

ISO9001  
ISO14001



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# 2011

## Electronic Materials Components

### Thermistor (NTC /PTC)

- *SMD NTC Thermistor*
  - ▶ *ECTH Series*
  - ▶ *JTH Series*
- *SMD PTC Thermistor*
- *Jointherm<sup>®</sup> Series*
  - ▶ *Lead type NTC Thermistor*
  - ▶ *Film type NTC Thermistor*
  - ▶ *LeadCoTh Series*
- *LeadTu<sup>™</sup> Series*



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## SMD NTC Thermistor

( ECTH Series )

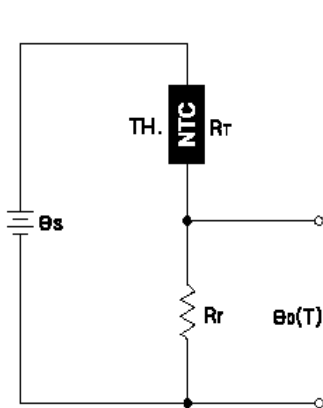


### 1 What is NTC Thermistor ?

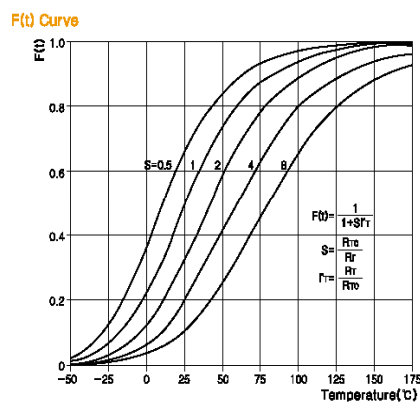
- Initial of **N**egative **T**emperature **C**oefficient of **T**hermal **R**esistor.
- Have a electrical characteristic of decreasing resistance with increasing of an ambient temperature, so called Semi-conductive Device of Metal Oxide.
- Protect the electronic equipment from caused by increasing temperature in an electronic circuit

### 2 Application of NTC Thermistor

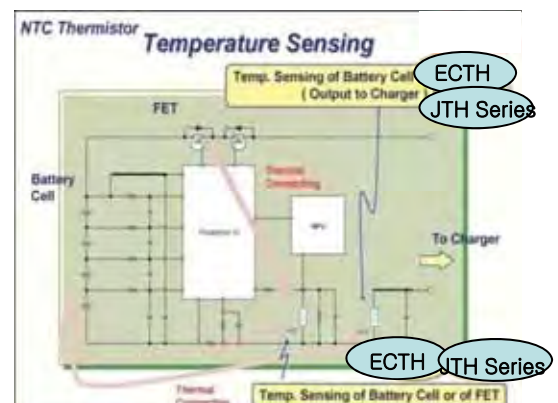
- Temperature Compensated Transistor , IC, TCXO, etc.
- Temperature Compensation of Battery Charger
- Temperature Compensation of LCD
- Car navigation system
- Medical Thermometer
- Computer Peripherals [CPU Battery, Hard/Floppy Disk] etc



Linear TH. Circuit



Linear TH. Output Characteristics.



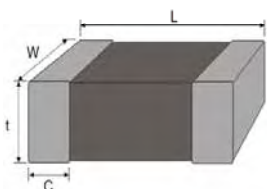
Application example

3 Order method : ECTH 1608 08 103 F 3435 F S I  
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

① Series	SMD NTC Thermistor ECTH Series
② Size(L×W)	0603, 1005, 1608, 2012
③ Thickness(T)	0.5, 0.8, .1.2
④ Resistance @25°C	103 = 10,000 Ω [ = 10×10 <sup>3</sup> Ω ]
⑤ R Tolerance	F: ±1% , G : ±2% , H : ±3% , J : ±5% , S : Special code
⑥ B(25/85)	3435K
⑦ B Tolerance	F: ±1% , G : ±2% , H : ±3%
⑧ Type	S: Pb free product
⑨ Packing	T : Paper carrier Tape & Plastic Reel , B : Bulk

### 4 Size & Dimension


Unit : mm



Type	L	W	t	C
<b>0603</b>	0.60 ± 0.03	0.30 ± 0.03	0.30 ± 0.03	0.15 ± 0.05
1005	1.00 ± 0.05	0.50 ± 0.05	0.50 ± 0.05	0.25 ± 0.10
1608	1.60 ± 0.05	0.80 ± 0.10	0.80 ± 0.10	0.40 ± 0.20
2012	2.00 ± 0.05	1.25 ± 0.20	0.80 ± 0.10	0.40 ± 0.20

