

RECIPIENT

## SPECIFICATIONS

**MODEL** SG-771PCD-125.002500-L

**FREQUENCY** 125.002500 MHz

**SPEC. No.** H13-003-0B

**DATE** 10<sup>th</sup>.MAY . 2013

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# SPECIFICATIONS

## 1. Application

- 1) This specifications apply to Crystal oscillator SG-771PCD-125.002500-L.
- 2) This product is compliant with RoHS Directive.
- 3) This Product supplied (and any technical information furnished, if any) by SEIKO EPSON CORPORATION. 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 extra high reliability, such as satellite, rocket and other space systems, and medical equipment, the functional purpose of which is to keep life.

## 2. Product No. / Model

The model is SG-771PCD-125.002500-L

## 3. Packing

It is subject to the packing standard of SEIKO EPSON CORPORATION.

## 4. Warranty

Defective parts which are originated by us are replaced free of charge in case defects are found within 12 months after delivery.

## 5. Amendment and abolishment

Amendment and/or abolishment of this specification are subject to the agreement between both parties.

## 6. Contents

Item No.	Item	Page
[ 1 ]	Absolute maximum ratings	2
[ 2 ]	Operating range	2
[ 3 ]	Frequency characteristics	2
[ 4 ]	Terminal description	3
[ 5 ]	Electrical characteristics	4
[ 6 ]	Test circuit	5
[ 7 ]	Timing chart	6
[ 8 ]	Environmental and mechanical characteristics	7
[ 9 ]	Electro static Discharge	8
[ 10 ]	Dimensions and marking layout	9
[ 11 ]	Board patterning	10
[ 12 ]	Notes	11,12

[ 1 ] Absolute maximum ratings

Parameter	Symbol	Value	Unit	Note
Supply voltage	VCC	-0.5 to +6.0	V	
Input voltage	VIN	-0.5 to VCC+0.5	V	
Storage temperature *	T_stg	-55 to +125	°C	Stored as bare product after unpacking.

\* Concerning the frequency change, please refer [8] Environmental and mechanical characteristics.

[ 2 ] Operating range

Parameter	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
Supply voltage	VCC	3.135	3.300	3.465	V	*1
Supply voltage	GND	0.0	0.0	0.0	V	
Output frequency	fo	—	125.0025	—	MHz	
Operating temperature	T_use	-40	—	+85	°C	L
Output load condition	L_ECL	50			ohm	

\*1 Start up time(0 %VCC→90 %VCC) of power source should be more than 150 μs.

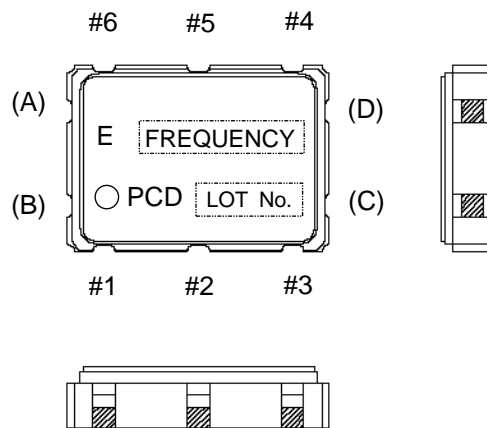
[ 3 ] Frequency characteristics

Output frequency (fo) ..... 125.002500 MHz

Parameter	Symbol	Value[1 × 10 <sup>-6</sup> ]	Note
Frequency tolerance *	f_tol	± 30	T_use= -40 °C to +85 °C

\* This includes initial frequency tolerance, temperature variation, supply voltage variation, and 1 year aging ( at +25 °C ).

[ 4 ] Terminal description



Name	No.	Type	Terminal description
DNC	#1	—	Please do not connect DNC(#1) of the terminal with patterns such as power supplies and GND.
DNC	#2	—	Please do not connect DNC(#2) of the terminal with patterns such as power supplies and GND.
GND	#3	—	GND terminal
OUT	#4	OUTPUT (Positive)	Clock out terminal
OUT	#5	OUTPUT (Negative)	Clock out terminal. Inversion output of #4
Vcc	#6	—	Vcc terminal

\* The metal part of the surface (metal cap) is connected to GND.

