84	635.86	6.62	12.04	17.37
90	0.11757	-2.77	552.56	6.87	12.52	17.88
95	0.10251	-2.71	481.81	7.11	12.99	18.37
100	0.08968	-2.64	421.50	7.34	13.45	18.85
105	0.07871	-2.58	369.91	7.57	13.89	19.31
110	0.06928	-2.52	325.64	7.79	14.32	19.77
115	0.06117	-2.46	287.51	8.01	14.74	20.21
120	0.05416	-2.41	254.57	8.22	15.15	20.64
125	0.04809	-2.35	226.03	8.43	15.55	21.06
130	0.04282	-2.30	201.23	8.63	15.94	21.46
135	0.03822	-2.25	179.62	8.82	16.32	21.86
140	0.0342	-2.20	160.73	9.02	16.70	22.25
145	0.03068	-2.15	144.17	9.20	17.06	22.63
150	0.02758	-2.10	129.63	9.38	17.41	23.00

Surface mount NTC thermistors

2322 615 2....

Table 5 Resistance values at intermediate temperatures with R_{25} at 10000 Ω ; see also Table 2

T_{oper} (°C)	CATALOGUE NUMBER 2322 615 2.103					
	R_T/R_{25}	TC (%/K)	R_T (Ω)	3% TOL. $\Delta R/R$ (%)	5% TOL. $\Delta R/R$ (%)	10% TOL. $\Delta R/R$ (%)
-40	23.0973	-5.84	230973	9.02	16.71	22.27
-35	17.3222	-5.67	173222	8.44	15.59	21.09
-30	13.1054	-5.49	131054	7.89	14.50	19.96
-25	9.99934	-5.33	99993	7.35	13.47	18.87
-20	7.69193	-5.17	76919	6.84	12.47	17.82
-15	5.96369	-5.01	59637	6.35	11.51	16.82
-10	4.6589	-4.86	46589	5.87	10.59	15.85
-5	3.66623	-4.72	36662	5.42	9.70	14.92
0	2.9054	-4.58	29054	4.98	8.85	14.03
5	2.31806	-4.45	23181	4.55	8.02	13.17
10	1.86153	-4.32	18615.3	4.14	7.23	12.33
15	1.50429	-4.20	15042.9	3.75	6.46	11.53
20	1.22295	-4.08	12229.5	3.37	5.72	10.75
25	1.00	-3.97	10000.0	3.00	5.00	10.00
30	0.82227	-3.86	8222.7	3.36	5.69	10.73
35	0.67977	-3.75	6797.7	3.70	6.36	11.43
40	0.56487	-3.65	5648.7	4.04	7.01	12.11
45	0.47174	-3.55	4717.4	4.36	7.64	12.77
50	0.39585	-3.46	3958.5	4.67	8.25	13.41
55	0.33371	-3.37	3337.1	4.98	8.84	14.02
60	0.28258	-3.28	2825.8	5.27	9.41	14.62
65	0.24031	-3.20	2403.1	5.56	9.97	15.21
70	0.20521	-3.12	2052.1	5.83	10.51	15.77
75	0.17594	-3.04	1759.37	6.10	11.03	16.32
80	0.15142	-2.96	1514.20	6.37	11.54	16.86
85	0.1308	-2.89	1308.04	6.62	12.04	17.37
90	0.1134	-2.82	1134.00	6.87	12.52	17.88
95	0.09865	-2.75	986.53	7.11	12.99	18.37
100	0.08611	-2.69	861.10	7.34	13.45	18.85
105	0.0754	-2.62	754.04	7.57	13.89	19.31
110	0.06624	-2.56	662.36	7.79	14.32	19.77
115	0.05836	-2.50	583.58	8.01	14.74	20.21
120	0.05157	-2.45	515.67	8.22	15.15	20.64
125	0.4569	-2.39	456.94	8.43	15.55	21.06
130	0.0406	-2.34	406.01	8.63	15.94	21.46
135	0.03617	-2.29	361.71	8.82	16.32	21.86
140	0.03231	-2.23	323.06	9.02	16.70	22.25
145	0.02893	-2.19	289.26	9.20	17.06	22.63
150	0.02596	-2.14	259.61	8.38	17.41	23.00

Surface mount NTC thermistors

2322 615 2....

