Telit

RECIPIENT

SPECIFICATIONS

Product No. : **X1G0038410033****

MODEL : **TG-5035CJ-39N**
16.369MHz

SPEC. No. : **A12-833-0B**

DATE: **Feb. 7. 2012**
△2 **Jul. 16. 2013**

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Update History

Contents of change			Reason for change	Update date
Page	Current	Update		
3	[5] Electrical characteristics		Demand of customer	① May. 23. 2013
	-	Add to specification of “Frequency drift on power up”		
7	[9] Recommendable patterning Picture of 2520 size.	[9] Recommendable patterning Picture of 2016 size.	error in writing.	② Jul. 16. 2013

SPECIFICATIONS

1. Application

This document is applicable to the temperature compensated crystal oscillator (TCXO) that is delivered to **Telit** from SEIKO EPSON Corp.

This product is compliant with RoHS Directive.

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.

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. Model

The product No. of this crystal oscillator unit is **X1G003841003300**.
The model is **TG-5035CJ-39N** (TCXO)

3. Packing

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

4. Amendment and abolishment

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

5. Contents

Item No.	Item	Page
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[1] Characteristics

- Lead Free Reflowable and ultra small SMD(2.0 × 1.6 × 0.75 mm).
- Using the heat-resisting type AT cut quartz crystal allows almost the same temperature soldering as universal SMD IC.
- Operating supply voltage: V_{CC} : 1.80 V

[2] Absolute maximum ratings

Parameter	Symbol	Value	Unit	Note
Supply voltage	V_{CC}-GND	-0.3 to 4.5	V	
Storage temperature range	$T_{_STG}$	-40 to +90	°C	

[3] Operating range

Parameter		Symbol	Value			Unit	Note
			Min.	Typ.	Max.		
Power voltage		V_{CC}	1.70	1.80	1.90	V	
Power voltage		GND	0.0	0.0	0.0	V	
Operating temperature range		T_use	-40	+25	+85	°C	
Output load		Load_R	9	10	11	kΩ	
		Load_C	9	10	11	pF	
	DC-cut capacitor	C_C	0.01			µF	

DC-cut capacitor is not included in our TCXO. Please insert DC-cut capacitor(0.01uF Min.) in output line.

[4] Frequency characteristics

1) Output frequency 16.369000 MHz

2) Frequency characteristics

(Condition : V_{CC} = 1.80 V, GND = 0.0 V, Load 10 kΩ // 10 pF, T_use =+25 °C)

Parameter	Symbol	Value	Note
Frequency tolerance *1	f_tol	$\pm 2.0 \times 10^{-6}$ Max.	T_use =+25 °C ± 2 °C After 2times reflow *2
Frequency / temperature characteristics	fo-Tc	$\pm 0.5 \times 10^{-6}$ Max.	T_use =- 40 °C to +85 °C (Based on frequency at +25 °C)
Frequency / temperature change	fo-Tc/°C	$\pm 0.1 \times 10^{-6}$ Max.	T_use =- 40 °C to +85 °C
Frequency / Load coefficient	fo-Load	$\pm 0.2 \times 10^{-6}$ Max.	Load : 10 kΩ // 10 pF, ± 10 % each
Frequency / voltage coefficient	fo-Vcc	$\pm 0.1 \times 10^{-6}$ Max.	V_{CC} :1.8 V ± 10 %
Frequency aging	f_age	$\pm 1.0 \times 10^{-6}$ Max.	T_use =+25 °C first year
Hysteresis	-	$\pm 0.6 \times 10^{-6}$ Max.	Beforeand after at +25 °C

*1 Include initial frequency tolerance and frequency deviation after reflow cycles.

*2 Measurement of frequency deviation is made 24h after reflow soldering.

