No. TPQ-08M05TC

Dec . 4 , 2008

TO : MAISON TECHNOLOGY LIMITED

TECHNICAL REPORT

Product name : DIA THERMISTOR NEGATIVE

Part number : TH05 Series

This document describes targeted specifications based on a new product under development. Therefore it DOES NOT warrant the new product's specifications.

A separate "SPECIFICATION" will be issued for approval of the final product.

Approval	H. Kumasaki for H.Iwamizu
Drawn	K. Yamazaki

MITSUBISHI MATERIALS CORPORATION

Electronic Materials & Components Company

Chip Thermistor Specification	Drawing No. RF-AP-1055E	Page 1/2
Type: TH05 Series	Date: July 13, 2005	

REFERENCE DRAWING

1.Scope of Application

This specification is applied to chip thermistors(TH05 Series).

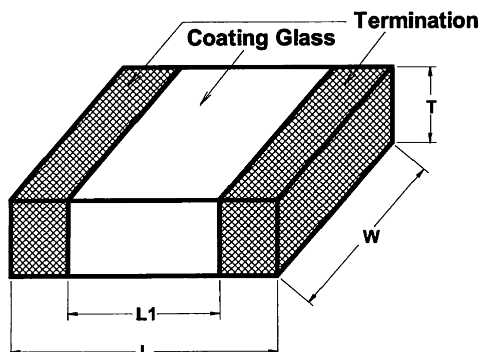
2.Part Numbering System

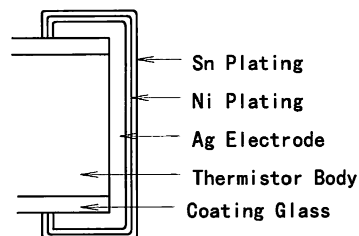
(Ex.) TH05 - 3H 103 F R
(1) (2) (3) (4) (5)

3.Specification

No.	Item	Symbol	Specification
(1)	Series	TH05	TH05 series
(2)	Nominal B-value	3H	※Table 1 B-value 25 ℃ to 50 ℃ $B_{25/50} = \left(\frac{1}{25+273.15} - \frac{1}{50+273.15} \right)^{-1} \ln \frac{R_{25}}{R_{50}}$ R_{25} :zero-power resistance at 25 ℃ R_{50} :zero-power resistance at 50 ℃
(3)	Nominal zero-power resistance	103	※Table 1 zero-power resistance at 25 ℃
(4)	Tolerance of nominal zero-power resistance	F	F :±1 % G :±2 % H :±3 %
(5)	Packaging form	R	Tape package 10,000pcs./reel
		B	Bulk package 500pcs./bag

4.Size and Dimensions





Structure of Termination

L(mm)	W(mm)	T(mm)	L1(mm)
1.00 ±0.15	0.50 +0.05/-0.10	0.50 +0.05/-0.10	0.2min.

REFERENCE DRAWING

Table 1 Resistance and B-value of Chip Thermistor (TH05 Series)

Part Number TH05-	Resistance (Ω)	B-value (K)	Tolerance of B-value
3H103	10k	3370	± 1%
3T103	10k	3820	
4B153	15k	4030	
3V223	22k	3900	
3N333	33k	3650	
3I473	47k	3400	
4B473	47k	4050	
3J683	68k	3450	
3L104	100k	3540	
3M154	150k	3620	

Chip Thermistor Characteristics Specification		Drawing No. RF-AQ-1004E	Page 1/3
Type	TH05 Series	Date	October 6, 2008

REFERENCE DRAWING

1. Scope of Application

This specification is applied to chip thermistors(TH05 series).

