



Approval Sheet

Manufacturer:

Customer:

Approved By:	Checked By:	Prepared By :

Approved By:	Examined By:	Tested By :

Company Stamp	
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Company Stamp	
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Approval No. : A616-040

Product : NTC THERMISTOR

Part No : EWTF02-103J3I-N

Specifications : R25 10,000 Ω $\pm$ 5 %

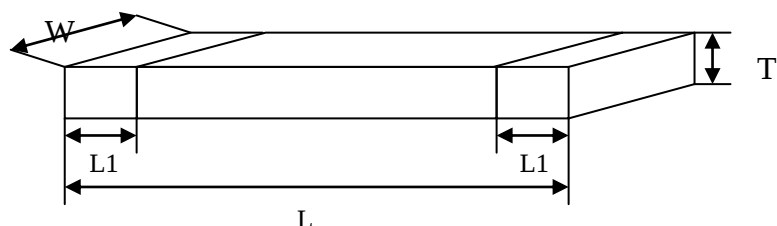
B25/85 3435 K $\pm$ 3 %

Date : 2018/05/25

Specification of SMD Chips Thermistor

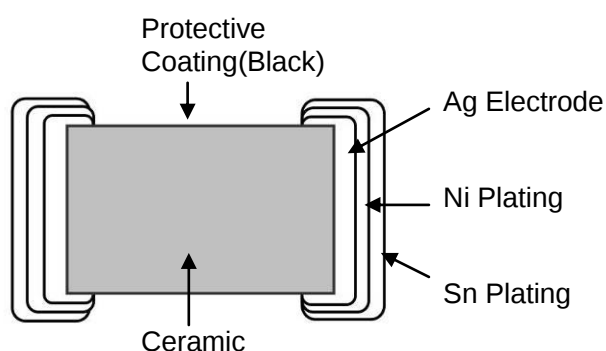
◆ **PART NO. :** EWTF02-103J3I-N

◆ **CHIP DIMENSIONS :**



ITEM	L (mm)	W (mm)	T (mm)	L1 (mm)
0402 (1005)	1.00 ± 0.10	0.50 ± 0.10	0.50 ± 0.10	0.15 ~ 0.30

◆ **CHIP STRUCTURE**

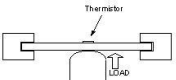
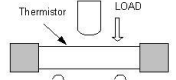
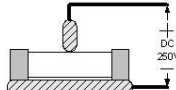


◆ **ELECTRICAL CHARACTERISTICS**

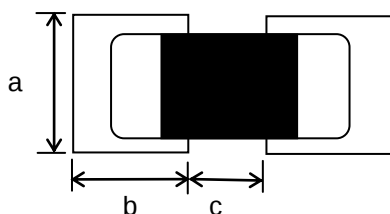
Style	Symbol	Condition	Specification
Resistance at T_a	R_{25}	$T_a = 25\text{ }^{\circ}\text{C}$	$10\text{ K } \Omega \pm 5\%$
B Constant	B	$25\text{ }^{\circ}\text{C} / 85\text{ }^{\circ}\text{C}$	$3435\text{ K } \pm 3\%$
Thermal Time Constant	T	$T_a = 25\text{ }^{\circ}\text{C}$	Approx. 3 seconds
Thermal Dissipation Constant	C	$T_a = 25\text{ }^{\circ}\text{C}$	Approx. 2.5 mW/ $^{\circ}\text{C}$
Maximum Power Rating*	$P_{\max}$	$T_a = 25\text{ }^{\circ}\text{C} \rightarrow 125\text{ }^{\circ}\text{C}$	250 mW
Operating Temp. Range	--	--	$-40\text{ }^{\circ}\text{C} \sim 125\text{ }^{\circ}\text{C}$

*Maximum Power Rating = Thermal Dissipation Constant $\times$ (Max. Operating Temp. ($125\text{ }^{\circ}\text{C}$) – $25\text{ }^{\circ}\text{C}$)