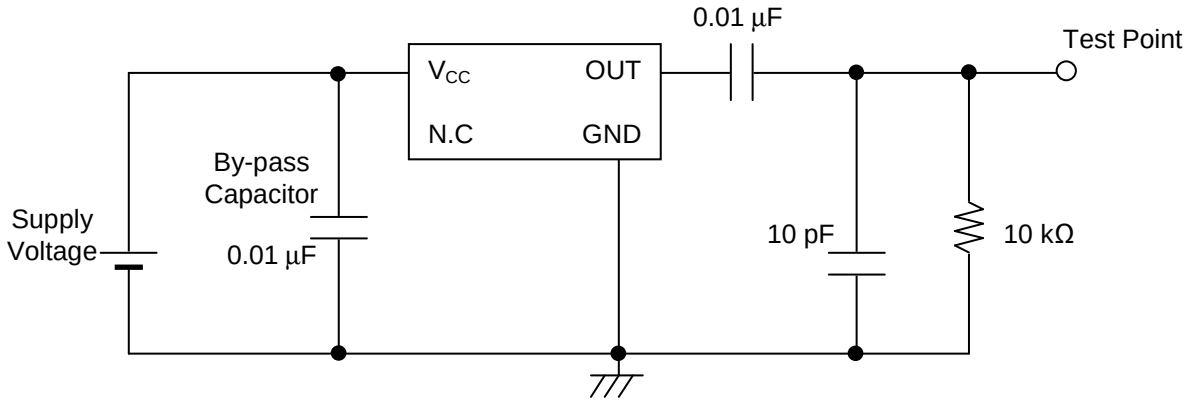
[5] Electrical characteristics ⚠1

(Condition : V_{CC} = 1.80 V, GND = 0.0 V, Load 10 kΩ // 10 pF, T_use =+25 °C)

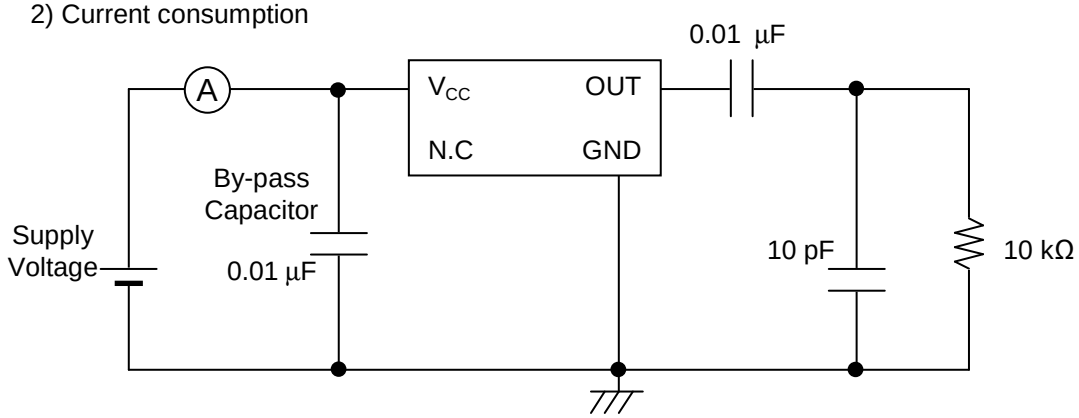
Parameter	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
Current consumption	I_{CC}	-	-	1.5	mA	
Output level	V_{PP}	0.8	-	-	V	Peak to peak voltage
Symmetry	SYM	40		60	%	GND level
SSB Phase noise	L(f)	-	-67	-55	dBc /Hz	Offset:1 Hz
		-	-94	-86		Offset:10 Hz
		-	-120	-116		Offset:100 Hz
		-	-140	-134		Offset:1 KHz
		-	-151	-148		Offset:10 KHz
Frequency drift on power up	-	-500	-	+500	$\times 10^{-9}$ /sec	Drift period : 0.03 to 1.0 seconds
		-40	-	+40		Drift period :1.0 to 2.0 seconds
		-2.5	-	+2.5		Drift period : 2.0 to 3.0 seconds

[6] Test circuit

1) Output Load : 10 kΩ//10 pF



2) Current consumption



3) Conditions

1. Oscilloscope: Impedance Min. 1 MΩ
   Input capacitance Max. 10 pF
   Band width Min. 300 MHz
   Impossible to measure both frequency and wave form at the same time.(In case of using oscilloscope's amplifier output, possible to measure both at the same time.)
2. CL includes probe capacitance.
3. A capacitor (By-pass:0.01 μF) is placed between V_{CC} and GND,and closely to TCXO.
4. Use the current meter whose internal impedance value is small.
5. Power Supply
   Impedance of power supply should be as lowest as possible.
6. GND should apply one point earth.

[7] Environmental and mechanical characteristics

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

No.	Item	Value *1		Test method
		Freq. Tolerance [1×10^{-6}] *2	Electrical characteristics	
1	High temp. storage *3	± 2.0	Satisfy Item output level after test	+85 ℃ × 1 000 h
2	Low temp. storage *3	± 2.0		-40 ℃ × 1 000 h
3	High temperature with Humidity	± 2.0		+85 ± 2 ℃ × 85 ± 5 %RH × 1 000 h
4	Temp. cycle *3	± 2.0		-40 ℃ to +85 ℃ (30 min × 100 cycle/each)
5	Resistance to Soldering heat (Reflow characteristics)	± 1.0		Reflow furnace with the condition 2 times
6	Drop	± 2.0		Free drop from 750 mm height on a hard wooden board for 3 times. (Board is thickness more than 30 mm)
7	Vibration (variable frequency)	± 1.0		10 Hz to 55 Hz 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)
8	ESD (MM)	± 1.0		200pF 0Ω 200V. Discharge 3 pulses
9	ESD (HBM)	± 1.0		100pF 1.5kΩ 2000V. Discharge 3 pulses
10	Solderability	Terminals must be 95 % covered with fresh solder		Dip termination into solder bath at +235 ℃ for 5 s (Using Rosin Flux)

Notes

1.*1 each test is independent.

