RoHS Compliant
Directive 2011/65/EU

SPECIFICATION

Customer:

Item:	CRYSTAL UNIT
Type:	NX3215SA
Nominal Frequency:	32.768kHz
Customer's Spec. No.:	---
NDK Spec. No.:	EXS00A-MU00202

Receipt

Charge:

Sales	NDK-TP：Lilian Chiu	Tel. 886-2-2555-0232
Engineer	1st Eng. Dept.: Hasuike	Tel. 81-(0)4-2900-6632

Approved	H.Matsudo
Checked	---
Drawn	Y.Hasuike

Revision Record

Rev.	Rev. Date	Items	Contents	Remarks
---	14.Nov.2011	Issued	---	---

1. Customer specifications number : ---

2. NDK specification number : EXS00A-MU00202

3. Type : NX3215SA

4. Electrical characteristics
   - 4.1. Nominal Frequency (F_0) : 32.768 kHz
   - 4.2. Overtone Order : Fundamental
   - 4.3. Adjustment tolerance(at +25°C) : $\pm 20 \times 10^{-6}$ Max.(No include aging)
   - 4.4. Turning Point : +25°C±5°C
   - 4.5. Temperature coefficient : -0.04×10^{-6} / °C^2 Max.
   - 4.6. Equivalent Resistance (R_R) : 70 kΩ Max.
   - 4.7. Shunt Capacitance (C_0) : 1.0 ± 0.5 pF
   - 4.8. Motional Capacitance (C_1) : 4.0 ± 2.0 fF
   - 4.9. Insulation Resistance :Terminal to terminal insulation resistance also terminal to cover insulation resistance must be 500MΩ (Min.) when DC100V ±15V is applied.

5. Measurement circuit
   - 5.1. Frequency measurement
     - ・Measuring instrument : Network Analyzer (CNA-LF made in Transat corp.)
     - ・Load capacitance (C_L) : 7.0pF
     - ・Level of drive : 0.1 μW
   - 5.2. Equivalent resistance measurement
     - ・Measuring instrument : Network Analyzer (CNA-LF made in Transat corp.)
     - ・Load capacitance (C_L) : Series
     - ・Level of drive : 0.1 μW

6. Other performances
   - 6.1. Operating Temperature range : - 40 to + 85°C
   - 6.2. Storage Temperature range : - 40 to + 125°C
   - 6.3. Maximum drive level : 0.5 μW Max.
   - 6.4 Aging (at +25 °C) : $\pm 3 \times 10^{-6}$ Max. / 1 year

7. Examination results document
   Since a performance is guaranteed, an examination results document does not submit.

8. Storage conditions
   - 8.1. It is not dropping a 2nd-packing box or not pushing and crushing in the case of storage.
   - 8.2. Direct rays are avoided and they are room temperature and humidity (dehumidification environment is desirable if it can do).
   - 8.3. A storage term should give half a year as a standard (even if it passes a storage term, there is no rapid degradation).

9. Application drawing

9.1. Dimension drawing	: EXD14B-00462
9.2. Taping and reel figure	: EXK17B-00302
9.3. Holder marking	: EXH11B-00422
9.4. Reel Packing	: EEK17B-00015
9.5. Structural Drawing	: EXD13B-00243
9.6. Reliability assurance Item	: EXS30B-00661
9.7. Quality Control Process Flow Chart	: EXQ11B-00387

10. Notice

10.1 Order items are manufactured according to specification. As to conditions, which are not indicated in t his specification and unpredictable such as applied condition and oscillation margin, please check them beforehand.

10.2 Unless we receive request for modification within 3 weeks from the issue date of this NDK specification sheet, we will supply products according to this specification. Also, if you'd like to modify specification of order, which has been placed with delivery request within 3 weeks from the issue data of this specification sheet, we would like to discuss with you separately.

10.3 In no event shall the company be liable for any product failure resulting from an inappropriate handling or operation of the product beyond the scope of its guarantee.

10.4 Where any change to the process condition is made due to the change(s) in the production line, inform personnel of the specifications.

