RECIPIENT

SPECIFICATIONS

Product No. : Q13FC1350004500

MODEL : FC-135

SPEC. No. : Q11-204-8B

DATE: Dec. 12. 2011

EPSON TOYOCOM CORPORATION

421-8 Hino, Hino-shi Tokyo 191-8501, Japan

CHECKED 金子優 / CS Quality Assurance Department

Masaru Kaneko

SPECIFICATIONS

1. Application

1) This document is applicable to the crystal unit that are delivered to MediaTec Inc. from Epson Toyocom Corp.
2) RoHS compliant
FC-135 contains lead in Low melting type solder which is exempted in RoHS directive.
3) This Product supplied (and any technical information furnished, if any) by Epson Toyocom Corporation shall not be used for the development and manufacture of weapon of mass destruction or for other military purposes.
Making available such products and technology to any third party who may use such products or technologies for the said purposes are also prohibited.
4) This product listed here is designed as components or parts for electronics equipment in general consumer use.
We do not expect that any of these products would be incorporated or otherwise used as a component or part forthe equipment, which requires an systems, and medical equipment, the functional purpose of which is to keep extra high reliability, such as satellite, rocket and other space life.

2. Product No. / Model

The product No. of this crystal unit is Q13FC1350004500.
The model is FC-135.

3. Packing

It is subject to the packing standard of Epson Toyocom Corp.

4. Warranty

Defective parts which originate with us are replaced free of charge in the case of defects being found with 12 months after delivery.

5. Amendment and/or termination

Amendment and/or termination of this specification is subject to the agreement between the two parties.

6. Contents

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[1] Absolute maximum ratings

No.	Item	Symbol	Rating value			Unit	Note
			Min.	Typ.	Max.		
1	Storage temperature range	T_stg	- 55		+ 125	°C	Suppose to be within CI STD at + 25 °C ± 3 °C.
2	Maximum level of drive	GL			1.0	μW	

[2] Operating range

No.	Item	Symbol	Rating value			Unit	Note
			Min.	Typ.	Max.		
1	Operating temperature range	T_use	- 40		+ 85	°C	
2	Level of drive	DL	0.01	0.1	1.0	μW	
3	Vibration mode		Fundamental				

[3] Static characteristics

No.	Item		Symbol	Value	Unit	Conditions
1	Nominal Frequency		f_nom	32.768	kHz	
2	Frequency tolerance		f_tol	± 20	$\times 10^{-6}$	CL = 12.5 pF Ta = + 25 ± 3 °C Level of drive : 0.1 μW Not include aging
3	Motional resistance		R1	70 Max.	kΩ	CI meter : Saunders 140B Level of drive : 0.5 μW
4	Motional capacitance		C1	3.4 Typ.	fF	
5	Shunt capacitance		C0	1.2 Typ.	pF	
6	Frequency temperature characteristics	Turnover temperature	Ti	+ 25 ± 5	°C	Values are calculated by The frequencies at + 10, + 25, + 40 °C with C-MOS circuit.
		Parabolic coefficient	B	- 0.04 Max.	$\times 10^{-6}/°C^2$	
7	Isolation resistance		IR	500 Min.	MΩ	DC 100 V ± 15, 60 seconds Between terminal # 1 and terminal # 2
8	Frequency Aging		f_age	± 3	$\times 10^{-6}$/year	Ta = + 25 °C ± 3 °C Level of drive : 0.1 μW

[4] Environmental and Mechanical characteristics

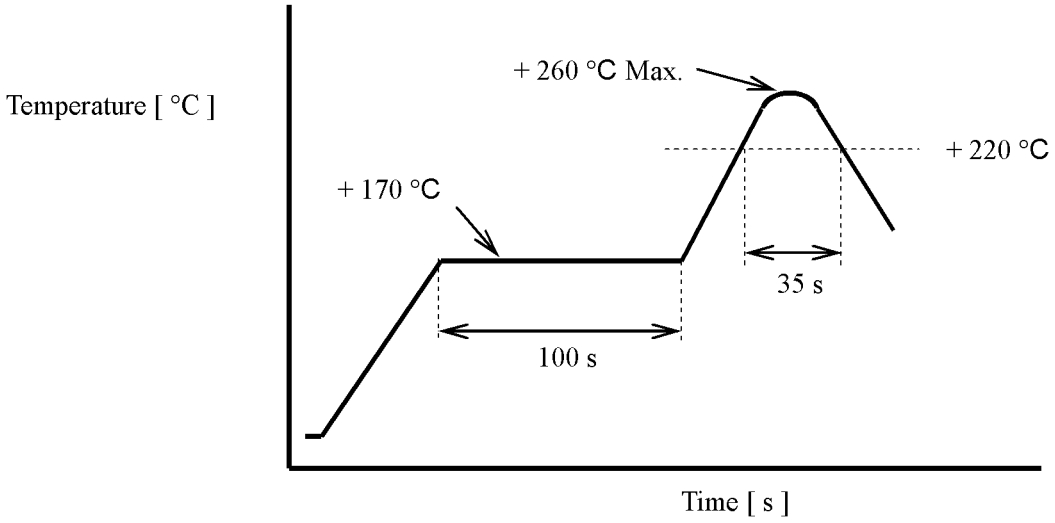
No.	Items	Value	Conditions
1	Shock resistance	*3Δ f/f : ± 8 × 10^{-6}	100 g dummy(EPSON TOYOCOM Standard), Natural drop from 1 500 mm height on to the concrete. 3 directions × 10 times *2
2	Vibration resistance	*3Δ f/f : ± 3 × 10^{-6}	10 Hz to 55 Hz amplitude 0.75 mm 55 Hz to 500 Hz acceleration 98 m/s^2 10 Hz → 500 Hz → 10 Hz 15 min./cycle 6 h (2 hours , 3 directions) *2
3	Soldering heat resistance	Δ f/f : ± 5 × 10^{-6}	For convention reflow soldering furnace (2 times)
4	High temperature storage	*3Δ f/f : ± 10 × 10^{-6}	+ 125 °C × 1 000 h *1
		*3Δ f/f : ± 7 × 10^{-6}	+ 85 °C × 1 000 h *1
5	Low temperature storage	*3Δ f/f : ± 10 × 10^{-6}	- 55 °C × 1 000 h *1
6	High temperature and humidity	*3Δ f/f : ± 10 × 10^{-6}	+ 85 °C × 85 %RH × 1000 h *1
7	Temperature cycle	*3Δ f/f : ± 10 × 10^{-6}	- 55 °C ↔ + 125 °C 30 minutes at each temperature × 100 cycles *1
8	Sealing	*3 1 × 10^{-8} hPa•l / s Max.	For He leak detector
9	Shear	No peeling-off at a soldered part	20 N press for 10 ± 1 s. Ref. IEC 60068-2-21
10	Pull - off	No peeling-off at a soldered part	20 N press for 10 ± 1 s. Ref. IEC 60068-2-21
11	Substrate bending	No peeling-off at a soldered part	Bend width reaches 3 mm and hold for 5 s ± 1 s × 1 time Ref. IEC 60068-2-21
12	Solvent resistance	The marking shall be legible	Ref. JIS C 0052 or IEC 60068-2-45

< Notes >

1. *1 Each test done independently.
2. *2 Measuring 2 h to 24 h later leaving in room temperature after each test. Drive level : 0.5 μW
3. *3 Pre conditionings(Treat the Reflow 2 times with the following profile) Initial value shall be after 24 h at room temperature.
   Shift of series resistance at before and after the test should be less than ±20 % or less than ±15kΩ.
   In case high temperature storage(+ 125 °C × 1 000 h), Soldering heat resistance,shift of series resistance at before and after the test should be less than ± 30 % or ± 20 kΩ.