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

3.*3 Pre conditionings

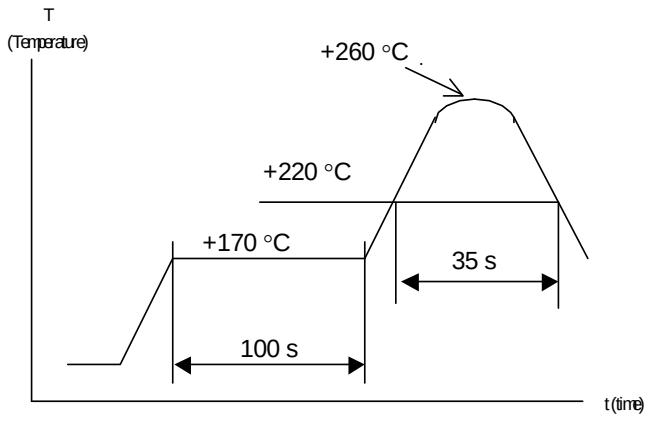
1. reflow 2 times
2. Initial value shall be after 24 h at room temperature.

Infrared-reflow

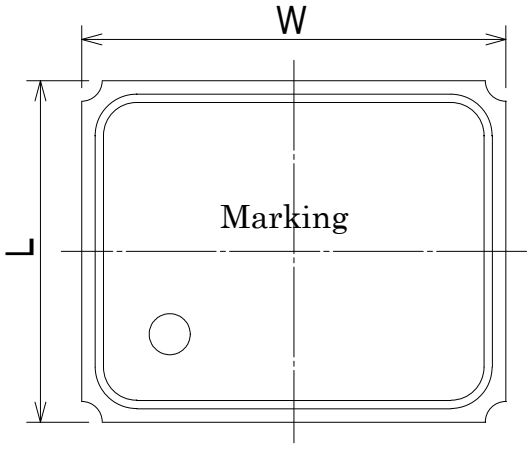
Pre heating temperature : +170 ℃ Pre heating time : 100 s

Heating temperature : +220 ℃ Heating time : 35 s

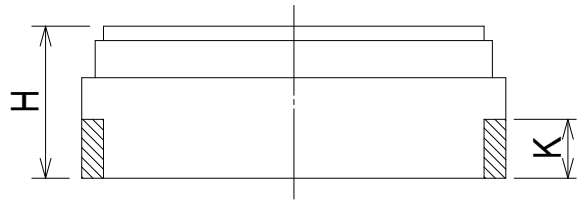
Peak temperature must not exceed +260 ℃



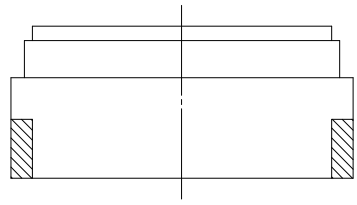
[8] Dimensions And Marking Layout

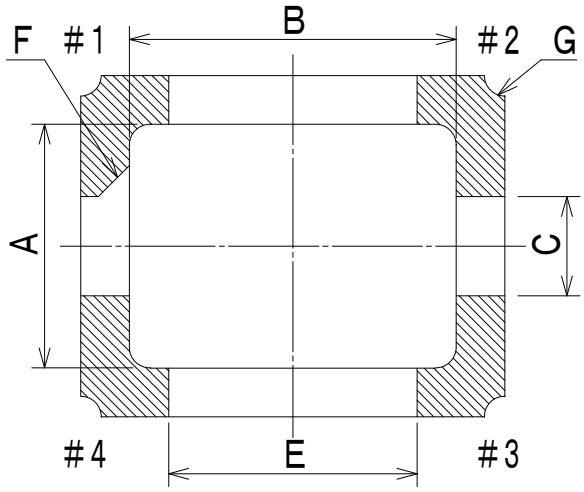


[TOP VIEW]

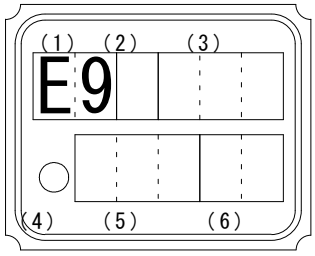


[SIDE VIEW]





[BOTTOM VIEW]