◆ RELIABILITY TEST

Performance	Standard	Test Method	$\Delta R_{25} / R_{25}$
Life	MIL-STD-202F Method 108A	70 °C , Load Power, 1000 hours.	Max.± 3 %
Humidity	MIL-STD-202F Method 103B	Temperature : 40 °C , Humidity: 95 % RH Load Power, 1000 hours.	Max.± 3 %
Thermal Shock	MIL-STD-202F Method 107	- 40 °C & 125 °C (30 min) , 10 times.	Max.± 3 %
High Temperature storage	IEC 68-2-2	125 °C , 1000 hours.	Max. ± 3 %
Solderability	MIL-STD-202F Method 208	Soldering 260 °C for 2 seconds.	Min. 95 % coverage
Resistance to Soldering Heat	MIL-R-55342D Para 4.7.7	Soldering 260 °C for 10 seconds.	Max.± 3 %
Bending Strength	JIS C 5202 6.1.4	Pressurizing rod at distance 1 mm for 5 seconds. 	No visible damage
Resistance to flexure of Substrate	JIS C 5202 6.2.1	Pressurizing force shall be over 3 Kg . 	Min.3 Kg
Insulation Resistance	MIL-STD-202F Method 302	DC 250 V For 10 seconds. 	Min.1000 MΩ
Dielectric Withstand Voltage	MIL-STD-202F Method 301		Not Short

◆ RECOMMENDED LAND DIMENSIONS

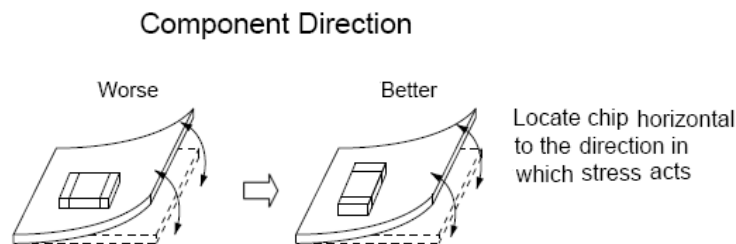


Unit : mm

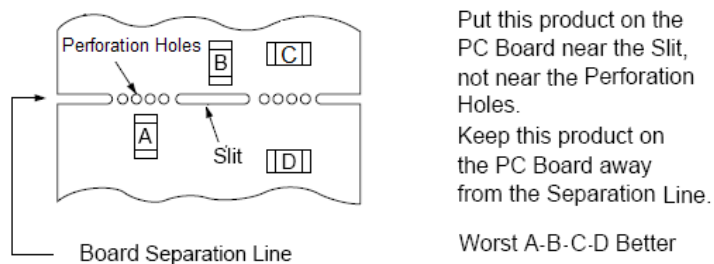
Type	a	b	c
0402 (1005)	0.6 ~ 0.7	0.8 ~ 0.9	0.4 ~ 0.5
0603 (1608)	0.9 ~ 1.0	1.0 ~ 1.1	0.6 ~ 0.7
0805 (2012)	1.4 ~ 1.5	1.2 ~ 1.3	0.7 ~ 0.8
1206 (3216)	1.7 ~ 1.8	1.5 ~ 1.6	1.3 ~ 1.4

◆ MOUNTING POSITION

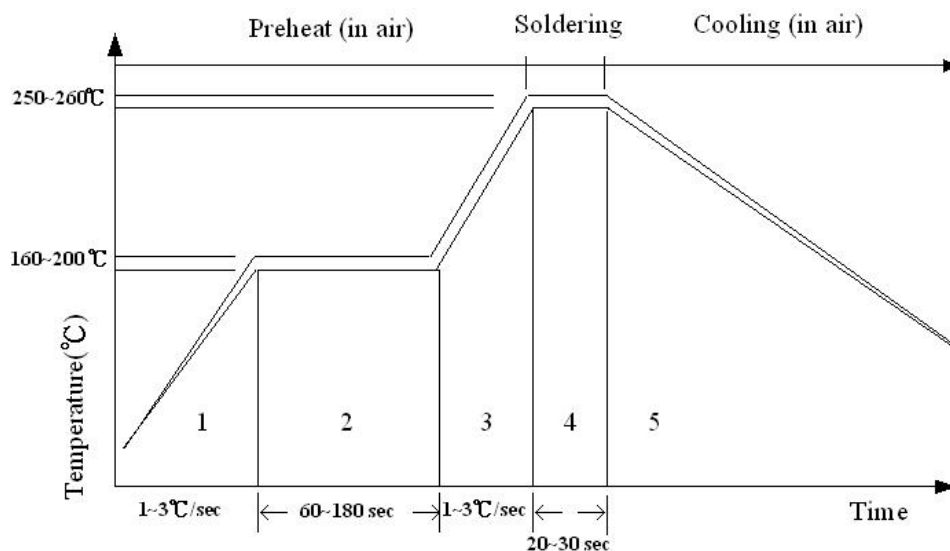
Choose a mounting position that minimizes the stress imposed on the chip during flexing or bending of the board.