2. Mechanical Quality

Item	Test method	Performance
2-1. Resistance to Soldering Heat Test	Immerse into melted solder. Solder: H-63A Flux:Rosin 25wt% Soldering temperature: 260 ℃± 5 ℃ Duration of immersion:10sec.± 1sec. Preheating: 150 ℃, 1min. (According to JIS C 2570)	Visual: No mechanical damage Zero-power resistance at 25 ℃: Change as against pretest values within ±3%
	Immerse into melted solder. Solder: Sn-3.0Ag-0.5Cu Flux:Rosin 25wt% Soldering temperature: 260 ℃± 5 ℃ Duration of immersion:10sec.± 1sec. Preheating: 150 ℃, 1min.	
2-2. Solderability Test	Immerse into melted solder. Solder: H-63A Flux: Rosin 25wt% Soldering temperature: 235 ℃± 5 ℃ Duration of immersion:2sec.± 0.2sec. Preheating: 150 ℃, 1min. (According to JIS C 2570)	At least 90% of the electrode on each end of the ceramic chip must be covered with new solder.
	Immerse into melted solder. Solder: Sn-3.0Ag-0.5Cu Flux: Rosin 25wt% Soldering temperature: 240 ℃± 5 ℃ Duration of immersion:2sec.± 0.2sec. Preheating: 150 ℃, 1min.	
2-3. Vibration Test	Vibration frequency: 10 to 55Hz Full amplitude: 1.5mm 10 to 55 to 10Hz about 1 min./cycle In each X,Y,Z direction 2 hrs. Total 6 hrs. (According to JIS C 2570)	Visual: No mechanical damage Zero-power resistance at 25 ℃: Change as against pretest values within ±3%

REFERENCE DRAWING

Item	Test method	Performance
2-4. Resistance to flexure of substrate	The substrate shall be so placed with its surface on which thermistor is mounted downwards that the center of thermistor coincides with the center of support as illustrated in fig. 1. Load R340 Thermistor 45±2mm 45±2mm Fig. 1. Testing Condition The middle part of substrate shall, successively, be pressurized by means of the pressurizing rod at a rate of about 1 mm/sec until the deflection becomes 1 mm and then the pressure shall be maintained for 5 sec. Then the thermistor shall be measured with the pressure applied. After the measurement the pressurizing force is removed and the substrate is taken out from the test stand.	Visual: No mechanical damage Zero-power resistance at 25 ℃: Change as against pretest values within ±3 %

REFERENCE DRAWING

3. Climatic Quality

Item	Test method	Performance
3-1. Dry Heat Test	Test temperature:125 ℃± 2 ℃ Test duration:1000hrs.$^{+48}_{0}$ hrs. After completion of the test,allow the sample to stand under the standard conditions for at 24hrs.± 2hrs. (According to JIS C 2570)	Zero-power resistance at 25 ℃ Change as against pretest values within ±3%
3-2. Cold Test	Test temperature:-40 ℃± 3 ℃ Test duration:1000hrs.$^{+48}_{0}$ hrs. After completion of the test,allow the sample to stand under the standard conditions for at 24hrs.± 2hrs. (According to JIS C 2570)	Zero-power resistance at 25 ℃ Change as against pretest values within ±3%
3-3. Damp Heat Test (Steady State)	Test temperature:40℃± 2℃ Test duration:500hrs.$^{+24}_{0}$ hrs. Test relative humidity:90 %~ 95 % After completion of the test,allow the sample to stand under the standard conditions for at 24hrs.± 2hrs. (According to JIS C 2570)	Zero-power resistance at 25 ℃ Change as against pretest values within ±3%
3-4. Thermal Shock Test	+85 ℃± 2 ℃ — 30min ordinary temp. -40 ℃± 3 ℃ — 30min Fig. 2. Operations per One Cycle One cycle is the operation shown in Fig. 2. This cycle is repeated 25 times. After completion of the test, allow the sample to stand under the standard conditions for at 24hrs. ± 2hrs. (According to JIS C 2570)	Visual: No mechanical damage Zero-power resistance at 25 ℃ Change as against pretest values within ±3%

* Testing substrate: Glass fabric base epoxy resin (Test item : 2-3, 2-4, 3-1, 3-2, 3-3, 3-4)

Chip Thermistor Packaging Specification	Drawing No. RF-AR-0007E	Page 1/3
Type: TN05,TC05,TH05 Series	Date	April 12, 2006

REFERENCE DRAWING

1.Scope of application

This specification is applied to thermistors.(TN05,TC05,TH05 series)

2.Packaging(Bulk package)

Bulk Packaging must be made so that thermistors must not be damaged during transportation or custody.