\* Please use DNC pin with no connection.

## [ 5 ] Electrical characteristics

(measuring condition T=+25°C, Vcc=+3.3V)

Parameter	Symbol	Value			Unit	Note
		Min.	Typ	Max		
Start up time	t_str	—	—	10	ms	
Current consumption	Icc	—	—	100	mA	OE=Vcc , RL=50Ω
Rise time *1	tr	—	—	0.8	ns	20 % to 80 % output swing
Fall time *1	tf	—	—	0.8	ns	80 % to 20 % output swing
Symmetry *1	SYM	45	—	55	%	Vcc-1.3V
High level output voltage	V <sub>OH</sub>	Vcc-1.025	—	Vcc-0.880	V	
Low level output voltage	V <sub>OL</sub>	Vcc-1.810	—	Vcc-1.620	V	

Please see [6] Test circuit.

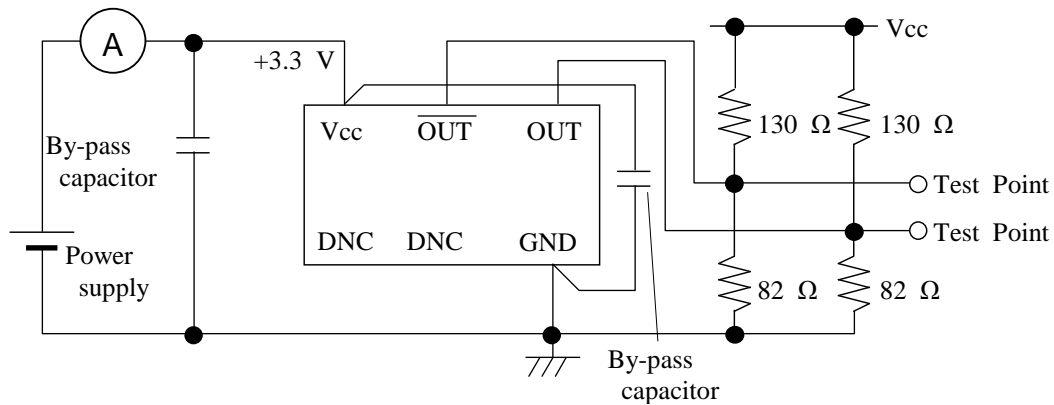
\*1 Please see [7] 1) Output waveform.

Phase Jitter Characteristic

Phase Jitter = 0.5 ps max ( 12 kHz to 20 MHz )

## [ 6 ] Test circuit

1) To observe waveform and current



- \* Each output line is same length.
- \* Please use DNC pin with no connection.

2) Measurement condition

(1) Oscilloscope

- Bandwidth should be 5 times higher than DUT's output frequency. (1 GHz)
- Probe ground should be placed closely from test point and lead length should be as short as possible.

le.

(2) By-pass capacitor 1 (approx. 0.01  $\mu\text{F}$  to 0.1  $\mu\text{F}$ ) places closely between Vcc and GND.

(3) By-pass capacitor 2 (approx. 10  $\mu\text{F}$ ) places closely between power supply terminals on the board.