Chip Mounting Close to Board Separation Line



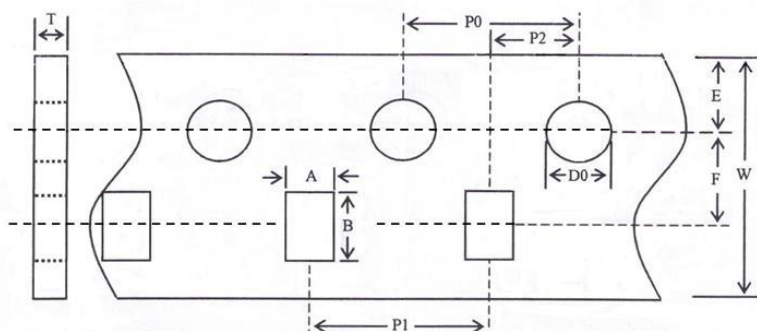
◆ REFLOW SOLDERING PROFILE



◆ HAND SOLDERING IRON

Item	Condition
Temperature of Soldering Iron-tip	360 °C Max.
Diameter of Soldering Iron-tip	ø 3 mm Max.
Soldering Time	3 seconds Max.
Caution: Please do not touch the component surface with soldering iron directly to avoid its damage	

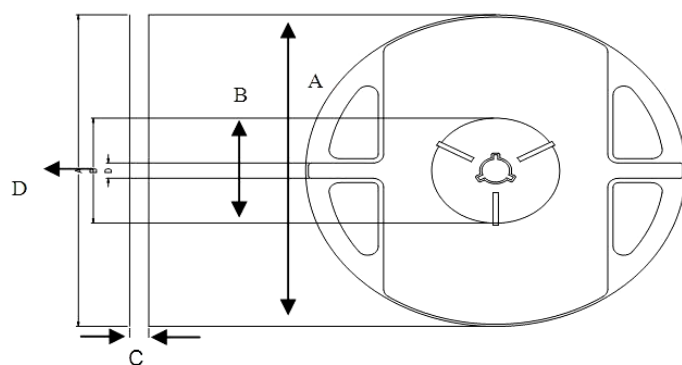
◆ TAPING DIMENSIONS



Unit : mm

Dimension	0402	0603	0805	1206
A	0.65 ± 0.10	1.10 ± 0.10	1.50 ± 0.10	2.00 ± 0.10
B	1.15 ± 0.10	1.90 ± 0.10	2.30 ± 0.10	3.57 ± 0.10
W	8.00 ± 0.20	8.00 ± 0.20	8.00 ± 0.20	8.00 ± 0.20
D0	1.50 ± 0.25	1.50 ± 0.25	1.50 ± 0.25	1.55 ± 0.25
E	1.75 ± 0.10	1.75 ± 0.10	1.75 ± 0.10	1.75 ± 0.10
F	3.50 ± 0.05	3.50 ± 0.05	3.50 ± 0.05	3.50 ± 0.05
P0	4.00 ± 0.10	4.00 ± 0.10	4.00 ± 0.10	4.00 ± 0.10
P1	2.00 ± 0.10	4.00 ± 0.10	4.00 ± 0.10	4.00 ± 0.10
P2	2.00 ± 0.10	2.00 ± 0.10	2.00 ± 0.10	2.00 ± 0.10
T	1.10 Max.	1.10 Max.	1.10 Max.	1.10 Max.

◆ REEL DIMENSIONS



Unit : mm

Item	A	B	C	D
Dimension	178.0 ± 1.0	60.0 ± 1.0	9.0 ± 0.1	13.0 ± 0.1

Item	0402	0603	0805	1206
Qty. / Reel	10000 pcs	4000 pcs	4000 pcs	3000 pcs

◆ STORAGE CONDITIONS

1. Storage Temperature : - 10 °C ~ + 40 °C .
2. Relative humidity : 30 ~ 75 % RH.
3. Thermistor must be kept away from sunshine and stored in a non-corrosive atmosphere.
4. Period of Storage : 1 year.