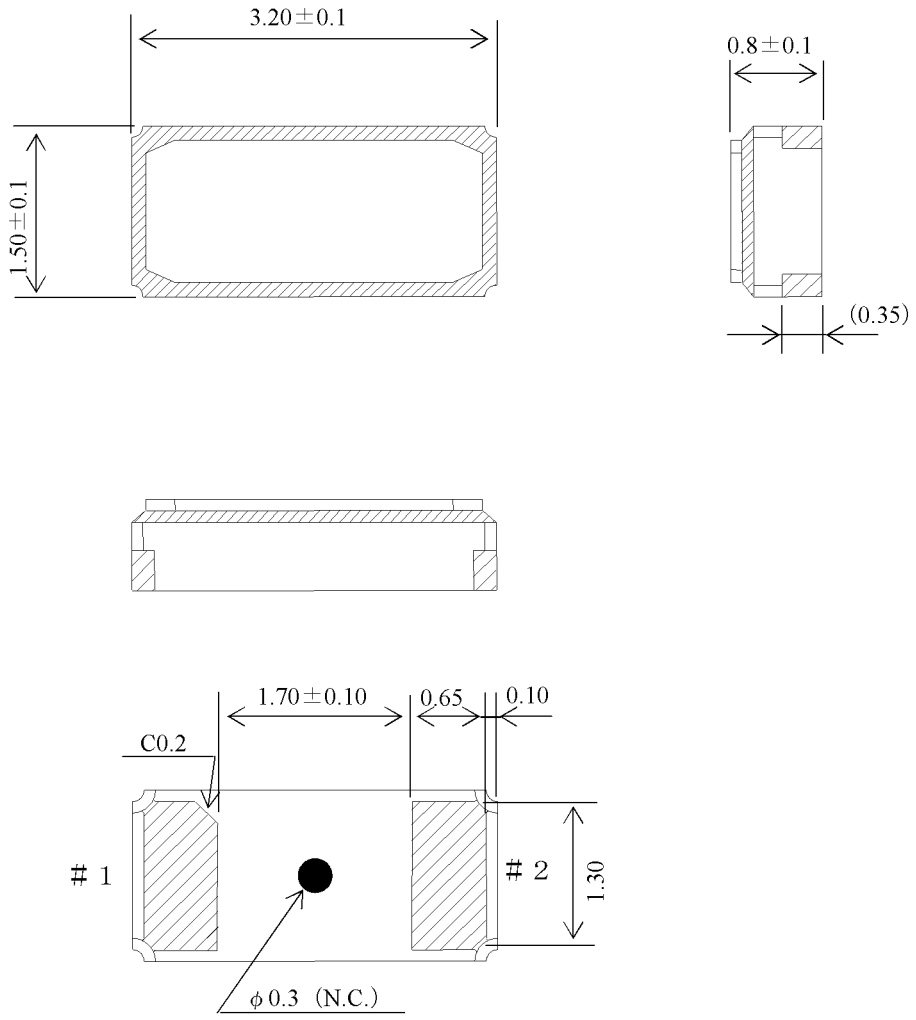
♦ Conditions of hot air convection reflow

Pre heating temperature : + 170 °C
Heating temperature : + 220 °C
Pre heating time : 100 s
Heating time : 35 s

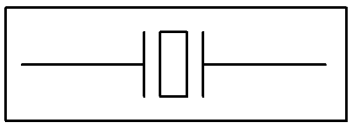


[5] Dimensions and Marking layout

1. Dimensions



2. Internal Connection



1 # 2

Package : Ceramic(Al_2O_3)

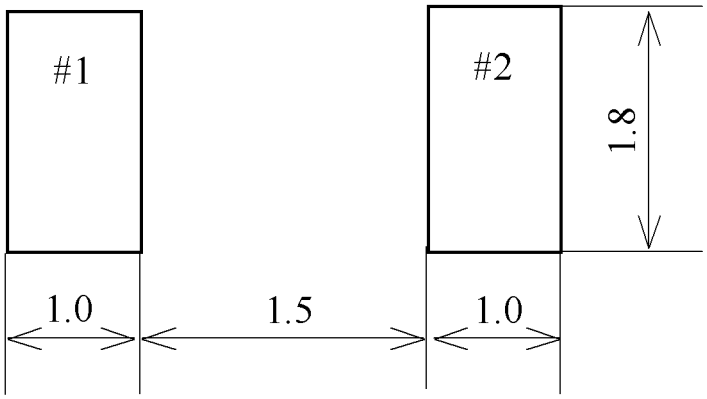
Terminal Au plate : 0.5 μm Min.

Lid : Glass

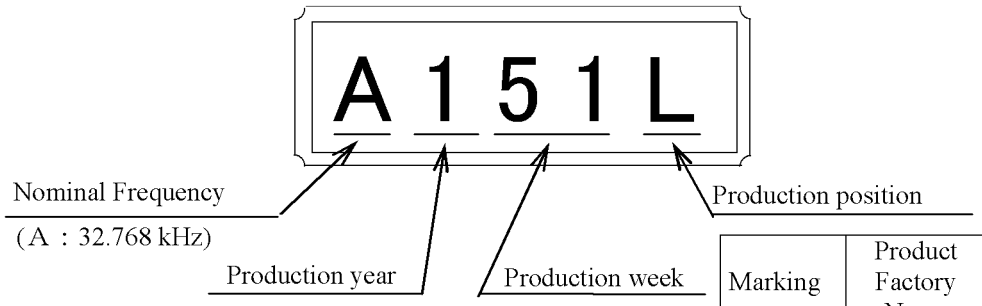
Type	FC-135	Terminal treatment	Au plating	Unit	1 = 1 mm

3. Recommended soldering pattern

Unit : 1 = 1 mm



4. Marking layout



Marking	Product Factory Name	Country
J	INA	Japan
Y	AEC	Japan
C	ETSZ	China
L	ETMY	Malaysia
K	KATO	Japan
N	GKL	Malaysia

* The above marking layout shows only marking contents and their approximate position and it is not for font, size and exact position.

Type	FC-135	Unit	1 = 1 mm

[6] Notes

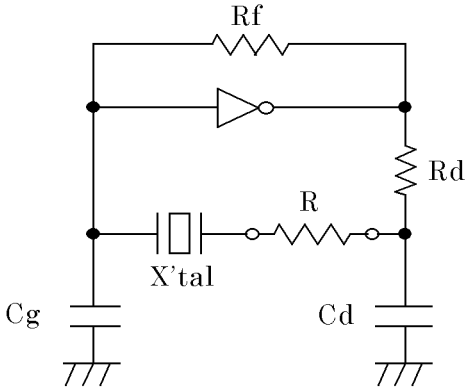
1. Max two (2) times reflow is allowed. Once miss soldering is happened, hand work soldering by soldering iron is recommended. (+ 350 °C × within 5 s)

2. Patterning should be followed by our recommended one.

3. Applying excessive excitation force to the crystal unit may cause deterioration damage.

4. Unless adequate negative resistance is allocated in the oscillation circuit, start up time of oscillation may be increased, or no oscillation may occur.

   How to check the negative resistance.



(1) Connect the resistance (R) to the circuit in series with the crystal unit.
(2) Adjust R so that oscillation can start (or stop).
(3) Measure R when oscillation just start (or stop) in above (2).
(4) Get the negative resistance
-R = R + CI value.
(5) Recommended -R
$|-R| > CI \times (5 \sim 10)$

5. The shortest patterning line on board is recommendable.
   Too long line on board may cause of abnormal oscillation.

6. To avoid mull function, no pattern under or near the crystal is allowed.

7. This device must be stored at the normal temperature and humidity conditions before mounting on a board.

8. Too much exciting shock or vibration may cause deterioration on damage.
   Depending on the condition such as a shock in assembly machinery, the products may be damaged.
   Please check your condition in advance to maintain shock level to be smallest.

9. Depending on the conditions, ultrasonic cleaning may cause resonant damage of the internal crystal unit. Since we are unable to determine the conditions (type of cleaning unit, power, time, conditions inside the bath, etc.) to be used in your company, we cannot guarantee the safety of this unit when it is cleaned in an ultrasonic cleaner.

10. Ink marking may be damaged by some kind of solvent, please take precautions when choosing solvent by your selves.

11. Please refer to packing specification regarding how to storage the products in the pack.

TAPING SPECIFICATION

1. APPLICATION

This document is applicable to FC-135.