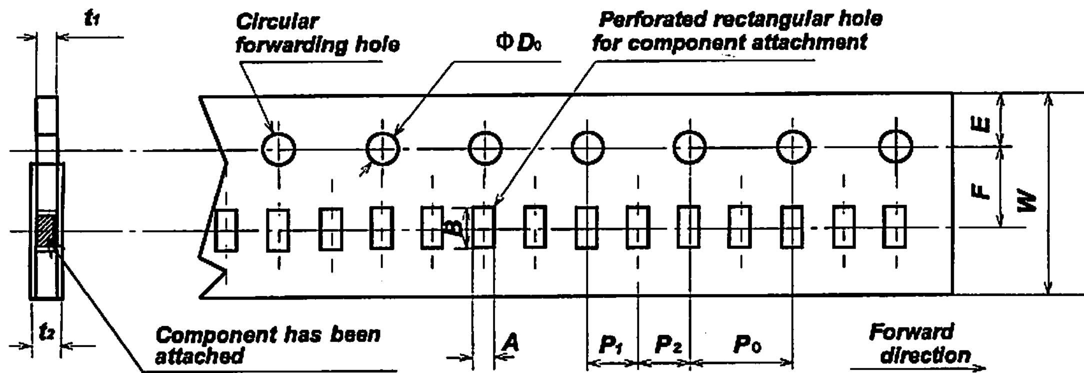
Packaging quantity 500 (pcs./Bag)

2-1.Items described on label

(1) Ordered part number (PART NO)
(2) Packaging quantity (QUANTITY)
(3) Recieved order number (SERIAL)
(4) Part number+Discernment sign (ITEM)
Discernment sign RoHS (Directive 2002/95/EC) Compliance : P
(Ex. TH05-3H103FR P)

3.Packaging (Tape package)

3-1.Dimensions of Taping



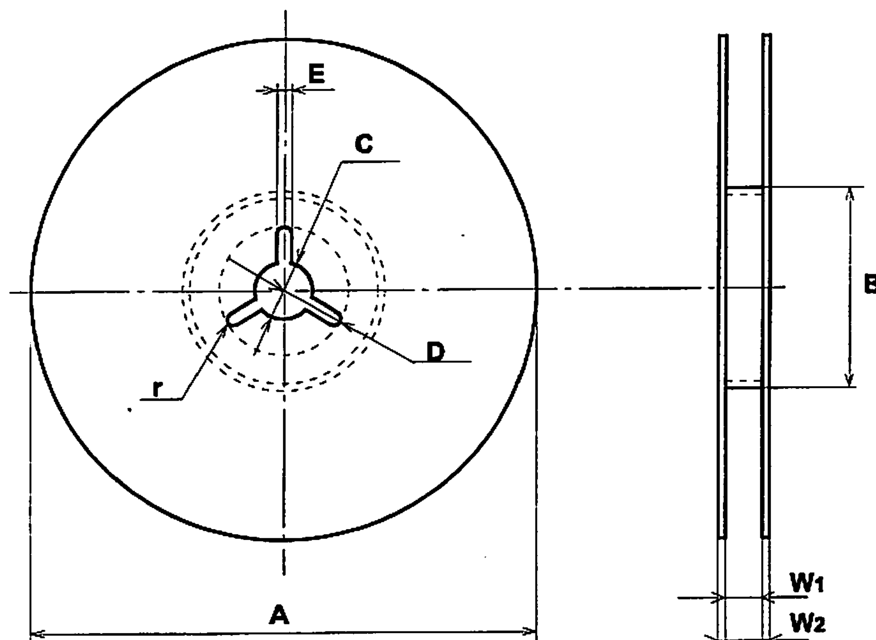
Unit:mm

A	B	W	F	E	P1	P2	P0
0.62 ± 0.10	1.15 ± 0.10	8.0 ± 0.3	3.5 ± 0.05	1.75 ± 0.10	2.0 ± 0.1	2.00 ± 0.05	4.0 ± 0.1

D0	t1	t2	Insert hole
ϕ 1.5 +0.1 -0	0.8 or less	0.9 or less	Perforated rectangular holes

