Specifications No.	sc20s15070

Messrs.

_____

(first ・ revised)

Delivery Specifications

Product No	:	Quartz Crystal Unit SC-20S
Item code	:	Q-SC20S03220C5AAAF
Product form	:	32.768kHz ± 20 × 10^{-6} / 12.5 pF
The number of copies	:	1 copy
Date of Registrantion	:	31 Mar / '15

Receipt Column	Note

〈NOTICE〉

1. Advance agreement will be needed before changing any contents of the specification herein.
2. Provided that the information herein is subject to change, only revised pages shall be reissued.
3. When the product described herein includes Regulated Products subject The Wassenaar Arrangement etc, they may not be exported without authorization from the appropriate governmental authorities.
4. The contents of this specification including all figures and illustrations are proprietary information (copyright or know-how) of Seiko Instruments Inc. It is strictly prohibited to copy all or part of these specifications to third parties without permission.
5. In the case that the products described herein are used as part of any devices or equipment which might influence any one of the human body, human life and property, such as physical exercise equipment, medical equipment or vehicles, please let us know that.

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Dept. of Issue
Sales Section

Dept. of Control
Quality Assurance Section

Delivery Specifications

1. Scope

These specifications apply to QUARTZ CRYSTAL RESONATORS (hereinafter referred to as RESONATORS) to be manufactured by Seiko Instruments Inc. (hereinafter referred to as SII) to_____

2. Designation

RESONATORS are designated"SC-20S" (32.768 kHz).

3. Shape and dimensions

As per the SC-20S drawing shown on page 5 .

4. Electrical characteristics

Specified on page 2 through 3 .

5. Shipment and packaging

5.1 (3,000) pcs are the standard lot size to which the lot number shall be allotted

5.2 The packaging shall conform to the resonator packaging standards.

6. Outgoing inspection

6.1 When mutually agreed, the outgoing inspection shall be conducted as per the standard on page 4.

6.2 The outgoing inspection slip is not basically affixed to each packaging.

7. Warranty

In the event that any defective RESONATORS or defective lot is found at incoming inspection at_____ and that any defect resulting from failures in process-control at SII after incoming inspection is found, good RESONATORS shall be supplied to _____free of charge as a replacement.

In the event that any trouble or problems rising directly from RESONATORS occurs, it will be amicably settled between both parties, provided that warranty shall be done within the score of replacement of good RESONATORS.

8. Revision or abolition of the specifications

Revision or abolition of the specifications shall be made upon mutual consent between _____ and SII. If any problem arises, it shall be amicably settled between both parties.

9.Effectiveness of the specifications

These specifications are effective after receipt of returned copies with your approved sign.

10. Others

This product is completely Pb-free and Halogen-free.

[1] Maximum Rating

	Item	Symbol	Rating	Note
1	Storage temperature range	T_stg	−55～+125℃	
2	Maximum drive level	DL max.	1.0 μ W max.	

[2] Recommended Operating Condition

	Item	Symbol	Rating	Note
1	Operating temperature range	T_use	−40～+85℃	
2	Drive level	DL	0.1 μ W typ.	

[3] Electrical-characteristics

Measurement temperature: 25±2℃

	Item	Symbol	Specification	Condition
1	Nominal frequency	f_nom	32.768 kHz	
2	Frequency tolerance	f_tol	$\pm$ 20 × 10^{-6}	
3	Load capacitance	C_L	12.5 pF	
4	Motional resistance	R_1	70 kΩ max.	Measured with ATI 4192A Impedance analyzer OSC LEVEL = 0.1V
5	Motional capacitance	C_1	6 fF typ.	
6	Shunt capacitance	C_0	1.3 pF typ.	Measured with ATI 4192A Impedance analyzer OSC LEVEL = 0.1V
7	Turnover temperature	Ti	25 ± 5℃	Measure this coefficient at 5 points of −40℃、−20℃、25℃、60℃、 85℃ using C-MOS circuit.
8	Parabolic coefficient	B	(−0.03±10%) × 10^{-6}/℃^{2}	
9	Frequency aging	f_age	$\pm$ 3 × 10^{-6} /year	25±3℃, First year
10	Insulation resistance	IR	500 MΩ min.	Measured with ATI 4329A Insulation Resistance Meter Apply DC100V