2. CONTENTS

Item No.	Item	Page
[1]	Taping specification	1 to 2
[2]	Inner carton	3
[3]	Shipping carton	
[4]	Marking	4
[5]	Quantity	
[6]	Storage environment	
[7]	Handling	

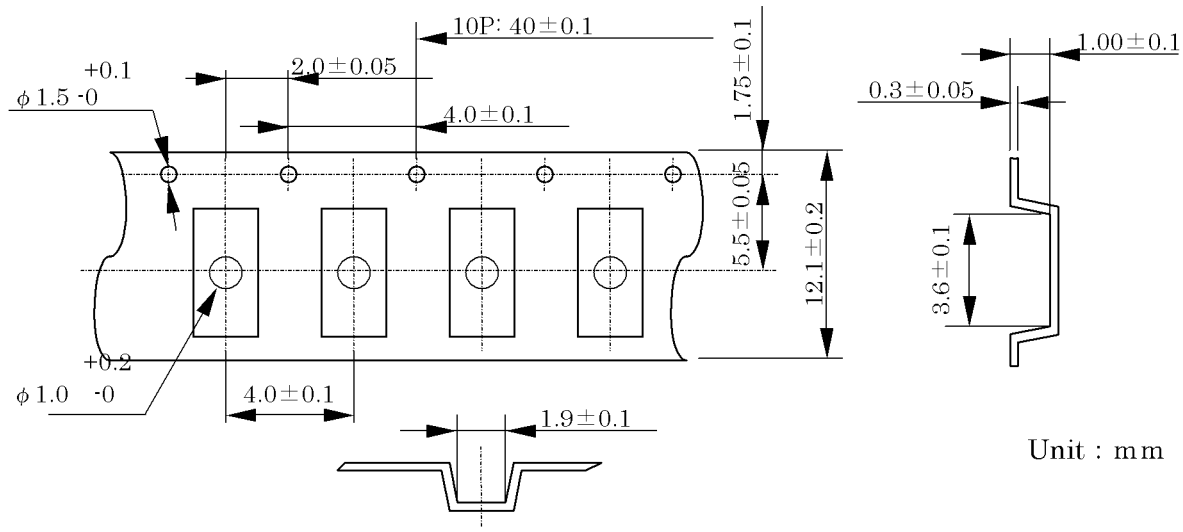
[1] Taping specification

Subject to EIA-481 and IEC 60286

(1) Tape dimensions TE1204L

Material of the Carrier Tape : PS

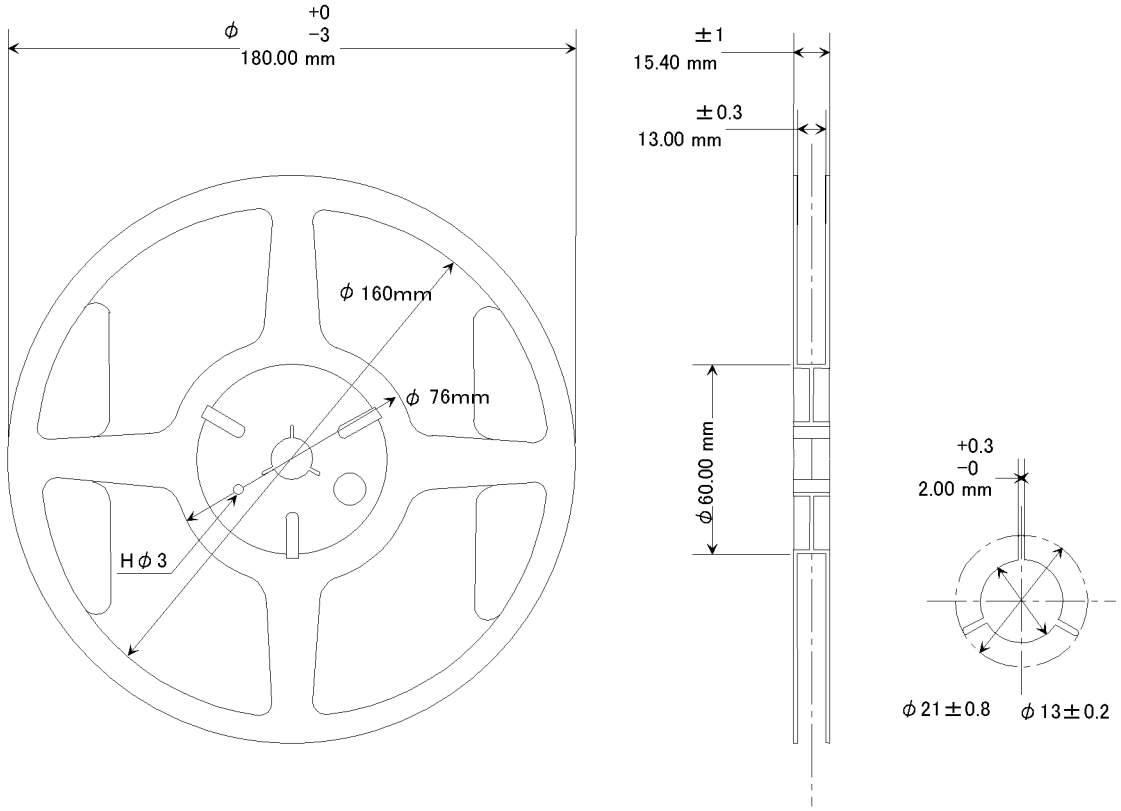
Material of the Top Tape : PET+PE



Unit : mm

(2) Reel dimensions EIAJRRM φ180

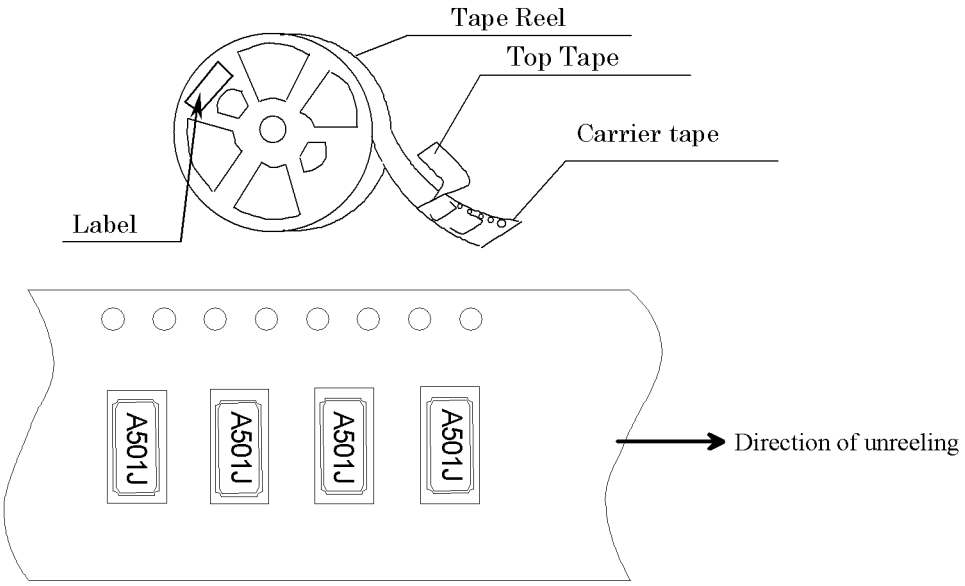
Material of the Reel : PS



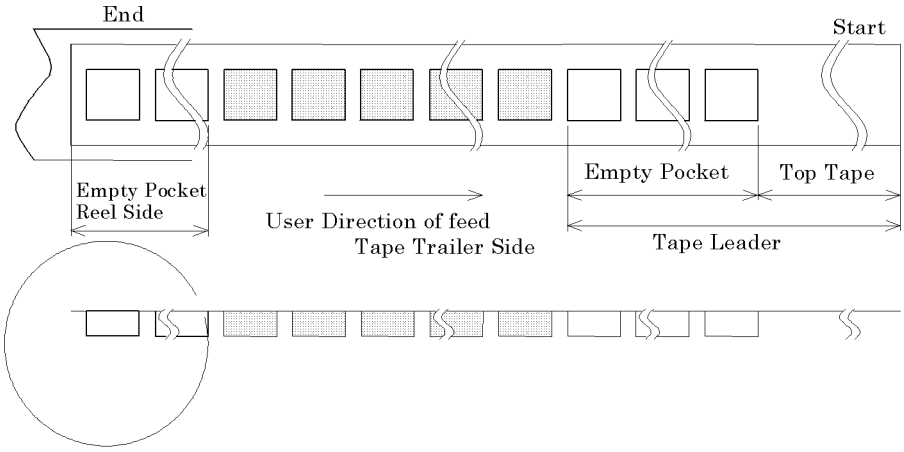
Form and Size of reel window shows are one of the example