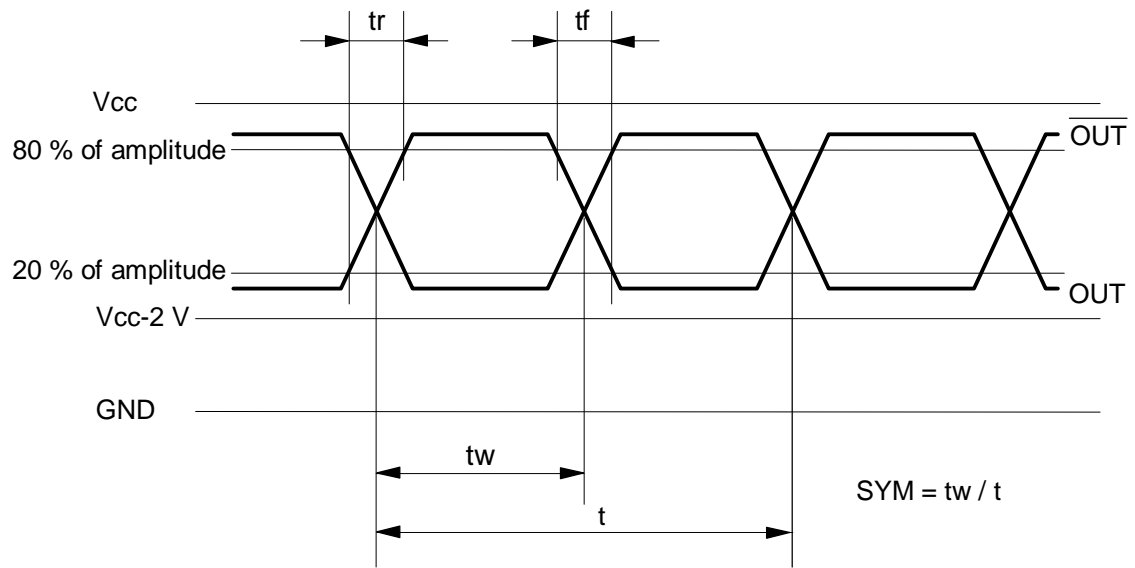
(4) Use the current meter whose internal impedance value is small.

(5) Power supply

- Start up time (0 V  $\rightarrow$  90 % Vcc) of power source should be more than 150  $\mu\text{s}$ .
- Impedance of power supply should be as low as possible.

# [ 7 ] Timing chart

## 1) Output waveform



## [ 8 ] Environmental and mechanical characteristics

\*Epson Toyocom evaluation condition : Evaluated by the following examination items and conditions.

No.	Item	Value *1		Test Conditions
		$\Delta f / f$ *2 [ $1 \times 10^{-6}$ ]	Electrical characteristics	
1	High temperature bias *3	$\pm 10$	Satisfy [5] specification after test	+85 °C $\times$ Vcc/Vc $\times$ 1 000 h
2	High temperature storage *3	$\pm 10$		+125 °C $\times$ 1 000 h
3	Low temperature storage *3	$\pm 10$		-55 °C $\times$ 1 000 h
4	High temp. humidity storage *3	$\pm 10$		+85 °C $\times$ 85 %RH $\times$ 1000 h
5	Temperature cycle *3	$\pm 10$		-55 °C ~ +125 °C 30 min. at each temp. 100 cycles
6	Resistance to soldering heat	$\pm 10$		For conventional reflow soldering furnace (3 times) Ref. IPC/JEDEC J-STD-020D.1
7	Vibration	$\pm 5$		10 Hz to 85 Hz amplitude 1.5 mm 85 Hz to 2 000 Hz acceleration 20G 10 Hz $\rightarrow$ 2 000 Hz $\rightarrow$ 10 Hz 20 min./cycle 12 h (4 h $\times$ 3 directions)
8	Shock	$\pm 5$		1000 G 1/2 sine wave 3 shocks in X,Y,Z (Total of 9 shocks).
9	Drop	$\pm 5$		Free drop from 750 mm height on a hard wooden board for 9 times.
10	Sealing	$1 \times 10^{-9}$ Pa $\cdot$ m <sup>3</sup> /s Max.		For He leak detector