10.5 Should this specification data give rise to any disputes relating to any intellectual property rights or any other rights of a third person, the company shall not indemnify anyone for any damage. Their disclosure must not be construed as the grant of a license to use any of the intellectual property rights owned by the company.

10.6 If you intend to use products listed on this specification for applications that may result in loss of life or assets (controls relating to safety, medical equipment, aeronautical equipment, space equipment, etc.), please do not fail to advise us of your intention beforehand.

10.7 In the company's production process whatever amount of ozone depleting substances (ODS) as s pecified in the Montreal protocol is not used.

10.8 Information contained in this specification must not be quoted, reproduced or used for other purposes including processing either in part or in full without obtaining prior approval from the company.

11. Prohibited items

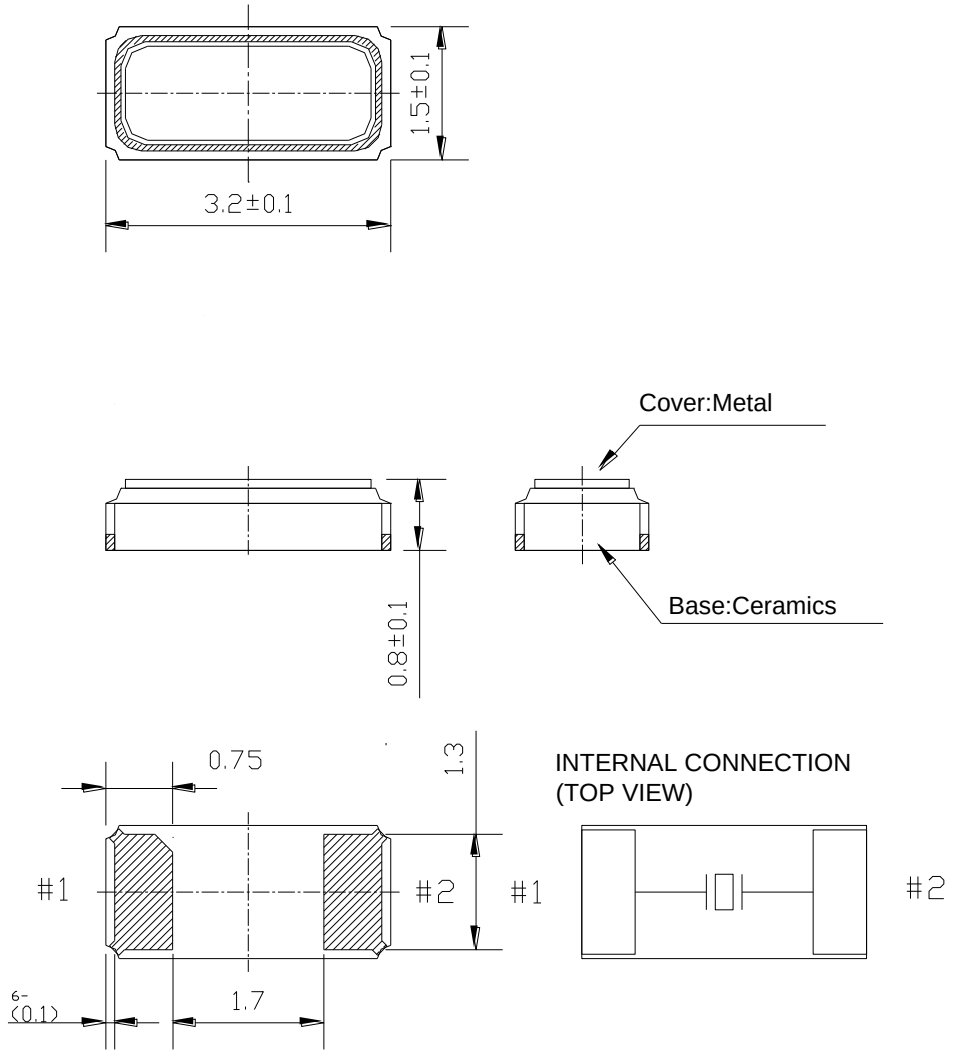
Be sure to use the product under the following conditions. Otherwise, the characteristics deterioration or destruction of the product may result.