### 5 SMD NTC Thermistor Series

#### SMD NTC Thermistor ECTH Series

NO	Size [mm]	Electrical specifications						Part No.
		R <sub>25C</sub> [Ω]	R[%]	B <sub>25/85</sub> (K)	B[%]	δ(mW/ )	τ(sec)	
 1	0603	10,000	3	3435	3	1	3	ECTH060303 103H3435HST
2	1005	33	3	3250	3	1	3	ECTH100505 330H3250HST
3	1005	47	3	3250	3	1	3	ECTH100505 470H3250HST
4	1005	68	3	3250	3	1	3	ECTH100505 680H3250HST
5	1005	100	3	3250	3	1	3	ECTH100505 101H3250HST
6	1005	1,000	3	4100	3	1	3	ECTH100505 102H4100HST
7	1005	2,000	3	4100	3	1	3	ECTH100505 202H4100HST
8	1005	2,000	3	4520	3	1	3	ECTH100505 202H4520HST
9	1005	2,200	3	4100	3	1	3	ECTH100505 222H4100HST
10	1005	4,700	3	4100	3	1	3	ECTH100505 472H4100HST
11	1005	10,000	3	3435	3	1	3	ECTH100505 103H3435HST
12	1005	10,000	3	3830	3	1	3	ECTH100505 103H3830HST
13	1005	10,000	3	3950	3	1	3	ECTH100505 103H3950HST
14	1005	10,000	3	4100	3	1	3	ECTH100505 103H4100HST
15	1005	10,000	3	4550	3	1	3	ECTH100505 103H4550HST
16	1005	15,000	3	3920	3	1	3	ECTH100505 153H3920HST
17	1005	22,000	3	3800	3	1	3	ECTH100505 223H3800HST
18	1005	22,000	3	4550	3	1	3	ECTH100505 223H4550HST
19	1005	33,000	3	4050	3	1	3	ECTH100505 333H4050HST
20	1005	47,000	3	3920	3	1	3	ECTH100505 473H3920HST
21	1005	47,000	3	4050	3	1	3	ECTH100505 473H4050HST
22	1005	47,000	3	4550	3	1	3	ECTH100505 473H4550HST
23	1005	68,000	3	4150	3	1	3	ECTH100505 683H4150HST
24	1005	100,000	3	4050	3	1	3	ECTH100505 104H4050HST
25	1005	100,000	3	4600	3	1	3	ECTH100505 104H4600HST
26	1005	150,000	3	4050	3	1	3	ECTH100505 154H4050HST
27	1005	220,000	3	4600	3	1	3	ECTH100505 224H4600HST
28	1005	470,000	3	4050	3	1	3	ECTH100505 474H4050HST
29	1005	470,000	3	4650	3	1	3	ECTH100505 474H4650HST
30	1608	33	3	3200	3	2	5	ECTH160808 330H3200HST
31	1608	47	3	3200	3	2	5	ECTH160808 470H3200HST
32	1608	68	3	3200	3	2	5	ECTH160808 680H3200HST
33	1608	100	3	3250	3	2	5	ECTH160808 101H3250HST
34	1608	220	3	3250	3	2	5	ECTH160808 221H3250HST
35	1608	570	3	3250	3	2	5	ECTH160808 571H3250HST
36	1608	1,000	3	4150	3	2	5	ECTH160808 102H4150HST
37	1608	2,000	3	4150	3	2	5	ECTH160808 202H4150HST
38	1608	3,000	3	4150	3	2	5	ECTH160808 302H4150HST
39	1608	4,700	3	4150	3	2	5	ECTH160808 472H4150HST
40	1608	4,700	3	4500	3	2	5	ECTH160808 472H4500HST
41	1608	5,000	3	3520	3	2	5	ECTH160808 502H3520HST
42	1608	5,000	3	3970	3	2	5	ECTH160808 502H3970HST
43	1608	6,800	3	3830	3	2	5	ECTH160808 682H3830HST
44	1608	10,000	3	3435	3	2	5	ECTH160808 103H3435HST
45	1608	10,000	3	3800	3	2	5	ECTH160808 103H3800HST
46	1608	10,000	3	3970	3	2	5	ECTH160808 103H3970HST
47	1608	10,000	3	4050	3	2	5	ECTH160808 103H4050HST
48	1608	10,000	3	4550	3	2	5	ECTH160808 103H4550HST
49	1608	12,000	3	3830	3	2	5	ECTH160808 123H3830HST
50	1608	30,000	3	3950	3	2	5	ECTH160808 303H3950HST