(3) Packing

(a) Tape & Reel



(b) Start & End Point



Item		Empty Space
Tape Leader	Top Tape	Min. 1 000 mm
	Carrier Tape	Min. 80 mm
Tape Trailer	Top Tape	Min. 0 mm
	Carrier Tape	Min. 80 mm

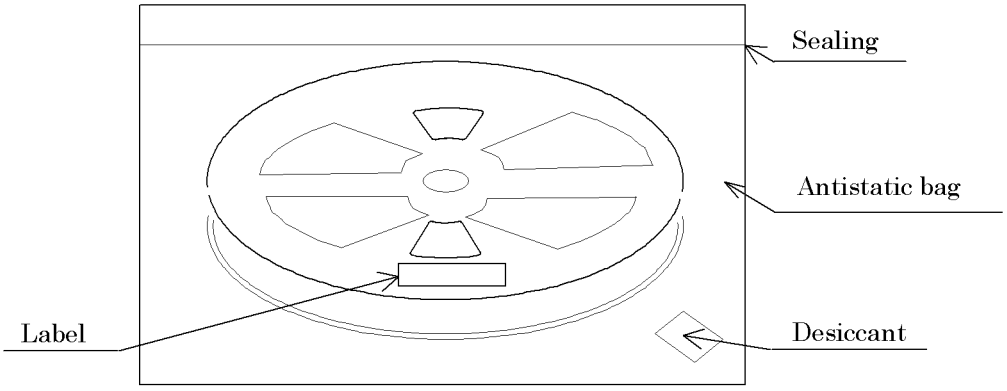
(4) Peel force of the cover tape

(a) angle : cover tape during peel off and the direction of unreeling shall be 165° to 180°.

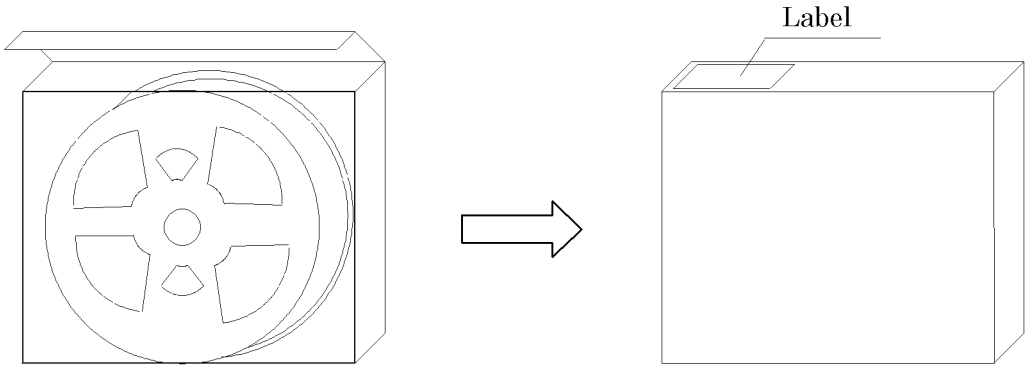
(b) peel speed : 300 mm/min

[2] Inner Carton

a) Packing to antistatic bag

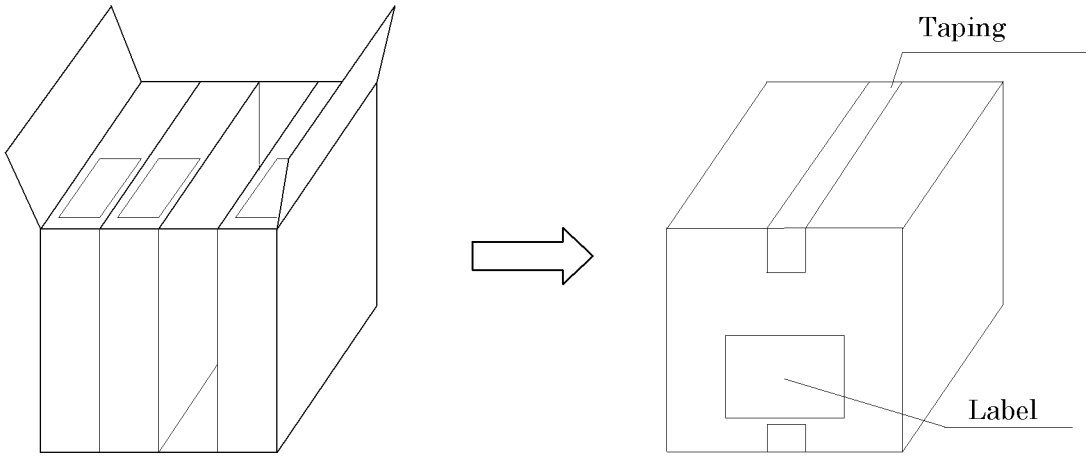


b) Packing to innercarton



[3] Shipping Carton

- Put inner boxes into an outer box.
- If there are room in the outer box,material is put in a shock absorbing together.



[4] Marking

(1) Reel marking

- Reel marking shall consist of :
  1) Parts name
  2) Quantity
  3) Manufacturing Date or symbol
  4) Manufacturer's Date or symbol
  5) Others (if necessary)

(2) Inner carton marking

- Same as Reel marking.

(3) Shipping carton marking

- Shipping carton marking shall consist of :
  1) Parts name
  2) Quantity

[5] Quantity

- 3 000 pcs./reel

[6] Storage environment

(1) To storage the reel at +15 °C to +35 °C, 25 %RH to 85 %RH of Humidity.
(2) To open the packing just before using.
(3) Not to expose the sun.
(4) Not to storage with some erosive chemicals.
(5) Nothing is allowed to put on the reel or carton to prevent mechanical damage.

[7] Handling

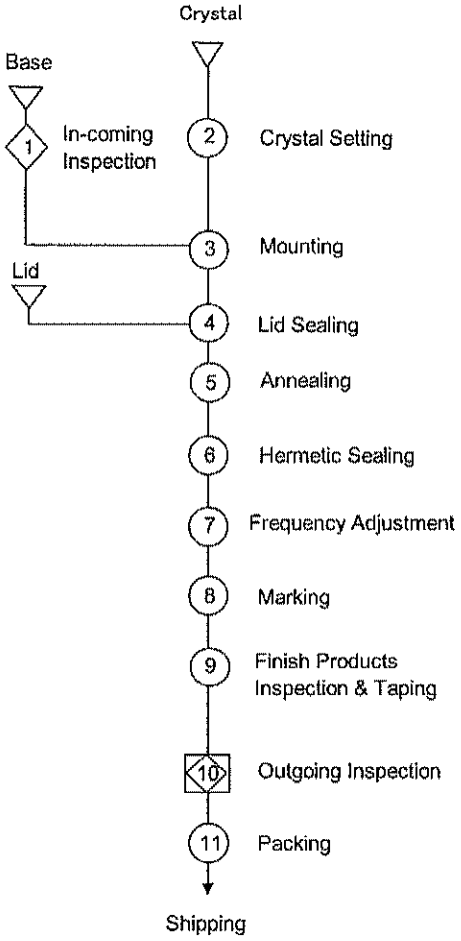
To handle with care to prevent the damage of tape, reel and products.

