| RECIPIENT |
| --- |
| |

# SPECIFICATIONS

**Product No. : Q13MC3061001800**

**MODEL : MC-306**

**SPEC. No. : Q13-185-9A**

**DATE: Nov. 8. 2013**


**SEIKO EPSON CORPORATION**

**8548 Naka-minowa**
**Minowa-machi Kamiina-gun**
**Nagano-ken**
**399-4696 Japan**


**CHECKED** _____ / TD･CS Quality Assurance Department Manager
Hiroaki Ohashi

**PREPARED** _____ / TD･CS Quality Assurance Department Senior Staff
Takashi kurumizawa

# SPECIFICATIONS

## 1. Application

1) This document is applicable to the crystal unit that are delivered to from Seiko Epson Corp.

2) RoHS compliant
MC-306 contains lead in high melting type solder which is exempted in RoHS directive.

3) This Product supplied (and any technical information furnished, if any) by Seiko Epson 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 for the 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 Q13MC3061001800.
The model is MC-306.

## 3. Packing

It is subject to the packing standard of Seiko Epson 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


| Item No. | Item | Page |
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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 | |
| 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 | | 0.1 | | 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 | ± 10 | $\times 10^{-6}$ | CL = 12.5 pF<br>Ta = + 25 ± 3 °C<br>Not include aging |
| 3 | Quality factor | | Q | 5.0Min. | $\times 10^{4}$ | Decay method |
| 4 | Motional resistance | | R1 | 50 Max. | kΩ | CI meter : Saunders 140B<br>Level of drive : 1.0 μW |
| 5 | Motional capacitance | | C1 | 1.8 Typ. | fF | |
| 6 | Shunt capacitance | | C0 | 0.9 Typ. | pF | |
| 7 | 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. | $\times 10^{-6}/°C^{2}$ | |
| 8 | Isolation resistance | | IR | 500 Min. | MΩ | DC 100 V ± 15, 60 seconds<br>Between terminal # 1 and terminal # 4 |
| 9 | Frequency Aging | | f_age | ± 3 | $\times 10^{-6}$/year | Ta = + 25 °C ± 3 °C |

## [ 4 ] Environmental and mechanical characteristic

(The company evaluation condition We evaluate it by the following examination item and examination condition.)

| No. | Items | Value*1*2 | Conditions |
|---|---|---|---|
| | | Δ f/f [1 × $10^{-6}$] | |
| 1 | Drop | ± 5 | Free drop from 750 mm height on a hard wooden board for 3 times (Board is thickness more than 30 mm) |
| 2 | Vibration resistance | ± 3 | 10 Hz to 55 Hz amplitude 0.75 mm<br>55 Hz to 500 Hz acceleration 98 $m/s^2$<br>10 Hz → 500 Hz → 10 Hz 15 min./cycle<br>6 h (2 hours , 3 directions) |
| 3 | High temperature storage | *3 a ) ± 20<br>*3 b ) ± 10 | a )+ 125 °C × 1 000 h<br>b ) + 85 °C × 1 000 h |
| 4 | Low temperature storage | *3 ± 20 | - 55 °C × 1 000 h |
| 5 | Temperature cycle | *3 ± 20 | - 55 °C ⇔ + 125 °C<br>30 min. at each temp. 100 cycles |
| 6 | High temperature and humidity | *3 ± 20 | + 85 °C × 8 5%RH × 1 000 h |
| 7 | Soldering heat resistance | ± 5 | For convention reflow soldering furnace (2 times) |
| 8 | Shear | No peeling-off at a soldered part | 20 N press the side for 10 ± 1 s<br>Ref. IEC 60068-2-21 |
| 9 | Pull - off | No peeling-off at a soldered part | 10 N press the side for 10 ± 1 s.<br>Ref. IEC 60068-2-21 |
| 10 | Solvent resistance | The marking shall be legible | Ref. JIS C 0052 or IEC 60068-2-45 |
| 11 | Solderability | Termination must be 95 % covered with fresh solder | Dip termination into solder bath at + 235 °C ± 5 °C for 3 s (Using Rosin Flux) |

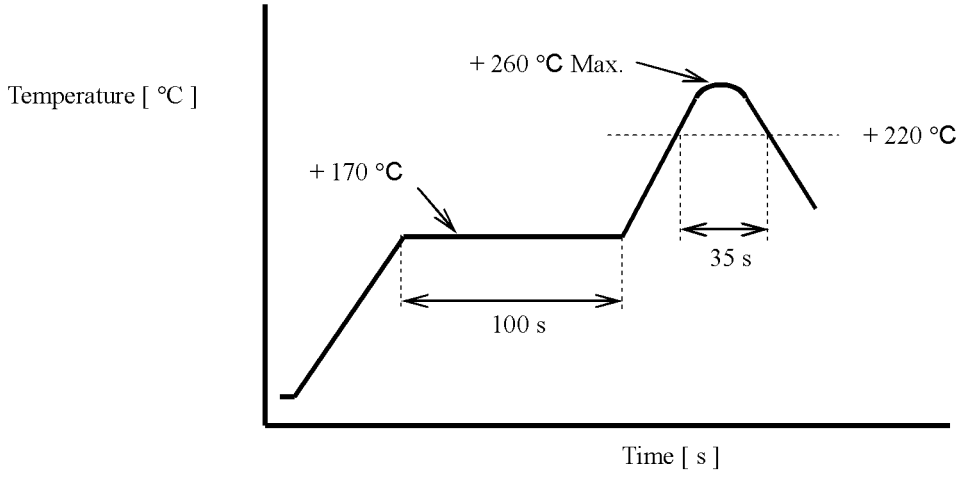
< Notes >

1. *1 Each test done independently.
2. *2 Measuring 2 h to 24 h later leaving in room temperature after each test.
3. *3 Pre conditionings
   1. + 125 °C × 24 h to + 85 °C × 85 %RH × 48 h ± 1 h → reflow 2 times
   2. Initial value shall be after 24 h at room temperature.
4. Shift series resistance at after above tests should be less than 60 kΩ

