No.MLPGE10011

SPECIFICATIONS

HIGH FREQUENCY MULTILAYER CHIP FILTER

FI 212B245027-T

TAIYO YUDEN CO., LTD.

Date: 30.Apr.2010

HIGH FREQUENCY MULTILAYER CHIP FILTER

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※RoHS compliance

- This product conform to "RoHS compliance".
- "RoHS compliance" means that the product does not contain lead, cadmium, mercury, hexavalent chromium, PBB or PBDE referring to EU Directive 2002/95/EC, except other non-restricted substances or impurities which could not be technically removed at the refining process.

1 Scope

This specification covers high frequency multilayer chip filter「FI 212B245027-T」for use in electronic appliances and electric communications equipment.

2 Part Numbering System

Part number is indicated as follows.

FI	△	212	B	2450	27	−T
(1)	(2)	(3)	(4)	(5)	(6)	(7)

Code	Contents	Example	Explanation
(1)	Device	FI	High frequency multilayer chip filter
(2)	Electrodes	△ (Space)	Plating
(3)	Dimensions	212	2.0×1.25 mm
(4)	Special code	B	Band pass Filter
(5)	Frequency (MHz)	2450	2450 MHz
(6)	Spec	27	Individual Spec
(7)	Packaging	−T	Packaging code

3 Electrical specification

3-1 Electrical Characteristics

No.	Item	Specification
1	Impedance (Zin・Zout)	50Ω Nominal
2	Nominal Frequency (fc)	2450MHz Nominal
3	Pass band frequency	2400 to 2500MHz
4	Insertion Loss at Pass band	1.4dB max. (+25℃) 1.7dB max. (-40 to +85℃)
5	Ripple at Pass band	1.0 dB max.
6	V.S.W.R. at Pass band	2.0 max.
7	Attenuation	30 dB min. (880 to 960MHz)
		30 dB min. (1710 to 1910MHz)
		6 dB min. (2110 to 2170MHz)
		20 dB min. (4800 to 5000MHz)

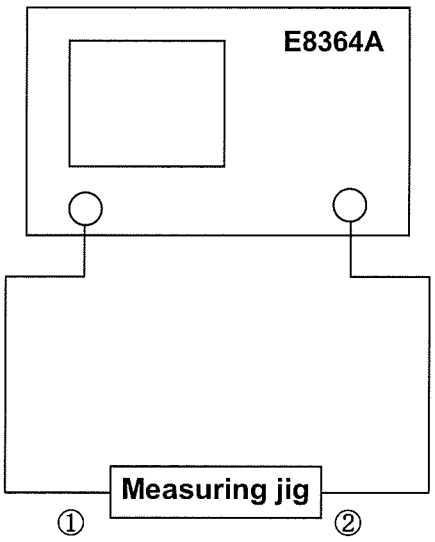
※ Unless otherwise specified, conduct inspection in accordance with the condition specified in 3-4 Environment conditions.

3-2 Inspection method (reference)

・Electrical characteristics shall be measured on condition that test sample is set in specified measuring equipment.

Measuring equipment

NETWORK ANALYZER E8364A or equivalent



3-3 Attenuation

In above measuring equipment, when input① and output② are shorted, output shall be E1.
And in case calibrated to reference level (0dB), when test sample is inserted in the equipment, output shall be E2. The loss shall be prescribed as attenuation.

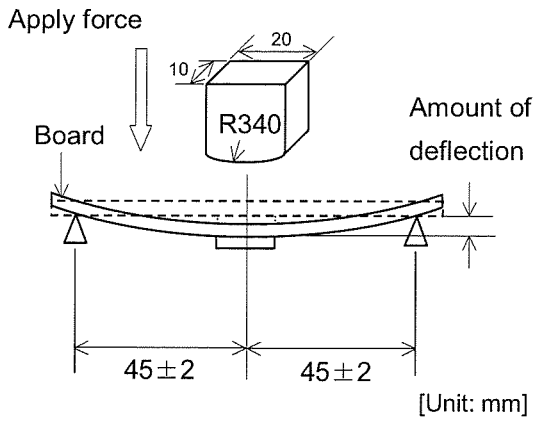
Attenuation (ATT.) = -20 log (E2/E1) [dB]