Table 6 Resistance values at intermediate temperatures with R_{25} at 47000 Ω ; see also Table 2

T_{oper} (°C)	CATALOGUE NUMBER 2322 615 2.473					
	R_T/R_{25}	TC (%/K)	R_T (Ω)	3% TOL. $\Delta R/R$ (%)	5% TOL. $\Delta R/R$ (%)	10% TOL. $\Delta R/R$ (%)
-40	33.21001	-6.62	1560870	9.02	16.71	22.27
-35	23.99043	-6.39	1127550	8.44	15.59	21.09
-30	17.52031	-6.18	823454	7.89	14.50	19.96
-25	12.92895	-5.98	607660	7.35	13.47	18.87
-20	9.63600	-5.78	452892	6.84	12.47	17.82
-15	7.25018	-5.60	340758	6.35	11.51	16.82
-10	5.50470	-5.42	258721	5.87	10.59	15.85
-5	4.21578	-5.25	198142	5.42	9.70	14.92
0	3.25548	-5.09	153008	4.98	8.85	14.03
5	2.53391	-4.93	119094	4.55	8.02	13.17
10	1.98726	-4.79	93401	4.14	7.23	12.33
15	1.56988	-4.64	73784	3.75	6.46	11.53
20	1.24880	-4.51	58694	3.37	5.72	10.75
25	1.00000	-4.38	47000	3.00	5.00	10.00
30	0.80592	-4.25	37878	3.36	5.69	10.73
35	0.65349	-4.13	30714	3.70	6.36	11.43
40	0.53300	-4.02	25051	4.04	7.01	12.11
45	0.43718	-3.91	20547	4.36	7.64	12.77
50	0.36053	-3.80	16945	4.67	8.25	13.41
55	0.29887	-3.70	14047	4.98	8.84	14.02
60	0.24900	-3.60	11703	5.27	9.41	14.62
65	0.20845	-3.51	9797.0	5.56	9.97	15.21
70	0.17531	-3.42	8239.5	5.83	10.51	15.77
75	0.14809	-3.33	6960.4	6.10	11.03	16.32
80	0.12564	-3.26	5905.1	6.37	11.54	16.86
85	0.10703	-3.17	5030.6	6.62	12.04	17.37
90	0.09154	-3.09	4203.6	6.87	12.52	17.88
95	0.09865	-3.01	3694.1	7.11	12.99	18.37
100	0.08611	-2.94	3183.4	7.34	13.45	18.85
105	0.0754	-2.87	2753.1	7.57	13.89	19.31
110	0.06624	-2.80	2389.1	7.79	14.32	19.77
115	0.05836	-2.74	2080.2	8.01	14.74	20.21
120	0.05157	-2.67	1817.0	8.22	15.15	20.64
125	0.4569	-2.61	1592.1	8.43	15.55	21.06
130	0.0406	-2.55	1399.2	8.63	15.94	21.46
135	0.03617	-2.50	1233.2	8.82	16.32	21.86
140	0.03231	-2.44	1090.0	9.02	16.70	22.25
145	0.02893	-2.39	966.0	9.20	17.06	22.63
150	0.02596	-2.34	858.4	8.38	17.41	23.00

Surface mount NTC thermistors

2322 615 2....

Table 7 Resistance values at intermediate temperatures with R_{25} at 68000 Ω ; see also Table 2

T_{oper} (°C)	CATALOGUE NUMBER 2322 615 2.683					
	R_T/R_{25}	TC (%/K)	R_T (Ω)	3% TOL. $\Delta R/R$ (%)	5% TOL. $\Delta R/R$ (%)	10% TOL. $\Delta R/R$ (%)
-40	25.783	-6.07	1753245	9.02	16.71	22.27
-35	19.1253	-5.88	1300524	8.44	15.59	21.09
-30	14.32	-5.70	973760	7.89	14.50	19.96
-25	10.8187	-5.52	735675	7.35	13.47	18.87
-20	8.24438	-5.35	560618	6.84	12.47	17.82
-15	6.33489	-5.19	430772	6.35	11.51	16.82
-10	4.90655	-5.03	333646	5.87	10.59	15.85
-5	3.82943	-4.88	260401	5.42	9.70	14.92
0	3.01078	-4.74	204733	4.98	8.85	14.03
5	2.3839	-4.60	162105	4.55	8.02	13.17
10	1.90036	-4.47	129225	4.14	7.23	12.33
15	1.52479	-4.34	103686	3.75	6.46	11.53
20	1.23112	-4.22	83716	3.37	5.72	10.75
25	1.00	-4.10	68000	3.00	5.00	10.00
30	0.81697	-3.99	55554.1	3.36	5.69	10.73
35	0.67116	-3.88	45639.0	3.70	6.36	11.43
40	0.55433	-3.77	37694.3	4.04	7.01	12.11
45	0.46019	-3.67	31293.0	4.36	7.64	12.77
50	0.38393	-3.58	26107.6	4.67	8.25	13.41
55	0.32184	-3.48	21885.4	4.98	8.84	14.02
60	0.27103	-3.39	18430.3	5.27	9.41	14.62
65	0.22926	-3.30	15589.4	5.56	9.97	15.21
70	0.19475	-3.22	13242.7	5.83	10.51	15.77
75	0.16611	-3.14	11295.4	6.10	11.03	16.32
80	0.14225	-3.06	9672.7	6.37	11.54	16.86
85	0.12228	-2.99	8314.8	6.62	12.04	17.37
90	0.1055	-2.92	7173.9	6.87	12.52	17.88
95	0.09135	-2.85	6211.6	7.11	12.99	18.37
100	0.07936	-2.78	5396.8	7.34	13.45	18.85
105	0.06918	-2.71	4704.5	7.57	13.89	19.31
110	0.0605	-2.65	4114.1	7.79	14.32	19.77
115	0.05307	-2.59	3609.0	8.01	14.74	20.21
120	0.0467	-2.53	3175.4	8.22	15.15	20.64
125	0.04121	-2.47	2802.0	8.43	15.55	21.06
130	0.03646	-2.42	2479.4	8.63	15.94	21.46
135	0.03235	-2.37	2199.9	8.82	16.32	21.86
140	0.02878	-2.31	1957.0	9.02	16.70	22.25
145	0.02567	-2.26	1745.4	9.20	17.06	22.63
150	0.02295	-2.22	1560.5	9.38	17.41	23.00

