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		RF-AP-0154E		1/2
Type	TH11 Series	Date	March 18, 2002	

1.Scope of Application

This specification is applied to chip thermistors(TH11 Series).

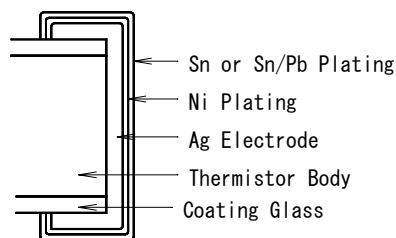
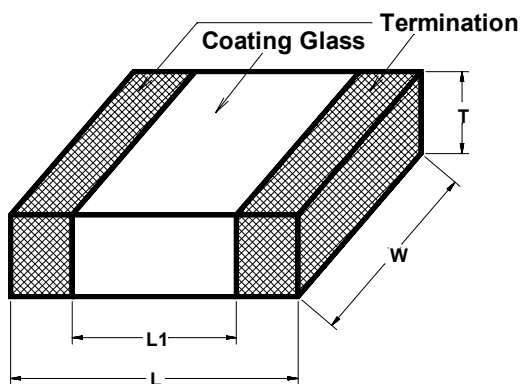
2.Part Numbering System

(Ex.) $\frac{TH11}{(1)} - \frac{3H}{(2)} \frac{103}{(3)} \frac{F}{(4)} \frac{T}{(5)}$

3.Specification

No.	Item	Symbol	Specification
(1)	Series	TH11	TH11 series
(2)	Nominal B-value	3H	※ Table 1 B-value 25 °C to 50 °C $B_{25/50} = \left(\frac{1}{25+273.15} - \frac{1}{50+273.15} \right)^{-1} \ln \frac{R_{25}}{R_{50}}$ R ₂₅ :zero-power resistance at 25 °C R ₅₀ :zero-power resistance at 50 °C
(3)	Nominal zero-power resistance	103	※ Table 1 zero-power resistance at 25 °C
(4)	Tolerance of nominal zero-power resistance	F G H	F : ± 1 % G : ± 2 % H : ± 3 %
(5)	Packaging form	T	Tape package 4000pcs./reel
		B	Bulk package 500pcs./bag

4.Size and Dimensions



Structure of Termination

L(mm)	W(mm)	T(mm)	L1(mm)
1.60 ± 0.15	0.80 ± 0.15	0.70max.	0.3min.

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**Table 1 Resistance and B-value
of Chip Thermistor (TH11 Series)**

Part Number TH11-	Resistance (Ω)	B-value (K)	Tolerance of B-value
3H103	10k	3370	$\pm 1\%$
3V103	10k	3910	
4C153	15k	4110	
3T223	22k	3820	
3K333	33k	3480	
3J473	47k	3440	
4B473	47k	4050	
3K683	68k	3500	
3M104	100k	3590	
4H104	100k	4360	
3R154	150k	3680	
3S224	220k	3760	
3U334	330k	3850	
3W474	470k	3940	

Chip Thermistor Characteristics Specification		Drawing No.	Page
		RF-AQ-1003E	1/3
Type	TH11 Series	Date	November 08, 2001

1. Scope of Application

This specification is applied to chip thermistors (TH11 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 °C ± 5 °C Duration of immersion: 10sec. ± 1sec. Preheating: 150 °C, 1min. (According to JIS C 2570)	Visual: No mechanical damage Zero-power resistance at 25 °C: Change as against pretest values within ± 3%
	Immerse into melted solder. Solder: Sn-3.0Ag-0.5Cu Flux: Rosin 25wt% Soldering temperature: 260 °C ± 5 °C Duration of immersion: 10sec. ± 1sec. Preheating: 150 °C, 1min.	
2-2. Solderability Test	Immerse into melted solder. Solder: H-63A Flux: Rosin 25wt% Soldering temperature: 235 °C ± 5 °C Duration of immersion: 2sec. ± 0.2sec. Preheating: 150 °C, 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 °C ± 5 °C Duration of immersion: 2sec. ± 0.2sec. Preheating: 150 °C, 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 °C: Change as against pretest values within ± 3%
2-4. Adhesion	The pressurizing force shall be 5N (0.5 kgf) and the duration of application shall be 10 ± 1 sec.	Visual: No mechanical damage

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Item	Test method	Performance
<p>2-5. Resistance to flexure of substrate</p>	<p><i>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.</i></p> <div style="text-align: center;"> <p>The diagram shows a horizontal substrate supported by two triangular stands. A thermistor is mounted on the bottom surface of the substrate. A load is applied downwards to the top surface of the substrate, centered over the thermistor. The distance from the center of the thermistor to each support is labeled as 45 ± 2mm.</p> </div> <p>Fig. 1. Testing Condition</p> <p><i>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.</i></p>	<p>Visual: No mechanical damage Zero-power resistance at 25 °C: Change as against pretest values within ± 3 %</p>

