High sensitivity thermistor

ET Thermistor

The ET thermistor series features small size and high sensitivity.

Features: – Tight resistance and B-value tolerances; high accuracy
– Uniform shape facilitates automated assembly
– Long term reliability

Product number explanation

103 ET □□–□□

- R_{25} tolerance 1P: ± 1%
  none: ± 3%
  none (ETB only): ± 2%
- Shape -1: Fig. 1
  -2: Fig. 2
  B□: Fig. 2
  -3H: Fig. 3
- High sensitivity thermistor
- Rated zero-power resistance at 25 ℃
  E.g.: 103 = 10 x 10^3 Ω

Applications

Body thermometers, thermometers, medical devices, controllers, mobile devices, battery chargers, battery packs, home electronics, toilet heaters, security, LCDs, electric vehicles

Specifications

Product number	R_{25}[1]	R_{25} tolerance	B value[2]	Operating temperature range (℃)
212ET	2.10 kΩ	± 3%	3850 K ± 1%	– 40 to 90
402ET	4.00 kΩ		3100 K ± 1%	
582ET	5.80 kΩ		3614 K ± 1%	
103ET	10.0 kΩ		3250 K ± 1%	
203ET	20.0 kΩ		3450 K ± 1%	– 40 to 100
303ET	30.0 kΩ		3760 K ± 1%	
403ET	40.0 kΩ		3525 K ± 1%	
503ET	50.0 kΩ		4055 K ± 1%	
833ET	83.0 kΩ		4013 K ± 1%	
104ET	100 kΩ		4132 K ± 1%	– 40 to 90
224ET	226 kΩ		4021 K ± 1%	– 40 to 100
234ET	232 kΩ		4274 K ± 1%	
103ETB	10.0 kΩ	± 1%、± 2%	3435 K ± 1%	– 40 to 90

- Dissipation factor: 0.7 mw / ℃
- Thermal time constant[3]: approx. 3.4 s (ET-1: approx. 3.2 s)
- Rated power at 25 ℃: 3.5 mW

[1]: Rated zero-power resistance at 25 ℃
[2]: B value calculated from rated zero-power resistance at 25 ℃ and 85 ℃
[3]: Time required to reach 63.2% of temperature difference. Measured with sensor suspended in mid-air.

Product number	R_{37}[4]	R_{37} tolerance	B value[5]	Operating temperature range (℃)
503ET-3H	29.937 kΩ	± 1.08%	3944 K ± 0.5%	– 40 to 100

- Dissipation factor: 0.7 mw / ℃
- Thermal time constant[6]: approx. 0.8 s
- Rated power at 25 ℃: 3.5 mW

[4]: Rated zero-power resistance at 37 ℃
[5]: B value calculated from rated zero-power resistance at 30 ℃ and 45 ℃
[6]: Time required to reach 63.2% of temperature difference. Measured with sensor immersed in oil.

Dimensions

Fig. 1 (ET-1)

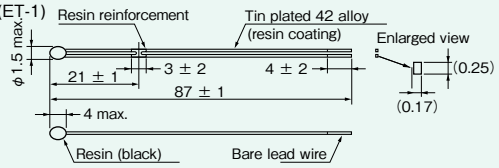


Fig. 2 (ET-2, ETB)

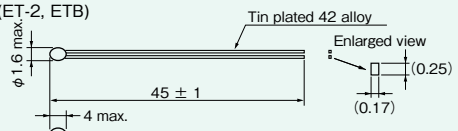
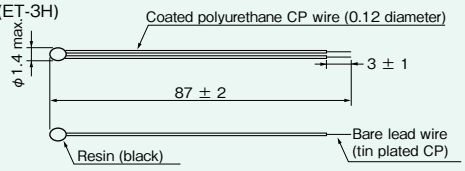


Fig. 3 (ET-3H)