REFERENCE DRAWING

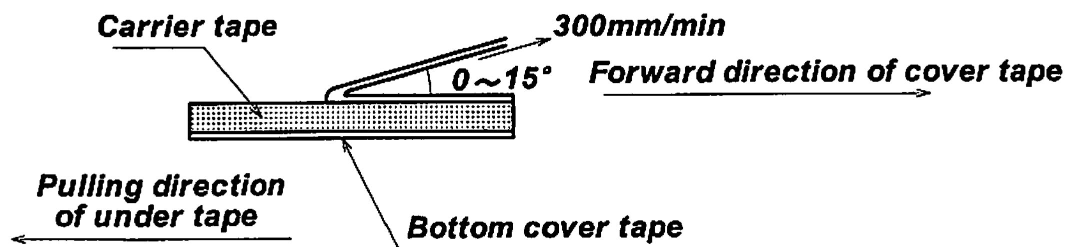
3-2.Dimensions of Reel



Unit:mm

Symbol	A	B	C	D	E	W_1	W_2	r
RRM08B	ϕ 180 +0 -3	ϕ 60 +1 -0	ϕ 13.0 ± 0.2	R10.5 ± 0.4	2.0 ± 0.5	9.0 ± 0.3	11.4 ± 1.0	0.5

3-3.Peel Force of Top Cover Tape

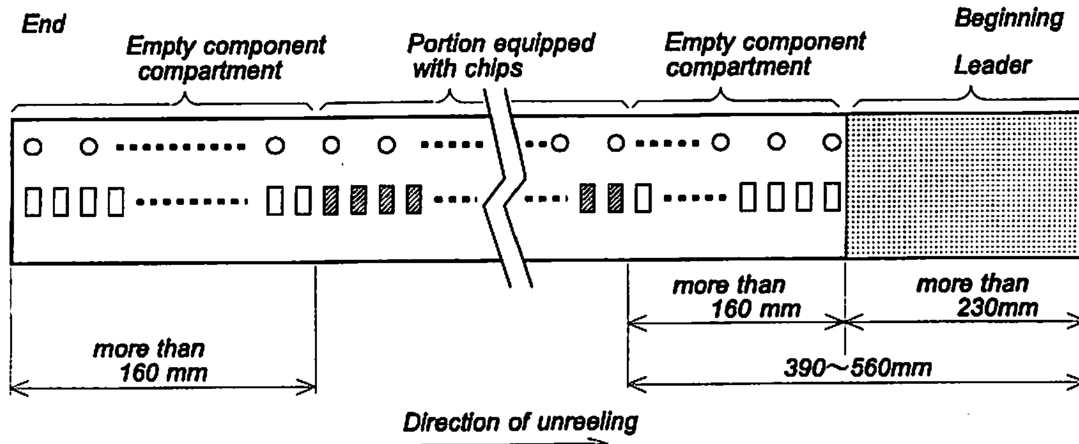


In the case, the top cover tape is pulled off under the above conditions.
The peel force of the top cover tape should be as the following table.

kind of tape	peel force
top cover tape	0.1N ～ 0.6N

3-4.Structure of Taping

Taping must have Leader and empty component compartments as shown in the following rough sketch.



(1)Chips should not be stick on both the top cover tape and the bottom cover tape.
(2)When the top cover tape is released, the adhesive should remain on the cover tape.
(3)When the top cover tape is released, there should not be any difficulty in taking out the chip from the tape because of clearance troubules. Also there should not be any tape troubles that will cause pick-up troubles because of nozzle clogging.

3-5.Packaging quantity

10,000 (pcs./Reel)

3-6.Items described on shipping label

(1) Ordered part number (PART NO)
(2) Packaging quantity (QUANTITY)
(3) Recieved order number (SERIAL)
(4) Part number+Discernment sign (ITEM)
Discernment sign RoHS (Directive 2002/95/EC) Compliance : P
(Ex. TH05-3H103FR P)

3-7.Items described on shipping box

(1) Recieved order number (PACKAGE ID)
(2) Number of shipping box (PACKAGE COUNT)
(3) Packaging quantity (QUANTITY)
(4) Order number (TRANS ID)
(5) Ordered part number (CUST PROD)
(6) Part number+Discernment sign (ITEM)
Discernment sign RoHS (Directive 2002/95/EC) Compliance : P
(Ex. TH05-3H103FR P)
(7) Customer name (CUSTOMER)
(8) Customer's machine name (MODEL NO)

Chip Thermistor Usage Specification		Drawing No.		Page
		RF-AS-0003E		1/2
Type	SMD chip type	Date	July 30, 2007	

REFERENCE DRAWING

1.Scope of application

This specification is applied to SMD chip type thermistors.