3-4 Environmental conditions

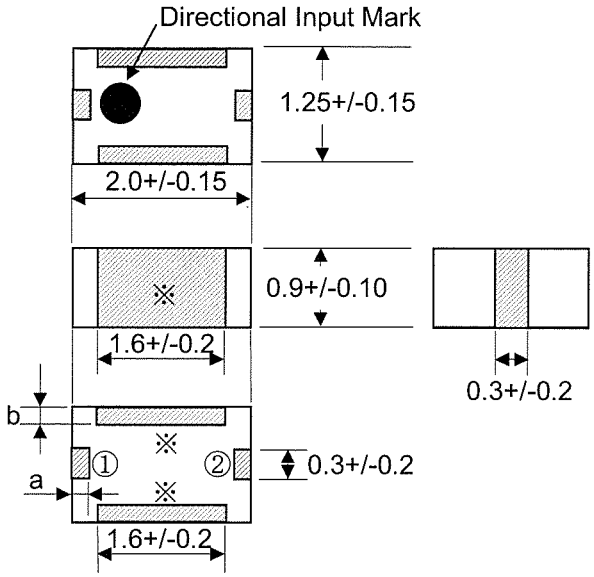
Standard test conditions shall be temperature of 5 to 35℃, relative humidity of 45 to 85% and air pressure of 86 to 106kPa. Test shall be conducted at temperature of 20±2℃, relative humidity of 60 to 70% and air pressure of 86 to 106kPa if test result is suspectable.
Unless otherwise specified, all tests shall be conducted under standard conditions.

4 Mechanical specification

4-1 Mechanical specification

No.	Item	Specified Value	Remarks
1	Operating Temperature Range	-30 to +85℃	Continuous use is available in this range.
2	Adhesive Force	Initial performance shall be satisfied. Terminal electrodes have no exfoliation or a sign of exfoliation. No significant abnormality in appearance.	Conforming to JIS C 60068-2-21 Appendix 2 Test sample shall be soldered to test jig and a force of 5N {0.51kgf} shall be applied from I/O side for 10±1 seconds.
3	Bending Strength		Conforming to JIS C 60068-2-21 Appendix 2 Test sample shall be soldered to test board. Soldering shall be conducted with care of avoiding an abnormality such as heat shock. Deflection test is such that force to cause deflection as much as 2.0mm is applied for 10 seconds in method shown in figure below. Board thickness shall be 0.8mm.  [Unit: mm]

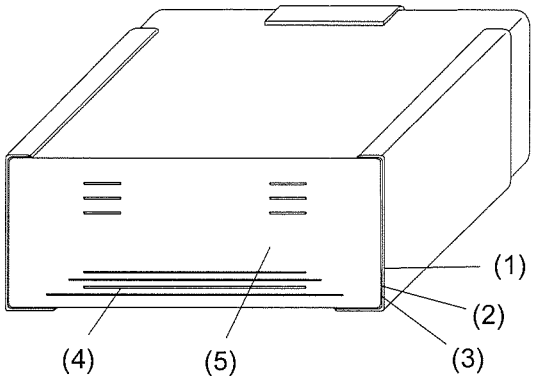
4-2 External dimensions (Unit: mm)