♦ Air-reflow

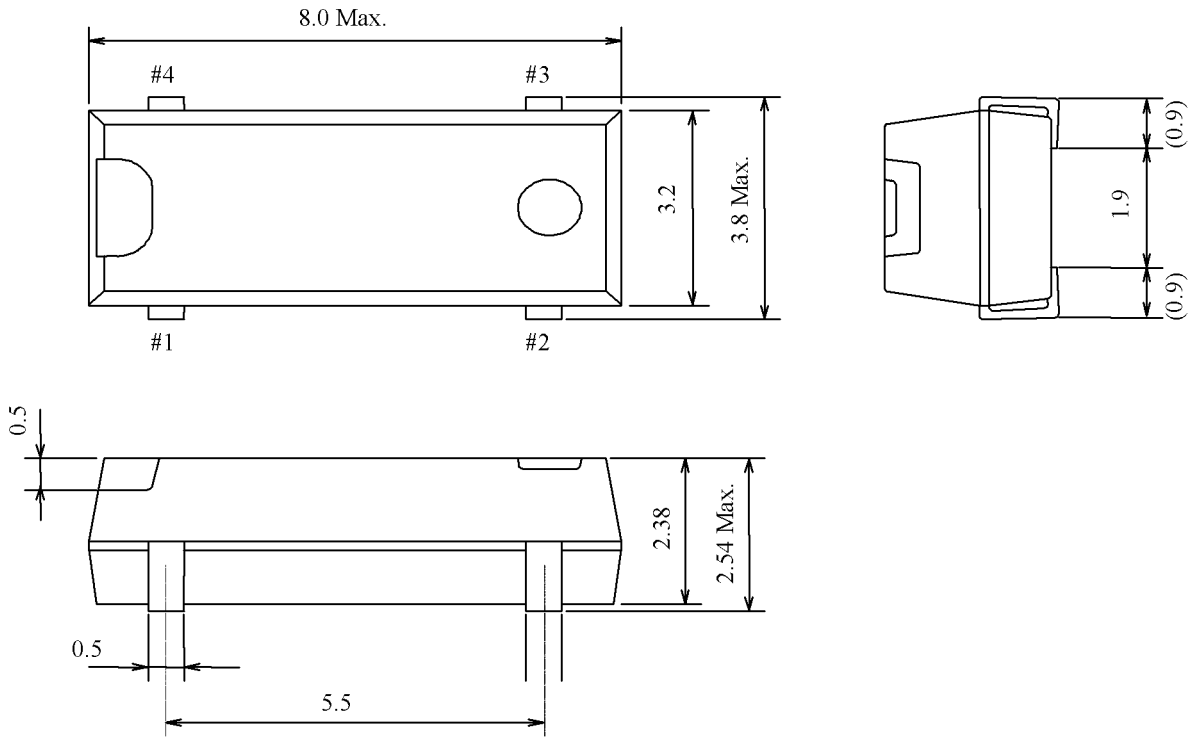
Pre heating temperature : + 170 °C  Pre heating time : 100 s

Heating temperature : + 220 °C  Heating time : 35 s



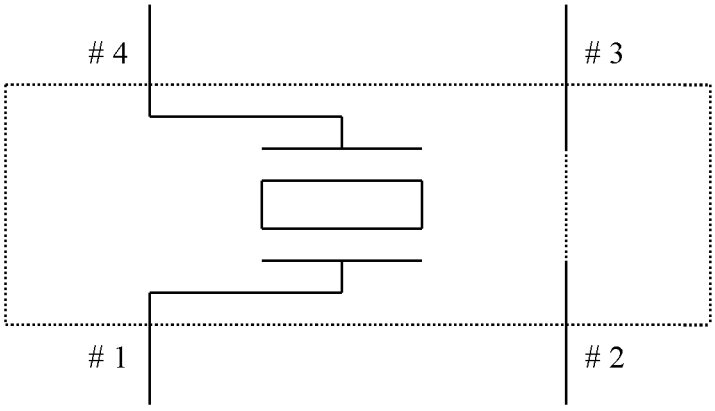
[ 5 ] Dimensions and marking layout

1. Dimensions




Metal may be exposed on the top or bottom of this product.
This will not affect any quality, reliability or electrical spec.

2. Circuit location

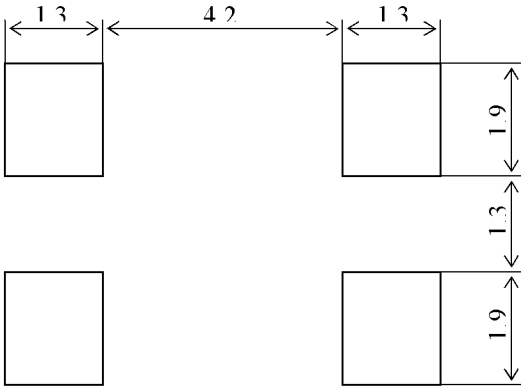



Do not connect # 2 and # 3 terminals to any external terminals.

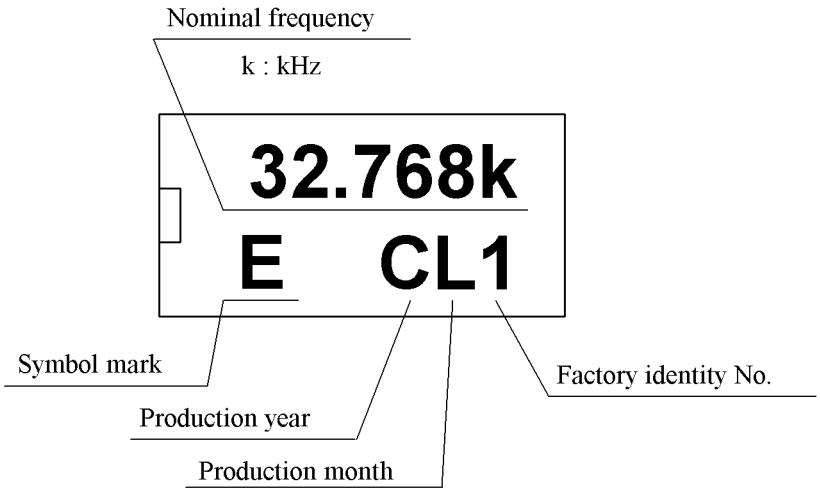
| Type | MC-306 | Terminal treatment | Pb Free Solder plate | Unit | 1 = 1 mm |
|---|---|---|---|---|---|

3. Recommendable patterning

Unit : 1 = 1 mm




4. Marking layout




Symbol of Manufacturing year

| Year digit | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|
| Marking | A | B | C | D | E | F | G | H | J | K |

Year digit(1st) of the Production

Symbol of Manufacturing month

| Month digit | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Marking ( Halide free ) | A | B | C | D | E | F | G | H | J | K | L | M |

- ♦ Nominal frequency is only example.
- ♦ The above marking layout shows only marking contents and their approximate position and it is not for font, size and exact position.

## [ 6 ] Notes

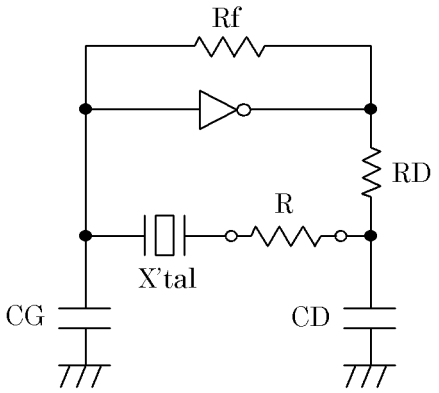
1. Max two (2) times reflow is allowed. Once miss soldering is happen, hand work soldering by soldering iron is recommended. (+ 350 °C × within 5 sec.)

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

6. To avoid malfunction, no pattern under or near the X'tal is allowed.
   Solder paste should be more than 150 μm thickness.

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 cloud cause resonance damage of the internal crystal unit. Since we are unable to determine the usage conditions (type of cleaning unit, power, time, conditions inside the bath, etc.) at our company, we cannot guarantee the safety of this unit when it is cleaned in an ultrasonic cleaner.

10. Ink marking is some kind of solvent may damage marking ink; please take precautions when choosing solvent.

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

# TAPING SPECIFICATION

## 1. APPLICATION

This document is applicable to MC-306 and MC-30A.