2.Caution in Usage

2-1 Operating Power

Thermistors shall not be operated in excess of the specified "Maximum operating power". Unless the thermistors are operated under the specified Maximum Power Dissipation, it may cause burnout and damage due to thermal run away.
The accuracy may be greatly influenced by self-heat generation and the heat dissipation of the Thermistor, even if the Thermistor is operated under the specified Maximum Power Dissipation.
Fully check safety and reliability in your circuit.

2-2 Operating Conditions

Do not use the thermistors under the following conditions because all these factors deteriorate the thermistor characteristics or cause failures and burnout.

1) Wet or humid locations
2) Corrosive or deoxidizing gas
   (Hydrogen sulfide, Sulfurous acid, Chloride and ammonia, etc.)
3) Volatile or flammable gas
4) Dusty conditions
5) Under high pressure or low pressure
6) Locations with salt water, oils, chemical liquids or organic solvents
7) Strong vibrations or mechanical impact
8) Other places similar to the hazardous conditions mentioned above

Be sure to provide an appropriate fail-safe function on your product to prevent secondary damages that may be caused by the failure of our product.

2-3 Safety precaution

Our products shall be used for general purpose applications required for consumer type electronics equipment. Strongly recommend to consult us before use of our product, if you think about use of our products on the following special applications with high level of safety. ･Medical equipment, ･Aircraft equipment, Aerospace equipment,
･Atomic power equipment, etc.

2-4 Strage Conditions

1) Storage temperature and humidity
   Temperature : -10 to +40 degree C
   Humidity : less than 70%RH(not dewing condition)
2) Storage term
   Use our product within 12 months after delivery.
3) Handling after unpacking
   After unpacking, reseal products or store them in a sealed package with a dry agent.

4) Storage place

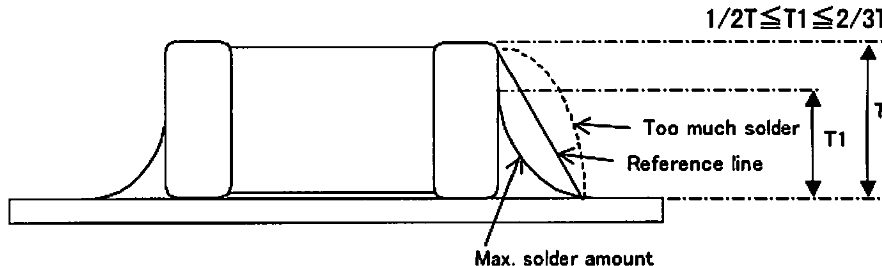
Do not store our products in direct sunlight or in corrosive gas(sulfuric acid or chlorine gas, etc.)

2-5 Soldering and mounting notice

1) Use recommended dimensions of lands and the dimensions shall be symmetrical.
2) Use rosin-based flux. Do not use strong acid flux with halide content over 0.2wt%.
3) Do not use ultrasonic cleaning with too much output to avoid deteriorating the strength of the terminal electrodes or cracking in the solder and/or ceramic bodies of the products. The followings are recommended conditions for ultrasonic cleaning.

   Frequency : less than 40 kHz
   Output : less than 20 W/l
   Cleaning time : less than 5 min

4) Too much soldering may cause mechanical stress resulting in cracking. The amount of solder shall be controlled according to the standard height of fillet shown below.