Marking

(1) TCXO Model ID (E9)
(2) TCXO Product place
(3) TCXO Lot No.
(4) 1Pin Mark
(5) XTAL Lot No.
(6) XTAL Model ID

Connection

Pin No.	Terminal
# 1	N.C
# 2	GND
# 3	OUT
# 4	V_{CC}

Material

Ceramics(base)
Au coated nickel(terminal)
Fe-Ni-Co(lid)

(unit : mm)

DIM.	MIN.	TYP.	MAX.	DIM.	MIN.	TYP.	MAX.
W	1.85	2.00	2.15	C	0.38	0.48	0.58
L	1.45	1.60	1.75	E	1.10	1.20	1.30
H	0.66	0.73	0.80	F	---	C0.15	---
A	1.08	1.18	1.28	G	---	R0.10	---
B	1.48	1.58	1.68	K	---	0.27	---

Co-planarity : 0.05mm

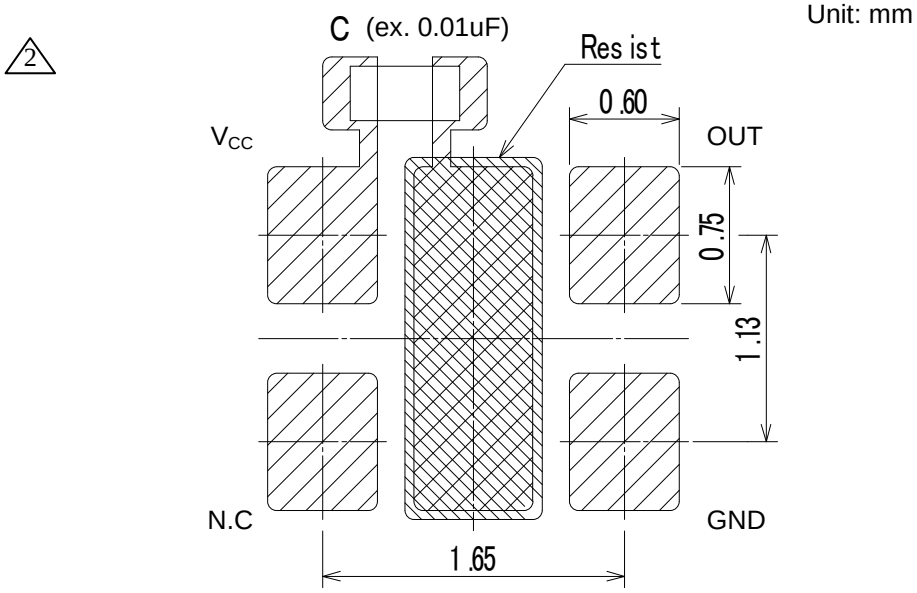
[9] Recommendable patterning

For actual design work, please consider optimum condition together with mounting density, reliability of soldering and mount ability etc.

Do not design any patterns except GND on the shaded area.

Soldering position

Unit: mm



[10] Handling precautions

Prior to using this product, please carefully read the section entitled “Precautions” on our Web site (http://www5.epsondevice.com/en/quartz/tech/precaution/) for instructions on how to handle and use the product properly to ensure optimal performance of the product in your equipment. Before using the product under any conditions other than those specified therein, please consult with us to verify and confirm that the performance of the product will not be negatively affected by use under such conditions.

In addition to the foregoing precautions, in order to avoid the deteriorating performance of the product, we strongly recommend that you DO NOT use the product under ANY of the following conditions:

(1) Mounting the product on a board using water-soluble solder flux and using the product without removing the residue of the flux completely from the board. The residue of such flux that is soluble in water or water-soluble cleaning agent, especially the residues which contains active halogens, will negatively affect the performance and reliability of the product.
(2) Using the product in any manner that will result in any shock or impact to the product.
(3) Using the product in places where the product is exposed to water, chemicals, organic solvent, sunlight, dust, corrosive gasses, or other materials.
(4) Using the product in places where the product is exposed to static electricity or electromagnetic waves.
(5) Applying ultrasonic cleaning without advance verification and confirmation that the product will not be affected by such a cleaning process, because it may damage the crystal, IC and/or metal line of the product.
(6) Touching the IC surface with tweezers or other hard materials directly.
(7) Using the product under any other conditions that may negatively affect the performance and/or reliability of the product.
(8) Using the product with power line ripple exceeding 200 mV(p-p) level.

Should any customer use the product in any manner contrary to the precautions and/or advice herein, such use shall be done at the customer’s own risk.

TAPING SPECIFICATION (STD)

Ⅰ. Application

This standard will apply to 2.0×1.6 SMD package.