[4] Environment and Mechanical Characteristics

	Item	Specification	Condition	
1	High temperature storage 1	$\Delta f/f_0 = \pm 10 \times 10^{-6}$	After storage under 85℃ for 1000 hours, measure at room temperature.	*1 *3
	High temperature storage 2	$\Delta f/f_0 = \pm 15 \times 10^{-6}$	After storage under 125℃ for 1000 hours, measure at room temperature.	*1 *3
2	Low temperature storage	$\Delta f/f_0 = \pm 10 \times 10^{-6}$	After storage under −55℃ for 1000 hours, measure at room temperature.	*1 *3
3	High temperature and high humidity storage	$\Delta f/f_0 = \pm 10 \times 10^{-6}$	After storage under +85±2℃, 85 % RH for 1000h, measure at room temperature.	*1 *3
4	Temperature cycle	$\Delta f/f_0 = \pm 10 \times 10^{-6}$	Measure at room temperature after 100 cycles. −55℃ ⇔ +125℃ for 30 minutes.	*1 *3
5	Mechanical shock resistance	$\Delta f/f_0 = \pm 10 \times 10^{-6}$	Measure after 100g−dummy(SII Standard) drop from 1500mm height on the concrete at 3 directions for 10 times each.	*2
6	Vibration resistance	$\Delta f/f_0 = \pm 10 \times 10^{-6}$	Amplitude 1.5mm and 10〜60Hz with cycle time 2〜3 minutes in 3 direction (X,Y, and Z axis) each for 2 h.	*2
7	IR Reflow	$\Delta f/f_0 = \pm 10 \times 10^{-6}$	Measure after 2 time reflow under reflow profile specified in page 10	*1
8	Shear strength	No peeling−off	Pressuring force 10N×10±1sec. according to IEC60068−2−21	*2
9	Peel strength	No peeling−off	Pressuring force 10N×10±1sec. according to IEC60068−2−21	*2
10	Bending test	No peeling−off	Bending: 3mm×5±1sec. Thickness of the testing board: 1mm	*2

Note:
1. Each test shall be done independently. (not in series tests)
2. *1: Measure after 24 hours left at room temperature.
3. *2: Measure after 2 hours left at room temperature.
4. *3: Pre conditions
   (1) IR Reflow : 2 times
   (2) Initial values shall be measured after 24 hours at room temperature.
5. Shift in series resistance after the above tests shall be less than ±20% or less than ±15kΩ.
   In case of resistance to IR reflow, shift in series resistance after the above tests shall be less than ±30% or ±20kΩ.
   In case of resistance to high temperature storage(±125℃ for 1000 hours), shift in series resistance after the above tests shall be less than ±40% or ±30kΩ.

[5] Precautions

(1) Recommended mounting conditions
Reflow profile As per reflow profile shown in page 10.
Manual soldering 350℃max. for 4 sec. Max.

(2) Cleaning
The crystal resonator may be destroyed by ultrasonic cleaning.
We don't guarantee the quality of the product with that cleaning method because such conditions as type of the washing machine, power, time, position in the bath, and etc. can not be specified.
Please confirm ultrasonic cleaning is not giving any damage to the product before use when that cleaning method must be used.