◆ ORDERING INFORMATION

EWTF 02 - 103 J 3 I - N
 ① ② ③ ④ ⑤ ⑥

1. E WAY SMD Thermistor. (TF - Lead Free)
2. Dimension : 02 (0402) , 03 (0603) , 05 (0805) , 06 (1206) .
3. Resistance at 25 °C : 103 = $10 \times 10^3 = 10,000 (\Omega)$.
4. Tolerance of R : F:±1% ; G:±2% ; H:±3% ; J:±5% ; K:±10%.
5. B value : 3 I = 3435 (3000 + 435)

1: 1000	C: 101~150	I: 401~450	O: 701~750
2: 2000	D: 151~200	J: 451~500	P: 751~800
3: 3000	E: 201~250	K: 501~550	Q: 801~850
4: 4000	F: 251~300	L: 551~600	R: 851~900
A: 0~50	G: 301~350	M: 601~650	S: 901~950
B: 51~100	H: 351~400	N: 651~700	T: 951~999

6. Coating Color : N : New Color (Black).

Resistance-Temperature Characteristics

Part No. : EWTF02-103J3I-N

R25 :	<u>10,000</u>	Ω	$\pm$	<u>5%</u>
B25/85 :	<u>3435</u>	K	$\pm$	<u>3%</u>

Temperature (°C)	Resistance (Ω)			Temp. Coef. (%/°C)	Resist. Tol. (%)		Temp. Tol. (°C)	
	MIN.	CENTER	MAX.		MIN.	MAX.	MIN.	MAX.
-40	176514	203378	233745	-5.63	-13.21	14.93	-2.65	2.35
-39	167167	192285	220624	-5.59	-13.06	14.74	-2.64	2.34
-38	158370	181862	208316	-5.56	-12.92	14.55	-2.62	2.33
-37	150087	172064	196766	-5.52	-12.77	14.36	-2.60	2.31
-36	142285	162851	185923	-5.49	-12.63	14.17	-2.58	2.30
-35	134935	154185	175741	-5.45	-12.49	13.98	-2.56	2.29
-34	128007	146030	166175	-5.42	-12.34	13.79	-2.55	2.28
-33	121475	138354	157185	-5.38	-12.20	13.61	-2.53	2.27
-32	115314	131126	148733	-5.35	-12.06	13.43	-2.51	2.25
-31	109501	124317	140785	-5.32	-11.92	13.25	-2.49	2.24
-30	104015	117901	133307	-5.28	-11.78	13.07	-2.47	2.23
-29	98836	111854	126270	-5.25	-11.64	12.89	-2.46	2.22
-28	93944	106151	119644	-5.22	-11.50	12.71	-2.44	2.20
-27	89323	100772	113404	-5.18	-11.36	12.54	-2.42	2.19
-26	84956	95697	107526	-5.15	-11.22	12.36	-2.40	2.18
-25	80828	90907	101987	-5.12	-11.09	12.19	-2.38	2.17
-24	76924	86383	96763	-5.09	-10.95	12.02	-2.36	2.15
-23	73231	82111	91838	-5.06	-10.82	11.85	-2.34	2.14
-22	69737	78075	87192	-5.02	-10.68	11.68	-2.32	2.13
-21	66429	74260	82807	-4.99	-10.55	11.51	-2.30	2.11
-20	63297	70654	78668	-4.96	-10.41	11.34	-2.29	2.10
-19	60331	67243	74759	-4.93	-10.28	11.18	-2.27	2.08
-18	57521	64017	71068	-4.90	-10.15	11.01	-2.25	2.07
-17	54859	60964	67579	-4.87	-10.01	10.85	-2.23	2.06
-16	52333	58073	64281	-4.84	-9.88	10.69	-2.21	2.04
-15	49940	55337	61164	-4.81	-9.75	10.53	-2.19	2.03
-14	47669	52745	58215	-4.78	-9.62	10.37	-2.17	2.01
-13	45515	50289	55425	-4.75	-9.49	10.21	-2.15	2.00
-12	43470	47961	52784	-4.72	-9.36	10.06	-2.13	1.98
-11	41528	45754	50284	-4.70	-9.24	9.90	-2.11	1.97
-10	39685	43662	47918	-4.67	-9.11	9.75	-2.09	1.95
-9	37933	41676	45674	-4.64	-8.98	9.59	-2.07	1.94
-8	36269	39793	43550	-4.61	-8.86	9.44	-2.05	1.92
-7	34687	38005	41536	-4.58	-8.73	9.29	-2.03	1.90
-6	33184	36308	39627	-4.56	-8.60	9.14	-2.01	1.89
-5	31754	34696	37816	-4.53	-8.48	8.99	-1.99	1.87
-4	30393	33164	36097	-4.50	-8.36	8.85	-1.97	1.86
-3	29099	31709	34467	-4.47	-8.23	8.70	-1.94	1.84
-2	27867	30326	32920	-4.45	-8.11	8.55	-1.92	1.82
-1	26694	29011	31451	-4.42	-7.99	8.41	-1.90	1.81