## 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 | |

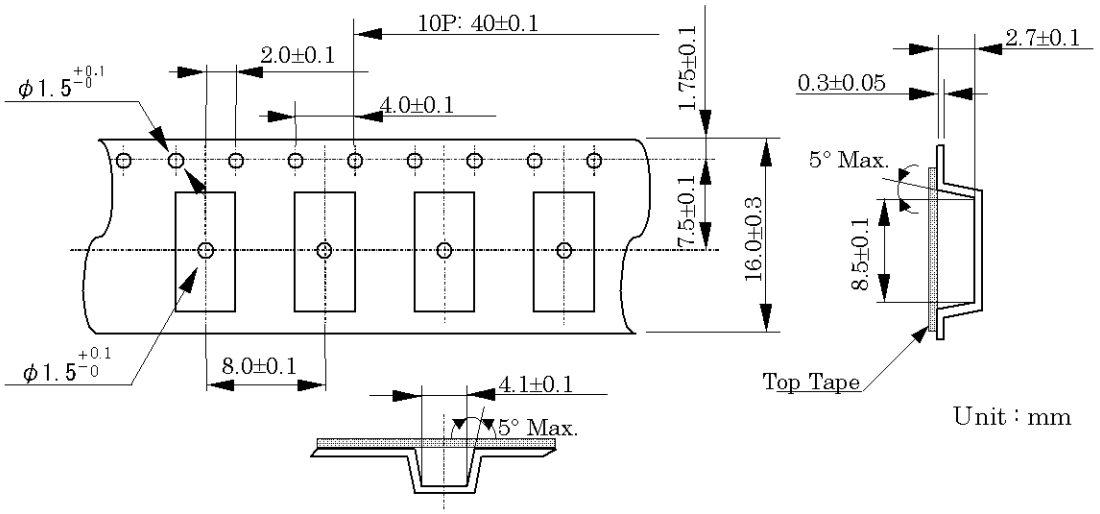
## [ 1 ] Taping specification

Subject to EIA-481 and IEC 60286.