### 5 SMD NTC Thermistor Series

#### SMD NTC Thermistor ECTH Series

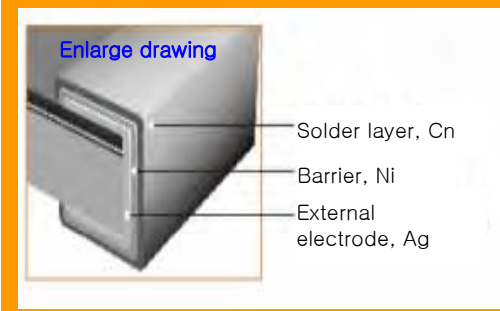
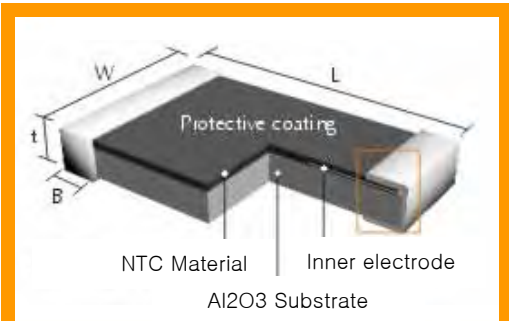
NO	Size [mm]	Electrical specifications						Part No.
		R <sub>25C</sub> [Ω]	R[%]	B <sub>25/85</sub> (K)	B[%]	δ(mW/ )	τ(sec)	
51	1608	47,000	3	3950	3	2	5	ECTH160808 473H3950HST
52	1608	47,000	3	4050	3	2	5	ECTH160808 473H4050HST
53	1608	47,000	3	4550	3	2	5	ECTH160808 473H4550HST
54	1608	68,000	3	4150	3	2	5	ECTH160808 683H4150HST
55	1608	100,000	3	3970	3	2	5	ECTH160808 104H3970HST
56	1608	100,000	3	4050	3	2	5	ECTH160808 104H4050HST
57	1608	100,000	3	4150	3	2	5	ECTH160808 104H4150HST
58	1608	100,000	3	4400	3	2	5	ECTH160808 104H4400HST
59	1608	150,000	3	3800	3	2	5	ECTH160808 154H3800HST
60	1608	150,000	3	4600	3	2	5	ECTH160808 154H4600HST
61	1608	220,000	3	4600	3	2	5	ECTH160808 224H4600HST
62	1608	330,000	3	4050	3	2	5	ECTH160808 334H4050FST
63	1608	470,000	3	4050	3	2	5	ECTH160808 474H4050HST
64	1608	520,000	3	4600	3	2	5	ECTH160808 524H4600HST
65	1608	530,000	3	3970	3	2	5	ECTH160808 534H3970HST
66	2012	2,000	3	4100	3	3	7.5	ECTH201208 202H4100HST
67	2012	2,200	3	3520	3	3	7.5	ECTH201208 222H3520HST
68	2012	2,200	3	4100	3	3	7.5	ECTH201208 222H4100HST
69	2012	3,300	3	3750	3	3	7.5	ECTH201208 332H3750HST
70	2012	10,000	3	3435	3	3	7.5	ECTH201208 103H3435HST
71	2012	10,000	3	3970	3	3	7.5	ECTH201208 103H3970HST
72	2012	10,000	3	4050	3	3	7.5	ECTH201208 103H4050HST
73	2012	10,000	3	3750	3	3	7.5	ECTH201208 103H3750HST
74	2012	20,000	3	3950	3	3	7.5	ECTH201208 203H3950HST
75	2012	30,000	3	3950	3	3	7.5	ECTH201208 303H3950HST
76	2012	47,000	3	3950	3	3	7.5	ECTH201208 473H3950HST
77	2012	47,000	3	4050	3	3	7.5	ECTH201208 473H4050HST
78	2012	68,000	3	3800	3	3	7.5	ECTH201208 683H3800HST
79	2012	100,000	3	4050	3	3	7.5	ECTH201208 104H4050HST
80	2012	5,000,000	3	5150	3	3	7.5	ECTH201208 505H5150HST

\* Another specifications are available on request.

#### SMD NTC Thermistor JTH Series

NO	Size [mm]	Electrical specifications						Part No.
		R <sub>25C</sub> [Ω]	R[%]	B <sub>25/85</sub> (K)	B[%]	δ(mW/ )	τ(sec)	
1	1005	10,000	1	3435	1	1	3	JTH05103F3435FST
2	1608	10,000	1	3435	1	1	3	JTH16103F3435FST
3	1608	50,000	1	3970	1	1	3	JTH16503F3970FST

## SMD NTC Thermistor ( JTH Series )



### 1 What is JTH Thermistor ?



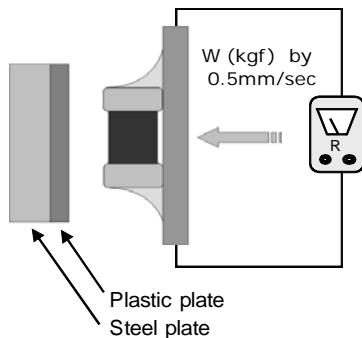
**Have good mechanical strength** because thermistor material is formed on the alumina substrate with high intensive strength.

- Resistor trimming process is applied to the production for making high precision Thermistor
- Protect the electronic equipment from caused by increasing temperature in an electronic circuit.

### 2 Application of NTC Thermistor

- Temperature Compensated Transistor , IC, TCXO, etc.
- Temperature Compensation of Battery Charger
- Temperature Compensation of LCD
- Car navigation system
- Medical Thermometer
- Computer Peripherals [CPU Battery, Hard/Floppy Disk] etc

### Mechanical strength

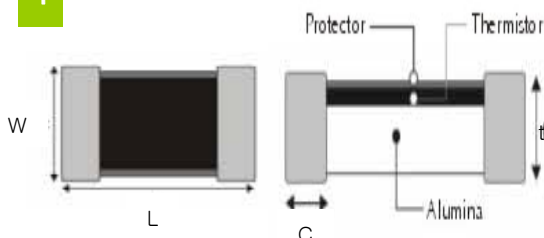


Manufacturer	Other company	Joinset [ECTH series]	Joinset [JTH series]
Part No.	1005 (0402)	ECTH1 00505 103F3435FST	JTH05 103F3435F
1	18	20	20
2	20	20	20
3	20	18	20
4	12	20	20
5	19	20	20
6	20	9	20
7	20	20	20
8	8	13	20
9	16	16	20
10	20	20	20
Max.	20	20	20
Min.	8	9	20
Avg.	17.3	17.6	20
Comment	50% samples are over 20kgf	60% samples are over 20kgf	All samples are over 20kgf