Resistance-Temperature Characteristics

Part No. : EWTF02-103J3I-N

R25 :	<u>10,000</u>	Ω	±	<u>5%</u>
B25/85 :	<u>3435</u>	K	±	<u>3%</u>

Temperature (°C)	Resistance (Ω)			Temp. Coef. (%/°C)	Resist. Tol. (%)		Temp. Tol. (°C)	
	MIN.	CENTER	MAX.		MIN.	MAX.	MIN.	MAX.
0	25576	27760	30055	-4.39	-7.87	8.27	-1.88	1.79
1	24512	26570	28728	-4.37	-7.74	8.12	-1.86	1.77
2	23499	25438	27469	-4.34	-7.62	7.98	-1.84	1.76
3	22533	24361	26272	-4.32	-7.50	7.84	-1.82	1.74
4	21612	23335	25133	-4.29	-7.38	7.70	-1.80	1.72
5	20734	22358	24049	-4.26	-7.27	7.57	-1.77	1.70
6	19896	21427	23019	-4.24	-7.15	7.43	-1.75	1.69
7	19096	20540	22038	-4.21	-7.03	7.29	-1.73	1.67
8	18334	19695	21105	-4.19	-6.91	7.16	-1.71	1.65
9	17606	18890	20217	-4.16	-6.80	7.02	-1.69	1.63
10	16911	18121	19369	-4.14	-6.68	6.89	-1.66	1.61
11	16248	17389	18564	-4.12	-6.56	6.76	-1.64	1.59
12	15614	16690	17796	-4.09	-6.45	6.63	-1.62	1.58
13	15007	16022	17063	-4.07	-6.33	6.50	-1.60	1.56
14	14429	15386	16365	-4.04	-6.22	6.37	-1.57	1.54
15	13876	14778	15700	-4.02	-6.11	6.24	-1.55	1.52
16	13346	14197	15064	-4.00	-5.99	6.11	-1.53	1.50
17	12840	13642	14458	-3.97	-5.88	5.98	-1.51	1.48
18	12356	13113	13881	-3.95	-5.77	5.86	-1.48	1.46
19	11893	12606	13329	-3.93	-5.66	5.73	-1.46	1.44
20	11450	12122	12802	-3.90	-5.55	5.61	-1.44	1.42
21	11025	11659	12298	-3.88	-5.44	5.48	-1.41	1.40
22	10619	11216	11817	-3.86	-5.33	5.36	-1.39	1.38
23	10230	10793	11359	-3.84	-5.22	5.24	-1.37	1.36
24	9857	10388	10920	-3.82	-5.11	5.12	-1.34	1.34
25	9500	10000	10500	-3.79	-5.00	5.00	-1.32	1.32
26	9137	9629	10122	-3.77	-5.11	5.12	-1.36	1.35
27	8789	9273	9759	-3.75	-5.21	5.24	-1.40	1.39
28	8458	8933	9411	-3.73	-5.32	5.36	-1.44	1.43
29	8140	8607	9078	-3.71	-5.43	5.47	-1.48	1.46
30	7836	8295	8759	-3.69	-5.53	5.59	-1.52	1.50
31	7544	7995	8451	-3.67	-5.64	5.71	-1.56	1.54
32	7266	7708	8157	-3.65	-5.74	5.82	-1.60	1.57
33	6999	7433	7874	-3.62	-5.84	5.94	-1.64	1.61
34	6743	7169	7603	-3.60	-5.94	6.05	-1.68	1.65
35	6498	6916	7343	-3.58	-6.05	6.17	-1.72	1.69
36	6263	6673	7092	-3.56	-6.15	6.28	-1.76	1.72
37	6038	6440	6852	-3.54	-6.25	6.40	-1.80	1.76
38	5823	6217	6622	-3.52	-6.34	6.51	-1.85	1.80
39	5615	6002	6399	-3.50	-6.44	6.62	-1.89	1.84