Spec：CJ package

Ⅱ. 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	

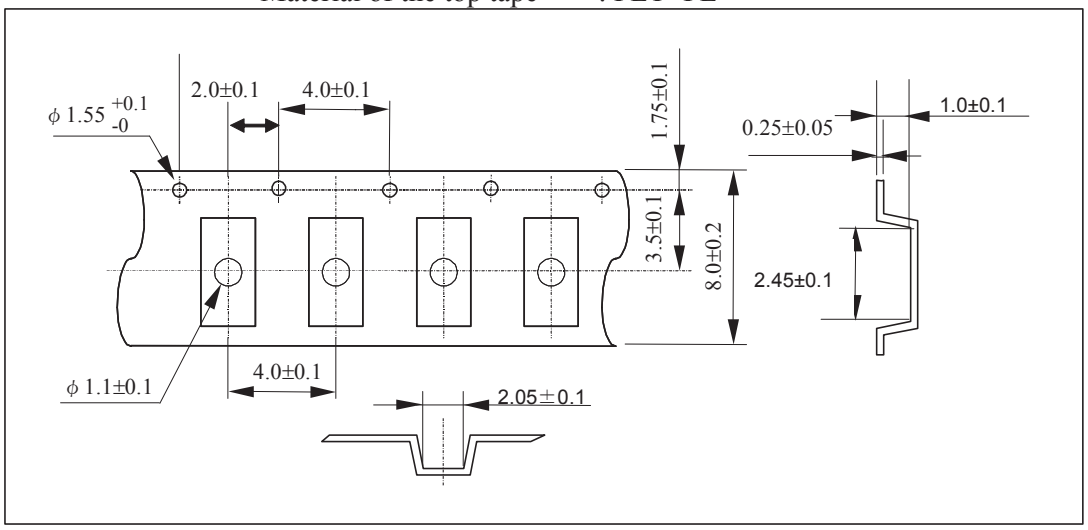
〔1〕 Taping specification

Subject to EIA-481& IEC-60286

(1) Tape dimensions

Material of the carrier tape : PS （BLACK /Electric conduction）

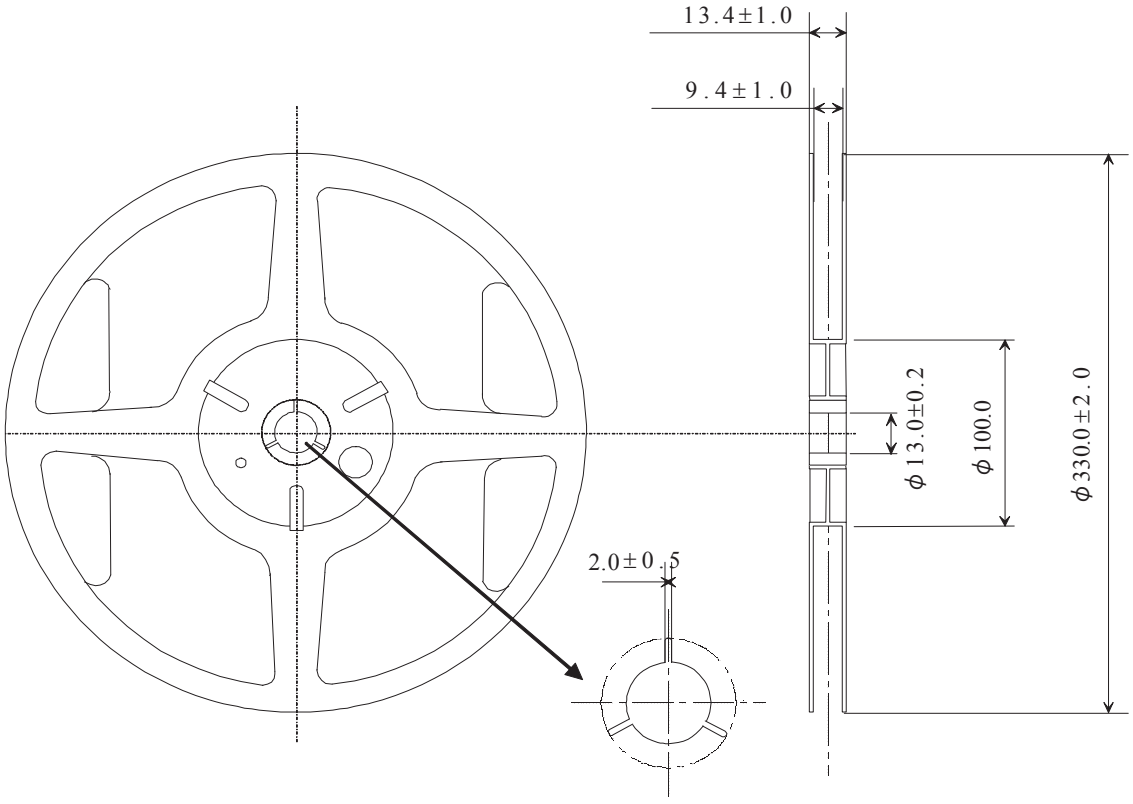
Material of the top tape : PET+PE



Unit : mm

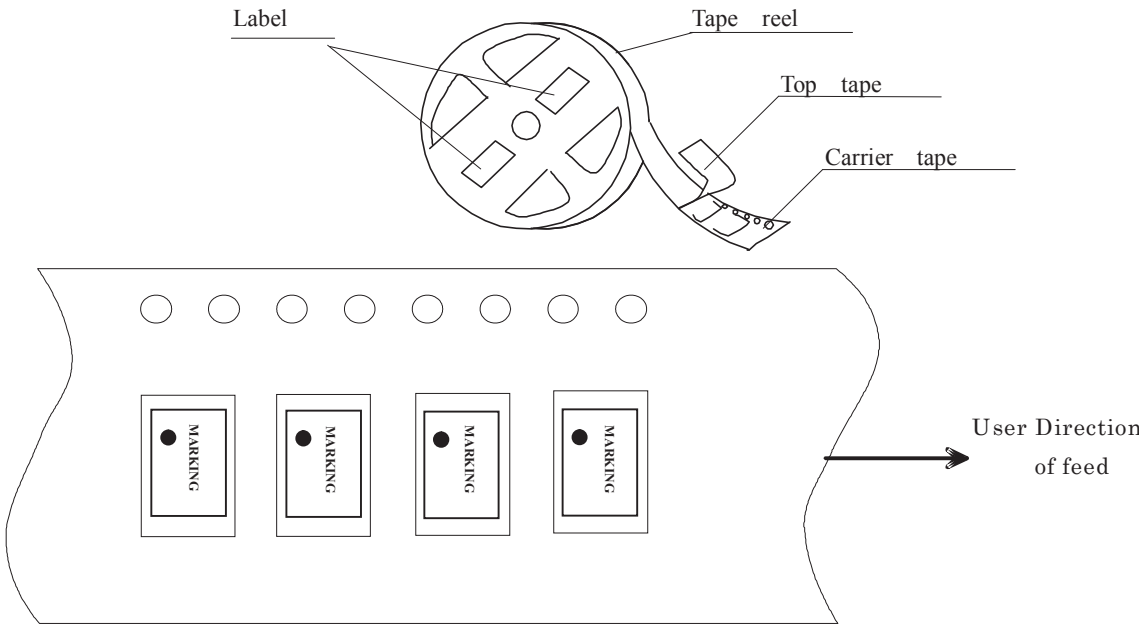