### 3 Order method : JTH    16    103    F    3435    F    S    T ①                      ②                      ③                      ④                      ⑤                      ⑥                      ⑦                      ⑧

① Series	SMD NTC Thermistor JTH Series
② Size(L×W)	05=1005, 16=1608
③ Resistance @25°C	103 = 10,000 Ω [ = 10×10 <sup>3</sup> Ω ]
④ R Tolerance	F: ±1% , G : ±2% , H : ±3% , J : ±5% , S : Special code
⑤ B(25/85)	3435K
⑥ B Tolerance	F: ±1% , G : ±2% , H : ±3%
⑦ Type	S: Pb free product
⑧ Packing	T : Paper carrier Tape & Plastic Reel , B : Bulk

### 4 Size & Dimension



(Unit : mm)

Type	L	W	t	C
1005	1.00 ± 0.05	0.50 ± 0.05	0.50 ± 0.05	0.25 ± 0.10
1608	1.60 ± 0.05	0.80 ± 0.10	0.80 ± 0.10	0.40 ± 0.20

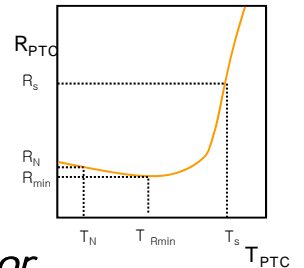
## SMD PTC Thermistor ( ECPTH Series )



### 1 What is PTC Thermistor ?

PTC Thermistor is Positive Temperature Coefficient of Thermally Sensitive Resistor. It's resistance value rises sharply with increasing temperature has been exceeded. This feature makes it use many applications of electronic devices as resettable fuse against current overload.

- $R_{PTC} = f(T_{PTC})$
- $R_N$  Rated PTC resistance (resistance value at  $T_N$ )
- $R_{min}$  Minimum resistance (resistance value at  $T_{Rmin}$ )
- $T_{Rmin}$  Temperature at  $R_{min}$  ( $\alpha$  becomes positive)
- $R_s$  Sensing resistance  
 $R_s = 10 \cdot R_{min}$  (resistance value at  $T_s$ )
- $T_s$  Sensing Temperature (Resistance rises sharply)



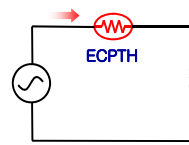
### 2 Feature of PTC Thermistor

- Suitable for miniaturizing circuits due to small size SMD type
- Fast response for overheating sensing with an accuracy of  $\pm 5^\circ\text{C}$
- Contact noise & trouble free due to surface mounted

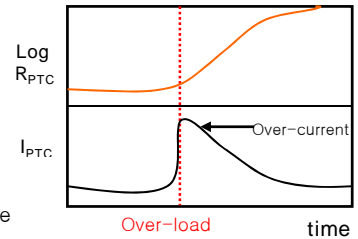
### 3 Applications of PTC Thermistor

- Overheat protection for power transistor and power-ICs
- Inverter circuit for LCD backlight
- AC adapter of Net-book and Note-book PC
- DC/DC converter in LCD driving circuit
- Light driving circuit in LED application

Overheat/Overcurrent



Function of resettable fuse

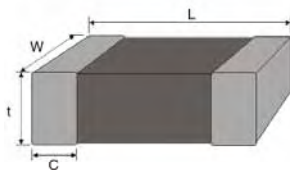


### 4 Order method (standard) : ECPTH G 1608 221 N 75 T

① Series	SMD PTC Thermistor ECPTH Series
② Type	G : Over current Protection , F : Over heat Sensing
③ Dimensions	1005, 1608, 2012, 3225
④ Resistance	221 = 220 $\Omega$ [ = 22 $\times 10^1 \Omega$ ]
⑤ R Tolerance	K : $\pm 10\%$ , M : $\pm 20\%$ , H : $\pm 25\%$ , N : $\pm 30\%$ , P : $\pm 50\%$
⑥ Temperature	G type : Curie temperature [ $T_c : R@25^\circ\text{C} \times 2$ ] F type : Sensing temperature [ $T_s : R@25^\circ\text{C} \times 10$ ]
⑦ Packing	T : Paper carrier Tape & Plastic Reel , B : Bulk

### 5 Size & Dimension

Unit : mm



Bulk type(MB)

Multilayer type(MM)



Type	L	W	t	C
1005	1.00 $\pm$ 0.05	0.50 $\pm$ 0.05	0.50 $\pm$ 0.05	0.25 $\pm$ 0.10
1608	1.60 $\pm$ 0.05	0.80 $\pm$ 0.10	0.80 $\pm$ 0.10	0.40 $\pm$ 0.20
2012	2.00 $\pm$ 0.05	1.25 $\pm$ 0.20	0.80 $\pm$ 0.10	0.40 $\pm$ 0.20
* 3216	3.20 $\pm$ 0.05	1.60 $\pm$ 0.20	1.15 $\pm$ 0.30	0.60 $\pm$ 0.20
* 3225	3.20 $\pm$ 0.05	2.50 $\pm$ 0.20	1.15 $\pm$ 0.30	0.60 $\pm$ 0.20
* 4532	4.50 $\pm$ 0.05	3.20 $\pm$ 0.20	1.15 $\pm$ 0.30	0.60 $\pm$ 0.20