Resistance-Temperature Characteristics

Part No. : EWTF02-103J3I-N

R25 :	10,000	Ω	±	5%
B25/85 :	3435	K	±	3%

Temperature (°C)	Resistance (Ω)			Temp. Coef. (%/°C)	Resist. Tol. (%)		Temp. Tol. (°C)	
	MIN.	CENTER	MAX.		MIN.	MAX.	MIN.	MAX.
40	5417	5796	6186	-3.48	-6.54	6.73	-1.93	1.88
41	5226	5598	5981	-3.46	-6.64	6.84	-1.98	1.92
42	5044	5408	5784	-3.45	-6.74	6.95	-2.02	1.96
43	4868	5225	5594	-3.43	-6.83	7.06	-2.06	1.99
44	4700	5050	5412	-3.41	-6.93	7.17	-2.11	2.03
45	4538	4881	5237	-3.39	-7.02	7.28	-2.15	2.07
46	4383	4719	5068	-3.37	-7.12	7.39	-2.19	2.11
47	4234	4563	4905	-3.35	-7.21	7.50	-2.24	2.15
48	4091	4413	4749	-3.33	-7.30	7.61	-2.28	2.19
49	3953	4269	4598	-3.31	-7.40	7.72	-2.33	2.23
50	3821	4130	4453	-3.30	-7.49	7.82	-2.37	2.27
51	3693	3996	4313	-3.28	-7.58	7.93	-2.42	2.31
52	3571	3868	4179	-3.26	-7.67	8.04	-2.46	2.35
53	3454	3744	4049	-3.24	-7.76	8.14	-2.51	2.39
54	3340	3625	3924	-3.22	-7.85	8.25	-2.56	2.43
55	3231	3510	3803	-3.21	-7.94	8.35	-2.60	2.47
56	3127	3400	3687	-3.19	-8.03	8.45	-2.65	2.52
57	3026	3293	3575	-3.17	-8.11	8.56	-2.70	2.56
58	2929	3191	3467	-3.16	-8.20	8.66	-2.74	2.60
59	2836	3092	3363	-3.14	-8.29	8.76	-2.79	2.64
60	2746	2997	3263	-3.12	-8.37	8.87	-2.84	2.68
61	2659	2905	3165	-3.10	-8.46	8.97	-2.89	2.72
62	2575	2816	3071	-3.09	-8.54	9.07	-2.94	2.77
63	2495	2731	2981	-3.07	-8.63	9.17	-2.99	2.81
64	2417	2648	2893	-3.06	-8.71	9.27	-3.03	2.85
65	2343	2569	2810	-3.04	-8.80	9.37	-3.08	2.89
66	2271	2492	2728	-3.02	-8.88	9.47	-3.13	2.94
67	2201	2418	2649	-3.01	-8.96	9.57	-3.18	2.98
68	2135	2347	2574	-2.99	-9.04	9.67	-3.23	3.02
69	2070	2278	2500	-2.97	-9.12	9.76	-3.28	3.07
70	2007	2211	2429	-2.96	-9.21	9.86	-3.33	3.11
71	1948	2147	2361	-2.94	-9.29	9.96	-3.38	3.15
72	1890	2085	2295	-2.93	-9.36	10.06	-3.43	3.20
73	1834	2025	2231	-2.91	-9.44	10.15	-3.49	3.24
74	1780	1967	2169	-2.90	-9.52	10.25	-3.54	3.29
75	1728	1911	2109	-2.88	-9.60	10.34	-3.59	3.33
76	1677	1857	2051	-2.87	-9.68	10.44	-3.64	3.38
77	1628	1804	1994	-2.85	-9.76	10.54	-3.69	3.42
78	1582	1754	1940	-2.84	-9.83	10.63	-3.74	3.46
79	1536	1705	1888	-2.82	-9.91	10.72	-3.80	3.51

