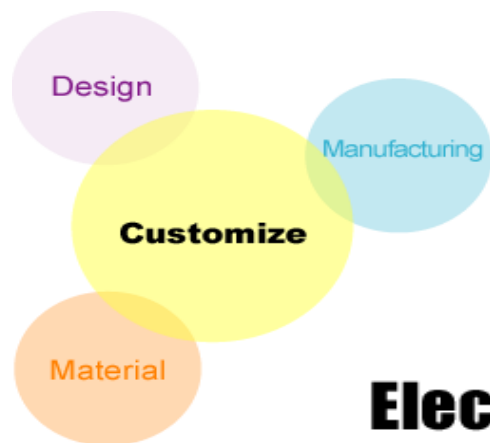




ISO9001
ISO14001



2014

Electronic Materials Components

Thermistor (NTC /PTC)

- **SMD NTC Thermistor**
 - ▶ ECTH Series
 - ▶ JTH Series
- **SMD PTC Thermistor**
- **Radial type Thermistor**
 - ▶ Radial Series
 - ▶ LeadCoTh Series



SMD NTC Thermistor
(ECTH Series)

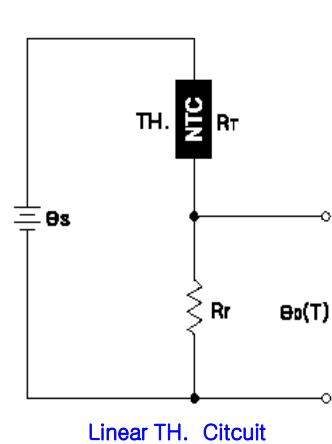


1 What is NTC Thermistor ?

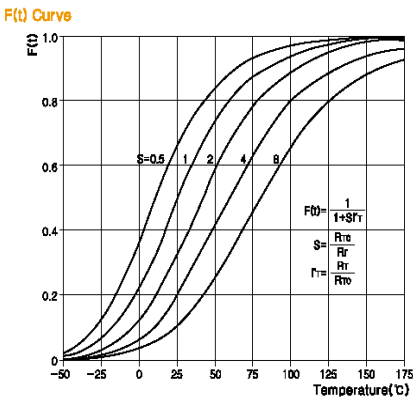
- Initial of Negative Temperature Coefficient of Thermal Resistor.
- Have a electrical characteristic of decreasing resistance with increasing of an ambient temperature, so called Semi-conductive Device of Metal Oxide.
- Protect the electronic equipment from caused by increasing temperature in an electronic circuit

2 Application of NTC Thermistor

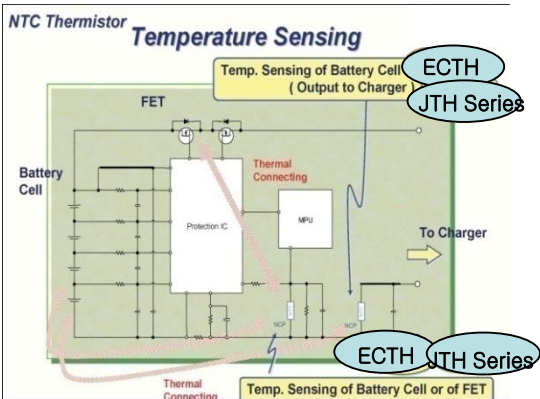
- Temperature Compensated Transistor , IC, TCXO, etc.
- Temperature Compensation of Battery Charger
- Temperature Compensation of LCD
- Car navigation system
- Medical Thermometer
- Computer Peripherals[CPU Battery, Hard/Floppy Disk] etc



Linear TH. Citcuit



Linear TH. Output Characteristics.