Displacement	
(1)	Input
(2)	Output
※	GND

Dimensions	
a	0.20+/-0.15
b	0.25+/-0.15

4-3 Material



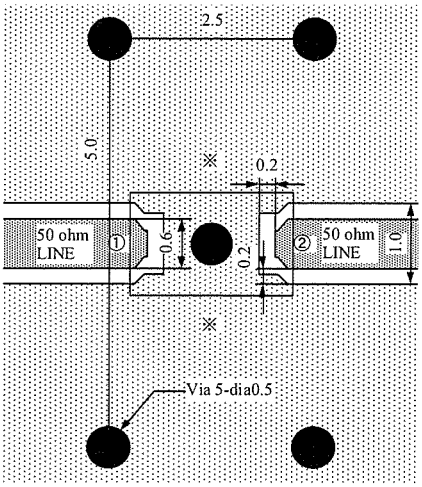
	Name	Material
(1)	Terminal Electrodes (Surface)	Sn Plating
(2)	Terminal Electrodes	Ni Plating
(3)	External Electrodes	Ag
(4)	Internal Electrodes	Ag
(5)	Dielectric	Ceramics of Ba-Nd-Ti type

4-4 Marking

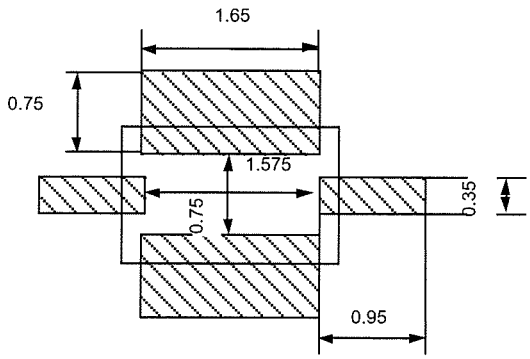
Marking dot which means direction of product.

4-5 Example of land pattern (reference) Thickness of dielectric between Line and GND is 0.1mm, FR4, Both side via hole board

Electrodes pattern



Resist pattern (aperture size)



Layout

① Input

② Output

※ GND

Unit [mm]

5. Reliability test Condition

5-1 Reliability test

<table>
<tr><th>No.</th><th>Item</th><th>Specified Value</th><th>Remarks</th></tr>
<tr><td>1</td><td>Thermal Shock</td><td rowspan="4">Initial performance shall be satisfied.
No significant change in appearance.</td><td>Conforming to JIS C 0025
Test sample shall be soldered to test board.
Test sample shall be kept for specified time at each of temperature in steps 1 to 4 shown below in sequence.

<table><tr><th>Step</th><th>Temperature (℃)</th><th>Time (minutes)</th></tr><tr><td>1</td><td>-40±3℃</td><td>30±3</td></tr><tr><td>2</td><td>Normal temperature</td><td>3 max.</td></tr><tr><td>3</td><td>+85±2℃</td><td>30±3</td></tr><tr><td>4</td><td>Normal temperature</td><td>3 max.</td></tr></table>
Temperature cycle shall be repeated 100 times in this method, and measurement shall be conducted after test sample is kept at room temperature for 2 to 3 hours.</td></tr>
<tr><td>2</td><td>High Temperature Life Test</td><td>Conforming to JIS C 60068-2-2
Temperature: 85 ± 2℃
Duration: 96 hours
Measurement shall be conducted after test sample is kept at room temperature for 2 to 3 hours.</td></tr>
<tr><td>3</td><td>Low Temperature Life Test</td><td>Conforming to JIS C 60068-2-1
Temperature: -40 ± 2℃
Duration: 96 hours
Measurement shall be conducted after test sample is kept at room temperature for 2 to 3 hours.</td></tr>
<tr><td>4</td><td>Humidity</td><td>Conforming to JIS C 60068-2-3
Temperature: 40 ± 2℃
Relative humidity: 90～95%RH
Duration: 96 hours
Measurement shall be conducted after test sample is kept at room temperature for 2 to 3 hours.</td></tr>
</table>