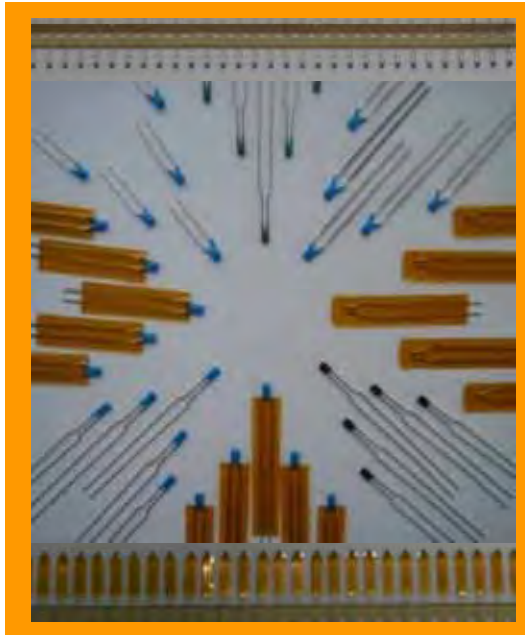


### 6 ECPTH Series

NO	Size [mm]	Electrical specifications				Part No.
		R <sub>25C</sub> [Ω]	R[%]	T <sub>c</sub> (°C)	T <sub>s</sub> (°C)	
<b>NEW</b> 1	<b>1005</b>	10kΩ	50	-	4.7MΩ[at130 ]	ECPTHF 1005 103P 130T
2	1608	220	30	75±5	-	ECPTHG 1608 221N 75T
3	1608	470	30	75±5	-	ECPTHG 1608 471N 75T
4	1608	470	50	-	70±5	ECPTHF 1608 471P 70T
5	1608	470	50	-	80±5	ECPTHF 1608 471P 80T
6	1608	470	50	-	90±5	ECPTHF 1608 471P 90T
7	1608	470	50	-	100±5	ECPTHF 1608 471P 100T
8	1608	470	50	-	110±5	ECPTHF 1608 471P 110T
9	1608	470	50	-	120±5	ECPTHF 1608 471P 120T
10	1608	470	50	-	130±5	ECPTHF 1608 471P 130T
<b>NEW</b> 11	<b>1608</b>	10kΩ	50	-	4.7MΩ[at130 ]	ECPTHF 1608 103P 130T
12	2012	220	30	75±5	-	ECPTHG 2012 221N 75T
13	2012	470	30	75±5	-	ECPTHG 2012 471N 75T
14	2012	470	50	-	70±5	ECPTHF 2012 471P 70T
15	2012	470	50	-	80±5	ECPTHF 2012 471P 80T
16	2012	470	50	-	90±5	ECPTHF 2012 471P 90T
17	2012	470	50	-	100±5	ECPTHF 2012 471P 100T
18	2012	470	50	-	110±5	ECPTHF 2012 471P 110T
19	2012	470	50	-	120±5	ECPTHF 2012 471P 120T
20	2012	470	50	-	130±5	ECPTHF 2012 471P 130T
21	2012	10kΩ	50	-	4.7MΩ[at130 ]	ECPTHF 2012 103P 130T
22	3225	55	30	120±5	-	ECPTHG 3225 550N 120T



## Jointherm® Series



### 1 What is Jointherm® ?

Jointherm® is basically a lead wire type itself, and advanced products made with lead wire type thermistor. Used chips are two kinds, bare chip & Joinchip(JTH).

Jointherm® Series

- Lead Wire Type [Bare Chip or Joinchip(JTH)]
- Lead Wire Type + Polyimide(PI) Film
- Lead Wire Type + Heat Resistance Elastomer Tube [LeadTu™]
- Lead Wire Type + Coating [Heat Resistance Elastomer]

### 2 Feature of Jointherm®

- Use 100% sorted chips. Auto insert and soldering. Finally auto sorting. Due to these, reliability is high.
- Control of the sensing part size is available, so can meet customer's request flexibility.
- Application is very wide as per insulation material and its shape.
- Our round type is very suitable on PCB hole for insertion. And it is very strong against bending.
- Square or round wire both are available.
- Reel packing is also available.

### 3 Application of Jointherm®

- Temperature Sensing and Protection in 2<sup>nd</sup> cell : Notebook, Mobile phone, PDA, Computer CPU.
- Temperature Sensing and Protection in Electronic Devices.