Resistance-Temperature Characteristics

Part No. : EWTF02-103J3I-N

R25 :	<u>10,000</u>	Ω	$\pm$	<u>5%</u>
B25/85 :	<u>3435</u>	K	$\pm$	<u>3%</u>

Temperature (°C)	Resistance (Ω)			Temp. Coef. (%/°C)	Resist. Tol. (%)		Temp. Tol. (°C)	
	MIN.	CENTER	MAX.		MIN.	MAX.	MIN.	MAX.
80	1492	1657	1836	-2.81	-9.99	10.82	-3.85	3.56
81	1450	1612	1788	-2.80	-10.06	10.91	-3.90	3.60
82	1408	1567	1739	-2.78	-10.14	11.00	-3.96	3.65
83	1368	1524	1693	-2.77	-10.21	11.10	-4.01	3.69
84	1330	1483	1649	-2.75	-10.29	11.19	-4.06	3.74
85	1294	1443	1606	-2.74	-10.36	11.28	-4.12	3.78
86	1258	1404	1564	-2.72	-10.43	11.37	-4.17	3.83
87	1222	1366	1523	-2.71	-10.51	11.46	-4.23	3.88
88	1189	1330	1484	-2.70	-10.58	11.55	-4.28	3.92
89	1157	1295	1446	-2.68	-10.65	11.64	-4.34	3.97
90	1126	1261	1409	-2.67	-10.72	11.73	-4.40	4.02
91	1095	1227	1372	-2.65	-10.80	11.82	-4.45	4.07
92	1065	1195	1337	-2.64	-10.87	11.91	-4.51	4.12
93	1037	1164	1304	-2.63	-10.94	12.00	-4.57	4.17
94	1009	1134	1271	-2.61	-11.01	12.09	-4.63	4.21
95	983	1105	1240	-2.60	-11.07	12.17	-4.69	4.26
96	957	1077	1209	-2.58	-11.14	12.26	-4.74	4.31
97	931	1049	1179	-2.57	-11.21	12.35	-4.80	4.36
98	908	1023	1150	-2.56	-11.28	12.43	-4.86	4.41
99	884	997	1122	-2.55	-11.35	12.52	-4.92	4.46
100	861	972	1095	-2.53	-11.42	12.61	-4.98	4.51
101	839	948	1068	-2.52	-11.48	12.69	-5.03	4.55
102	817	924	1042	-2.51	-11.55	12.78	-5.09	4.60
103	796	901	1017	-2.50	-11.62	12.86	-5.15	4.65
104	776	879	993	-2.49	-11.68	12.95	-5.21	4.70
105	757	858	970	-2.47	-11.75	13.03	-5.27	4.75
106	738	837	947	-2.46	-11.81	13.11	-5.32	4.80
107	719	816	924	-2.45	-11.88	13.20	-5.38	4.84
108	702	797	903	-2.44	-11.94	13.28	-5.44	4.89
109	684	777	881	-2.43	-12.01	13.36	-5.50	4.94
110	667	759	861	-2.42	-12.07	13.44	-5.57	5.00
111	651	741	841	-2.40	-12.13	13.53	-5.63	5.05
112	635	723	821	-2.39	-12.20	13.61	-5.70	5.11
113	619	706	803	-2.37	-12.26	13.69	-5.77	5.17
114	605	690	785	-2.36	-12.32	13.77	-5.84	5.23
115	591	674	767	-2.34	-12.38	13.85	-5.92	5.29
116	576	658	750	-2.33	-12.45	13.93	-5.99	5.35
117	563	643	733	-2.31	-12.51	14.01	-6.06	5.41
118	549	628	716	-2.30	-12.57	14.09	-6.12	5.46
119	536	614	701	-2.30	-12.63	14.17	-6.17	5.50



Resistance-Temperature Characteristics

Part No. : EWTF02-103J3I-N

R25 :	10,000	Ω	±	5%
B25/85 :	3435	K	±	3%

Temperature (°C)	Resistance (Ω)			Temp. Coef. (%/°C)	Resist. Tol. (%)		Temp. Tol. (°C)	
	MIN.	CENTER	MAX.		MIN.	MAX.	MIN.	MAX.
120	524	600	685	-2.29	-12.69	14.25	-6.22	5.54
121	511	586	670	-2.29	-12.75	14.33	-6.26	5.57
122	500	573	656	-2.29	-12.81	14.40	-6.30	5.60
123	488	560	641	-2.28	-12.87	14.48	-6.35	5.64
124	476	547	627	-2.25	-12.93	14.56	-6.46	5.74
125	466	535	613	-2.20	-12.99	14.64	-6.66	5.91