PROCESS QUALITY CONTROL

FC-135

No.C-0102-AIE-3

2008/7/29



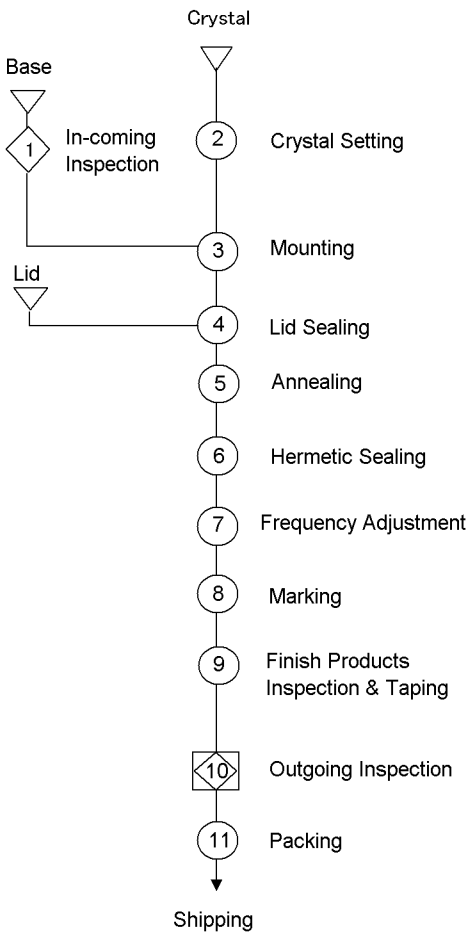
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1	Inspection Section	Purchasing Specification	Appearance	Sampling	Visual Inspection	In-coming Inspection
	(INA Plant QA)	Incoming Inspection Standard	Dimension	Sampling	Tool Microscope	Data Sheet
2	INA Plant	Manufacturing Instruction Sheet	Appearance	100% Inspection	Microscope	Process Data Sheet
3	INA Plant	Manufacturing Instruction Sheet	Appearance	100% Inspection	Microscope	Process Data Sheet
4	INA Plant	Manufacturing Instruction Sheet	Appearance	100% Inspection	Microscope	Process Data Sheet
			Height Measure	Sampling	Inspection Jig	
5	INA Plant	Manufacturing Instruction Sheet	Appearance	100% Inspection	Microscope	Process Data Sheet
6	INA Plant	Manufacturing Instruction Sheet	Appearance	100% Inspection	Microscope	Process Data Sheet
7	INA Plant	Manufacturing Instruction Sheet	Frequency	100% Inspection	Frequency Adjust-ment Machine	Data Sheet
8	INA Plant	Manufacturing Instruction Sheet	Appearance	100% Inspection	Microscope	Process Data Sheet
			Marking Strength	Sampling	Rubbing Test	Data Sheet
9	INA Plant	Manufacturing Instruction Sheet	Frequency	100% Inspection	Characteristics In-spection Machine	Process Data Sheet
			Crystal Inpedance	100% Inspection		
			Appearance	100% Inspection	Microscope	
10	INA Plant	Specification	Electrical Characteristics	Sampling	Measuring Equipment	Outgoing Inspection
		Outgoing Inspection Standard	Appearance	Sampling	Microscope	Data Sheet
			Dimension	Sampling	Tool Microscope	
11	INA Plant	Packing Instruction	Customers	— — —	— — —	Shipment List
		Daily Shipping List	Type			
			Quantity			

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No.C-0102-AAE-5

2009/11/4



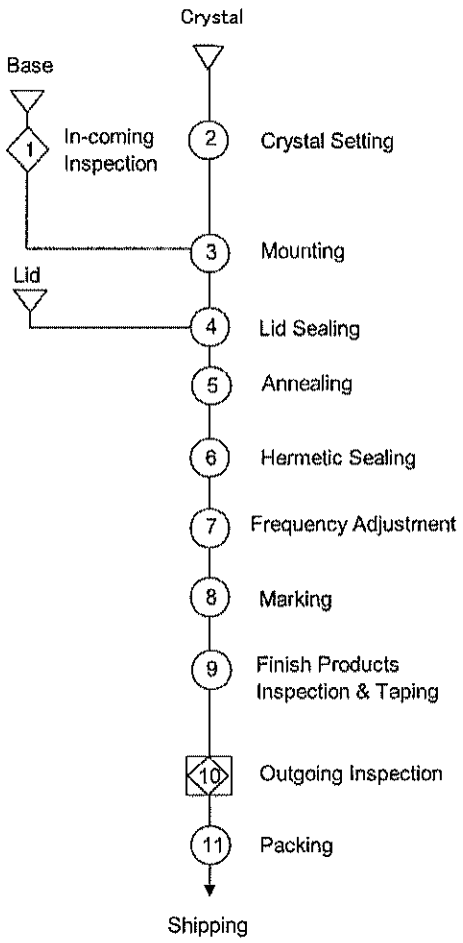
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	(AKITA EPSON QA)	Incoming Inspection Standard	Dimension	Sampling	Tool Microscope	Data Sheet
2	AKITA EPSON	Manufacturing Instruction Sheet	Appearance	100% Inspection	Microscope	Process Data Sheet
3	AKITA EPSON	Manufacturing Instruction Sheet	Appearance	100% Inspection	Microscope	Process Data Sheet
4	AKITA EPSON	Manufacturing Instruction Sheet	Appearance	100% Inspection	Microscope	Process Data Sheet
			Height Measure	Sampling	Inspection Jig	
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6	AKITA EPSON	Manufacturing Instruction Sheet	Appearance	100% Inspection	Microscope	Process Data Sheet
7	AKITA EPSON	Manufacturing Instruction Sheet	Frequency	100% Inspection	Frequency Adjust-ment Machine	Data Sheet
8	AKITA EPSON	Manufacturing Instruction Sheet	Appearance	100% Inspection	Microscope	Process Data Sheet
			Marking Strength	Sampling	Rubbing Test	Data Sheet
9	AKITA EPSON	Manufacturing Instruction Sheet	Frequency	100% Inspection	Characteristics In-spection Machine	Process Data Sheet
			Crystal Inpedance	100% Inspection		
			Appearance	100% Inspection	Microscope	
10	AKITA EPSON	Specification	Electrical Characteristics	Sampling	Measuring Equipment	Outgoing Inspection
		Outgoing Inspection Standard	Appearance	Sampling	Microscope	Data Sheet
			Dimension	Sampling	Tool Microscope	
11	AKITA EPSON	Packing Instruction	Customers	― ― ―	― ― ―	Shipment List
		Daily Shipping List	Type	― ― ―	― ― ―	
			Quantity	― ― ―	― ― ―	

PROCESS QUALITY CONTROL

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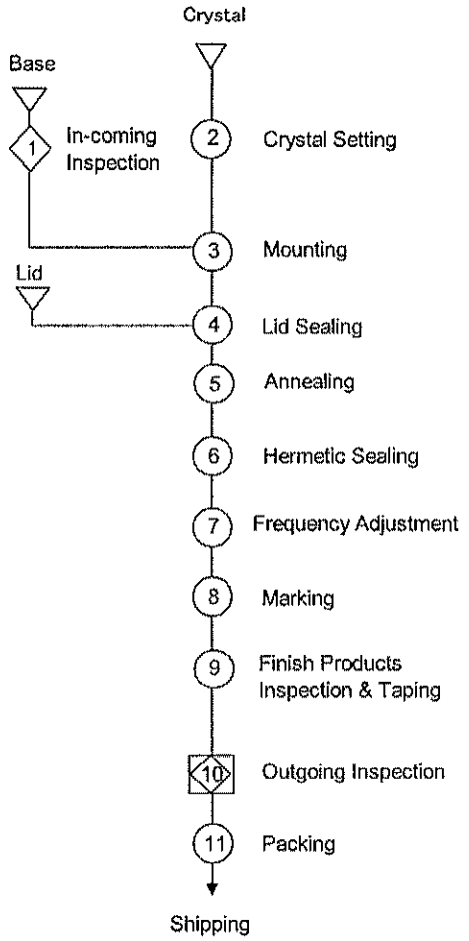
No.	Section In Charge	Standards	Inspection Control Item	Inspection Methods	Instruments	Record
1	Inspection Section (INA Plant QA)	Purchasing Specification Incoming Inspection Standard	Appearance Dimension	Sampling Sampling	Visual Inspection Tool Microscope	In-coming Inspection Data Sheet
2	CHINA Plant	Manufacturing Instruction Sheet	Appearance	100% Inspection	Microscope	Process Data Sheet
3	CHINA Plant	Manufacturing Instruction Sheet	Appearance	100% Inspection	Microscope	Process Data Sheet
4	CHINA Plant	Manufacturing Instruction Sheet	Appearance Height Measure	100% Inspection Sampling	Microscope Inspection Jig	Process Data Sheet
5	CHINA Plant	Manufacturing Instruction Sheet	Appearance	100% Inspection	Microscope	Process Data Sheet
6	CHINA Plant	Manufacturing Instruction Sheet	Appearance	100% Inspection	Microscope	Process Data Sheet
7	CHINA Plant	Manufacturing Instruction Sheet	Frequency	100% Inspection	Frequency Adjust-ment Machine	Data Sheet
8	CHINA Plant	Manufacturing Instruction Sheet	Appearance Marking Strength	100% Inspection Sampling	Microscope Rubbing Test	Process Data Sheet Data Sheet
9	CHINA Plant	Manufacturing Instruction Sheet	Frequency Crystal Inpedance Appearance	100% Inspection 100% Inspection 100% Inspection	Characteristics In-spection Machine Microscope	Process Data Sheet
10	CHINA Plant	Specification Outgoing Inspection Standard	Electrical Characteristics Appearance Dimension	Sampling Sampling Sampling	Measuring Equipment Microscope Tool Microscope	Outgoing Inspection Data Sheet
11	CHINA Plant	Packing Instruction Daily Shipping List	Customers Type Quantity	--- --- ---	--- --- ---	Shipment List