< Notes >

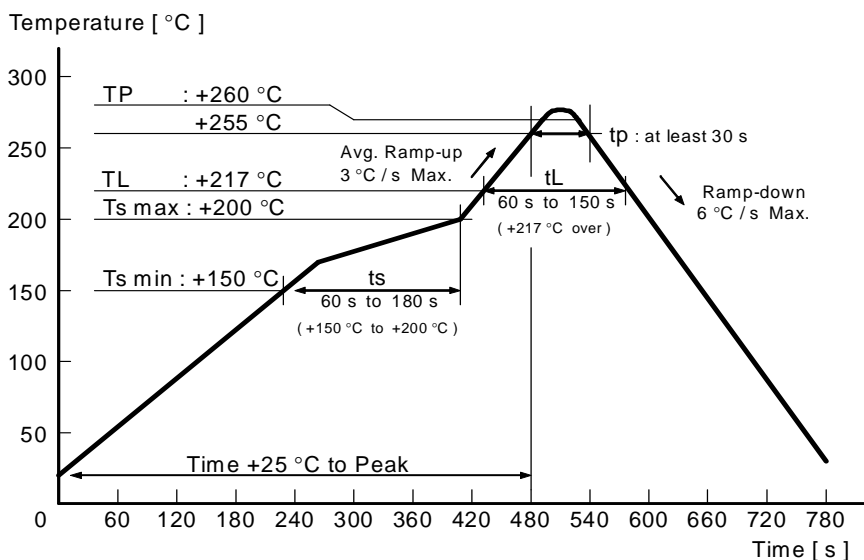
\*1 Each test done independently.

\*2 Measuring 2 h to 24 h later leaving in room temperature after each test.

\*3 Initial value shall be measured after 24 h storage at room temperature after pre-conditioning.

Pre-conditioning: Reflow (3 time)

Convection reflow condition (Ref. IPC/JEDEC J-STD-020D.1)





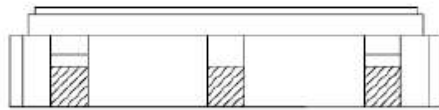
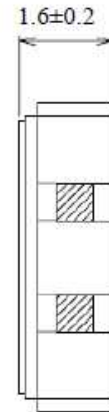
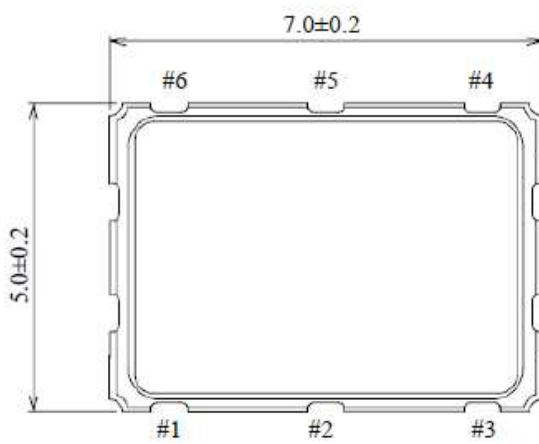
## [ 9 ] Electro Static Discharge

### • ESD

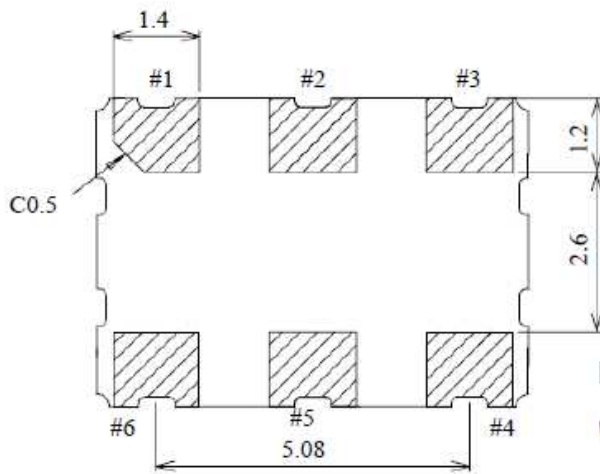
Item	Value	Condition
Human Body Model (HBM)	$\pm 2\ 000\ \text{V}$	Ref. IAJ ED-4701-1 C111A 100 pF, 1.5 k $\Omega$ , 3 times
Machine Model (MM)	$\pm 200\ \text{V}$	Ref. IAJ ED-4701-1 C111 200 pF, 0 $\Omega$ , 1 time