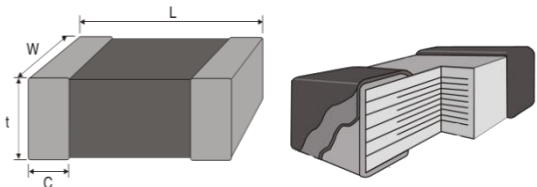
Application example

3 Order method : ECTH 1608 08 103 F 3435 F S T

① Series	SMD NTC Thermistor ECTH Series
② Size(L×W)	0603, 1005, 1608, 1212
③ Thickness(T)	0.5, 0.8, .1.2
④ Resistance @25℃	103 = 10,000 Ω [= 10×10 ³ 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
0603	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

SMD NTC Thermistor
(ECTH Series)

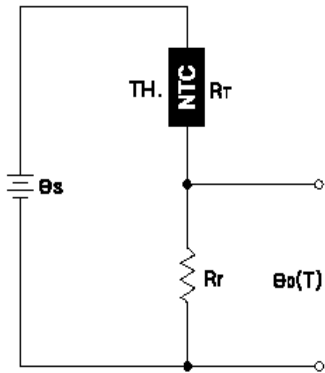


1 What is NTC Thermistor ?

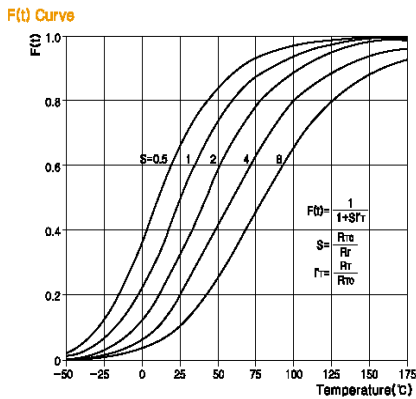
- Initial of Negative Temperature Coefficient of Thermal Resistor.
- Have a electrical characteristic of decreasing resistance with increasing of an ambient temperature, so called Semi-conductive Device of Metal Oxide.
- Protect the electronic equipment from caused by increasing temperature in an electronic circuit

2 Application of NTC Thermistor

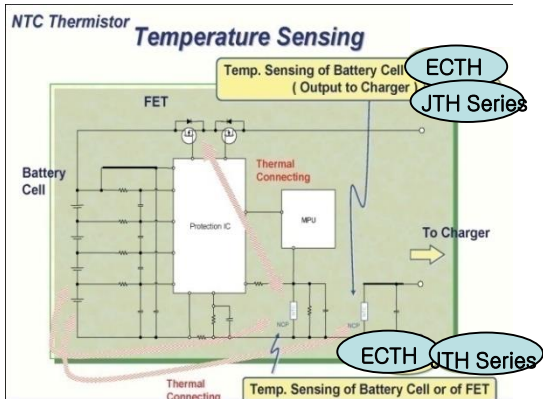
- Temperature Compensated Transistor , IC, TCXO, etc.
- Temperature Compensation of Battery Charger
- Temperature Compensation of LCD
- Car navigation system
- Medical Thermometer
- Computer Peripherals[CPU Battery, Hard/Floppy Disk] etc



Linear TH. Citcuit



Linear TH. Output Characteristics.