(1)Reflow soldering heat resistance

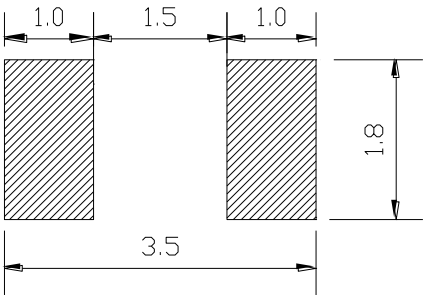
Peak temperature: 265°C, 10 sec
Heating: 230°C or higher, 30 sec
Preheating: 150°C to 180°C, 120 sec
Reflow passage times: Two times

(2)Manual soldering heat resistance

Pressing a soldering iron of 400°C on the terminal electrode for four seconds (twice).



Recommended soldering pattern



	Date of Revise	Charge	Approved	Reason
A	18.Dec.2009	Miyahara	K.Ueki	Add bilingual

	Date	Name	Third Angle Projection	Tolerance	Scale
Drawn	30.Aug.2009	Miyahara	単位:mm	±0.2	10 / 1
Designed	30.Aug.2009	Miyahara	Title	Drawing No.	Rev.
Checked	---	---	**NX3215SA External Dimension**	**EXD14B-00462**	A
Approved	30.Aug.2009	K. Ueki			

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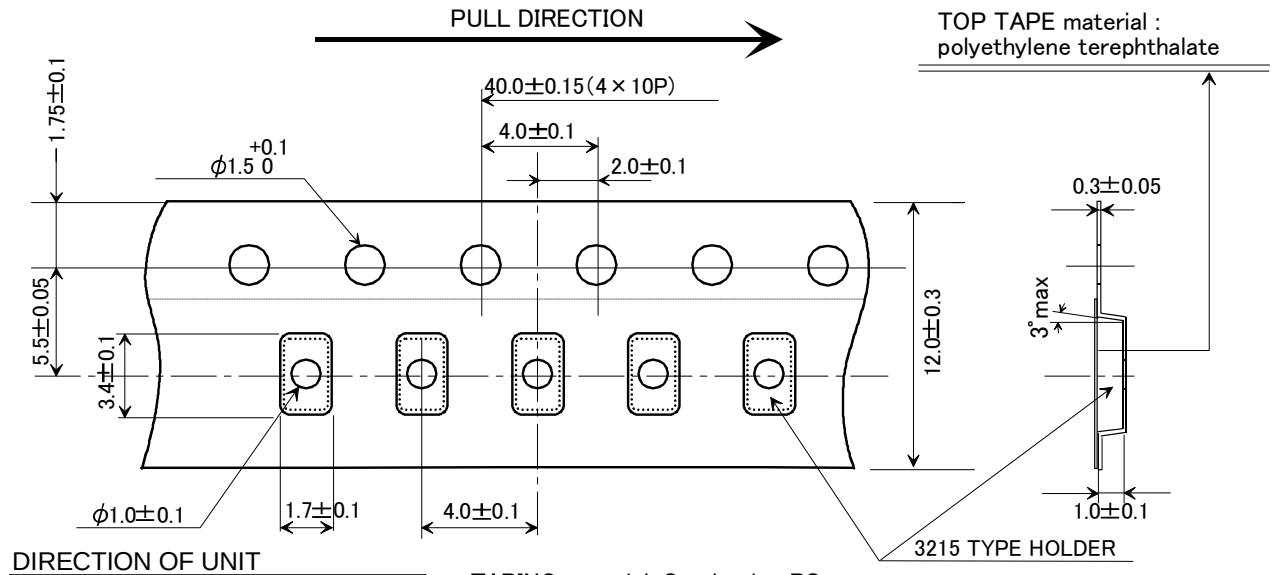