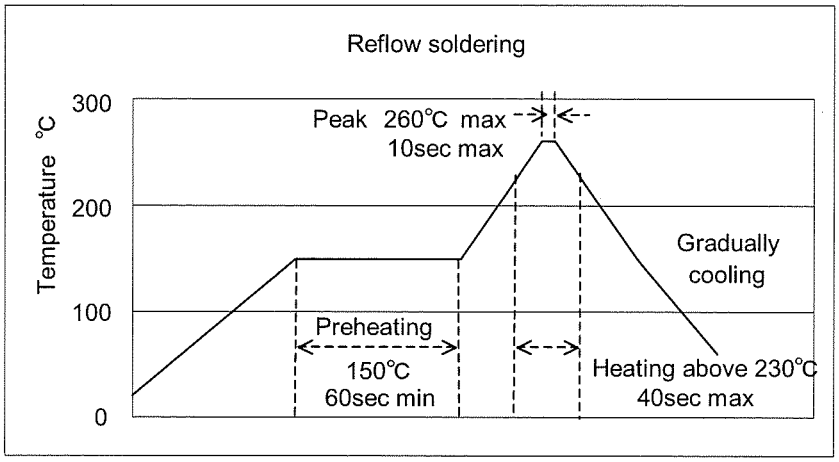
5. Reliability test Condition

5-1 Reliability test

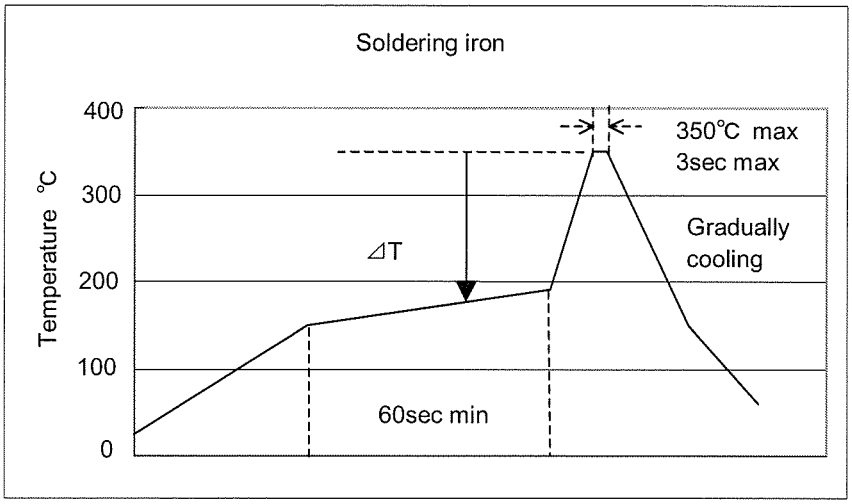
No.	Item	Specified Value	Remarks
5	Resistance to Soldering Heat (Reflow)	Initial performance shall be satisfied. No significant change in appearance.	Electrical characteristics shall be evaluated after chips passed from reflow soldering temperature profile as shown in 5-2 two times. Solder: Sn-3Ag- 0.5Cu Measurement shall be conducted after test sample is kept at room temperature for 2 to 3 hours.
	Resistance to Soldering Heat (Dip)		Conforming to JIS C 60068-2-20 Preheating temperature: 150±10℃ Duration: 1 to 2 minutes Solder temperature: 260 ± 5℃ Duration: 5 ± 0.5 seconds Immersion depth: whole chip shall be immersed into solder Solder: Sn-3Ag- 0.5Cu Flux: Rosin that contains 25% methyl alcohol Measurement shall be conducted after test sample is kept at room temperature for 2 to 3 hours.
6	Solderability	More than 75% of terminal electrodes shall be covered with fresh solder.	Conforming to JIS C 60068-2-20 (Eutectic solder) Solder: H63A Solder temperature: 230 ± 5℃ Immersion duration: 4 ± 1 seconds Immersion depth: whole chip shall be immersed into solder Flux: Rosin that contains 25% methyl alcohol (Pb-free solder) Solder: Sn-3Ag- 0.5Cu Solder temperature: 240 ± 5℃ Immersion duration: 4 ± 1 seconds Immersion depth: whole chip shall be immersed into solder Flux: Rosin that contains 25% methyl alcohol