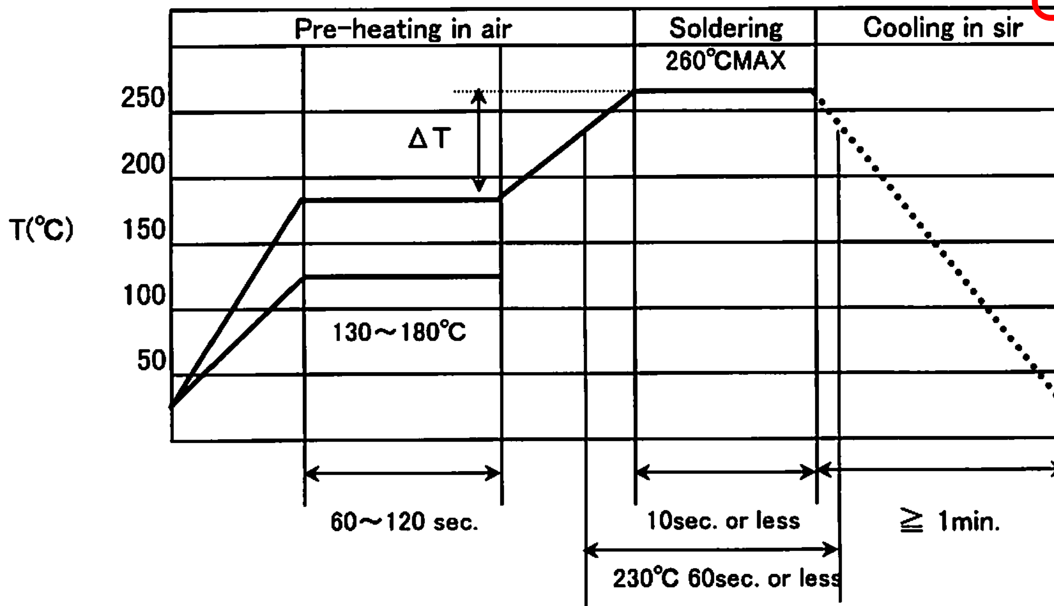
5) Choose a mounting position that minimizes the stress imposed on the chip during bending of the board.
6) Since dividing or breaking of the PC boards may cause mechanical stress in the thermistors on the PC boards, it shall be done carefully by using a jig to prevent the product from mechanical damage.
7) Soldering conditions : Appendix(1/1)

2-6 Other caution

Use this product within the specified temperature range.
Feel free to contact us when you have any questions regarding our products.

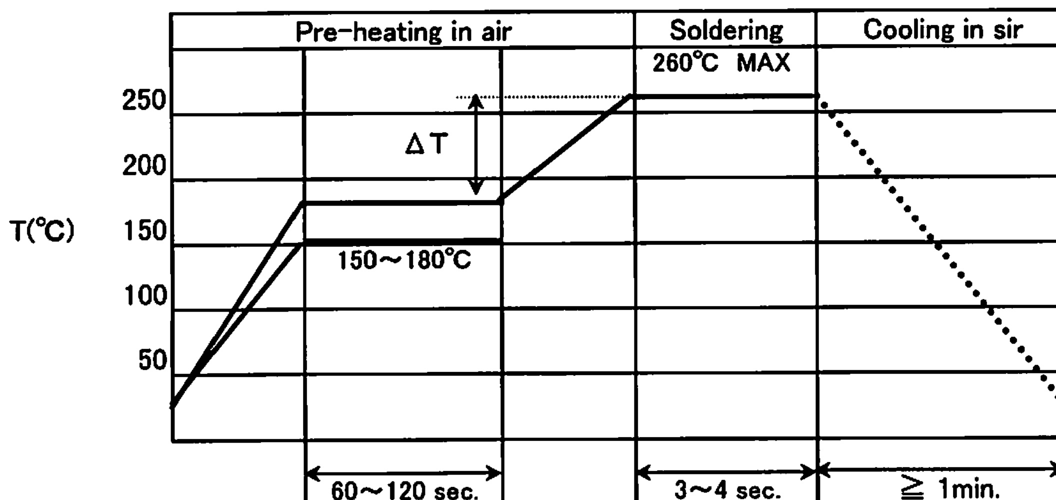
REFERENCE DRAWING

Chip thermistor reflow soldering mounting conditions



i)Time shown in the above figures is measured from the point when chip surface reaches the temperature.
ii)Temperature differnce in high temperature part should be within 110℃.
iii)The possible number of times : 2 Times

Chip thermistor flow soldering mounting conditions



i)Time shown in the above figures is measured from the point when chip surface reaches the temperature.
ii)Temperature differnce in high temperature part should be within 110℃.
iii)The possible number of times : 1 Time

Hand soldering

When sudden heat is applied to the tip by soldering iron, the chip may crack because remarkable temperature change causes deformity inside components.
In order to prevent mechanical damage in the tip, preheating should be required.
When using a soldering iron for repair work, being careful not to touch the chip directly with the iron.

(1)Wattage of soldering iron : 60W max.
(2)Temperature of soldering iron : 350℃ max.
(3)Duration of appliing : 3 sec max. / termination