### 4 Order Method (Standard)

Part No. : RBS 103 F 3435 F \*\* FO 26

①	RBS	Jointherm® Series. (Small coating Dia.)	⑦	FO	Film type terminal shape : O : Φ0.35(mm)
②	103	103=10×10 <sup>3</sup> (Ω)@25℃		FF	Film type terminal shape : □ : 0.65×0.15(mm)
③	F	Resistance tolerance ; F : 1%		CO	Insulation coated type
④	3435	B(25/85) Value		TO	Insulation tube type
⑤	F	B Value tolerance ; F : 1%	⑧	26	Total length(mm) [RA type Max. 32mm] [RBS type Max. 70mm]
⑥	**	Customer code: **			

### 5 Shape of Jointherm®

Code	Shape	Description
RA		Normal Coating Dia (Straight) (Dia. Max. 3.0mm)
RB		Normal Coating Dia (Forming) (Dia. Max. 3.0mm)
RBS		Small Coating Dia. (Max. Dia. 1.5mm)
RBS		Small Coating Dia. (Max. Dia. 1.5mm)

Ex. code) RBS 103F 3435F01 FO26

Code	Shape	Description
TO		Tube type
CO		Coating type (Withstanding Voltage Min. 1KV)
FO		Film type (Max. Thickness 1.5mm)
FF		Film type (Max. Thickness 1.5mm)

Ex. code) RAS 103F 3435F01 FO26



## 7 Jointherm® Series

### Jointherm® Series Lead type

NO	Item	Pitch(P) (mm)	Total Length (mm)	Electrical specifications						Part No.
				R <sub>25C</sub> [Ω]	R[%]	B <sub>25/85</sub> (K)	B[%]	δ (mW/ )	τ(sec)	
1	RA Series	2.0	32(max)	10,000	1	3435	1	2	7	RA103F3435F**
2	RB Series	2.5	32(max)	10,000	1	3435	1	2	7	RB103F3435F**
3	RBS Series	1.8	70(max)	10,000	1	3435	1	2	7	RBS103F3435F**
4	RBSH Series	1.8	70(max)	10,000	1	3435	1	2	7	RBSH103F3435F**

### Jointherm® Series Film type

NO	Item	Size (Film) (mm)	Pitch(P) (mm)	Total Length (mm)	Electrical specifications						Part No.
					R <sub>25C</sub> [Ω]	R[%]	B <sub>25/85</sub> (K)	B[%]	δ (mW/ )	τ(sec)	
1	RBS FO Series	5x23	1.8	26	10,000	1	3435	1	1	7.2	RBS103F3435F**FO26
2	RBS FF Series	5x23	1.8	26	10,000	1	3435	1	1	7.2	RBS103F3435F**FF26

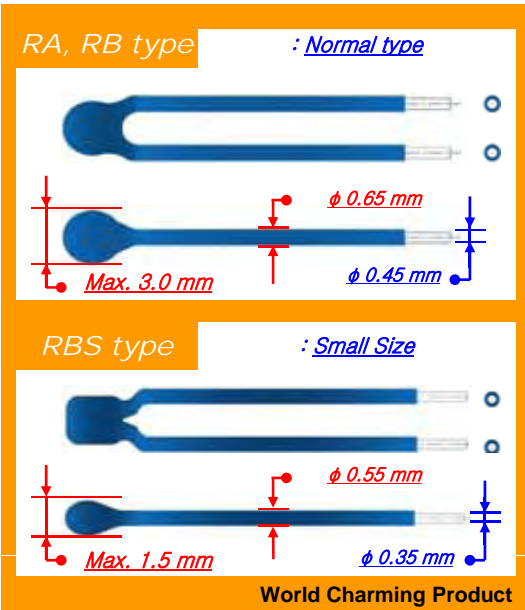
### Jointherm® Series Tube / Coating (LeadCoTh) type

NO	Item	Pitch(P) (mm)	Total Length (mm)	Electrical specifications						Part No.
				R <sub>25C</sub> [Ω]	R[%]	B <sub>25/85</sub> (K)	B[%]	δ (mW/ )	τ(sec)	
1	RA TO Series	2	32(max)	10,000	1	3435	1	2	7	RA103F3435F**TO32
2	RBS TO Series	1.8	70(max)	10,000	1	3435	1	2	7	RBS103F3435F**TO70
3	<b>RA CO Series</b>	2	26(max)	10,000	1	3435	1	2	7	RA103F3435F**CO26
4	<b>RBS CO Series</b>	1.8	70(max)	10,000	1	3435	1	2	7	RBS103F3435F**CO70



## LeadCoTh Series

(Insulation Coated Lead wire Thermistor)



### 1 LeadCoTh ?

LeadCoTh is an insulation coated NTC Thermistor and it has good properties such as flexibility, sealing and high voltage withstand. Thanks to automatic production, it has high quality and can offer low price.

### 2 LeadCoTh Features :

- Good insulation and high voltage withstand.
- Good flexibility and high performance at bending test (no crack).
- Due to high sealing, it is safe against moisture.
- Halogen free, compliant with EU-RoHS.