(1) Tape dimensions TE1608L

Material of the Carrier Tape : PS

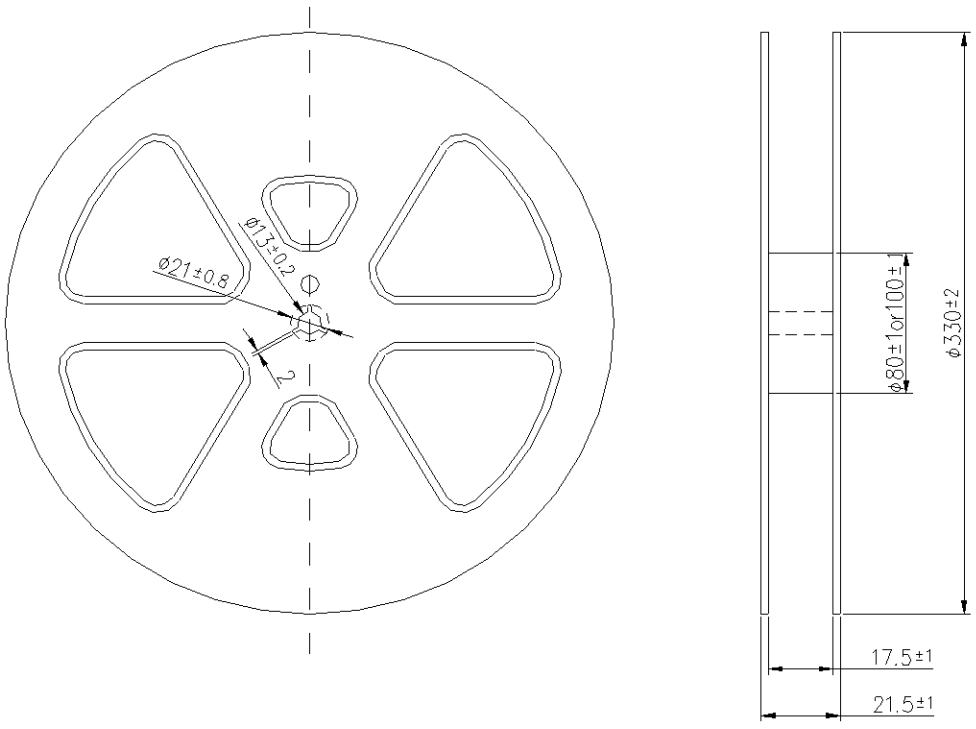
Material of the Top Tape : PET+PE




Unit : mm

(2) Reel dimensions

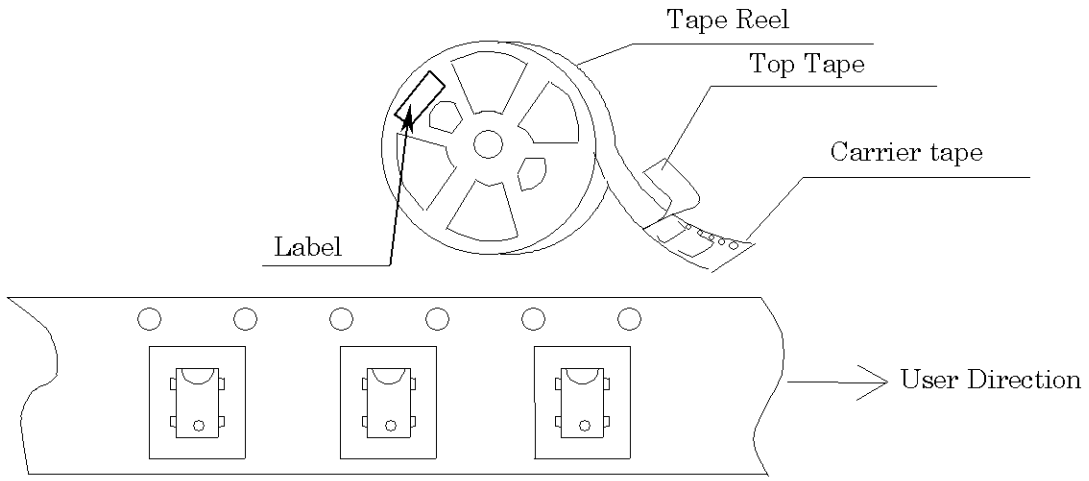
Material of the Reel : PS



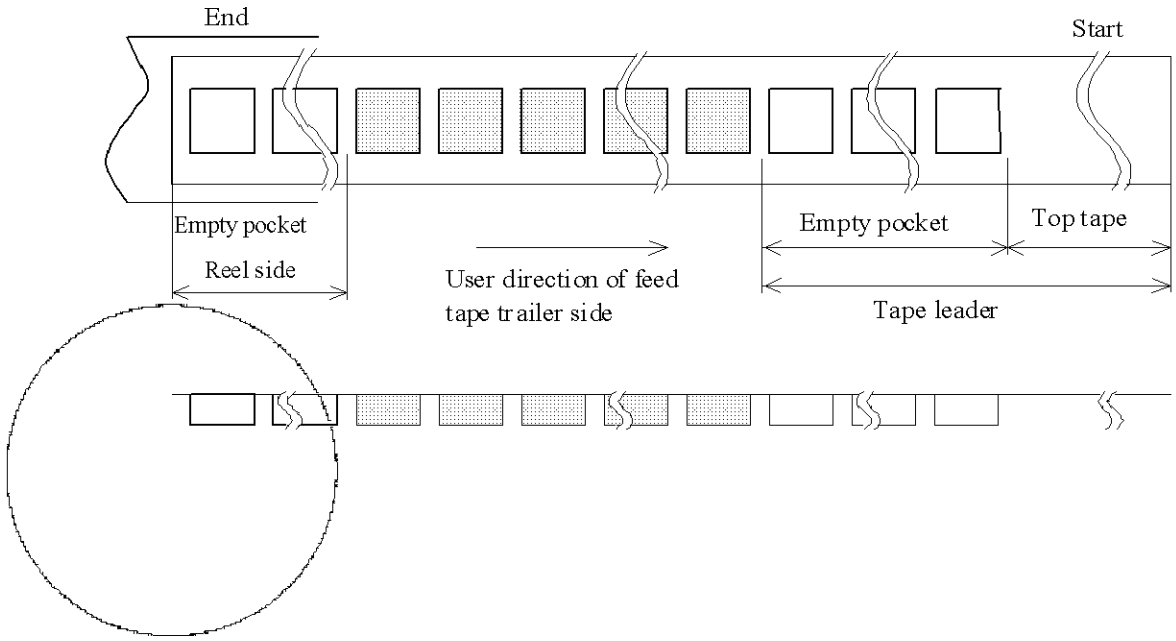

Form and Size of reel window shows are one of the example

(3) Packing

(a) Tape & Reel




(b) Start & End Point




(c) Peel force of the cover tape

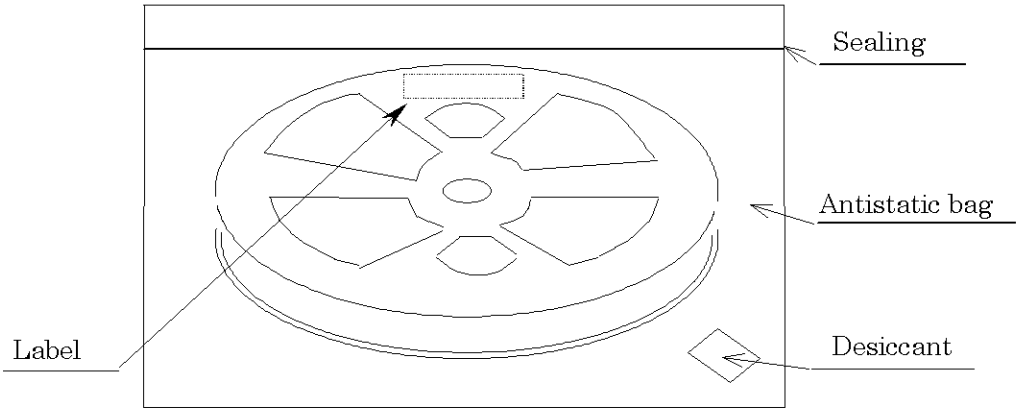
(1) angle : cover tape during peel off and the direction of unreeling shall be 165° to 180°.

(2) peel speed :300 mm/min

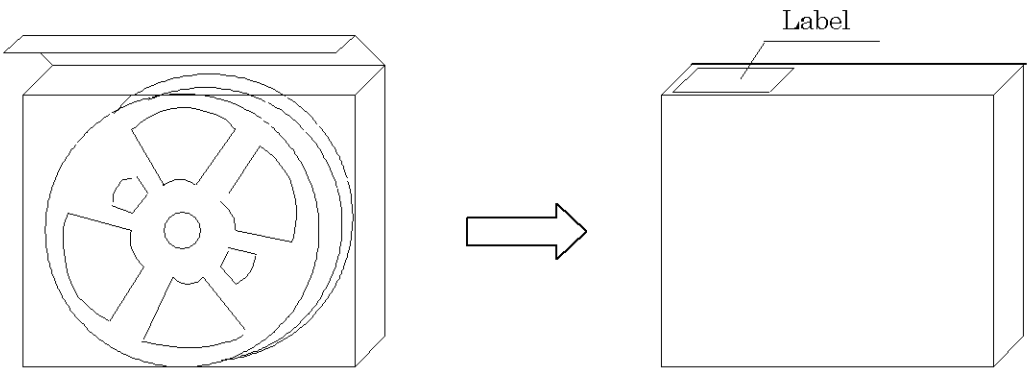
| Item | | Empty Space |
|---|---|---|
| Tape Leader | Top Tape | Min. 1 000 mm |
| | Carrier Tape | Min. 80 mm |
| Tape Trailer | Top Tape | Min. 0 mm |
| | Carrier Tape | Min. 80 mm |

## [ 2 ] Inner Carton

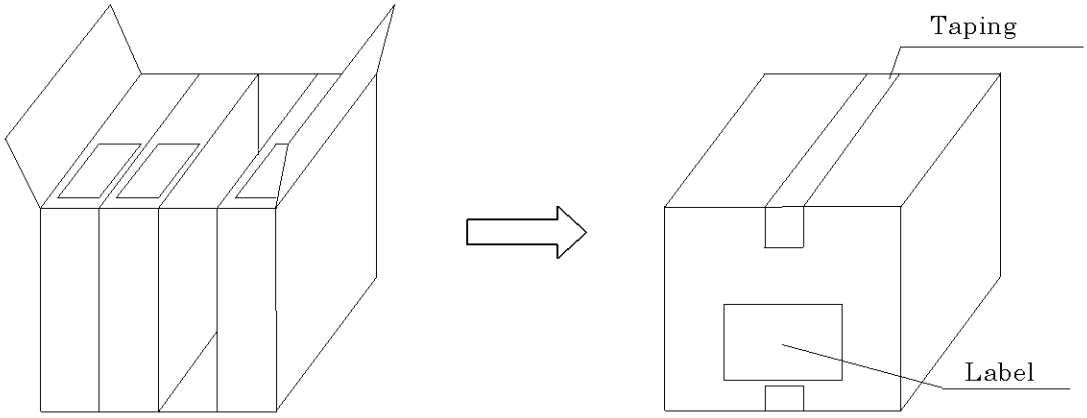
a) Packing to antistatic bag




b) Packing to inner carton




## [ 3 ] Shipping Carton



## [ 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

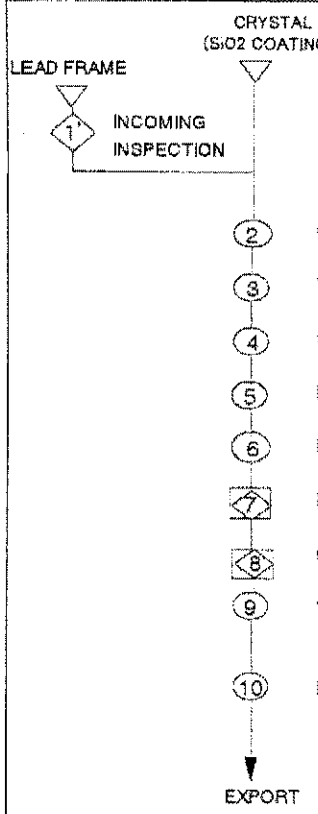
To handle with care to prevent the damage of tape, reel and products.