## [ 10 ] Dimensions and marking layout

### 1) Dimensions



No	Name
1	DNC
2	DNC
3	GND
4	OUT1
5	OUT2
6	Vcc

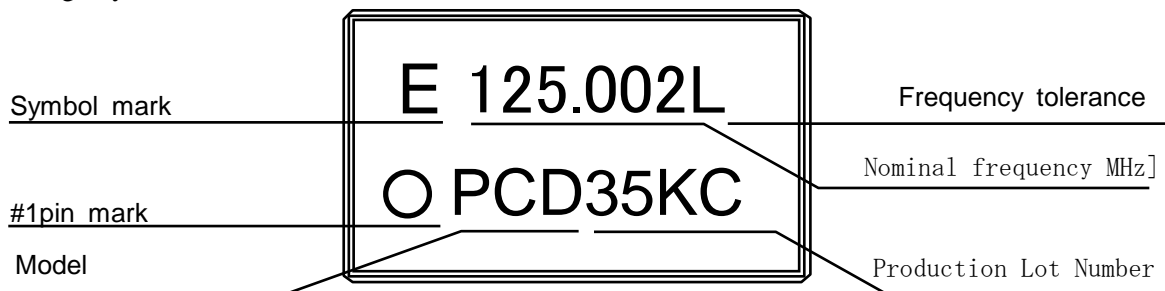


Please use DNC pin with no connection

[UNIT] mm

Warp of ceramic is in the range of 0.1 mm Max.

### 2) Marking layout



\* The above marking layout shows only marking contents and their approximate position, not actual font, size and exact position.

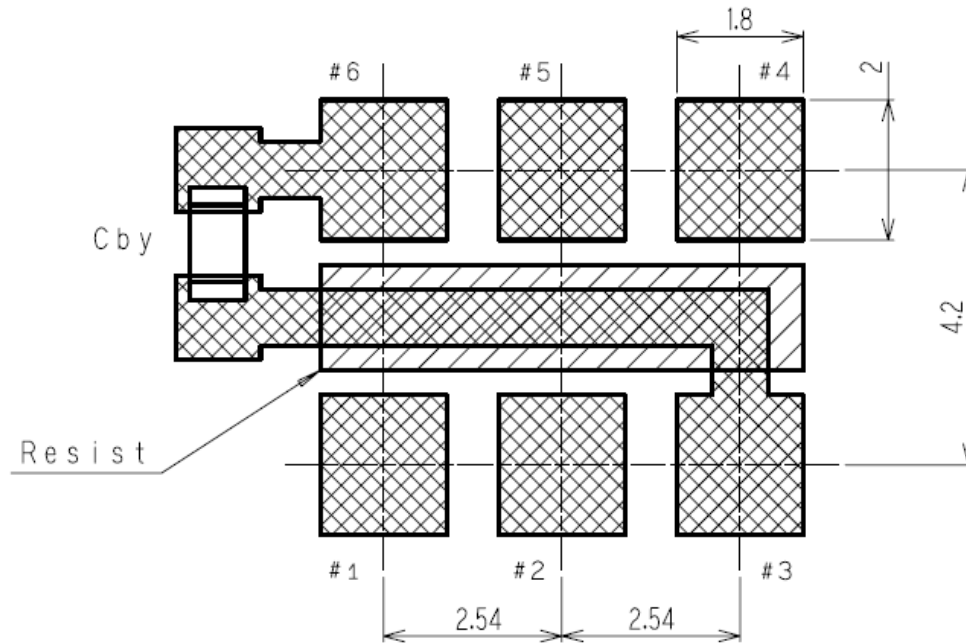
\* Nominal frequency omits the figure below the fourth place of decimals.