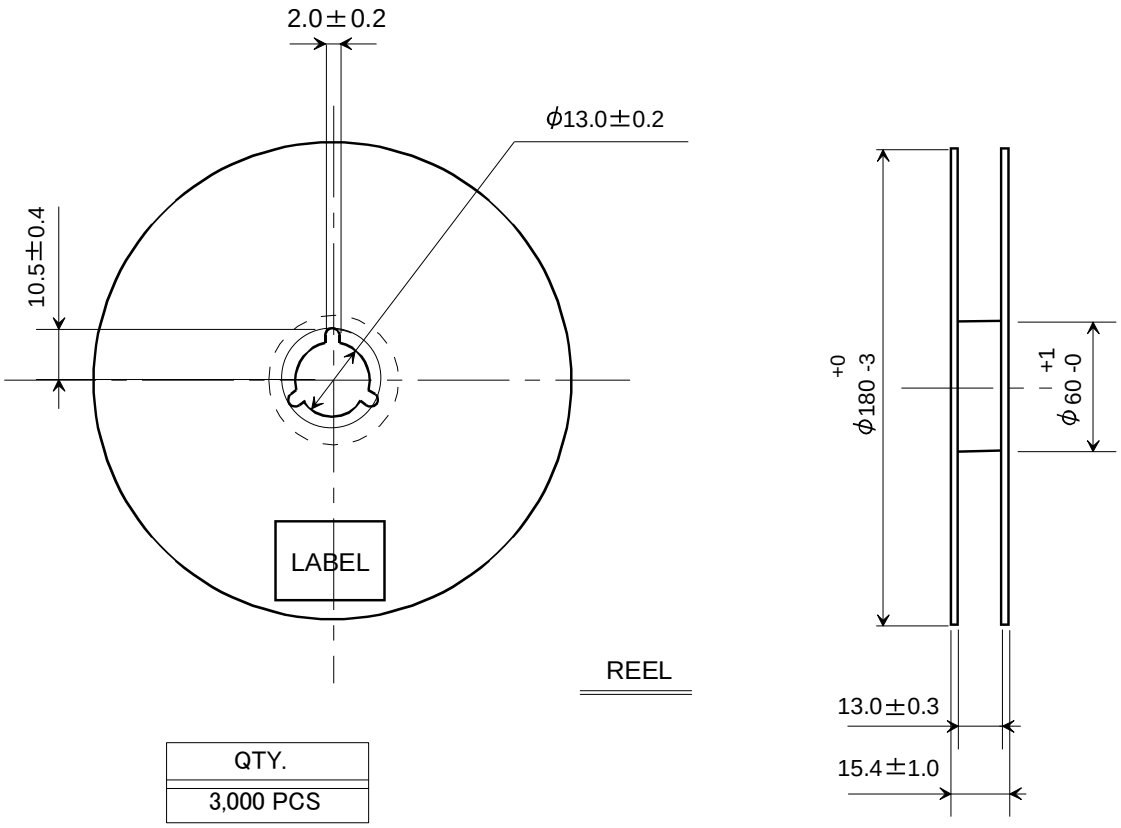

QTY.
3,000 PCS

	Date of Revise	Charge	Approved	Reason

	Date	Name	Third Angle Projection	Tolerance	Scale
Drawn	23.Jun.2009	Miyahara	Dimension:mm		/
Designed	23.Jun.2009	Miyahara	Title	Drawing No.	Rev.
Checked	---	---	**Tape and Reel Spec.**	**EXK17B-00302**	
Approved	23.Jun.2009	K. Ueki			