(2) Reel dimensions

Material of the reel : Conductive polystyrene（BLACK /Electric conduction）

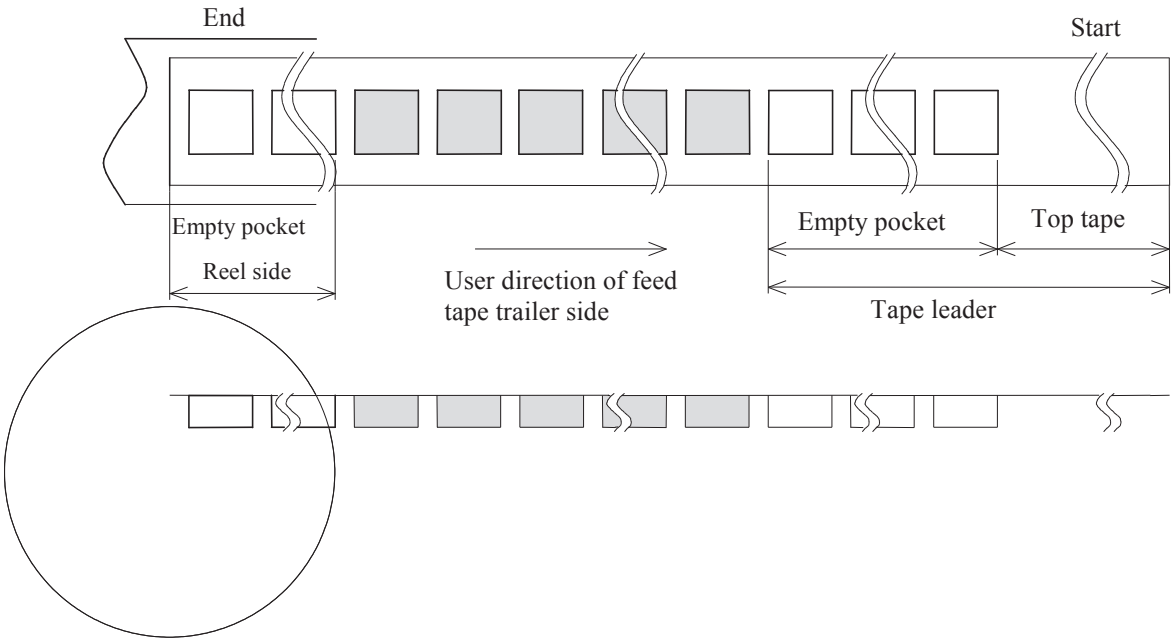


(3) Packing

①Tape & reel



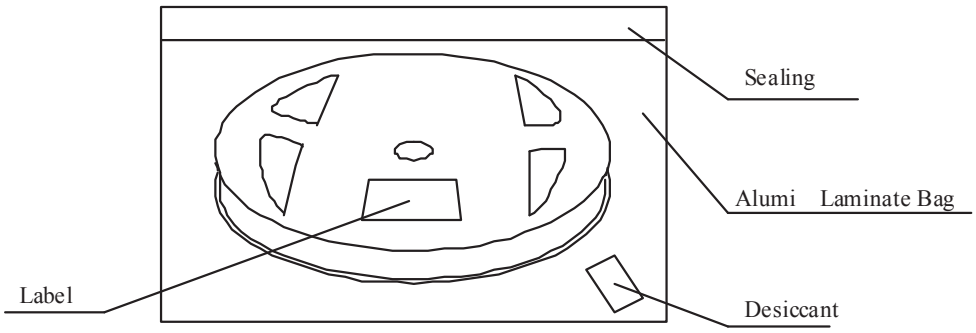
②Start & end point



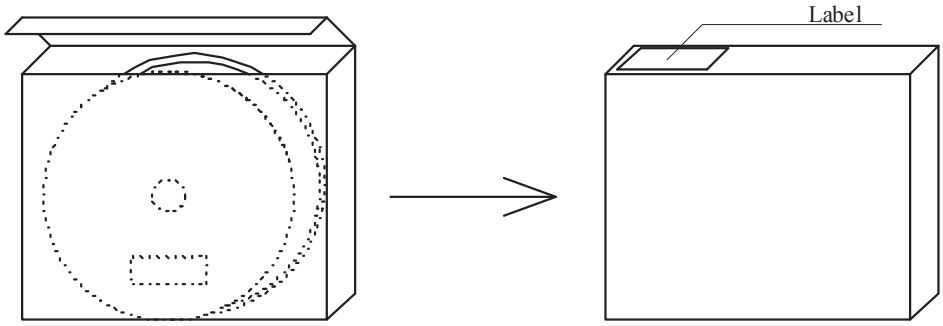
Item		Empty space	Note
Tape leader	Top tape	Min. 200 mm	Top tape shall be fixed using tape and/or polyethylene seal.