## [ 11 ] Board patterning

The soldering pad sample indicated as like following:

Soldering position (Unit : mm)

$$C_{by} = 0.01 \mu\text{F} \sim 0.1 \mu\text{F}$$



## [ 12 ] Notes

- 1) This device is made with C-MOS IC.  
Please take necessary precautions to prevent damage due to electrical static discharge.
- 2) We recommend placing a 0.01 to 0.1  $\mu$ F capacitor closely between Vcc and GND to obtain stable operation and protect against power line ripple.
- 3) Vcc and GND pattern shall be as large as possible so that high frequency impedance shall be small.
- 4) SEIKO EPSON CORPORATION cannot recommend to put filtering element into power line so as to reduce noise. Oscillator might be unstable oscillation because high frequency impedance of power line become higher. When use filtering element, please verify electrical construction and or element's spec.
- 5) SEIKO EPSON CORPORATION doesn't recommend to power on from intermediate electric voltage or extreme fast power on. Those powering conditions may cause no oscillation or abnormal oscillation.
- 6) Power ripple: 200 mV P-P max.
- 7) Please design the two output lines as short as possible.  
A long output line may cause irregular output.
- 8) Other high level signal lines may cause incorrect operation, so please do not place high-level signal line close to this device.
- 9) This device contains a crystal resonator, so please do not expose to excessive shock or vibration.
- 10) An automatic insertion is available, however, the internal Crystal resonator might be damaged in case that too much shock or vibration is produced mechanically.  
Be sure to check your machine condition in advance.
- 11) Ultrasonic cleaning can be used on this product, however, since the oscillator might be damaged under some conditions, please exercise caution in advance.
- 12) We recommend to use and store under room temperature and normal humidity to secure frequency accuracy and prevent moisture.
- 13) The metal part of the surface (metal cap) is connected to GND #3 pin.  
Please take necessary precautions to prevent short circuit to GND by contact with the metal cap.
- 14) Side leads (A) to (D) are connected to IC internally.  
Therefore be careful for short or a fall of insulation resistance etc.
- 15) Please use DNC pin with no connection.

16) Recommendation reflow times are less than 2 times.

When there was a soldering error, please do alteration with a soldering iron.

In this case, the iron ahead is equal to or less than +350 °C and asks within 5 s.

In case that this device is reflow soldered on the back side of your circuit board, please carefully verify the device is properly secured to prevent coming detached from card.

[About soldering method]

Soldering method	OK or NG
Reflow soldering (top side)	OK
Reflow soldering (back side)	Please carefully verify the device is properly secured to prevent coming detached from card.
Solder pot (static solder pot / flow solder pot)	NG
Iron soldering	OK

17) Aging in the frequency tolerance is from environmental tests results to the expectation of the amount of the frequency variation.

18) Please do not place signal lines and supply voltage lines on the area, its internal layers, and the back side of where the oscillators are soldered. This may affect the performances of the oscillators.

19) We will announce the discontinuance and switch to our successor before six months or more.