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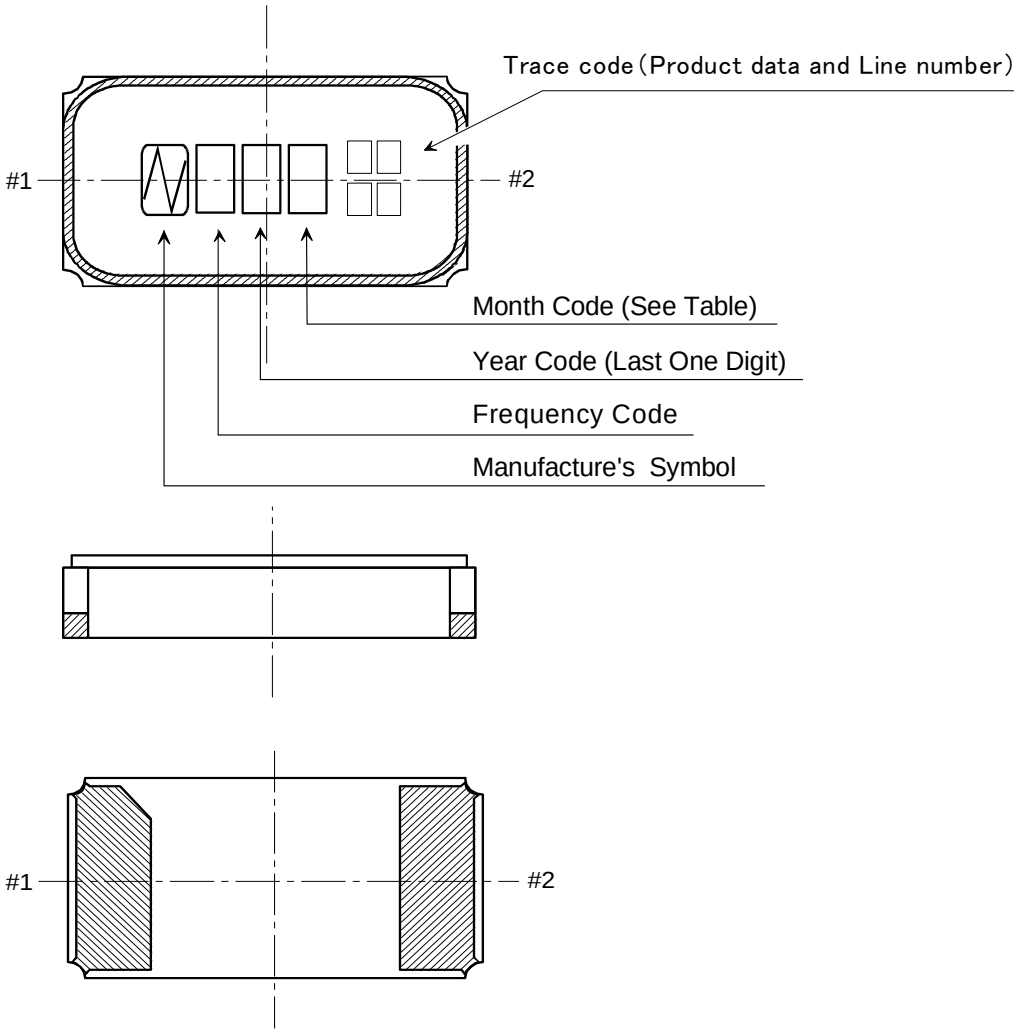

NOTE

1. Month Code

Month	1 Jan.	2 Feb.	3 Mar.	4 Apr.	5 May	6 June	7 July	8 Aug.	9 Sep.	10 Oct.	11 Nov.	12 Dec.
Month Code	1	2	3	4	5	6	7	8	9	X	Y	Z

2. Frequency Code

A : 32.768kHz

3. Marking Method

Marking Method is Laser Triming.

	Date of Revise	Charge	Approved	Reason

	Date	Name	Third Angle Projection	Tolerance	Scale
Drawn	28.OCt.2009	Miyahara	Dimension:mm		/
Designed	28.OCt.2009	Miyahara	Title: **NX3215SA Marking Drawing**	Drawing No.: **EXH11B-00422**	Rev.
Checked	--	--			
Approved	28.OCt.2009	Ueki			