# QC PROCESS FLOW SHEET

CODE : MC-306

Control No : 45-00-03-ANE-1

26-Apr-00



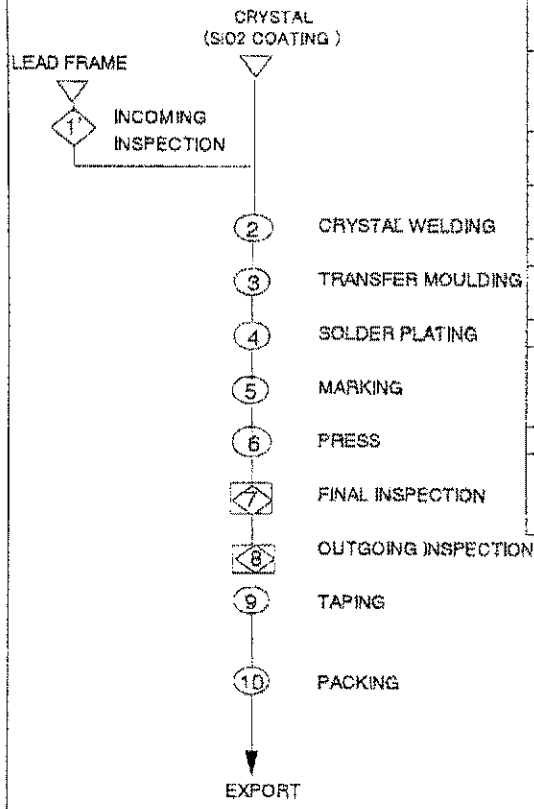

| No | RESPONSIBLE SECTION | STANDARD AND SPECIFICATIONS | INSPECTION AND CONTROL ITEMS | INSPECTION METHORD | MEASURING INSTRUMENTS | DATA COLLECTION |
|---|---|---|---|---|---|---|
| 1 | SUB-CONTRACTOR | PURCHASE SPECIFICATION | APPEARANCE | SAMPLING | MS SCALE SCOPE | INSPECTION DATA |
| | | INCOMING INSPECTION STD. | DIMENSION | | | |
| 2 | SUB-CONTRACTOR | MANUFACTURING INSTRUCTION | APPEARANCE | 100% INSPECTION | MICROSCOPE | DATA INPUT TO PC |
| | | | DIMENSION | SAMPLING | SCALE MICRO | RECORD SHEET |
| | | | STRENGTH | SAMPLING | PUSH&PULL GAUGE | RECORD SHEET |
| 3 | SUB-CONTRACTOR | MANUFACTURING INSTRUCTION | APPEARANCE | 100% INSPECTION | MICROSCOPE | RECORD SHEET |
| | | | | SAMPLING | X-RAY | RECORD SHEET |
| 4 | SUB-CONTRACTOR | SOLDER PLATING | S.P THICKNESS | SAMPLING | FLUOROSCOPY | RECORD SHEET |
| | | SPECIFICATION SHEET | APPEARANCE | SAMPLING | VISUAL INSPECTION | RECORD SHEET |
| 5 | SUB-CONTRACTOR | MANUFACTURING INSTRUCTION | APPEARANCE | SAMPLING | VISUAL INSPECTION | RECORD SHEET |
| 6 | SUB-CONTRACTOR | MANUFACTURING INSTRUCTION | APPEARANCE | SAMPLING | MICROSCOPE | RECORD SHEET |
| | | | DIMENSION | SAMPLING | INSPECTION JIG | RECORD SHEET |
| 7 | SUB-CONTRACTOR | MANUFACTURING INSTRUCTION | ELECTRICAL CHARACTERISTIC | 100% INSPECTION | Fo CHECKING By m/c | RECORD SHEET |
| 8 | SUB-CONTRACTOR | QUALITY STD. | APPEARANCE | SAMPLING | MICROSCOPE | OGI INSP.SHEET |
| | | | ELECTRICAL CHARACTERISTIC | SAMPLING | To&Ci CHECKER | OGI INSP.SHEET |
| | | | DIMENSION | SAMPLING | INSPECTION JIG | RECORD SHEET |
| 9 | SUB-CONTRACTOR | MANUFACTURING INSTRUCTION | TAPING STRENGTH | SAMPLING | STRENGTH TESTER | RECORD SHEET |
| 10 | SUB-CONTRACTOR | MANUFACTURING INSTRUCTION | EXPORT CUSTOMER LIST | | | EXPORT DOCUMENTS |
| | | PACKING INSTRUCTION | FREQUENCY | | | |
| | | THE LIST OF EXPORT DAILY BASE | QUANTITY | | | |

# QC PROCESS FLOW SHEET

CODE : MC-306

Control No : 45-00-03-AKE-1

26-Apr-00



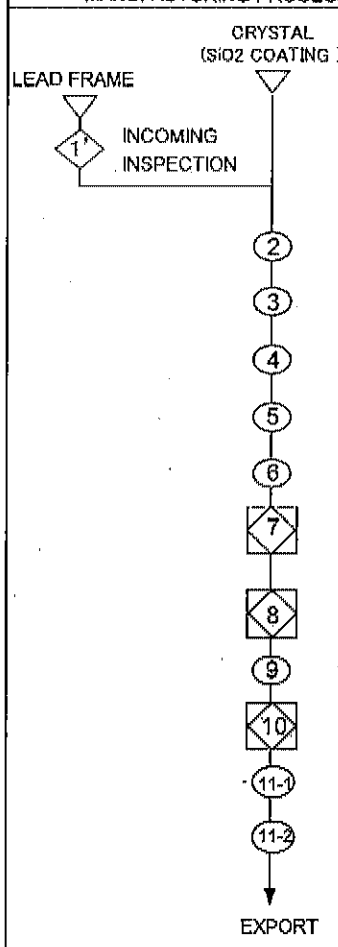

| No | RESPONSIBLE SECTION | STANDARD AND SPECIFICATIONS | INSPECTION AND CONTROL ITEMS | INSPECTION METHORD | MEASURING INSTRUMENTS | DATA COLLECTION |
|---|---|---|---|---|---|---|
| 1 | SUB-CONTRACTOR | PURCHASE SPECIFICATION<br>INCOMING INSPECTION STD. | APPEARANCE<br>DIMENSION | SAMPLING | MS SCALE SCOPE | INSPECTION DATA |
| 2 | SUB-CONTRACTOR | MANUFACTURING INSTRUCTION | APPEARANCE | 100% INSPECTION | MICROSCOPE | DATA INPUT TO PC |
| | | | DIMENSION | SAMPLING | SCALE MICRO | RECORD SHEET |
| | | | STRENGTH | SAMPLING | PUSH&PULL GAUGE | RECORD SHEET |
| 3 | SUB-CONTRACTOR | MANUFACTURING INSTRUCTION | APPEARANCE | 100% INSPECTION | MICROSCOPE | RECORD SHEET |
| | | | | SAMPLING | X-RAY | RECORD SHEET |
| 4 | SUB-CONTRACTOR | SOLDER PLATING | S.P THICKNESS | SAMPLING | FLUOROSCOPY | RECORD SHEET |
| | | SPECIFICATION SHEET | APPEARANCE | SAMPLING | VISUAL INSPECTION | RECORD SHEET |
| 5 | SUB-CONTRACTOR | MANUFACTURING INSTRUCTION | APPEARANCE | SAMPLING | VISUAL INSPECTION | RECORD SHEET |
| 6 | SUB-CONTRACTOR | MANUFACTURING INSTRUCTION | APPEARANCE | SAMPLING | MICROSCOPE | RECORD SHEET |
| | | | DIMENSION | SAMPLING | INSPECTION JIG | RECORD SHEET |
| 7 | SUB-CONTRACTOR | MANUFACTURING INSTRUCTION | ELECTRICAL CHARACTERISTIC | 100% INSPECTION | F0 CHECKING By m/c | RECORD SHEET |
| 8 | SUB-CONTRACTOR | QUALITY STD. | APPEARANCE | SAMPLING | MICROSCOPE | OQI INSP.SHEET |
| | | | ELECTRICAL CHARACTERISTIC | SAMPLING | T0&CI CHECKER | OQI INSP.SHEET |
| | | | DIMENSION | SAMPLING | INSPECTION JIG | RECORD SHEET |
| 9 | SUB-CONTRACTOR | MANUFACTURING INSTRUCTION | TAPING STRENGTH | SAMPLING | STRENGTH TESTER | RECORD SHEET |
| 10 | SUB-CONTRACTOR | MANUFACTURING INSTRUCTION | EXPORT CUSTOMER LIST | | | EXPORT DOCUMENTS |
| | | PACKING INSTRUCTION | FREQUENCY | | | |
| | | THE LIST OF EXPORT DAILY BASE | QUANTITY | | | |