[6] Outgoing Inspection Standard

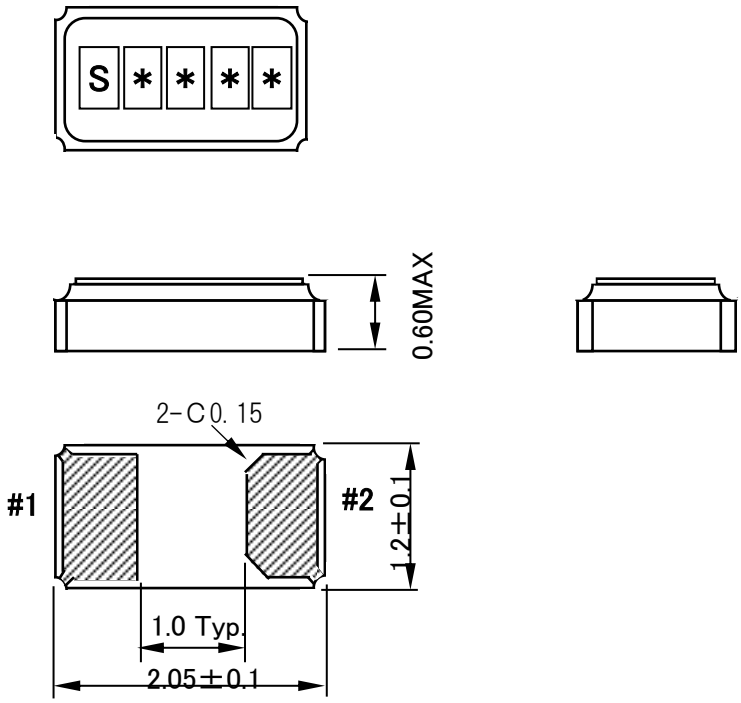
・The outgoing inspection shall be conducted as per the following standard.

・The sampling shall be performed according to the ANSI/ASQC Z1.4-1996.

NO	Item	Sampling level	AQL(%)
1	Frequency tolerance	I	1.0
2	Equivalent series resistance	I	1.0
3	Outer appearance	I	1.5
4	Others characteristics	Periodical quality inspection	

[7] Dimensions and Marking Layout

1. Out Line Drawing



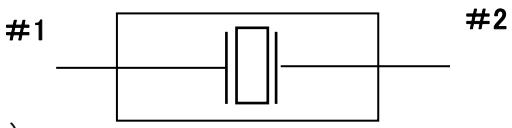
Unit = mm

2. Marking

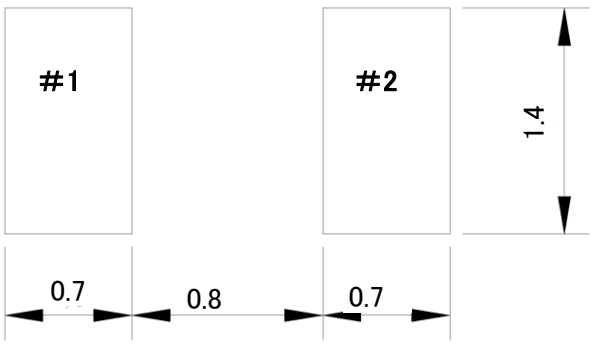
S	□	□	□	□
*1	*2	*3	*4	*5

*1	Specification
*2	CL (7pF: B, 9pF: J, 12.5pF: F)
*3	Year of Production (Last Digit of Year)
*4, 5	Week of Production (01～ 52)

3. Lead Connection



4. Recommended PAD Lay-out



Unit = mm

Please make sure that there is no pattem under SC-20S on the circuit board.

Materials:

Case: Alumina ceramics, Ni-plated, Au-plated

Lead: Kovar material, Ni-plated

[8] Taping Specification

1. Drawing of tape dimensions
   ① Carrier tape : Refer to page 8.
   ② Taping reel : Refer to page 9.

2. Material
   ① Carrier tape : PC black conductive
   ② Taping reel : PS conductive

3. Taping method
   (1) Taping shall be placed in tapes in such manner as to assure that marking of the components is visible as per Fig.1