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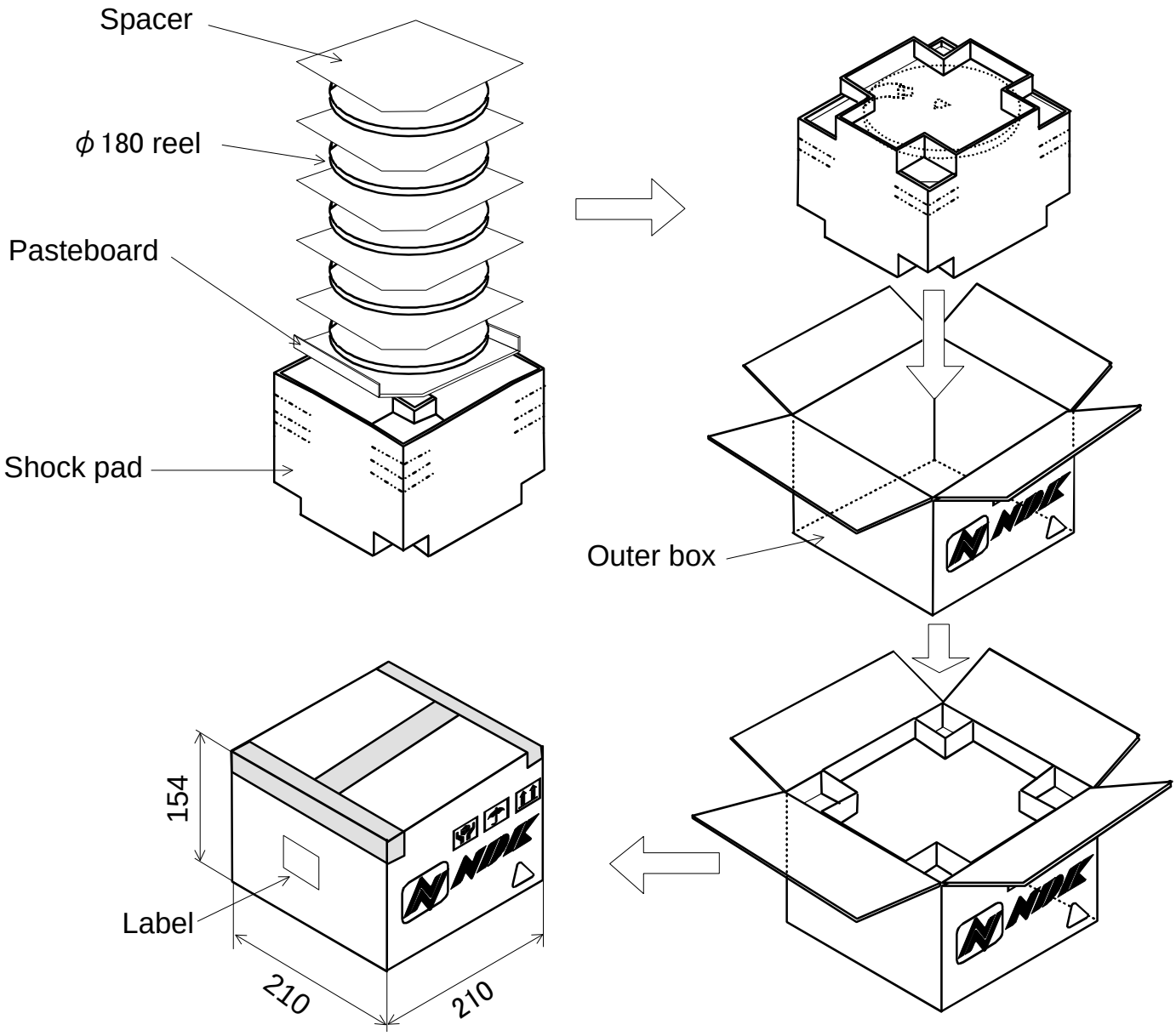

	Date of Revise	Charge	Approved	Reason
B	19 May 2011	H.Ohkubo	K.Oguri	Correction of a clerical error.

	Date	Name	Third Angle Projection	Tolerance	Scale
Drawn	26 Feb. 2010	H. Ohkubo	Dimension:mm	---	---
Designed	26 Feb. 2010	K.Oguri	Title	Drawing No.	Rev.
Checked	26 Feb. 2010	K.Oguri	**180 dia. Reel package**	**EEK17B-00015**	B
Approved	26 Feb. 2010	J. Nakamura			