# TAPING SPECIFICATION

## I. Application

This document is applicable to VG-45\*\*CA / SG-770\*\*\* / SG-771\*\*\*

## II. Contents

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

## [ 1 ] Taping specification

### (1) Tape dimensions

Material of the carrier tape : PS conduct

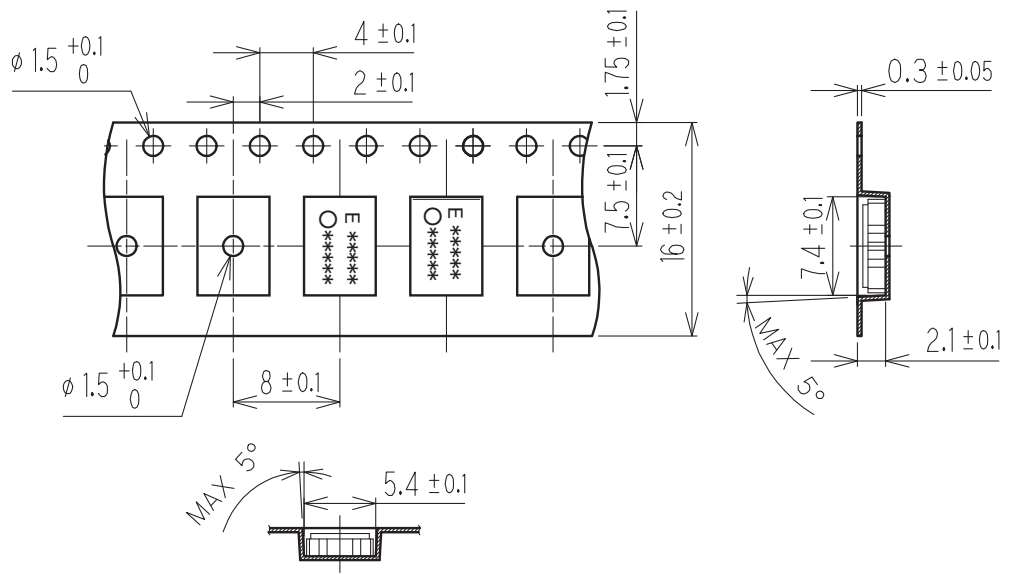
Material of the top tape : PET

### (2) Reel form

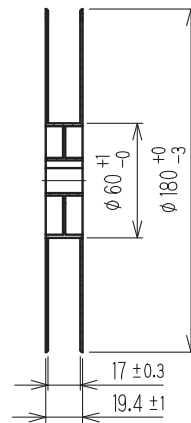
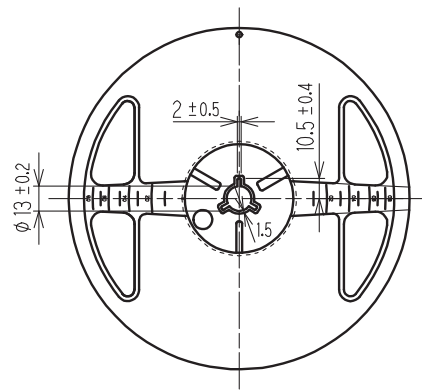
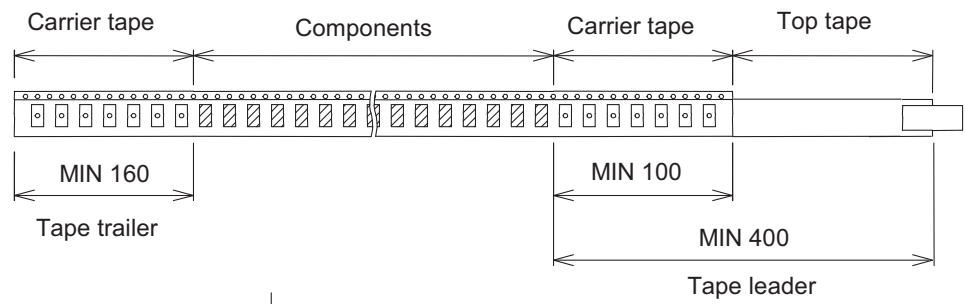
Material of the reel : PS conduct