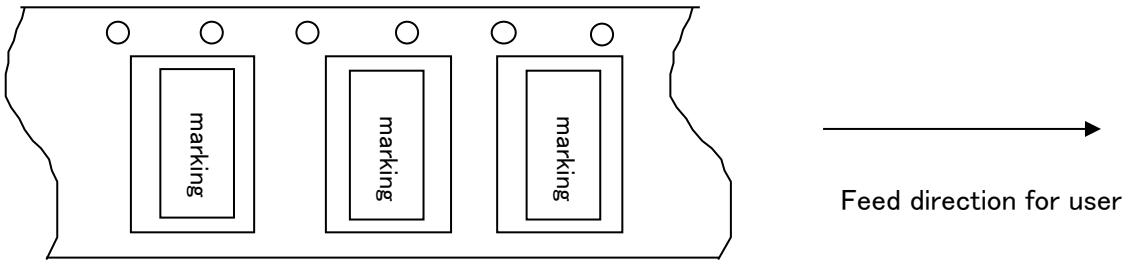


Fig. 1

   (2) Reel
   ① On the side of reel there shall be more than 160 mm of "No components".
   ② The beginning of Carrier Tape shall be bent vertically and hooked on groove of reel.

   (3) Leader
   ① On the side of leader, there shall be more than 160 mm of "No components"
   ② The length of Leader shall be over 400 mm.
   ③ The Length of Stick Tape for Cover Tape shall be about 100 mm and Stick Tape shall never be detached.

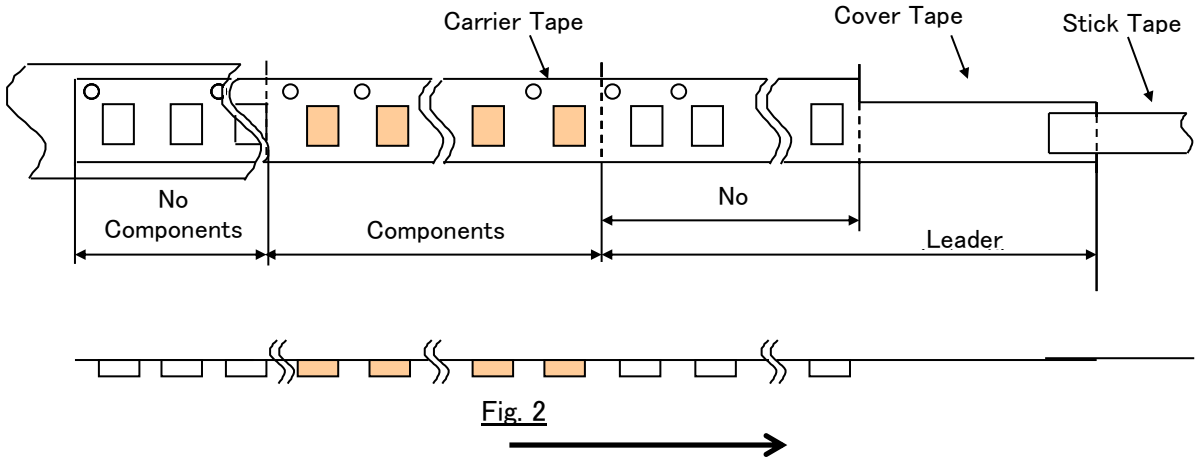
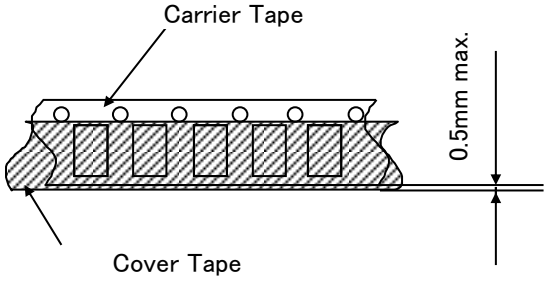


Fig. 2

(4) Gap between Carrier Tape and Cover Tape

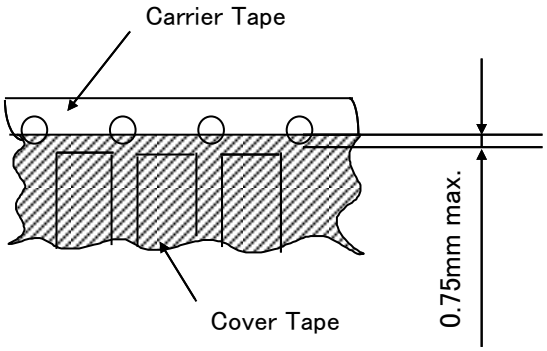
① Cover Tape protrudes from Carrier Tape by 0.5mm max.