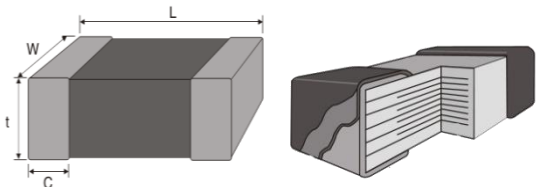
Application example

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

①	Series	SMD NTC Thermistor ECTH Series
②	Size(L×W)	0603, 1005, 1608, 1212
③	Thickness(T)	0.5, 0.8, .1.2
④	Resistance @25℃	103 = 10,000 Ω [= 10×10 ³ 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
0603	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 _{25C} [Ω]	△R[%]	B _{25/85} (K)	△B[%]	δ(mW/℃)	τ(sec)	
1	0603	10,000	3	3435	3	1	3	ECTH060303 103H3435HST
2	0603	10,000	3	4100	3	1	3	ECTH060303 103H4100HST
3	0603	22,000	3	3435	3	1	3	ECTH060303 223H3435HST
4	0603	47,000	3	4050	3	1	3	ECTH060303 473H4050HST
5	0603	100,000	3	4250	3	1	3	ECTH060303 104H4250HST
6	0603	100,000	3	4485	3	1	3	ECTH060303 104H4485HST
7	1005	33	3	3250	3	1	3	ECTH100505 330H3250HST
8	1005	47	3	3250	3	1	3	ECTH100505 470H3250HST
9	1005	68	3	3250	3	1	3	ECTH100505 680H3250HST
10	1005	100	3	3250	3	1	3	ECTH100505 101H3250HST
11	1005	1,000	3	4100	3	1	3	ECTH100505 102H4100HST
12	1005	2,000	3	4100	3	1	3	ECTH100505 202H4100HST
13	1005	2,000	3	4520	3	1	3	ECTH100505 202H4520HST
14	1005	2,200	3	4100	3	1	3	ECTH100505 222H4100HST
15	1005	4,700	3	4100	3	1	3	ECTH100505 472H4100HST
16	1005	10,000	3	3435	3	1	3	ECTH100505 103H3435HST
17	1005	10,000	3	3830	3	1	3	ECTH100505 103H3830HST
18	1005	10,000	3	3950	3	1	3	ECTH100505 103H3950HST
19	1005	10,000	3	4100	3	1	3	ECTH100505 103H4100HST
20	1005	10,000	3	4550	3	1	3	ECTH100505 103H4550HST
21	1005	15,000	3	3920	3	1	3	ECTH100505 153H3920HST
22	1005	22,000	3	3800	3	1	3	ECTH100505 223H3800HST
23	1005	22,000	3	4550	3	1	3	ECTH100505 223H4550HST
24	1005	33,000	3	4050	3	1	3	ECTH100505 333H4050HST
25	1005	47,000	3	3920	3	1	3	ECTH100505 473H3920HST
26	1005	47,000	3	4050	3	1	3	ECTH100505 473H4050HST
27	1005	47,000	3	4550	3	1	3	ECTH100505 473H4550HST
28	1005	68,000	3	4150	3	1	3	ECTH100505 683H4150HST
29	1005	100,000	3	4050	3	1	3	ECTH100505 104H4050HST
30	1005	100,000	3	4600	3	1	3	ECTH100505 104H4600HST
31	1005	150,000	3	4050	3	1	3	ECTH100505 154H4050HST
32	1005	220,000	3	4600	3	1	3	ECTH100505 224H4600HST
33	1005	470,000	3	4050	3	1	3	ECTH100505 474H4050HST
34	1005	470,000	3	4650	3	1	3	ECTH100505 474H4650HST
35	1608	33	3	3200	3	2	5	ECTH160808 330H3200HST
36	1608	47	3	3200	3	2	5	ECTH160808 470H3200HST
37	1608	68	3	3200	3	2	5	ECTH160808 680H3200HST
38	1608	100	3	3250	3	2	5	ECTH160808 101H3250HST
39	1608	220	3	3250	3	2	5	ECTH160808 221H3250HST
40	1608	570	3	3250	3	2	5	ECTH160808 571H3250HST
41	1608	1,000	3	4150	3	2	5	ECTH160808 102H4150HST
42	1608	2,000	3	4150	3	2	5	ECTH160808 202H4150HST
43	1608	3,000	3	4150	3	2	5	ECTH160808 302H4150HST
44	1608	4,700	3	4150	3	2	5	ECTH160808 472H4150HST
45	1608	4,700	3	4500	3	2	5	ECTH160808 472H4500HST
46	1608	5,000	3	3520	3	2	5	ECTH160808 502H3520HST
47	1608	5,000	3	3970	3	2	5	ECTH160808 502H3970HST
48	1608	6,800	3	3830	3	2	5	ECTH160808 682H3830HST
49	1608	10,000	3	3435	3	2	5	ECTH160808 103H3435HST
50	1608	10,000	3	3800	3	2	5	ECTH160808 103H3800HST

* Another specifications are available on request.