	Carrier tape	Min. 150 mm	
Tape trailer	Top tape	Min. 0 mm	Tape end point shall be fixed using tape or hooked in core area.
	Carrier tape	Min. 150 mm	

〔2〕 Inner carton

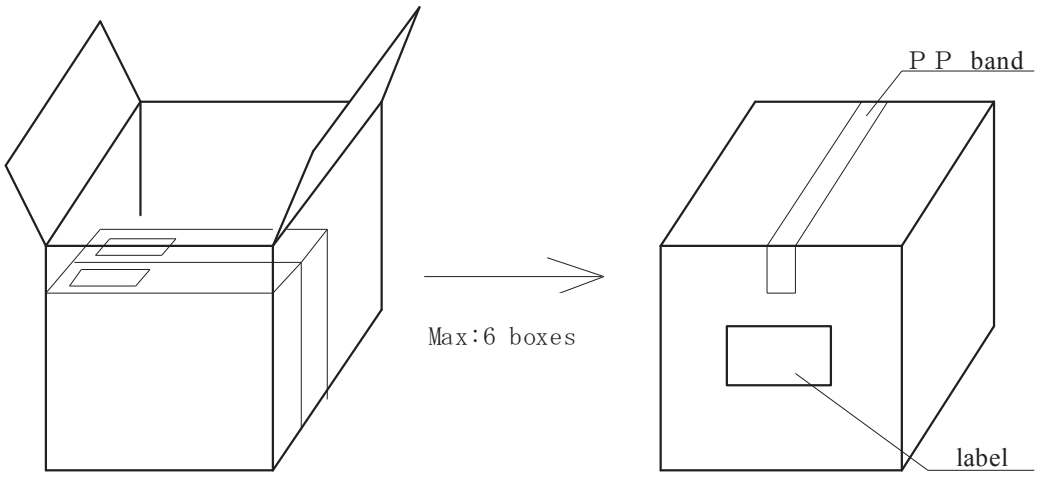
a) Packing to Alumi Laminate bag



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 or symbol
5) Others (if necessary)
6) Pb-Free Marking : LF