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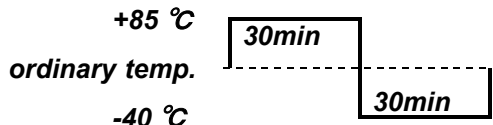
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3. Climatic Quality

Item	Test method	Performance
3-1. Dry Heat Test	Test temperature: $125\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ Test duration: $1000\text{hrs.}^{+4}_{-8}\text{ hrs.}$ After completion of the test, allow the sample to stand under the standard conditions for at $24\text{hrs.} \pm 2\text{hrs.}$ (According to JIS C 2570)	Zero-power resistance at $25\text{ }^{\circ}\text{C}$: Change as against pretest values within $\pm 3\%$
3-2. Cold Test	Test temperature: $-40\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$ Test duration: $1000\text{hrs.}^{+4}_{-8}\text{ hrs.}$ After completion of the test, allow the sample to stand under the standard conditions for at $24\text{hrs.} \pm 2\text{hrs.}$ (According to JIS C 2570)	Zero-power resistance at $25\text{ }^{\circ}\text{C}$: Change as against pretest values within $\pm 3\%$
3-3. Damp Heat Test (Steady State)	Test temperature: $40\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ Test duration: $500\text{hrs.}^{+24}_{-24}\text{ hrs.}$ Test relative humidity: $90\% \sim 95\%$ After completion of the test, allow the sample to stand under the standard conditions for at $24\text{hrs.} \pm 2\text{hrs.}$ (According to JIS C 2570)	Zero-power resistance at $25\text{ }^{\circ}\text{C}$: Change as against pretest values within $\pm 3\%$
3-4. Thermal Shock Test	 <p> $+85\text{ }^{\circ}\text{C}$ ordinary temp. 30min $-40\text{ }^{\circ}\text{C}$ 30min Fig. 3. Operations per One Cycle One cycle is the operation shown in Fig. 3. This cycle is repeated 25 times. After completion of the test, allow the sample to stand under the standard conditions for at $24\text{hrs.} \pm 2\text{hrs.}$ (According to JIS C 2570) </p>	Visual: No mechanical damage Zero-power resistance at $25\text{ }^{\circ}\text{C}$: Change as against pretest values within $\pm 3\%$

* Testing substrate: Glass fabric base epoxy resin (Test item : 2-3, 2-4, 2-5, 3-1, 3-2, 3-3, 3-4)

Chip Thermistor Packaging Specification		Drawing No.		Page
		RF-AR-0012E		1/3
Type	TN11,TH11 Series	Date	February 13, 2002	

1.Scope of application

This specification is applied to thermistors.(TN11,TH11 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)

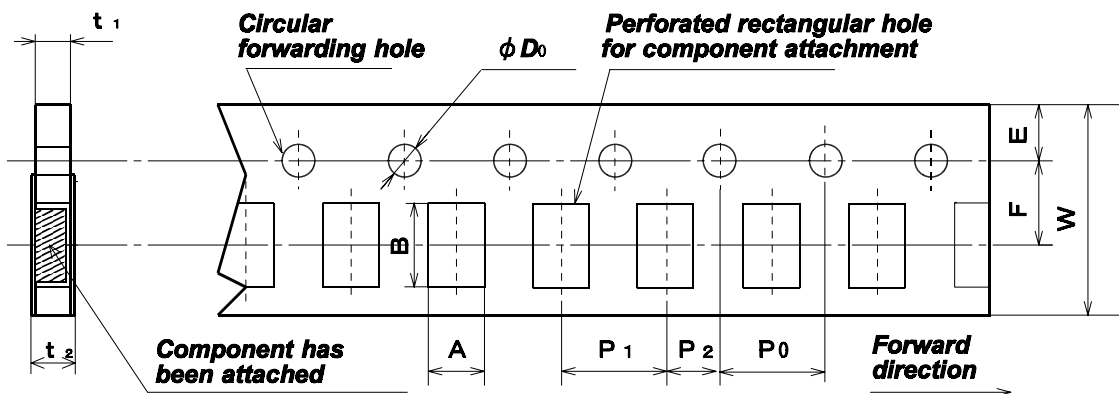
2-1.Items described on label

- (1) Ordered part number (PART NO)
- (2) Packaging quantity (QUANTITY)
- (3) Recieved order number (SERIAL)
- (4) Part number+Discernment sign (ITEM)

Discernment sign Lead free plating product : P / Solder plating product : blank
 (Ex. TH11-3H103FT P)

3.Packaging (Tape package)

3-1.Dimensions of Taping



Unit:mm

A	B	W	F	E	P1	P2	P0
1.1 ± 0.2	1.9 ± 0.2	8.0 ± 0.3	3.5 ± 0.05	1.75 ± 0.1	4.0 ± 0.1	2.0 ± 0.05	4.0 ± 0.1
D0	t1	t2	Insert hole				
ϕ 1.5 +0.1 -0	1.1 or less	1.4 or less	Perforated rectangular holes				