### 3 Applications :

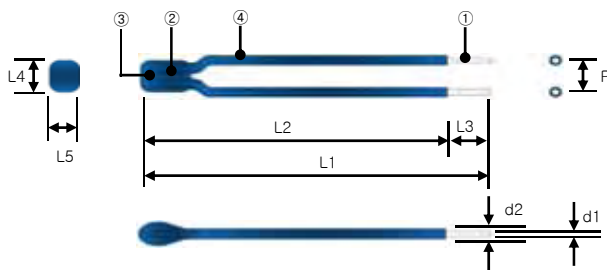
- 2<sup>nd</sup> battery (notebook, cell phone) & PC CPU
- Temperature sensing and compensation in various elec. devices.
- Application which insulated wire is need. [RA, RB type]
- Application which narrow space and insulation is need [RBS type]

### 4 How to order

Part No. : R\*\* 103 F 3435 F \*\* CO L1  
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧

①	R**	RA, RB, RBS	⑦	CO	Round wire [Φ0.35, Φ0.45 ]
②	103	103=10×10 <sup>3</sup> (Ω) @25℃±0.2℃		CF	Square wire [0.65mm × 0.15mm]
③	F	Resistance tolerance. F : 1%		CS	Special type [CO+Film]
④	3435	B(25/85)	⑧	L1	[RA/RB type Max. 32mm]
⑤	F	B tolerance. F : 1%			Total length (mm)
⑥	**	** : Customer code [01, 02, 03 .....]			

### 5 Size [standard]



Item	Material	Remarks
1	Wire RA, RB: Cu-Sn RBS: Fe-Cu-Sn	RA, RB: Φ0.45mm RBS: Φ0.35mm
2	Chip	NTC RA, RB: Bare chip RBS: Joinchip [JTH]
3	Head	Epoxy Blue
4	Coating	Epoxy Blue

Unit : mm


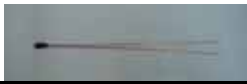
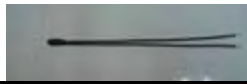

Type	L1	L2	L3	L4	L5	P	d1	d2	Remarks
RA, RB	Max. 70	Max. 68	Typ. 2.0	Max. 4.0	Max. 3.0	Typ. 2.0	Φ0.45	Typ. Φ0.65	
RBS	Max. 70	Max. 68	Typ. 2.0	Max. 2.0	Max. 1.5	Typ. 1.8	Φ0.35	Typ. Φ0.55	



### 6 Property



Material	Operating temperature	Voltage withstand	Hardness	Bending property	Sealing and friction
Epoxy	-30~120℃	Min. 1KV	Shore D75	No crack after 5 times 90° bending	No peel by rubbing

## 7 Comparison data

Item	<b>NEW</b> LeadCoTh	Enamel Wire type	Cable Wire type	Film type
Shape				
Reliability	◎	▲	▲	●
Productivity	◎	×	×	▲
Operating	Automatic	Semi-automatic	Semi-automatic	Semi-automatic
Reel Taping	Available	not available	not available	not available
Halogen Free / EU-RoHS	Compliant	Compliant	Compliant	Compliant
Total length	Max. 70mm	No limit	No limit	Max. 100mm

[ ◎ very good   ● : good   ▲ : not bad   × : poor ]

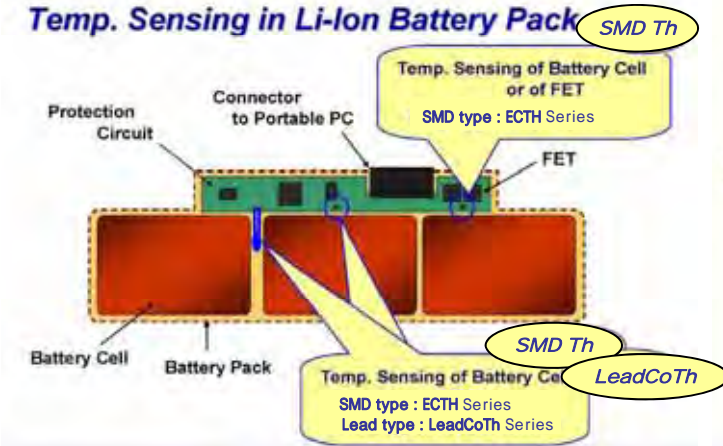
## 8 Reliability test [Bending & Voltage withstand]

Bending	Voltage withstand
	
1. Put LeadCoTh on JIG and do bend it under 5 times at <u>90°</u> .	1. Tester : [KIKUSUI TOS5050] Charge <u>1KV for 1 second</u> .