# QC PROCESS FLOW SHEET

CODE : MC-306

Control No. : 45-00-03-AGE-3

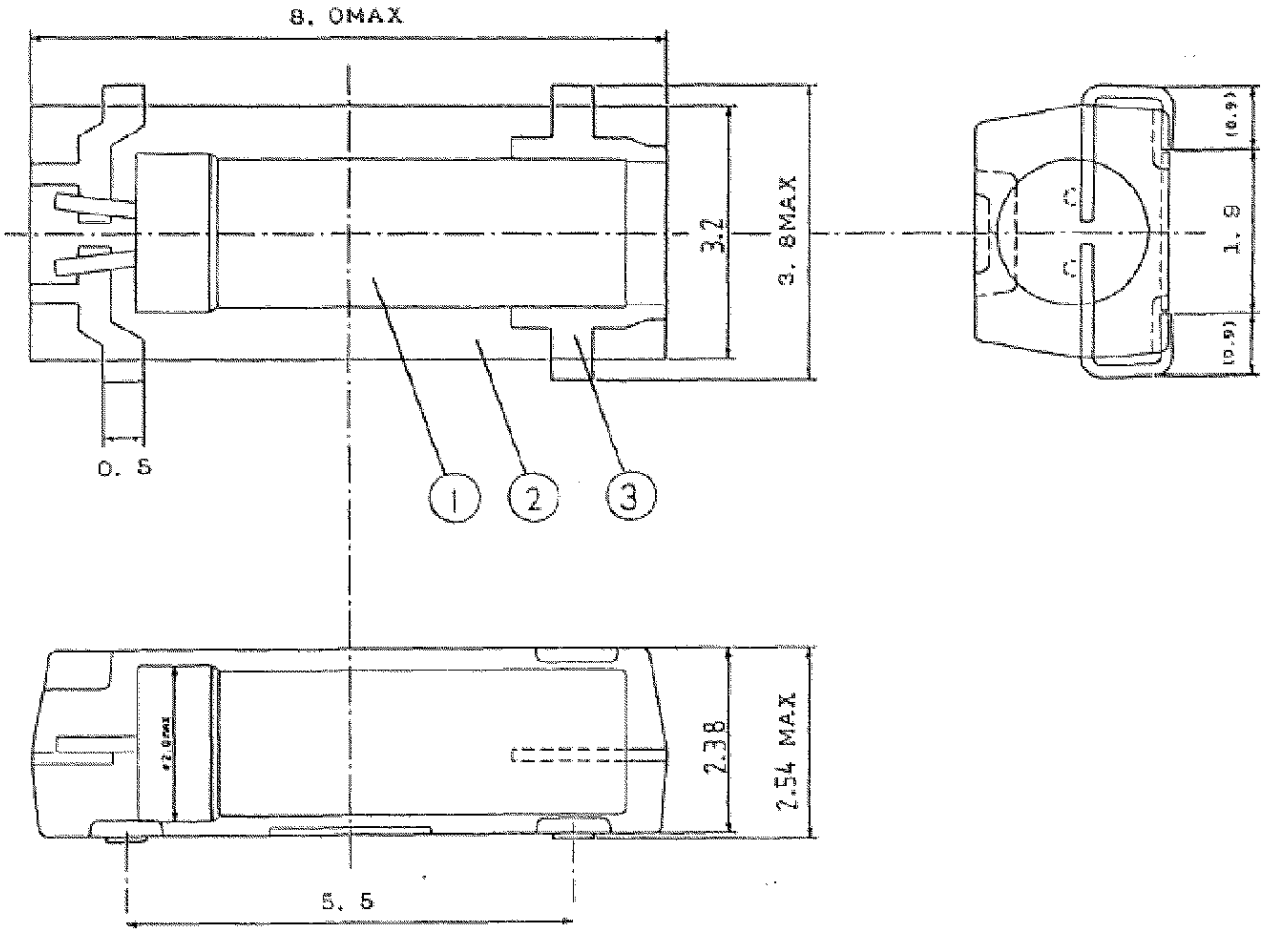
25-May-05




| MANUFACTURING PROCESS FLOW CHART | No. | RESPONSIBLE SECTION | STANDARD AND SPECIFICATIONS | INSPECTION AND CONTROL ITEMS | INSPECTION METHORD | MEASURING INSTRUMENTS | DATA COLLECTION |
|---|---|---|---|---|---|---|---|
| | 1 | MALAYSIA PLANT (Sub-Contractor) | PURCHASE SPECIFICATION<br>INCOMING INSPECTION STD. | APPEARANCE<br>DIMENSION | SAMPLING<br>SAMPLING | MICROSCOPE<br>MS SCALE SCOPE | INSPECTION DATA |
| | 2 | MALAYSIA PLANT (Sub-Contractor) | MANUFACTURING INSTRUCTION | APPEARANCE | SAMPLING | MICROSCOPE | RECORD SHEET |
| | 3 | MALAYSIA PLANT (Sub-Contractor) | MANUFACTURING INSTRUCTION | APPEARANCE | SAMPLING<br>SAMPLING | MICROSCOPE<br>VISUAL INSPECTION | RECORD SHEET<br>RECORD SHEET |
| | 4 | MALAYSIA PLANT (Sub-Contractor) | SOLDER PLATING SPECIFICATION SHEET | S.P THICKNESS<br>S.P ORGANIZATION<br>APPEARANCE | SAMPLING DATA<br>SAMPLING DATA | FLUOROSCOPY<br>MICROSCOPE | RECORD SHEET<br>RECORD SHEET<br>RECORD SHEET |
| | 5 | MALAYSIA PLANT (Sub-Contractor) | MANUFACTURING INSTRUCTION | APPEARANCE | SAMPLING | VISUAL INSPECTION | RECORD SHEET |
| | 6 | MALAYSIA PLANT (Sub-Contractor) | MANUFACTURING INSTRUCTION | APPEARANCE<br>DIMENSION | SAMPLING<br>SAMPLING | MICROSCOPE<br>INSPECTION JIG | RECORD SHEET<br>RECORD SHEET |
| | 7 | MALAYSIA PLANT (Sub-Contractor) | MANUFACTURING INSTRUCTION | ELECTRICAL CHARACTERISTIC | 100% INSPECTION | F0 CHECKING By m/c | RECORD SHEET |
| | 8 | MALAYSIA PLANT (Sub-Contractor) | QUALITY STD. | APPEARANCE<br>ELECTRICAL CHARACTERISTIC<br>DIMENSION | SAMPLING<br>SAMPLING<br>SAMPLING | MICROSCOPE<br>T0&CI CHECKER<br>INSPECTION JIG | OGI INSP.SHEET<br>OGI INSP.SHEET<br>RECORD SHEET |
| | 9 | MALAYSIA PLANT (Sub-Contractor) | MANUFACTURING INSTRUCTION | TAPING STRENGTH | SAMPLING | STRENGTH TESTER | RECORD SHEET |
| | 10 | MALAYSIA PLANT (Sub-Contractor) | QUALITY STD. | APPEARANCE | 100% INSPECTION | MICROSCOPE | OGI INSP.SHEET |
| | 11-1 | MALAYSIA PLANT (Sub-Contractor) | MANUFACTURING INSTRUCTION<br>PACKING INSTRUCTION<br>THE LIST OF EXPORT DAILY BASE | EXPORT CUSTOMER LIST<br>FREQUENCY<br>QUANTITY | ---<br><br> | ---<br><br> | EXPORT DOCUMENTS |
| | 11-2 | MALAYSIA PLANT | MANUFACTURING INSTRUCTION<br>PACKING INSTRUCTION<br>THE LIST OF EXPORT DAILY BASE | EXPORT CUSTOMER LIST<br>FREQUENCY<br>QUANTITY | ---<br><br> | ---<br><br> | EXPORT DOCUMENTS |