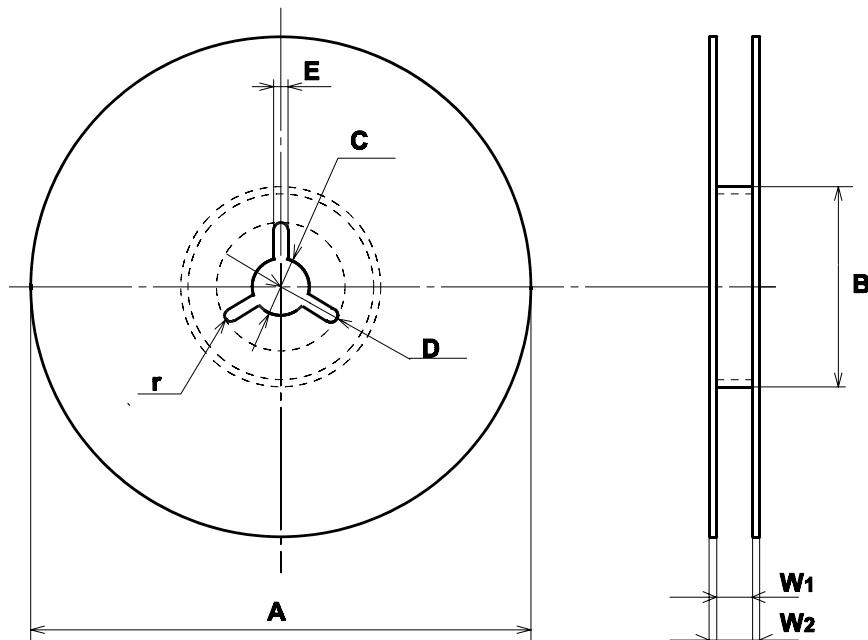
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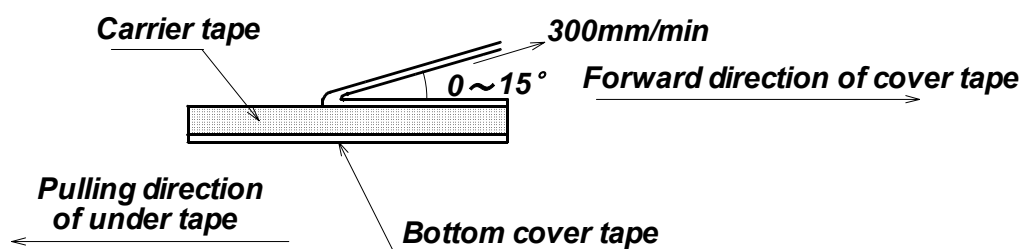
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3-2. Dimensions of Reel

Unit:mm

Symbol	A	B	C	D	E	W1	W2	r
RRM08B	ϕ 180 + 0 - 3	ϕ 60 + 1 - 0	ϕ 13.0 \pm 0.2	R10.5 \pm 0.4	2.0 \pm 0.5	9.0 \pm 0.3	11.4 \pm 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	0.20N ~ 0.59N

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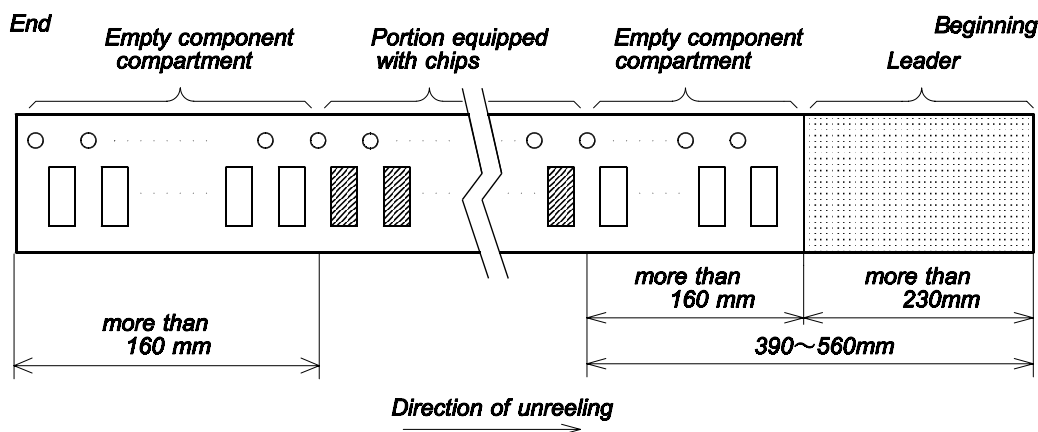
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3-4. Structure of Taping

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 troubles. Also there should not be any tape troubles that will cause pick-up troubles because of nozzle clogging.

3-5. Packaging quantity

4000 (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 Lead free plating product : P / Solder plating product : blank
(Ex. TH11-3H103FT 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 Lead free plating product : P / Solder plating product : blank
(Ex. TH11-3H103FT P)
- (7) Customer name (CUSTOMER)
- (8) Customer's machine name (MODEL NO)