Fig. 3



② Holes of Carrier Tape are covered with Cover Tape by 0.75mm max.

Fig. 4



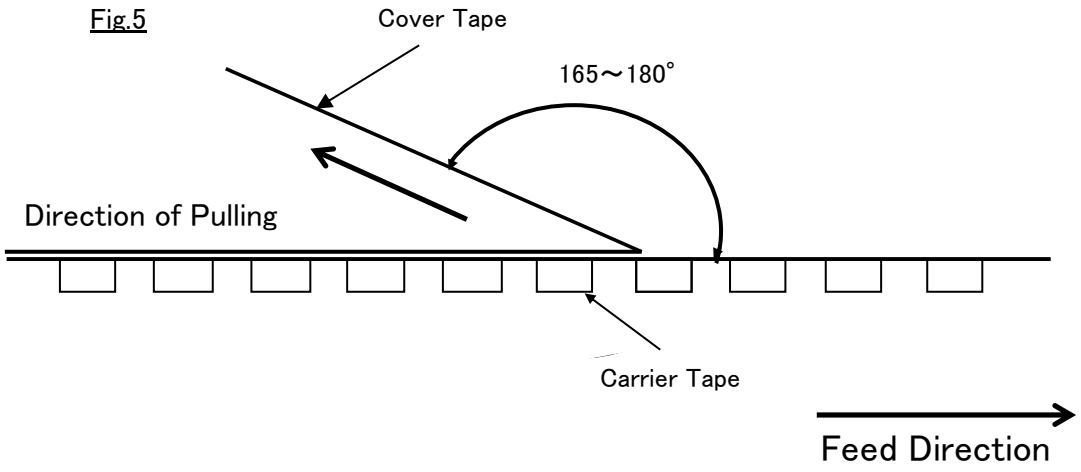
(5) Peel strength

① The method of testing is done as shown below.

② The value of force is at the beginning of desealing.

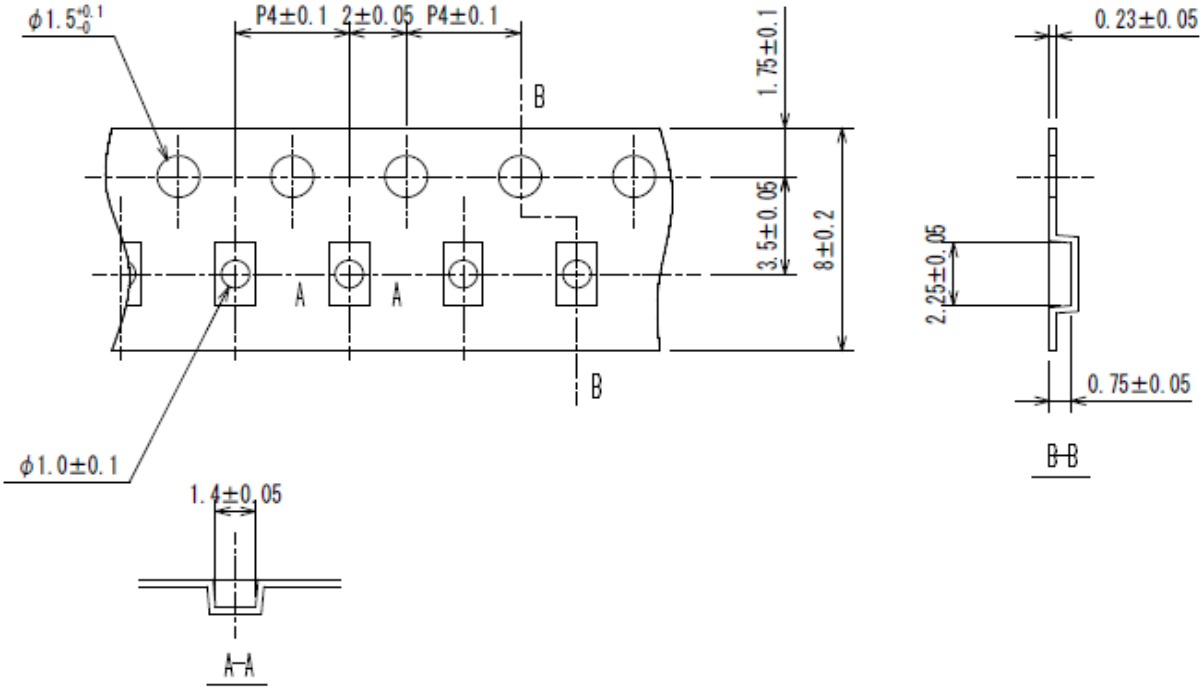
③ The Cover Tape peel forth shall be 0.1～1.3N at a peel speed of 300±10mm/min.