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No.	Section In Charge	Standards	Inspection Control Item	Inspection Methods	Instruments	Record
1	Inspection Section (INA Plant QA)	Purchasing Specification	Appearance	Sampling	Visual Inspection	In-coming Inspection Data Sheet
		Incoming Inspection Standard	Dimension	Sampling	Tool Microscope	
2	MALAYSIA Plant	Manufacturing Instruction Sheet	Appearance	100% Inspection	Microscope	Process Data Sheet
3	MALAYSIA Plant	Manufacturing Instruction Sheet	Appearance	100% Inspection	Microscope	Process Data Sheet
4	MALAYSIA Plant	Manufacturing Instruction Sheet	Appearance	100% Inspection	Microscope	Process Data Sheet
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9	MALAYSIA Plant	Manufacturing Instruction Sheet	Frequency	100% Inspection	Characteristics In-spection Machine	Process Data Sheet
			Crystal Inpedance	100% Inspection		
			Appearance	100% Inspection	Microscope	
10	MALAYSIA Plant	Specification	Electrical Characteristics	Sampling	Measuring Equipment	Outgoing Inspection Data Sheet
		Outgoing Inspection Standard	Appearance	Sampling	Microscope	
			Dimension	Sampling	Tool Microscope	
11	MALAYSIA Plant	Packing Instruction	Customers	--- --- ---	--- --- ---	Shipment List
		Daily Shipping List	Type	--- --- ---	--- --- ---	
			Quantity	--- --- ---	--- --- ---	

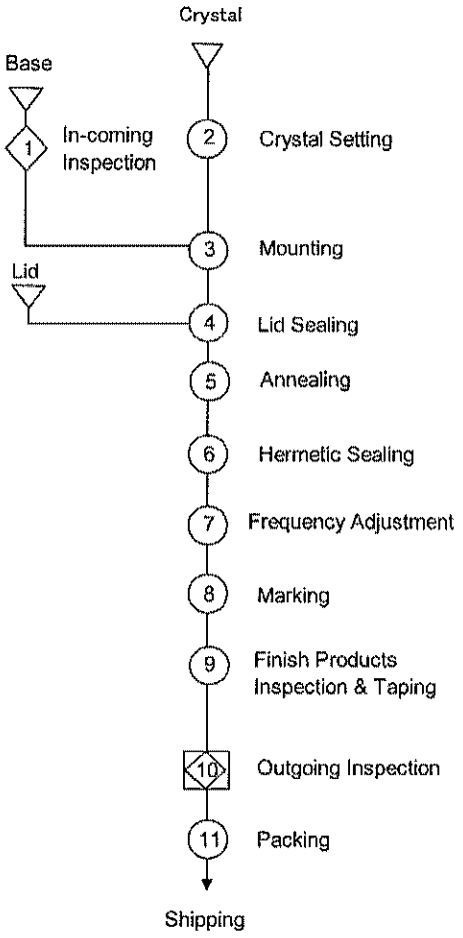
PROCESS QUALITY CONTROL

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No.C-0102-AKE-1

2008/7/29

Manufacturing process chart



No.	Section In Charge	Standards	Inspection Control Item	Inspection Methods	Instruments	Record
1	Inspection Section (INA Plant QA)	Purchasing Specification Incoming Inspection Standard	Appearance	Sampling	Visual Inspection	In-coming Inspection Data Sheet
			Dimension	Sampling	Tool Microscope	
2	SUB-CONTRACTOR	Manufacturing Instruction Sheet	Appearance	100% Inspection	Microscope	Process Data Sheet
3	SUB-CONTRACTOR	Manufacturing Instruction Sheet	Appearance	100% Inspection	Microscope	Process Data Sheet
4	SUB-CONTRACTOR	Manufacturing Instruction Sheet	Appearance	100% Inspection	Microscope	Process Data Sheet
			Height Measure	Sampling	Inspection Jig	
5	SUB-CONTRACTOR	Manufacturing Instruction Sheet	Appearance	100% Inspection	Microscope	Process Data Sheet
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7	SUB-CONTRACTOR	Manufacturing Instruction Sheet	Frequency	100% Inspection	Frequency Adjust-ment Machine	Data Sheet
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9	SUB-CONTRACTOR	Manufacturing Instruction Sheet	Frequency	100% Inspection	Characteristics In-spection Machine	Process Data Sheet
			Crystal Inpedance	100% Inspection		
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10	SUB-CONTRACTOR	Specification Outgoing Inspection Standard	Electrical Characteristics	Sampling	Measuring Equipment	Outgoing Inspection Data Sheet
			Appearance	Sampling	Microscope	
			Dimension	Sampling	Tool Microscope	
11	SUB-CONTRACTOR	Packing Instruction Daily Shipping List	Customers	---	---	Shipment List
			Type	---	---	
			Quantity	---	---	

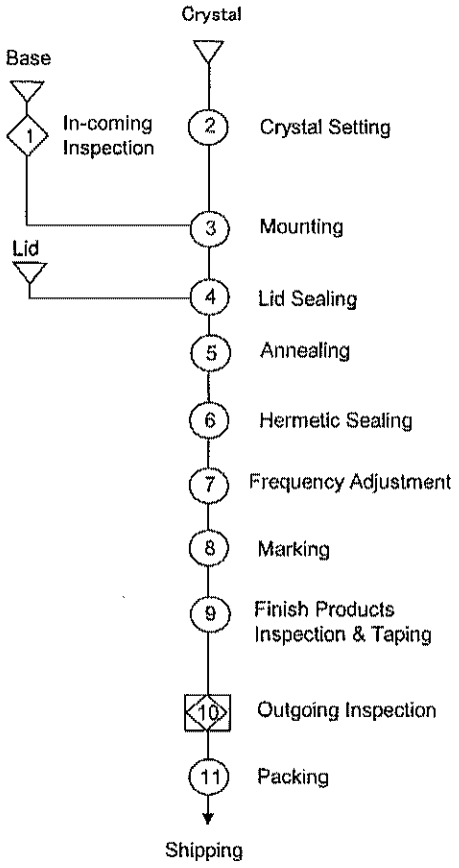
PROCESS QUALITY CONTROL

FC-135

No.C-0102-AGE-1

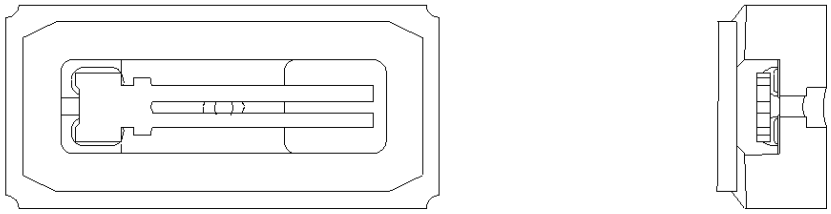
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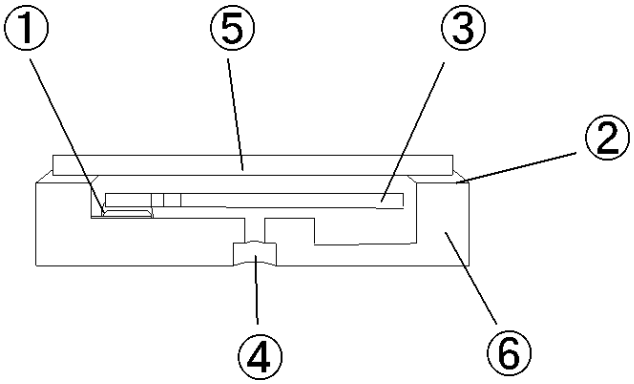
Manufacturing process chart