# MC-306 Structure diagram

Unit : mm




| No. | Name of Part | Material | Remarks |
|---|---|---|---|
| ③ | Lead | 42Alloy | Solder Plating (Pb free) |
| ② | Molding | Epoxy Compound<br>( Halide free ) | ———— |
| ① | Crystal C-002SH | ———— | ———— |

# RELIABILITY TEST DATA

**Product Name** : MC-306 (Halide free mold)

The Company evaluation condition

We evaluate environmental and mechanical characteristics by the following test condition . **No.F-45-0001-02-007EH**

| No. | ITEM | TEST CONDITIONS | VALUE *1 *2<br>Δ f / f<br>[1 × $10^{-6}$] | TEST Qty [ n ] | FAIL Qty [ n ] |
|---|---|---|---|---|---|
| 1 | Drop | Free drop from 750 mm height on a hard wooden board for 3 times (Board is thickness more than 30 mm) | ± 5 | 22 | 0 |
| 2 | Vibration | 10 Hz to 55 Hz amplitude 0.75 mm<br>55 Hz to 500 Hz acceleration 98 $m/s^2$<br>10 Hz → 500 Hz → 10 Hz 15 min / cycle<br>6 h ( 2 h × 3 directions ) | ± 3 | 22 | 0 |
| 3 | High temperature storage | a) +125℃ × 1 000 h<br>b) +85 ℃ × 1 000 h | *3 a) ± 20<br>*3 b) ± 10 | a) 22<br>b) 22 | a) 0<br>b) 0 |
| 4 | Low temperature storage | -55 ℃ × 1 000 h | *3 ± 20 | 22 | 0 |
| 5 | Temperature cycle | -55 ℃ ⇔ +125 ℃<br>30 min at each temp. 100 cycles | *3 ± 20 | 22 | 0 |
| 6 | Temperature humidity storage | +85 ℃ × 85 %RH × 1 000 h | *3 ± 20 | 22 | 0 |
| 7 | Resistance to soldering heat | For convention reflow soldering furnace (2 times) | ± 5 | 22 | 0 |
| 8 | Shear | 20 N press for 10 ± 1 s<br>Ref. IEC 60068-2-21 | No peeling - off at a solder part | 11 | 0 |
| 9 | Pull - off | 10 N press for 10 ± 1 s<br>Ref. IEC 60068-2-21 | No peeling - off at a solder part | 11 | 0 |
| 10 | Solvent resistance | Ref. JIS C 0052 or IEC 60068-2-45 | The marking shall be legible | 11 | 0 |
| 11 | Solderability | Dip termination into solder bath at +235 ℃ ± 5 ℃ for 3 s (Using Rosin Flux) | Termination must be 95 % covered with fresh solder | 11 | 0 |

Notes

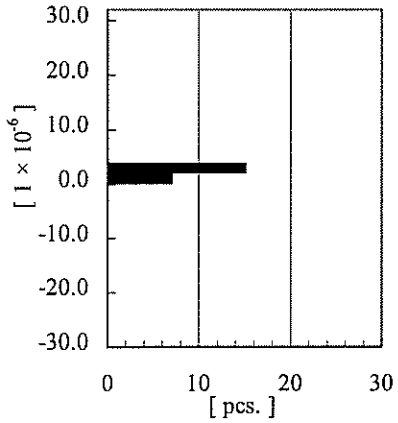
1. *1 Each test done independently.
2. *2 Measuring 2 h to 24 h later leaving in room temperature after each test.
3. *3 Pre conditionings Initial value shall be after 24 h at room temperature.
4. Shift series resistance at before above tests should be less than 60 kΩ.