Fig.5



Carrier tape

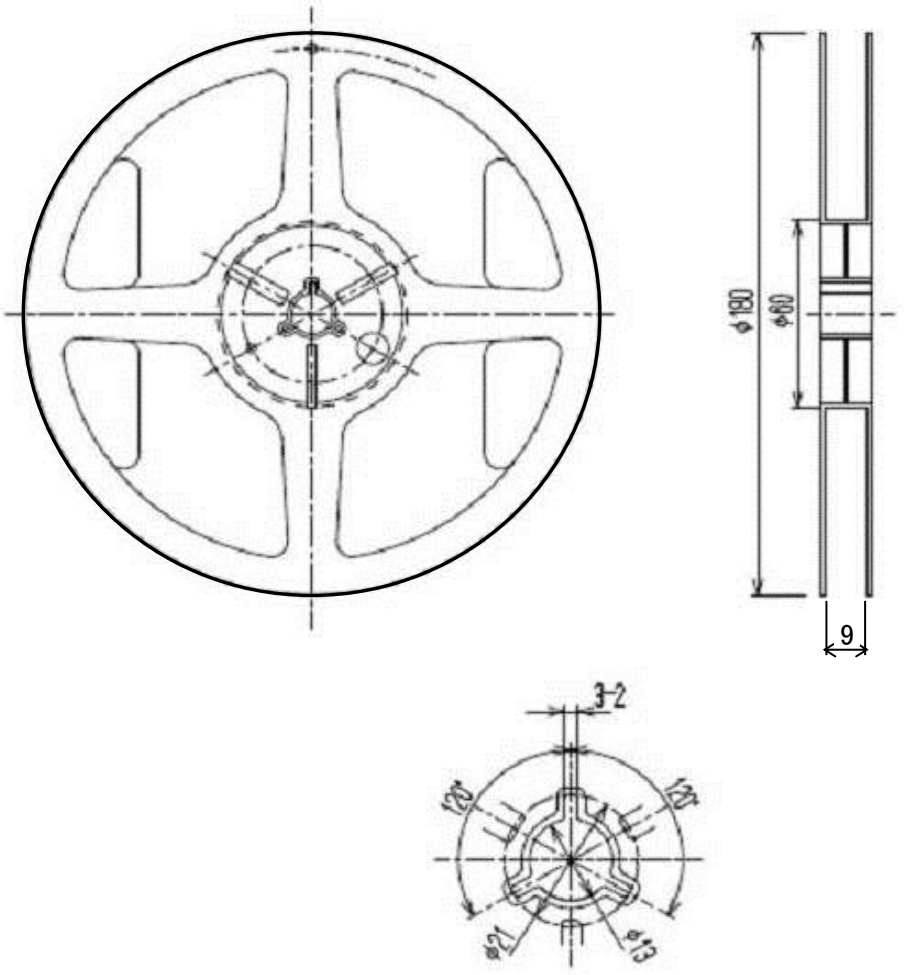
(1) Conformity with EIA-481
(2) Tolerance : ±0.2