Unit: mm

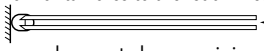
Reliability data

Item	Test conditions	Criteria
Resistance to soldering heat	10 s at 260 ℃	ΔR, ΔB ± 1%
Solderability	2 s at 245 ℃ Flux material: Rosin 25%, ethyl alcohol 75%	More than 90% soldered
Tensile strength (lead wire)	10 s at 1 N (horizontal pull)	ΔR, ΔB ± 1% and visual inspection
Free fall	Three times natural fall to a maple board from 1 m height.	
Insulation resistance	100 V DC	Over 100 MΩ
Dry heat	1000 hours at 100 ℃ (90 ℃ [7])	ΔR, ΔB ± 1% (± 2%[7])
Damp heat (under electrical load)	1000 hours at 40 ℃ and 90% humidity Electrical load: 0.1 mA DC	
Temperature cycle (thermal shock)	100 cycles as below: 1. - 20 ℃ for 5 minutes 2. Room temperature for 3 minutes 3. 100 ℃ (80 ℃ 7) for 5 minutes 4. Room temperature for 3 minutes	

[7]: The value in brackets is for 212ET to 103ET, 104ET and 103ETB

Caution

- Do not apply vertical force to the lead wires exceeding 0.3 N.
- Do not apply horizontal force to the lead wires exceeding 1 N (see drawing below).



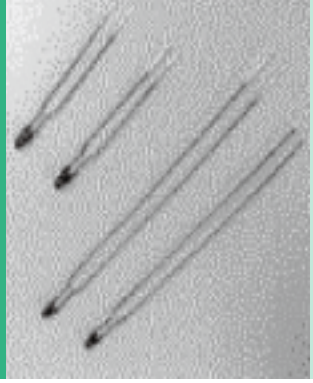
- When soldering make sure to have a minimum distance of 5 mm from the sensor head , use a soldering iron with 50 W and solder for maximum seven seconds at 340 ˚C.

Resistance / temperature characteristics

Temperature (℃)	Product number													
	212ET	402ET	582ET	103ET	203ET	303ET	403ET	503ET	833ET	104ET	224ET	234ET	103ETB	503ET-3H
– 40	64.02	57.71	127.7	170.9	402.2	810. 7	833. 3	1602	2664	3325	7005	9046	204. 7	1588
– 30	35.13	35.34	72.10	102.2	233.6	445.1	481.1	855.0	1421	1769	3784	4680	118.5	848.1
– 20	19.65	22.38	42.37	63.07	140.2	253.7	287.5	474.4	788.5	977.5	2116	2515	71.02	470.9
– 10	11.31	14.60	25.84	40.08	86.82	149.8	177.2	272.7	453.0	559.0	1225	1401	43.67	270.4
0	6.724	9.797	16.29	26.16	55.31	91.30	112.4	161.9	269.3	329.8	730.1	808.2	27.70	160.9
10	4.130	6.737	10.57	17.51	36.16	57.31	73.00	99.13	164.8	200.5	447.8	480.2	18.07	98.63
20	2.612	4.736	7.039	11.99	24.23	37.00	48.61	62.38	103.6	125.3	282.1	293.7	12.11	62.12
25	2.100	4.000	5.800	10.00	20.00	30.00	40.00	50.00	83.00	100.0	226.0	232.0	10.00	49.77
30	1.699	3.394	4.806	8.387	16.60	24.47	33.08	40.24	66.91	80.27	182.1	184.4	8.301	40.10
40	1.134	2.476	3.353	5.988	11.61	16.56	22.96	26.58	44.18	52.62	120.3	118.6	5.811	29.937[4]
50	0.7753	1.835	2.369	4.353	8.279	11.45	16.26	17.93	29.80	35.23	81.07	78.00	4.147	21.72[8]
60	0.5420	1.378	1.685	3.217	6.005	8.070	11.70	12.33	20.51	24.00	55.75	52.39	3.011	12.20
70	0.3867	1.049	1.214	2.414	4.425	5.791	8.569	8.588	14.37	16.59	39.01	35.87	2.224	8.449
80	0.2811	0.7997	0.8863	1.836	3.310	4.222	6.367	6.064	10.24	11.64	27.78	24.99	1.668	5.940
85	0.2413	0.7005	0.7610	1.610	2.877	3.626	5.517	5.120	8.700	9.807	23.58	21.00	1.451	5.009
90	0.2079	0.6145	0.6557	1.416	2.509	3.125	4.797	4.338	7.419	8.287	20.10	17.72	1.267	4.240
100					1.926	2.346	3.662	3.142	5.459		14.75	12.75		3.070
$B_{25/85}$	3850 K	3100 K	3614 K	3250 K	3450 K	3760 K	3525 K	4055 K	4013 K	4132 K	4021 K	4274 K	3435 K	3944 K[5]