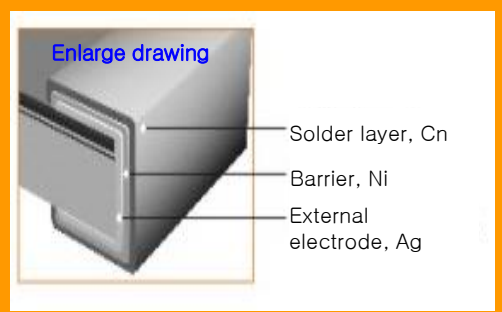
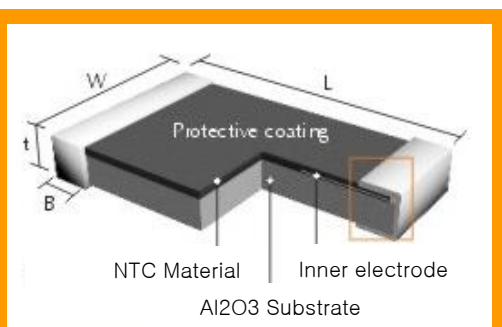
► SMD NTC Thermistor ECTH Series

NO	Size [mm]	Electrical specifications						Part No.
		R _{25C} [Ω]	△R[%]	B _{25/85} (K)	△B[%]	δ(mW/°C)	τ(sec)	
51	1608	10,000	3	3970	3	2	5	ECTH160808 103H3970HST
52	1608	10,000	3	4050	3	2	5	ECTH160808 103H4050HST
53	1608	10,000	3	4550	3	2	5	ECTH160808 103H4550HST
54	1608	12,000	3	3830	3	2	5	ECTH160808 123H3830HST
55	1608	30,000	3	3950	3	2	5	ECTH160808 303H3950HST
56	1608	47,000	3	3950	3	2	5	ECTH160808 473H3950HST
57	1608	47,000	3	4050	3	2	5	ECTH160808 473H4050HST
58	1608	47,000	3	4550	3	2	5	ECTH160808 473H4550HST
59	1608	68,000	3	4150	3	2	5	ECTH160808 683H4150HST
60	1608	100,000	3	3970	3	2	5	ECTH160808 104H3970HST
61	1608	100,000	3	4050	3	2	5	ECTH160808 104H4050HST
62	1608	100,000	3	4150	3	2	5	ECTH160808 104H4150HST
63	1608	100,000	3	4400	3	2	5	ECTH160808 104H4400HST
64	1608	150,000	3	3800	3	2	5	ECTH160808 154H3800HST
65	1608	150,000	3	4600	3	2	5	ECTH160808 154H4600HST
66	1608	220,000	3	4600	3	2	5	ECTH160808 224H4600HST
67	1608	330,000	3	4050	3	2	5	ECTH160808 334H4050FST
68	1608	470,000	3	4050	3	2	5	ECTH160808 474H4050HST
69	1608	520,000	3	4600	3	2	5	ECTH160808 524H4600HST
70	1608	530,000	3	3970	3	2	5	ECTH160808 534H3970HST
71	2012	2,000	3	4100	3	3	7.5	ECTH201208 202H4100HST
72	2012	2,200	3	3520	3	3	7.5	ECTH201208 222H3520HST
73	2012	2,200	3	4100	3	3	7.5	ECTH201208 222H4100HST
74	2012	3,300	3	3750	3	3	7.5	ECTH201208 332H3750HST
75	2012	10,000	3	3435	3	3	7.5	ECTH201208 103H3435HST
76	2012	10,000	3	3970	3	3	7.5	ECTH201208 103H3970HST
77	2012	10,000	3	4050	3	3	7.5	ECTH201208 103H4050HST
78	2012	10,000	3	3750	3	3	7.5	ECTH201208 103H3750HST
79	2012	20,000	3	3950	3	3	7.5	ECTH201208 203H3950HST
80	2012	30,000	3	3950	3	3	7.5	ECTH201208 303H3950HST
81	2012	47,000	3	3950	3	3	7.5	ECTH201208 473H3950HST
82	2012	47,000	3	4050	3	3	7.5	ECTH201208 473H4050HST
83	2012	68,000	3	3800	3	3	7.5	ECTH201208 683H3800HST
84	2012	100,000	3	4050	3	3	7.5	ECTH201208 104H4050HST
85	2012	5,000,000	3	5150	3	3	7.5	ECTH201208 505H5150HST

* Another specifications are available on request.