Surface mount NTC thermistors

2322 615 2....

Table 8 Resistance values at intermediate temperatures with R_{25} at 100000 Ω ; see also Table 2

T_{oper} (°C)	CATALOGUE NUMBER 2322 615 2.104					
	R_T/R_{25}	TC (%/K)	R_T (Ω)	3% TOL. $\Delta R/R$ (%)	5% TOL. $\Delta R/R$ (%)	10% TOL. $\Delta R/R$ (%)
-40	23.8997	-5.92	2389969	9.02	16.71	22.27
-35	17.8586	-5.74	1785861	8.44	15.59	21.09
-30	13.465	-5.56	1346502	7.89	14.50	19.96
-25	10.2407	-5.39	1024071	7.35	13.47	18.87
-20	7.85378	-5.23	785378	6.84	12.47	17.82
-15	6.07181	-5.07	607181	6.35	11.51	16.82
-10	4.73061	-4.92	473061	5.87	10.59	15.85
-5	3.7132	-4.77	371320	5.42	9.70	14.92
0	2.93554	-4.63	293554	4.98	8.85	14.03
5	2.33677	-4.50	233677	4.55	8.02	13.17
10	1.87249	-4.37	187249	4.14	7.23	12.33
15	1.51004	-4.24	151004	3.75	6.46	11.53
20	1.22522	-4.12	122522	3.37	5.72	10.75
25	1.00	-4.01	100000	3.00	5.00	10.00
30	0.82081	-3.89	82081.4	3.36	5.69	10.73
35	0.67742	-3.79	67741.7	3.70	6.36	11.43
40	0.56201	-3.68	56201.1	4.04	7.01	12.11
45	0.46863	-3.59	46862.6	4.36	7.64	12.77
50	0.39266	-3.49	39266.1	4.67	8.25	13.41
55	0.33055	-3.40	33055.3	4.98	8.84	14.02
60	0.27953	-3.31	27952.7	5.27	9.41	14.62
65	0.23741	-3.22	23740.6	5.56	9.97	15.21
70	0.20248	-3.14	20247.7	5.83	10.51	15.77
75	0.17339	-3.06	17338.6	6.10	11.03	16.32
80	0.14905	-2.99	14905.4	6.37	11.54	16.86
85	0.12862	-2.91	12861.8	6.62	12.04	17.37
90	0.11139	-2.84	11138.6	6.87	12.52	17.88
95	0.0968	-2.77	9680.1	7.11	12.99	18.37
100	0.08441	-2.71	8441.1	7.34	13.45	18.85
105	0.07385	-2.64	7384.6	7.57	13.89	19.31
110	0.06481	-2.58	6480.8	7.79	14.32	19.77
115	0.05705	-2.52	5704.9	8.01	14.74	20.21
120	0.05037	-2.46	5036.7	8.22	15.15	20.64
125	0.04459	-2.41	4459.4	8.43	15.55	21.06
130	0.03959	-2.35	3959.2	8.63	15.94	21.46
135	0.03524	-2.30	3524.4	8.82	16.32	21.86
140	0.03146	-2.25	3145.5	9.02	16.70	22.25
145	0.02814	-2.20	2814.4	9.20	17.06	22.63
150	0.02524	-2.15	2524.2	9.38	17.41	23.00