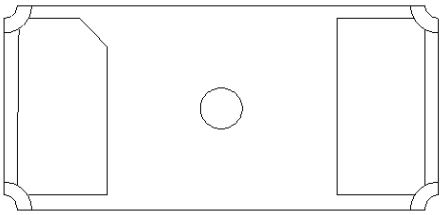


No.	Section In Charge	Standards	Inspection Control Item	Inspection Methods	Instruments	Record
1	Inspection Section	Purchasing Specification	Appearance	Sampling	Visual Inspection	In-coming Inspection
	(INA Plant QA)	Incoming Inspection Standard	Dimension	Sampling	Tool Microscope	Data Sheet
2	SUB-CONTRACTOR of ETMY	Manufacturing Instruction Sheet	Appearance	100% Inspection	Microscope	Process Data Sheet
3	SUB-CONTRACTOR of ETMY	Manufacturing Instruction Sheet	Appearance	100% Inspection	Microscope	Process Data Sheet
4	SUB-CONTRACTOR of ETMY	Manufacturing Instruction Sheet	Appearance	100% Inspection	Microscope	Process Data Sheet
			Height Measure	Sampling	Inspection Jig	
5	SUB-CONTRACTOR of ETMY	Manufacturing Instruction Sheet	Appearance	100% Inspection	Microscope	Process Data Sheet
6	SUB-CONTRACTOR of ETMY	Manufacturing Instruction Sheet	Appearance	100% Inspection	Microscope	Process Data Sheet
7	SUB-CONTRACTOR of ETMY	Manufacturing Instruction Sheet	Frequency	100% Inspection	Frequency Adjust-ment Machine	Data Sheet
8	SUB-CONTRACTOR of ETMY	Manufacturing Instruction Sheet	Appearance	100% Inspection	Microscope	Process Data Sheet
			Marking Strength	Sampling	Rubbing Test	Data Sheet
9	SUB-CONTRACTOR of ETMY	Manufacturing Instruction Sheet	Frequency	100% Inspection	Characteristics In-spection Machine	Process Data Sheet
			Crystal Inpedance	100% Inspection		
			Appearance	100% Inspection	Microscope	
10	SUB-CONTRACTOR of ETMY	Specification	Electrical Characteristics	Sampling	Measuring Equipment	Outgoing Inspection
		Outgoing Inspection Standard	Appearance	Sampling	Microscope	Data Sheet
			Dimension	Sampling	Tool Microscope	
11	SUB-CONTRACTOR of ETMY	Packing Instruction	Customers	---	---	Shipment List
		Daily Shipping List	Type	---	---	
			Quantity	---	---	

Structure diagram FC-135







LIST		
Name of part		Material
①	Crystal Adhesive	Ag Paste
②	Sealing	Seal Glass
③	Chip	Crystal
④	Sealing	Au/Ge
⑤	Lid	Glass
⑥	Package	Ceramic(Al2O3)

RELIABILITY TEST DATA
Product Name : FC-135

The Company evaluation condition
We evaluate environmental and mechanical characteristics by the following test condition . No. **F-C-0102-04-007EMH**

No.	ITEM	TEST CONDITIONS	VALUE *1 *2 Δ f / f [1 × 10^{-6}]	TEST Qty [n]	FAIL Qty [n]
1	Shock	100 g dummy (Epson Toyocom Standard) drop from 1 500 mm height on to the concrete 3 directions 10 times	*3 ± 8	22	0
2	Vibration	10 Hz to 55 Hz amplitude 0.75 mm 55 Hz to 500 Hz acceleration 98 m/s^2 10 Hz → 500 Hz → 10 Hz 15 min / cycle 6 h (2 h × 3 directions)	*3 ± 3	22	0
3	Resistance to soldering heat	For air reflow soldering furnace (2 times)	± 5	22	0
4	High temperature storage	a) +125℃ × 1 000 h b) +85 ℃ × 1 000 h	*3 a) ± 10 *3 b) ± 7	a) 22 b) 22	a) 0 b) 0
5	Low temperature storage	-55 ℃ × 1 000 h	*3 ± 10	22	0
6	Temperature humidity storage	+85 ℃ × 85 %RH × 1 000 h	*3 ± 10	22	0
7	Temperature cycle	-55 ℃ ⇔ +125 ℃ 30 min at each temp. 100 cycles	*3 ± 10	22	0
8	Sealing	For He leak detector	*3 1 × 10^{-8} hPa · l / s Max.	11	0
9	Shear	20 N press for 10 s ± 1 s Ref. IEC 60068-2-21	No peeling - off at a solder part	11	0
10	Pull - off	20 N press for 10 s ± 1 s Ref. IEC 60068-2-21	No peeling - off at a solder part	11	0
11	Substrate bending	Bend width reaches 3 mm and hold for 5 s ± 1 s × 1 time Ref. IEC 60068-2-21	No peeling - off at a solder part	11	0
12	Solvent resistance	Ref. JIS C 0052 or IEC 60068-2-45	The marking shall be legible	11	0

Notes
*1 Each test done independently.
*2 Measuring 2 h to 24 h later leaving in room temperature after each test. DL : 0.5 μW
*3 Pre conditionings Initial value shall be after 24 h at room temperature.
Shift of series resistance at before and after the test should be less than ±20 % or less than ±15 kΩ.
In case high temperature storage(+125 °C × 1 000 h), Soldering heat resistance,shift of series resistance at before and after the test should be less than ±30 % or ±20 kΩ.

Qualification Data

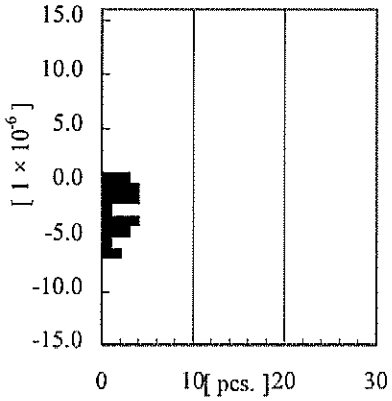
Product Name : FC-135

Δ f / f

No. **F-C-0102-04-008EMH**

1. Shock

1 500 mm × 3 directions 、 100 g 、 10 times

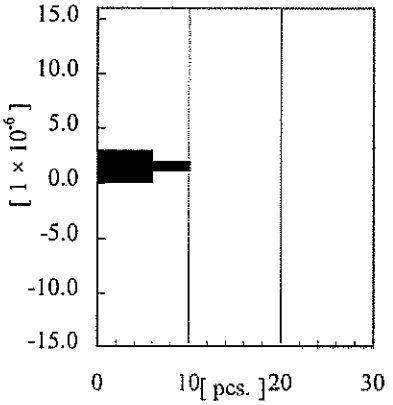


2. Vibration

10 Hz to 55 Hz amplitude 0.75 mm

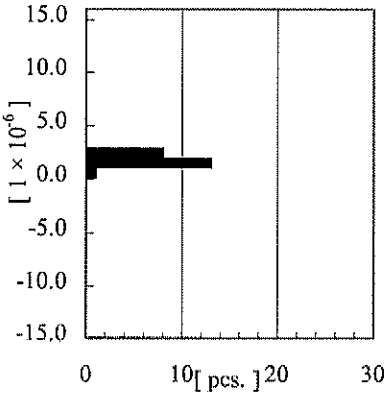
55 Hz to 500 Hz acceleration 98 m/s²

15 min / cycle 6 h (2 h 、 3 directions)



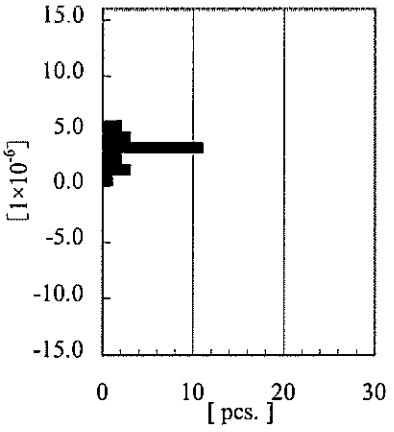
3.Resistance to soldering heat

For air reflow soldering furnace (2times)