5-2 Recommended Soldering Condition

Recommended Soldering Profiles for Lead-free Solder Paste



※Components should be preheated to within **100 to 130℃** from soldering temperature.
※Assured to be reflow soldering for 2 times



※ **⊿T≦190℃ (3216Type max) , ⊿T≦130℃ (3225Type min)**
※It is recommended to use 20W soldering iron and the tip is 1 ϕ or less.
※The soldering iron should not directly touch the components.
※Assured to be soldering iron for **1 time.**

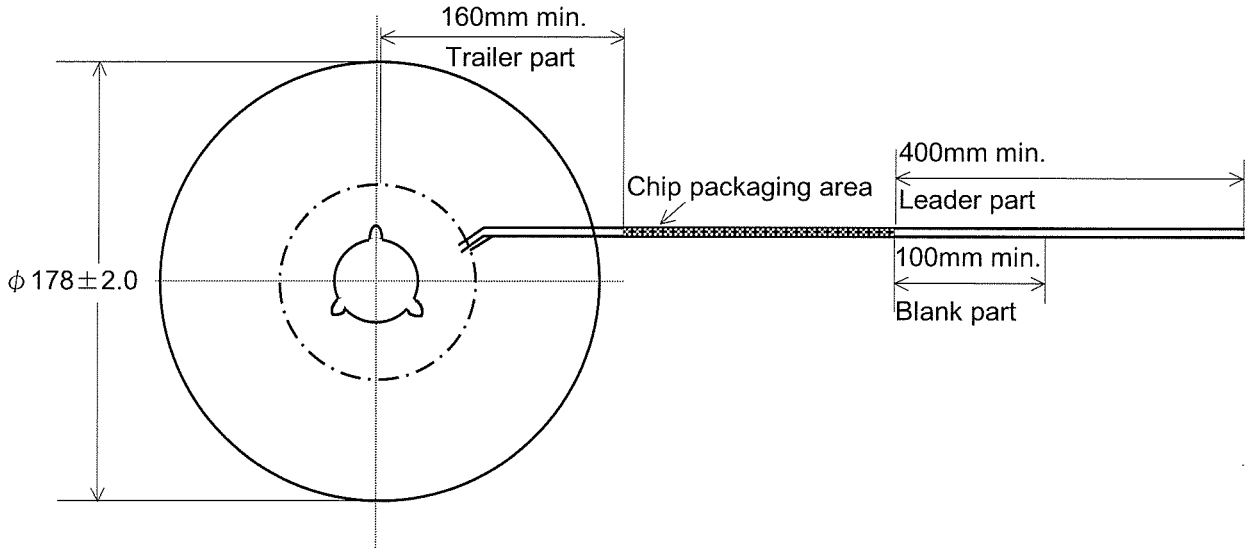
Note: The above profiles are the maximum allowable soldering condition, therefore these profiles are not always recommended.

6-1 Packaging

Taping shall be conducted as follows.
Unless otherwise specified, conform to JIS C 0806.

- Taping shall be right-sided wound (when the end is pulled out, sprocket hole will be at the right-hand side).
- Seal tape shall not be crossed over sprocket holes. And seal tape shall not be out of carrier tape.
- For packaging chips by taping, blank spaces are provided on taping as shown below.