## Product Name : MC-306 (Halide free mold)

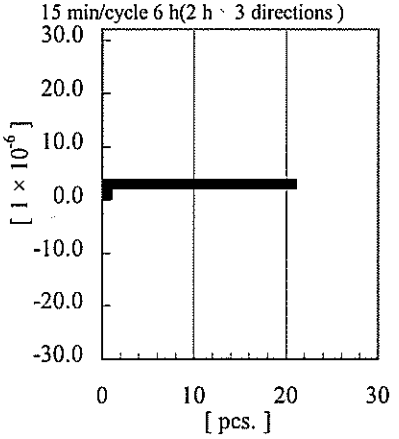
Δ f / f

**No.F-45-0001-02-008EH**

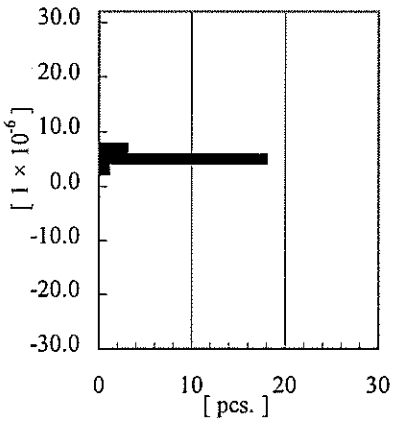
1. Drop
750 mm 、 3 times



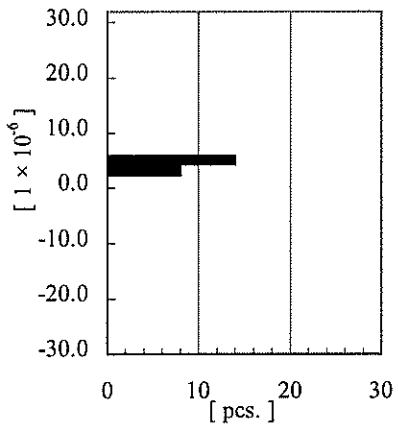

2. Vibration
10 Hz to 55 Hz amplitude 0.75 mm
55 Hz to 500 Hz acceleration 98 m/s²
15 min/cycle 6 h(2 h 、 3 directions )



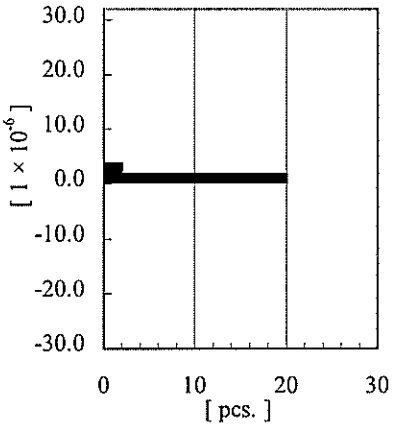

3. High temp. storage
a) +125 ℃ × 1 000 h



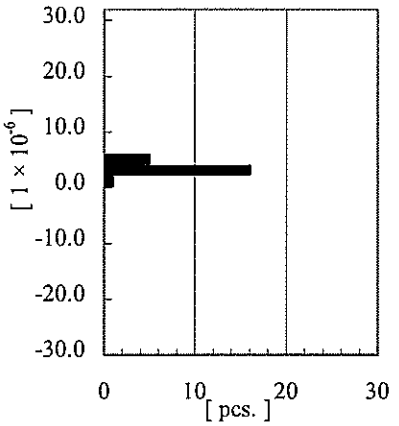

3. High temp. storage
b) +85 ℃ × 1 000 h



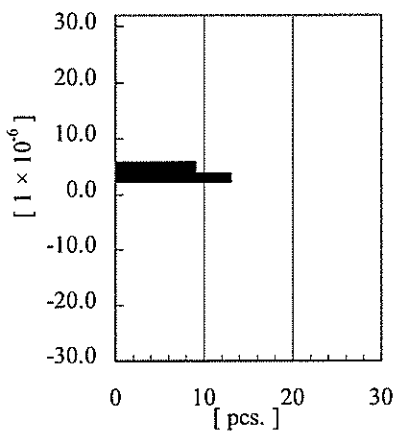

4. Low temp. storage
-55 ℃ × 1 000 h



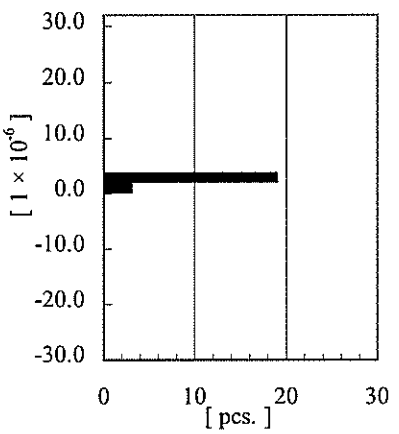

5. Temp. cycle
-55 ℃ ⇔ +125 ℃
100 cycles




6. Temp. humidity storage
+85 ℃ × 85 %RH × 1 000 h




7. Resistance to soldering heat (Reflow 2 times)



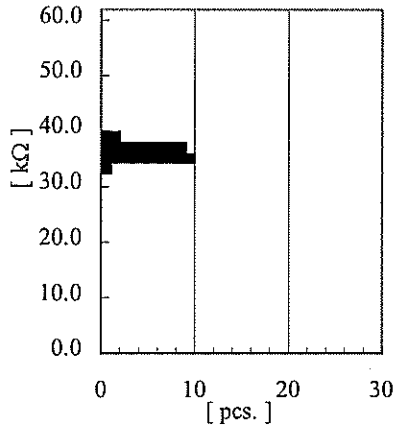

**Qualification Data**

## Product Name : MC-306 (Halide free mold)

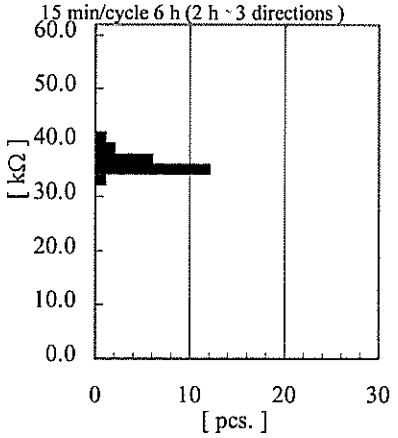
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No.F-45-0001-02-009EH

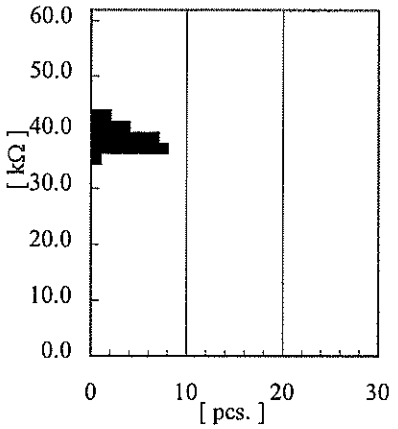
1. Drop
750 mm ↘ 3 times



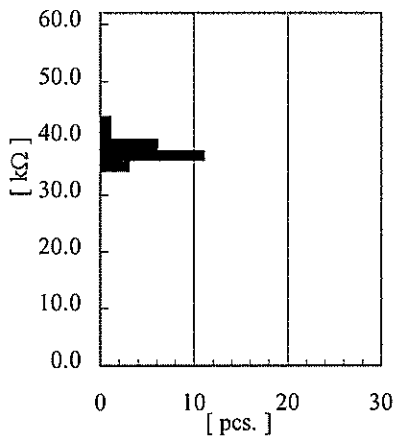

2. Vibration
10 Hz to 55 Hz amplitude 0.75 mm
55 Hz to 500 Hz acceleration 98 m/s$^2$
15 min/cycle 6 h (2 h ↘ 3 directions)



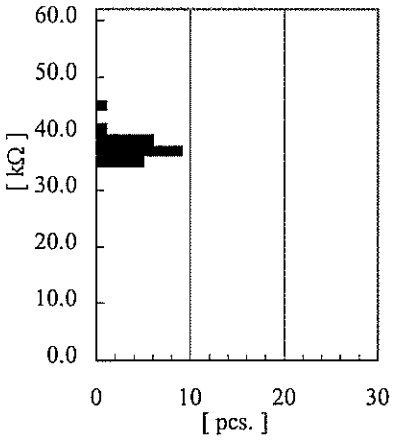

3. High temp. storage
a) +125 ℃ × 1 000 h



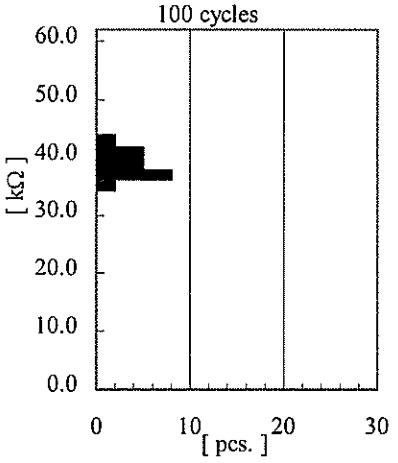

3. High temp. storage
b) +85 ℃ × 1 000 h



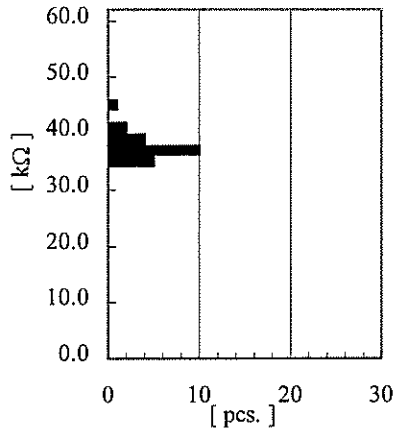

4. Low temp. storage
-55 ℃ × 1 000 h



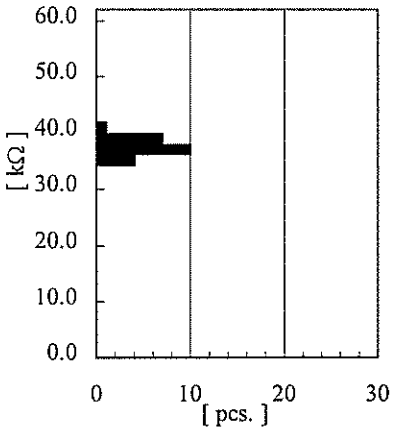

5. Temp. cycle
-55 ℃ ⇔ +125 ℃
100 cycles




6. Temp. humidity storage
+85 ℃ × 85 %RH × 1 000 h




7. Resistance to soldering heat (Reflow 2 times)




**Qualification Data**