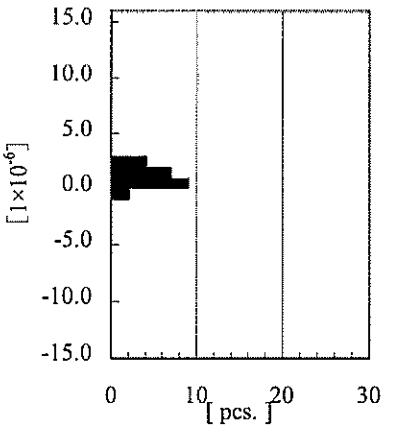
4. High temp. storage

a) +125 ℃ × 1 000 h



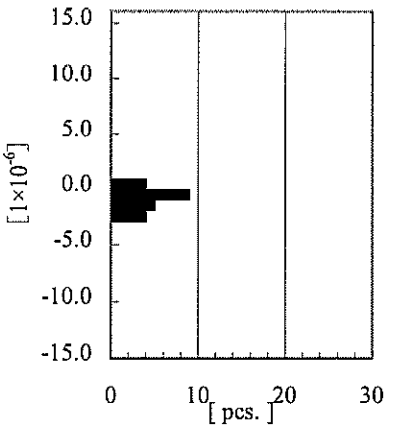
4. High temp. storage

b) +85 ℃ × 1 000 h



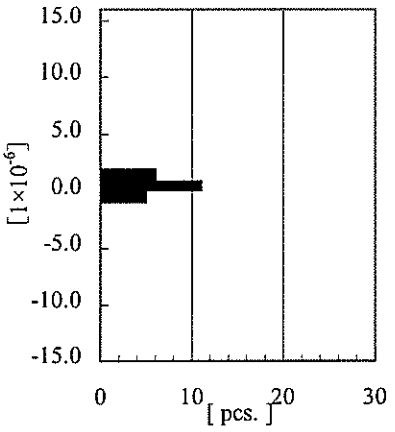
5. Low temp. storage

-55 ℃ × 1 000 h



6. Temp. humidity storage

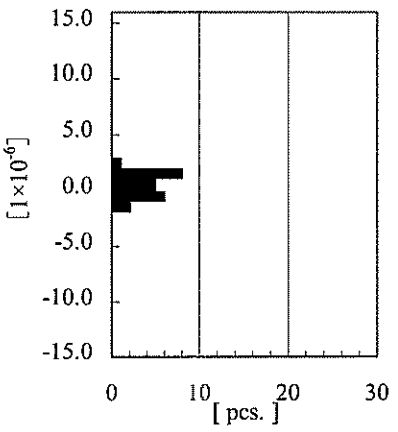
+85 ℃ × 85 %RH × 1 000 h



7.Temp. cycle

-55 ℃ ⇔ +125 ℃

100 cycles



Qualification Data

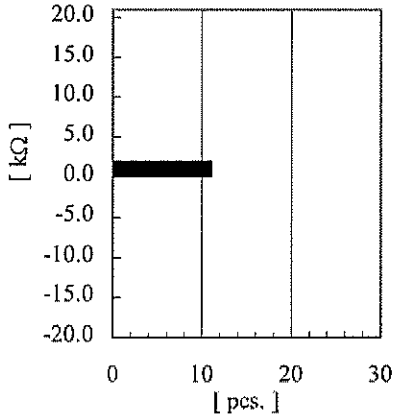
Product Name : FC-135

Δ CI

No. F-C-0102-04-009EMH

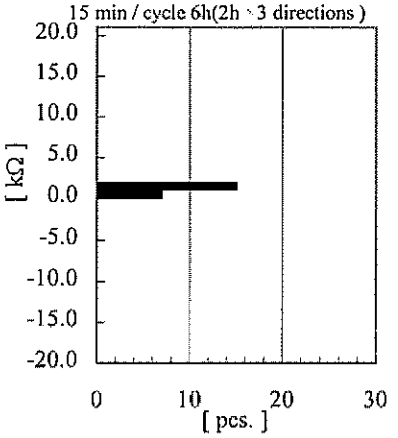
1. Shock

1 500 mm、3 directions、100 g
、10 times



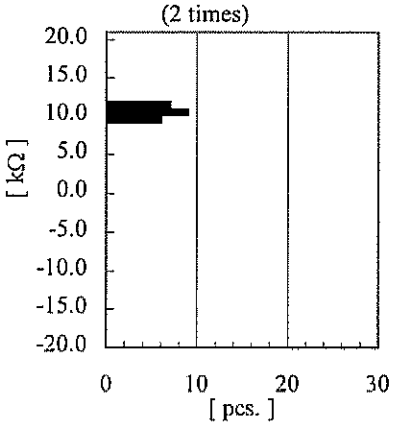
2. Vibration

10 Hz to 55 Hz amplitude 0.75 mm
55 Hz to 500 Hz acceleration 98 m/s^2
15 min / cycle 6h(2h、3 directions)



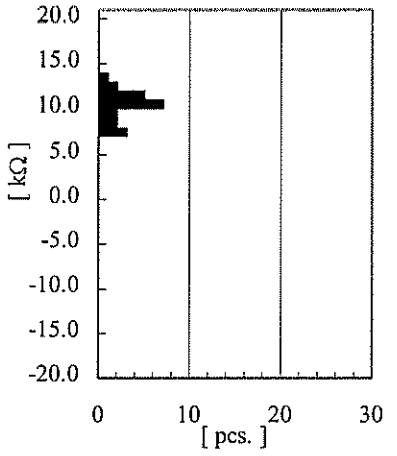
3. Resistance to soldering heat

For air reflow soldering furnace
(2 times)



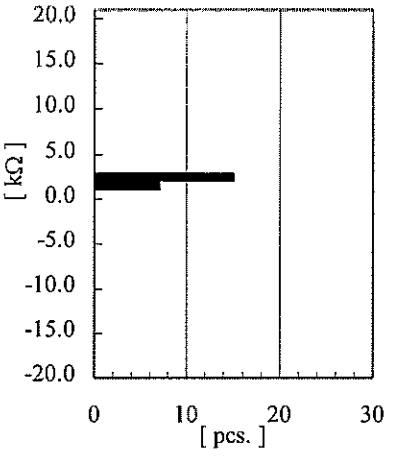
4. High temp. storage

a) +125 ℃ × 1 000 h



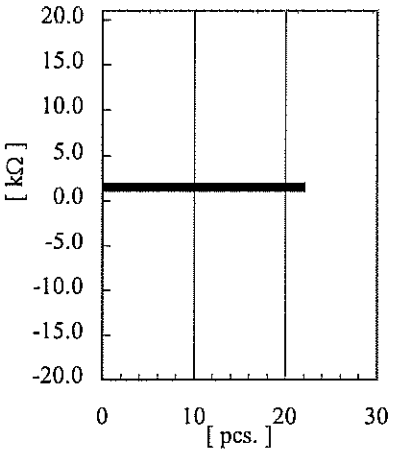
4. High temp. storage

b) +85℃ × 1 000 h



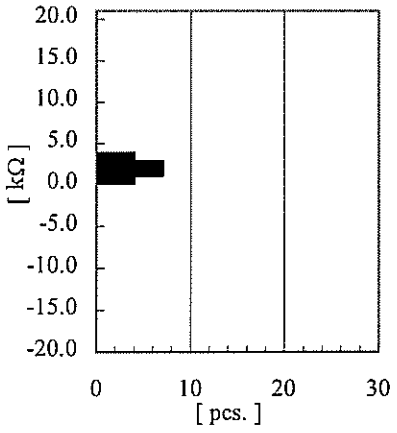
5. Low temp. storage

-55 ℃ × 1 000 h



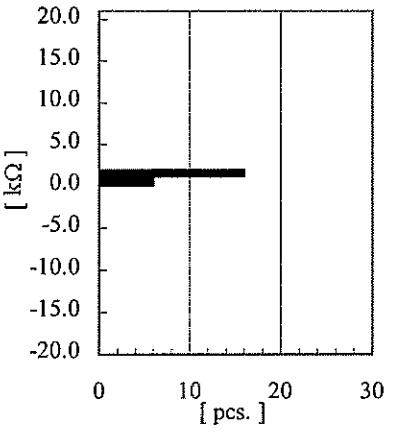
6. Temp. humidity storage

+85 ℃ × 85 %RH × 1 000 h



7.Temp. cycle

-55 ℃ ⇔ +125 ℃
100 cycles



Qualification Data