Unit=mm

Taping reel

(1) Conformity with EIAJ ET-7200B
(2) Quantity per reel : 3,000pcs./for a reel



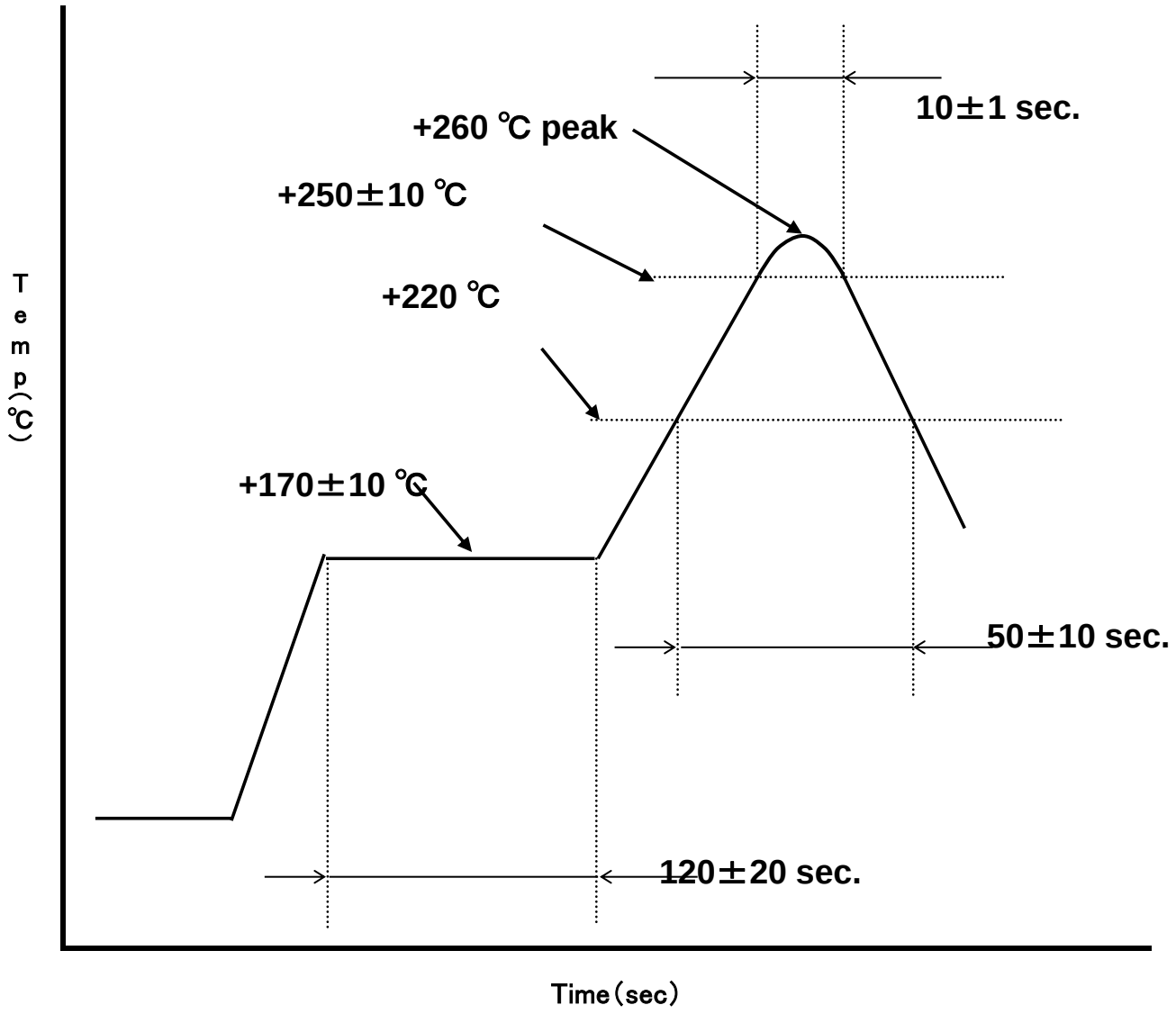
Torrance : ±0. 2mm

Item	Specification	Unit
Materials	PS(anti statics)	-
Inside reel wise W1	9.0+1.0/-0	mm
Outside reel wise W2	11.4±1.0	mm