### (3) Taping packing

Depends on Figure 1



dimensions : mm



Quantity  
1000pcs/Reel

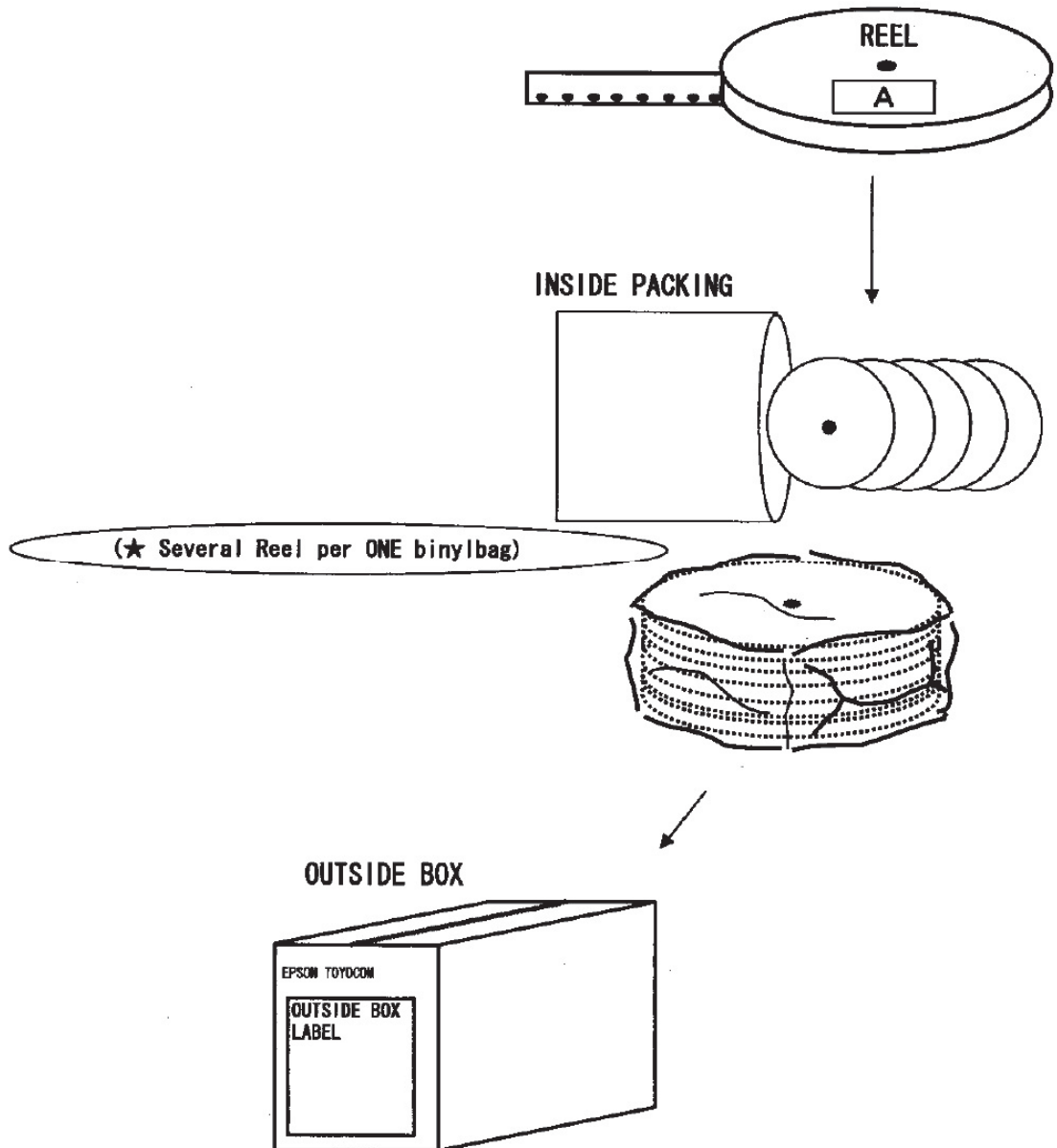
dimensions : mm

Figure 1 taping



[ 2 ] Inner carton

- (1) Sticks label on to the reel.
- (2) Pack reels into the antistatic bag. And seal the antistatic bag.
- (3) Sticks label on the Exterior box  
Box up products that are lagged with bentonite without moving. Then seal the box.



[ 3 ] Marking

1) Reel label

Label is put on the reel

Item

- (1) Parts No.
- (2) P/O
- (3) Parts name Frequency
- (4) LF(Pb free)
- (5) Order No.
- (6) Quantity
- (7) Lot No.
- (8) epsontoyocom's No.
- (9) Shipment date

2) Shipping carton marking

• Shipping carton marking shall consist of :

- 1) Parts name
- 2) Quantity

[ 4 ] Quantity

- 1000 pcs./reel

[ 5 ] 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.

[ 6 ] Handling

- (1) To handle with care to prevent the damage of tape, reel and products.
- (2) Please do not have one side of the reel alone.

There is unusually a thing that comes off from an inside wick according to handling.