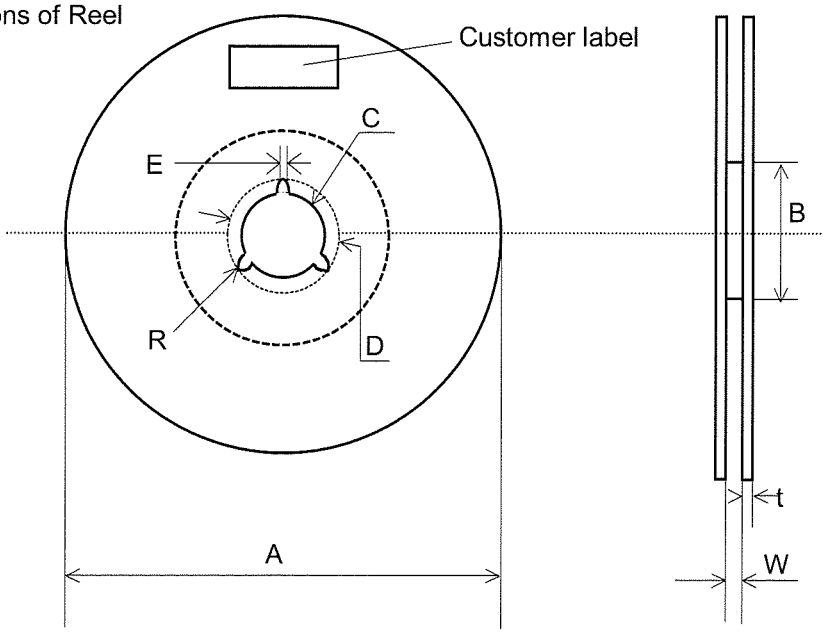
  Leader part: 400mm min.
  Leader part (Blank part): 100mm min.
  Trailer part (Blank part): 160mm min.



Unit [mm]

- Leader part of seal tape shall be sealed with adhesive tape.
- Peeling strength of seal tape (or top tape) shall be 0.1～0.7N (10.2～71.4gf) when seal tape (or top tape) is peeled from carrier tape at an angle of 0° ～20°
- Label indicating Parts No., Quantity, Control No. and Customer Parts No. shall be attached to reel.

6-2 Dimensions of Reel

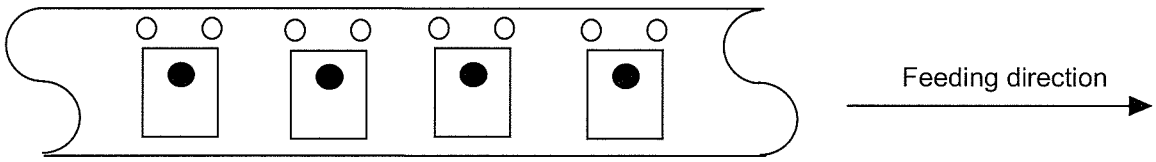


Code	ϕA	ϕB	ϕC	ϕD
Dimension	178±2.0	50 min	13±0.2	21±0.8

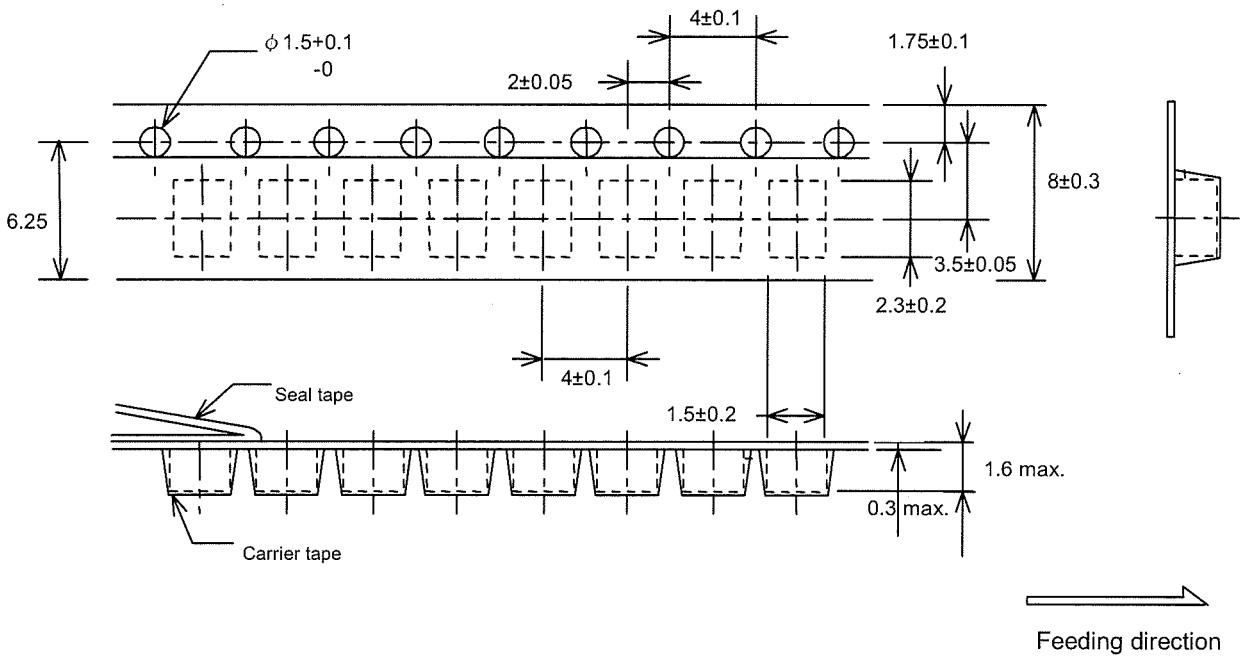
Code	E	W	t	R
Dimension	2.0±0.5	10±1.5	2.5 max	1.0