SMD NTC Thermistor

(JTH Series)



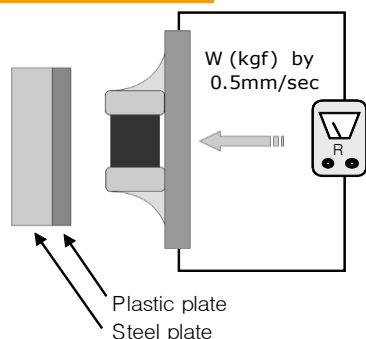
1 What is JTH Thermistor ?

- **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



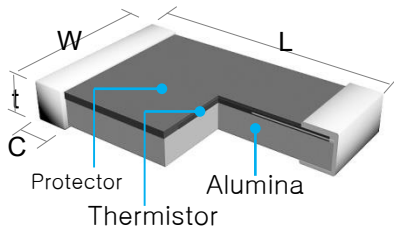
Manufacturer	Other company	Joinset [ECTH series]	Joinset [JTH series]
Part No.	1005 (0402)	ECTH100505 103F3435FST	JTH05 103F3435F
1	18	20	20
2	20	20	20
3	20	18	20
4	12	20	20
5	19	20	20
6	20	9	20
7	20	20	20
8	8	13	20
9	16	16	20
10	20	20	20
Max.	20	20	20
Min.	8	9	20
Avg.	17.3	17.6	20
Comment	50% samples are over 20kgt	60% samples are over 20kgt	All samples are over 20kgt

3 Order method : JTH 05 103 F 3435 F S I
 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℃	103 = 10,000 Ω [= 10×10 ³ 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

SMD NTC Thermistor
(JTH Series)

4 Size & Dimension



(Unit : mm)

Type	L	W	t	C
1005	1.00 ± 0.05	0.50 ± 0.05	0.35 ± 0.05	0.25 ± 0.10
1608	1.60 ± 0.05	0.80 ± 0.10	0.55 ± 0.10	0.40 ± 0.20

► SMD NTC Thermistor JTH Series

NO	Size [mm]	Electrical specifications						Part No.
		R _{25C} [Ω]	△R[%]	B _{25/85} (K)	△B[%]	δ(mW/°C)	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

6 ECPTH Series

NO	Size [mm]	Electrical specifications				Part No.
		R _{25C} [Ω]	△R[%]	T _c (°C)	T _s (°C)	
1*	1005	10kΩ	50	-	at. 4.7MΩ[at130±5 °C]	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	-	75±5	ECPTHF 1608 471P 75T
5	1608	470	50	-	85±5	ECPTHF 1608 471P 85T
6	1608	470	50	-	95±5	ECPTHF 1608 471P 95T
7	1608	470	50	-	105±5	ECPTHF 1608 471P 105T
8	1608	470	50	-	115±5	ECPTHF 1608 471P 115T
9	1608	470	50	-	125±5	ECPTHF 1608 471P 125T
10	1608	470	50	-	135±5	ECPTHF 1608 471P 135T
11*	1608	10kΩ	50	-	at. 4.7MΩ[at130±5 °C]	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	-	75±5	ECPTHF 2012 471P 75T
15	2012	470	50	-	85±5	ECPTHF 2012 471P 85T
16	2012	470	50	-	95±5	ECPTHF 2012 471P 95T
17	2012	470	50	-	105±5	ECPTHF 2012 471P 105T
18	2012	470	50	-	115±5	ECPTHF 2012 471P 115T
19	2012	470	50	-	125±5	ECPTHF 2012 471P 125T
20	2012	470	50	-	135±5	ECPTHF 2012 471P 135T
21*	2012	10kΩ	50	-	at. 4.7MΩ[at130±5 °C]	ECPTHF 2012 103P 130T
22	3225	55	30	120±5	-	ECPTHG 3225 550N 120T

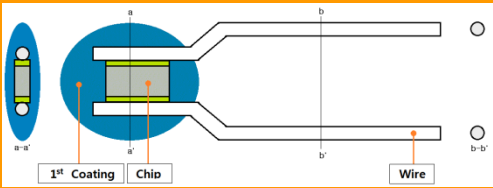
* Another specifications are available on request.