## 9 Applications [RBS Type : Small size]

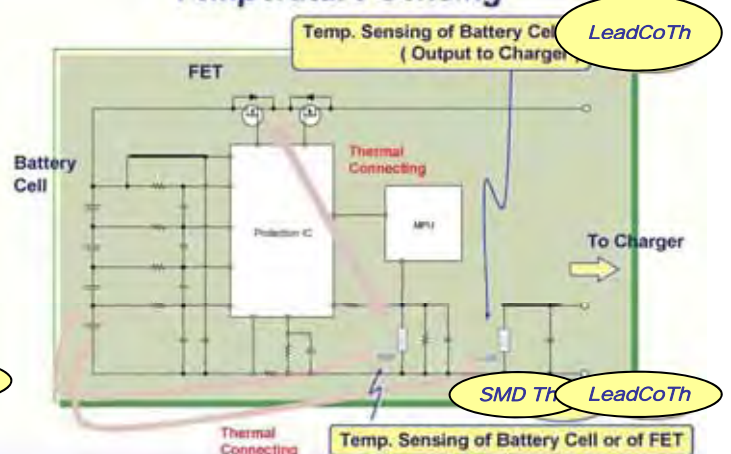
NTC Thermistor

### Temp. Sensing in Li-Ion Battery Pack



Li-Ion battery pack

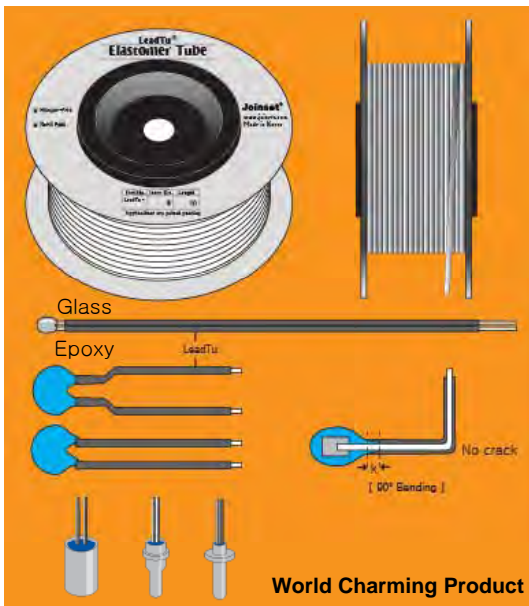
### Temperature Sensing



Li-Ion battery pack

## LeadTu™ Series

(Elastic Insulation Tube For Lead wire)



### 1 What is LeadTu™ ?

LeadTu is a elastic insulating tube having elasticity, flexibility, expanding and elongation as mechanical properties, and insulation as electric properties for the purpose of inserting Lead wire of Ceramic Chip Assembly. It is made of special heat resistance elastomer and the applications are patent pending. It is easy to be elongated and expanded when a lead wire and end of insulator of Ceramic Chip are inserted into the hole of LeadTu. After that, it is automatically shrunken by its elastic property, thus it is tightly attached with any shape of lead wire and the end of Head. Eventually, it provides lead wires with reliable insulation and prevent moisture or water from outside.

### 2 Usage:

1. To provide reliable insulation on Lead wire of Ceramic Chip Assembly.
2. To protect moisture and water from outside.

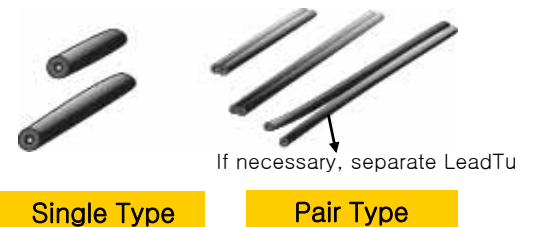
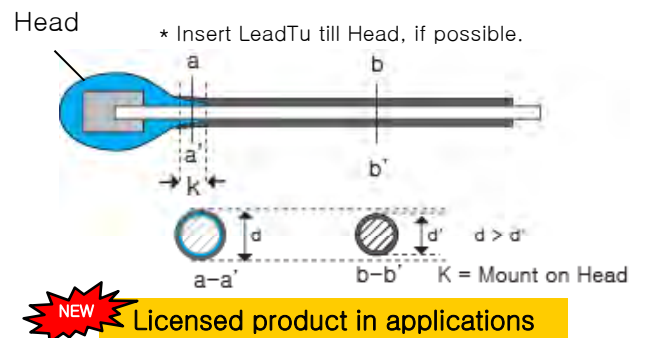
### 3 Feature :

1. Easy to insert Lead wire into the hole of LeadTu.
2. Automatically Shrunken after expanding.
3. Tight hold both Lead wire and End of Head.
4. Flexible and Elastic Properties.
5. Halogen Free, EU-RoHS
6. Maintain original shape and no crack after 90 degree bending.
7. The thickness of LeadTu is to be changed in real applications.

### 4 Applications :

1. Lead Type Thermistor, Capacitor, Varistor, Inductor Assembly.
2. Joint area of Lead wires for Insulation having tight attachment.
3. Replace Heat Shrinkable Tube, PI Tube, Teflon Tube and Etc.

### 5 Properties :



Material	Temp Rating	Dielectric Strength	Elongation	Tensile Strength	Hardness	Mechanical Property
Heat Resistance Elastomer	-40~200 °C	Min.20kv / mm	Min.220%	Min. 50kgf/cm <sup>2</sup>	Shore A65	Elasticity Restoration

### 6 Part Number and Packing

P / N	Inner Dia.(mm)	Outer Dia.(mm)	Color	Lead Wire Dia.	Packing	Cross Section
LeadTu-035	Min.0.35	Ave.0.80	Black	0.27-0.31mm	306M / 1 roll (1,000 Feet)	For Epoxy lead  Single Type
LeadTu-040	Min.0.40	Ave.0.90		0.37-0.41mm		
LeadTu-045	Min.0.45	Ave.1.00		0.42-0.46mm		
LeadTu-030P	Min.0.30 × 2	Ave.0.60 × 2		0.15-0.20mm	153M / 1 roll (500 Feet)	For Glass lead  Pair Type
LeadTu-035P	Min.0.35 × 2	Ave.0.70 × 2		0.20-0.25mm		
LeadTu-040P	Min.0.40 × 2	Ave.0.90 × 2		0.25-0.30mm		

Remarks : Above data is reference only and is subject to change without any notice.

All customers who are using LeadTu are permitted to use LeadTu onto Lead wire of Ceramic Chip Assembly.