Unit [mm]

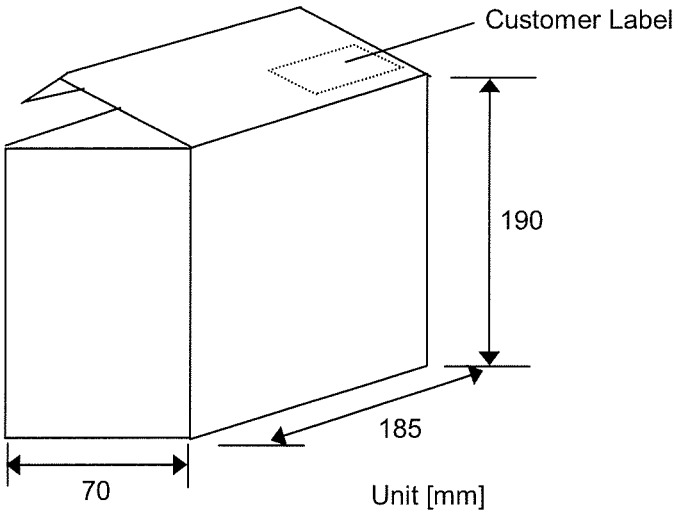
- Chips shall be packaged in the uniform direction; Marked side shall face sprocket holes.
- Chips shall not be out of mounting part of carrier tape.



6-3 External dimensions of carrier tape (Unit: mm)



6-4 Package type



Unit [mm]
(The size is only for reference.)

One Reel
3,000 pcs/ Reel

Customer label description

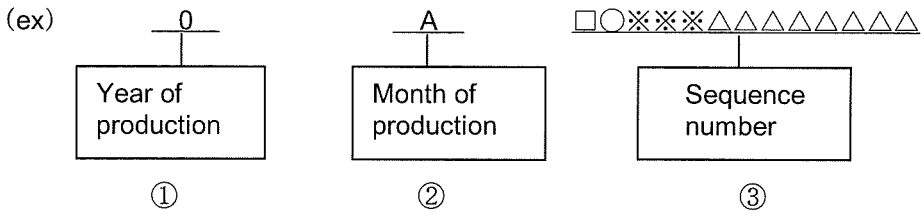
1. Manufacturer Name
2. Customer Parts No.
3. Our parts No.
4. Quantity
5. Control No.
   (Shipping Lot No.)
6. Manufacturing site
   (MADE IN ○○○)

・To attach labels means that all products are passed.