Radial Type Thermistor Series (Double Coating Layer's Radial Thermistor)

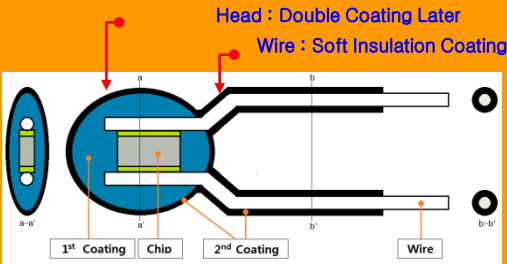
Radial Type Thermistor Series



RA/RB/RC/RD type



RAC/RBC/RCC/RDC type



World Charming Product

1 Radial Thermistor Series?

- There are three types of radial thermistors in Joinset products line. Normal type, its head part is coated with the hard epoxy. Products line is RA/RA/TC/RD normal type. Special type, its head part is coated with a special coating material in advance before the hard epoxy is applied. Products line is RA/RA/TC/RD special type. Insulation type has double coating layer. Head part is coated with the hard epoxy and second coating layer covers head and leads as well. We call it LeadCoTh and its products line is RAC/RAB/RCC/RCD.
- Technical Background
 - Thanks to two coating layer, it can protect chip from physical shock, moisture, and water (Patented).
 - Thanks to coating on lead, it performs insulation property and can prevent moisture which could flow in through lead wire. If it is applied for protect tube sensor, it shows a good insulation and good withstand voltage properties.
 - Reel packing is available as well.

2 Structure and Property of Radial Type Thermistor

Subject		Radial Series (Normal and High Reliable Products)				LeadCoTh Series (Standard and High Reliable Products)			
		RA type	RB type	RC type	RD type	RAC type	RBC type	RCC type	RDC type
Structure(St.) and Property(Pr.)									
St.	① Wire	Φ0.45mm			Φ0.35mm	Φ0.45mm			Φ0.35mm
	② Chip	Chip (Thermistor)							
	③ 1 st Coating (Head)	Hard Epoxy (1 st . Chip protection coating)							
	④ 2 nd Coating (Head + Wire)	Does not apply				Flexible Epoxy (2 nd . Protection coating)			
Pr.	Operating Temp.	-40℃ ~ 125℃							
	2 nd Coating Withstand Voltage	Does not apply				DC250V / 1sec			
	2 nd Coating Insulation Resistance	Does not apply				Min.100MΩ			
	Hardness at Head	Shore A90							
	Wire Bending Strength	After soldering, bend wire by 90 degree. No cutting at 5 times.							