Example of label-1

CRYSTAL OSCILLATOR	
P/N: 452002	P/O: 12345678901234567890
TG-50XXCJ-XXX XXMHz	MSL Level-2 LF
LOT NO: 0000000000	QUANTITY: 12,000
WEEK CODE:/ XXXXXX	X1G000000000 ** YYYY.MM.DD
EPSON TOYOCOM	MADE IN: JAPAN

(2) Inner carton and Alumi Laminate bag marking

・Same as reel marking.

(3) Shipping carton marking

・Shipping carton marking shall consist of

1) Parts name
2) Quantity

〔5〕 Quantity

・Max. 12,000 pcs./reel
・Min. 500 pcs./reel

note) The above quantity is our standard packing size.
In case of an odd sum as per the purchased quantity, the packing quantity might be below our standard minimum packing size.

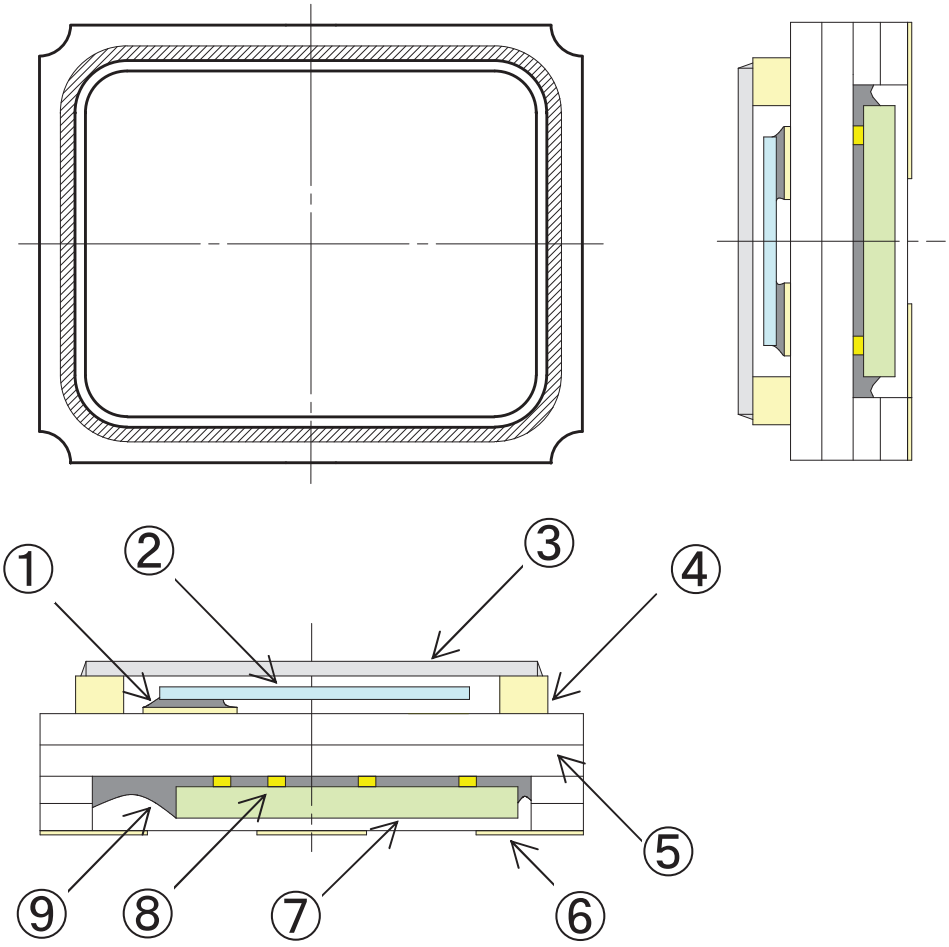
〔6〕 Storage environment

(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.

Structure diagram. TG-5035CJ



LIST		
Name of part		Specification
1	XTAL adhesives	Ag paste
2	XTAL chip	AT cut
3	Lid	Fe – Ni – Co
4	Seam ring	Kovar – Ni – Au
5	Base	Ceramic PKG
6	Terminal	Au coated , Ni
7	IC	CMOS
8	FC bump	Au
9	UF	Potting resin
10		

OUT-10-0116_02		
MGR.	CHK.	ENG.
Y.Shishido.		H.Hirano.