Unit = mm

[9] Reflow Profile

Pre-heating temperature : +170℃ Pre-heating time : 120sec
Heating temperature : +220℃ Heating time : 50sec



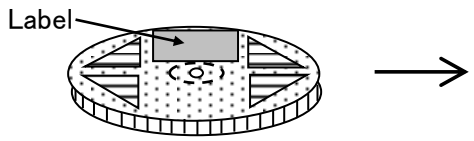
Note:

（1） The temperature used herein means the temperature on the circuit board.
（2） Reflow is permitted 2 times.

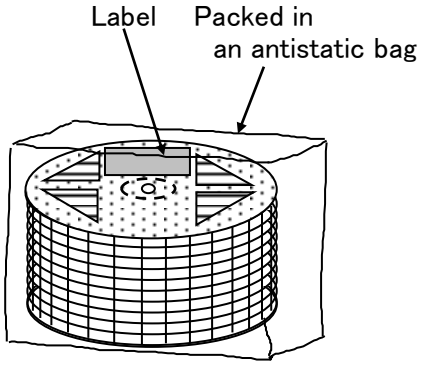
[10] Outside Box Packing Specification

1) A label is attached on each reel.

2) 10 reels are placed in each antistatic polyethylene bag.



【Figure 1】

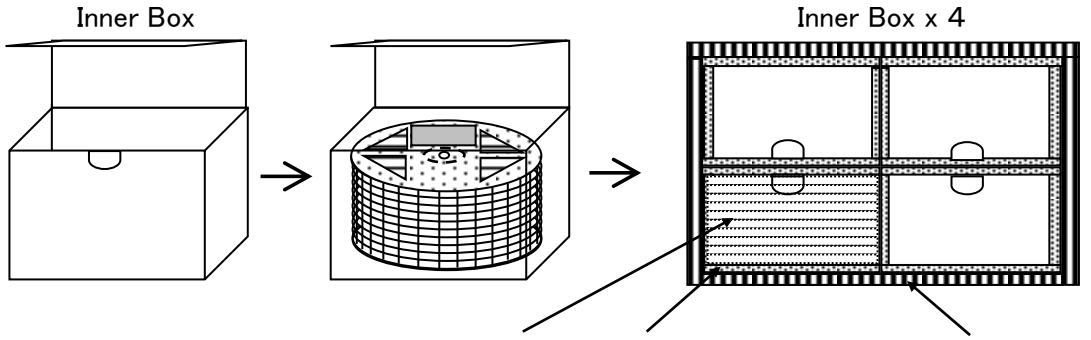


【Figure 2】

3) Package

10 reels are placed in each inner box.

4 inner boxes are placed in each shipping carton.



【Top View】

4) Storage quantity

Lot = Reel

N = 3,000 pcs /Reel

5) Sample of the label display (Please refer to【 Figure 1 】【 Figure 2 】)

Product bar code	Part	SC-20S	: Our company's product name
	Lot No.	000001	: Lot No.
	Quantity	3, 000 pcs	: Quantity
Item bar code *	Spec.	32.768kHz 12.5pF/±20×10^{-6}	: Frequency, CL value, F0 deviation
Quantity Lot.No.bar code 3,000 XXXX	Remarks	RoHS Compliant Pb Free	: Environment adaptability, and etc.

6) Storage environment

Please keep the products under the following conditions

* No direct rays
* Temperature condition : +15 to 35 ℃
* Humidity condition : 25 to 85%RH

7) Storage term

We recommend using within a year of shipment under the environment set in the specification (Temperature : 15-35℃, Humidity: 25-85%RH) regardless of opening the product or not.
Crystal oscillator doesn't have a lifetime by reason of little performance change caused by secular variation. Nevertheless, please note that you should confirm the specification of our product whose storage period expires before use.