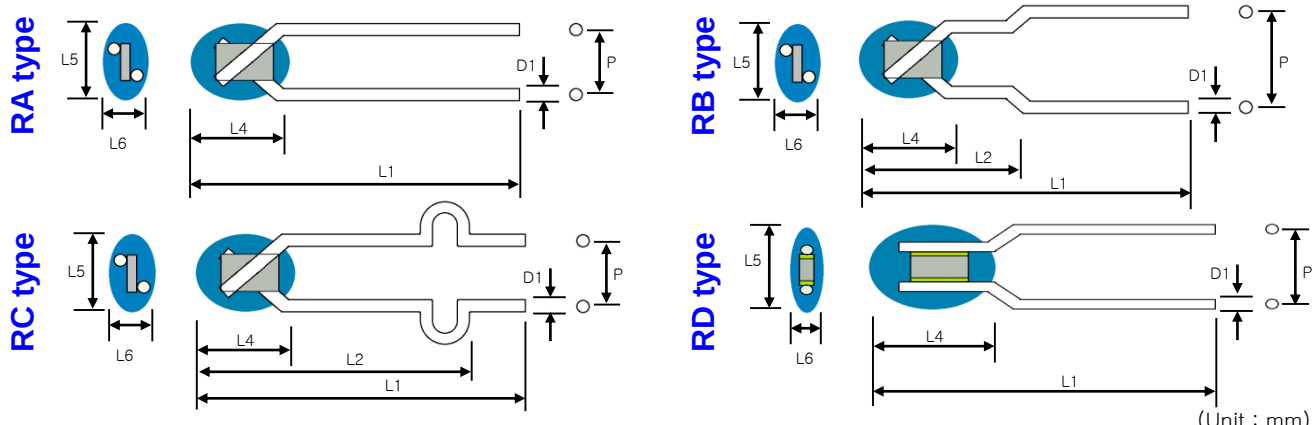
3 How to order

Part No. : R* ① * ② 103 ③ F ④ 3435 ⑤ F ⑥ ** ⑦ 12 ⑧

①	R*	Product Series. (RA,RB,RC,RD etc)	⑤	3435	B(25/85) Value ; 3435 : 3435K
②	*	Insulation type (C:Second protective coating, F:Film, T:Tube)	⑥	F	B Value tolerance ; F : 1%
③	103	103=10×10 ³ (Ω)@25℃	⑦	**	Customer code; ** (01,02,03,...)
④	F	Resistance tolerance ; F : 1%	⑧	12	Coating length ; 12 mm (For LeadCoTh)

4 Shape & Dimension

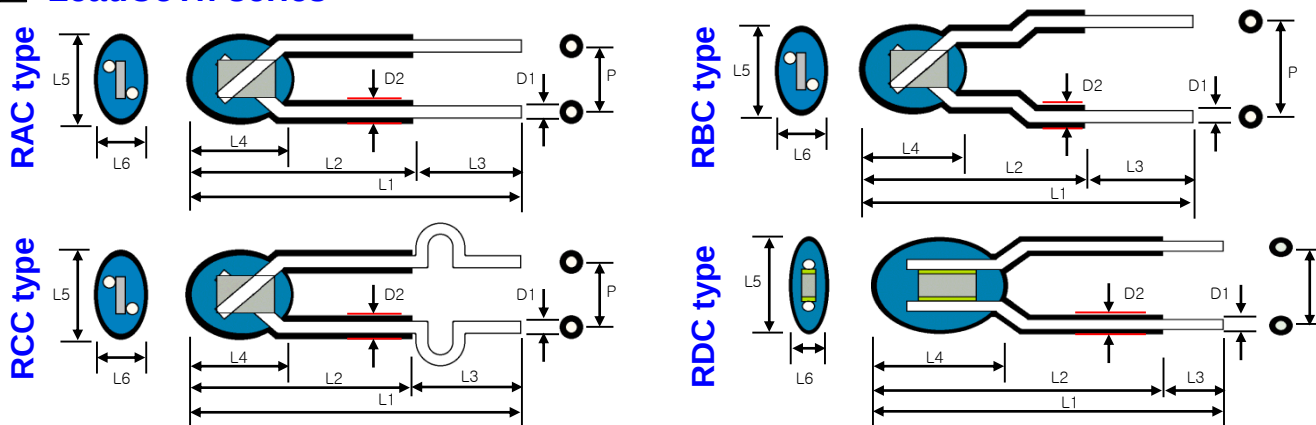
Radial series



(Unit : mm)

Type	L1	L2	L4	L5	L6	P	D1	Remark
RA	—	—	Typ. 4.0	Max. 4.0	Max. 3.0	Typ. 2.0	φ0.45	
RB	—	Typ. 6.5	Typ. 4.0	Max. 4.0	Max. 3.0	Typ. 2.5	φ0.45	
RC	—	Min. 5.5	Typ. 4.0	Max. 4.0	Max. 3.0	Typ. 2.0	φ0.45	
RD	—	—	Typ. 4.5	Max. 2.5	Max. 1.8	Typ. 1.8	φ0.35	

LeadCoTh series



(Unit : mm)

Type	L1	L2	L3	L4	L5	L6	P	D1	D2
RAC	—	—	Typ. 2.0	Typ. 4.0	Max. 4.0	Max. 3.0	Typ. 2.0	φ0.45	Typ. φ0.55
RBC	—	—	Typ. 2.0	Typ. 4.0	Max. 4.0	Max. 3.0	Typ. 2.5	φ0.45	Typ. φ0.55
RCC	—	—	Typ. 2.0	Typ. 4.0	Max. 4.0	Max. 3.0	Typ. 2.0	φ0.45	Typ. φ0.55
RDC	—	—	Typ. 2.0	Typ. 4.5	Max. 2.5	Max. 1.8	Typ. 1.8	φ0.35	Typ. φ0.45