[8]: Rated zero-power resistance at 45 ℃

Unit: kΩ



High sensitivity thermistor

ET-4 Thermistor

SEMITEC's ET-4 thermistor is small and highly reliable.
It is also very versatile and can be used for many applications.

New 2017

Product number explanation

103 ET −4−□□□

- Shape 025: total length 25 mm
- Shape 050: total length 50 mm
- High accuracy thermistor
- Rated zero-power resistance at 25 ℃
- E.g.: 103 = 10 x 10^3 Ω

Applications

Mobile devices, rechargeable batteries,
high accuracy air temperature sensors

Specifications

Product number	R_{25}[1]	R_{25} tolerance	B value[2]	Operating temperature range (℃)
103ET-4	10.0 kΩ	± 1%	3435 K ± 1%	− 40 to 100

- Dissipation factor: 0.7 mw / ℃
- Thermal time constant[3]: approx. 5 s
- Rated power at 25 ℃: 3.5 mW

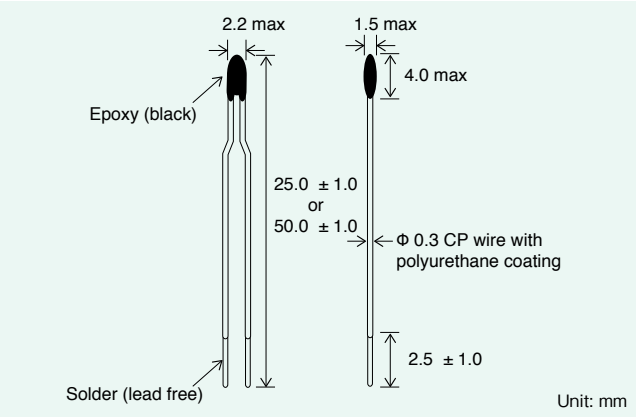
[1]: Rated zero-power resistance at 25 ℃
[2]: B value calculated from rated zero-power resistance at 25 ℃ and 85 ℃
[3]: Time required to reach 63.2% of temperature difference. Measured with sensor suspended in mid-air.

Resistance / temperature characteristics

Temperature (℃)	Resistance (kΩ)
− 40	204.7
− 30	118.5
− 20	71.02
− 10	43.67
0	27.70
10	18.07
20	12.11
25	10.00
30	8.301
40	5.811
50	4.147
60	3.011
70	2.224
80	1.668
85	1.451
90	1.267
100	0.9735

Unit: kΩ

Dimensions



Reliability data

Item	Test conditions	Criteria
Resistance to soldering heat	10 s at 260 ℃	ΔR, ΔB ± 1%
Solderability	2 s at 245 ℃ Flux material: Rosin 25%, ethyl alcohol 75%	More than 90% soldered
Tensile strength (lead wire)	10 s at 1 N (horizontal pull)	ΔR, ΔB ± 1% and visual inspection
Free fall	One time natural fall to a concrete board from 1 m height.	
Insulation resistance	100 V DC	Over 100 MΩ
Voltage proof	100 V AC for one minute	Less than 1 mA
Dry heat	1000 hours at 100 ℃	ΔR, ΔB ± 1%
Damp heat (under electrical load)	1000 hours at 40 ℃ and 90% to 95% humidity Electrical load: 0.1 mA DC	
Temperature cycle (thermal shock)	100 cycles as below: 1. - 40 ℃ for 30 minutes 2. Room temperature for 10 to 15 minutes 3. 100 ℃ for 30 minutes 4. Room temperature for 10 to 15 minutes	

Caution

- Please consult SEMITEC staff about mounting conditions when using mounting methods that may cause mechanical stress.
- When bending or cutting the lead wire always leave a distance of at least 3 mm to the thermistor head.