7 Precautions

1. Do not use the product in the following environment. It may cause deterioration of the characteristics.
   - Areas exposed to particular gases, such as C12, NH3, SOx and NOx.
   - Areas exposed to volatile or combustible gases.
   - Areas exposed to excessive dust.
   - Areas exposed to water.
   - Areas exposed to direct sunlight.
   - Areas exposed to freezing temperature.
   - Areas exposed to dew condensation due to high humidity.
2. Product is made from ceramics element. Do not apply excessive pressure and shock.
3. Do not apply excessive pressure and shock when transporting and handling print circuit board with the product mounted.
4. Be careful when handling (do not fall and hit) the product. Characteristics may be changed when electrode is damaged or chipped out.
   Do not touch the product with bare hands. It may cause solderability declines.
5. Please store the product under the following condition.
   Temperature: -10℃ to +40 ℃
   Humidity: 15 to 85% RH
   Use the product within six months after the delivery. After the six months, confirm solderability before use.
6. When arranging the mounting position of the product, avoid the area where stresses are applied to the warp or deflection of the circuit board.
   Do not apply warp or stress to the board. When the board is bend during the process after the product is soldered, or during the board is handled, it may cause electrode peeling or chip cracks. The process after soldering the product includes cutting of circuit board, break board checker, mounting of other components, installation to chassis, and flow soldering to the back of reflow soldered board, etc.
   Separation of the sheet board should not be done manually, but by using the appropriate devices.
7. Do not apply excessive stress and shock when mounting the product on printed circuit board, in order to prevent from breaking or chipped out.
8. Use flux containing less than 0.1% wt (cl conversion) of halogen material for soldering, in order to prevent the corrosion of electrodes and the decline of insulation resistance.
9. Component shall be preheated to within 100℃ from soldering temperature, in order to prevent breaks of the product.
10. Ultrasonic cleaning may cause cracks on the product or its soldered part by the ultrasonic vibration, or lower the strength of terminal electrode. Prior confirmation of the cleaning condition is required.

Composition of the Shipping Lot Number



①Year of production (The last numeral of the Christian era. (ex.)2010year→0)

②Month of production (It is due to the table below.)

③Sequence number is alphanumeric including space.

month	1	2	3	4	5	6	7	8	9	10	11	12
code	A	B	C	D	E	F	G	H	J	K	L	M

Operating conditions for guarantee of this product are as shown in the specification.
Please note that Taiyo Yuden Co., Ltd. shall not be responsible for a failure and/or abnormality which are caused by use under the conditions other than aforesaid operating conditions.

- All electronic components listed in this specification are developed, designed and intended for use in general electronics equipment.(for AV, office automation, household, office supply, information service, telecommunications, (such as mobile phone or PC) etc.). Before incorporating the components or devices into any equipment in the field such as transportation, (automotive control, train control, ship control), transportation signal, disaster prevention, medical, public information network(telephone exchange, base station) etc. which may have direct influence to harm or injure a human body, please contact Taiyo Yuden Co., Ltd. for more detail in advance.

  Do not incorporate the products into any equipment in fields such as aerospace, aviation, nuclear control, submarine system, military, etc. where higher safety and reliability are especially required. In addition, even electronic components or functional modules that are used for the general electronic equipment, if the equipment or the electric circuit require high safety or reliability function or performances, a sufficient reliability evaluation check for safety shall be performed before commercial shipment and moreover, due consideration to install a protective circuit is strongly recommended at customer's design stage.
- Please conduct validation and verification of products in actual condition of mounting and operating environment before commercial shipment of the equipment.
- The contents of this specification are applicable to the products which are purchased from our sales offices or distributors (so called TAIYO YUDEN's official sales channel).

  It is only applicable to the products purchased from any of TAIYO YUDEN's official sales channel.
- Please note that Taiyo Yuden Co., Ltd. shall have no responsibility for any controversies or disputes that may occur in connection with a third party's intellectual property rights and other related rights arising from your usage of products in this specification. Taiyo Yuden Co., Ltd. grants no license for such rights.
- Caution for export

  Certain items in this specification may require specific procedures for export according to Foreign Exchange and Foreign Trade Control Law of Japan, U.S. Export Administration Regulations, and other applicable regulations. Should you have any question or inquiry on this matter, please contact our sales staff.