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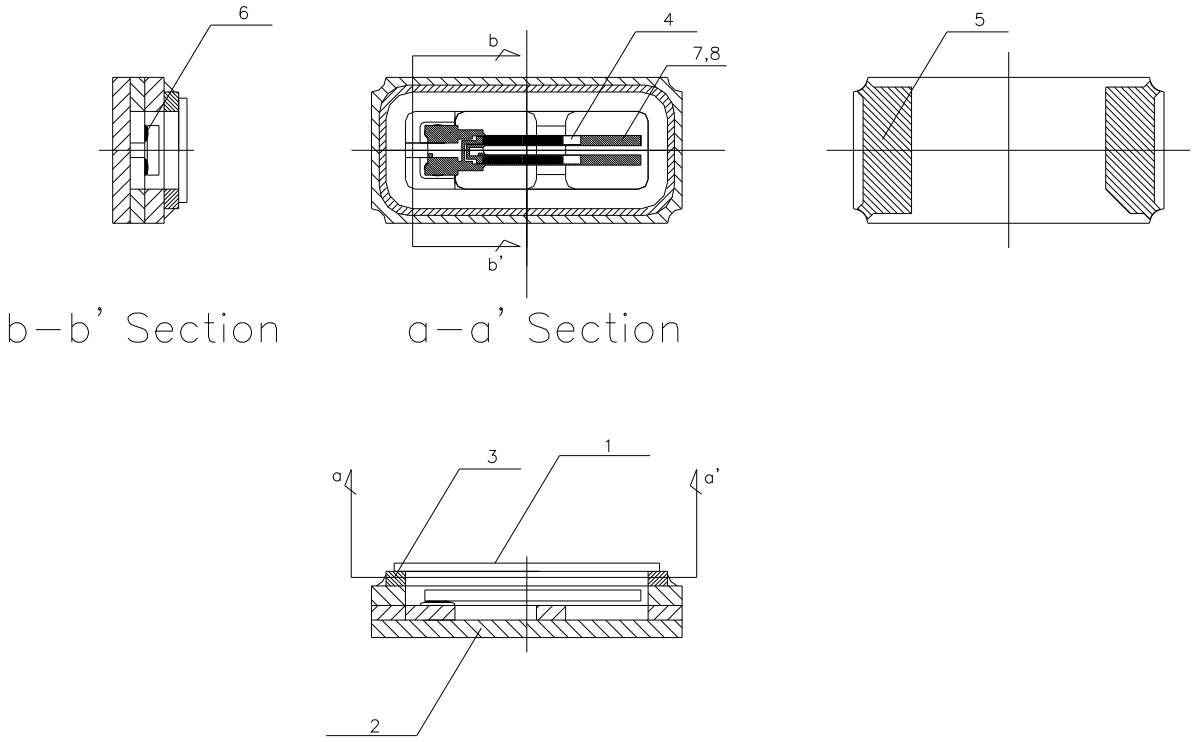

Seal			Seam weld	Mass(Reference: Typ.)		0.0129g
No.	Part		Material	No.	Part	Material
1	Lid		Kover Ni plating	5	Terminal	Tungsten Au plating (0.3 to 1.0μm) Ni pre-plating(1.27 to 8.89μm)
2	Base		Ceramic / Al_2O_3			
3	Base	Kover ring	kover Au plating Ni pre-plating	6	Conductive adhesive	Silicon + Ag filer
				7	Electrode	Au
4	Blank		Crystal （$Si0_2$）	8		Cr

	Date of Revise	Charge	Approved	Reason
	---	---	---	---

	Date	Name	Third Angle Projection	Tolerance	Scale
Drawn	14. Jul. 2011	Y.Hasuike	mm	----	- / -
Designed	14. Jul. 2011	Y.Hasuike	名称/Title	Drawing No.	Rev.
Checked	---	---	NX3215SA Structural Drawing	**EXD13B-00243**	---
Approved	14. Jul. 2011	H.Matsudo			

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Reliability assurance item

No.	Test Item	Test Methods	Specification Code
1	AGING	1 year at 25 °C +/- 3°C	a
2	HEAT RESISTANCE	at +85 °C for 500 hours.	a
3	COLD RESISTANCE	at –40 °C for 500 hours.	a
4	HUMIDITY	at +85 °C with 80 to 85 % RH for 500 hours.	a
5	THERMAL SHOCK	Temperature cycle as shown in (Fig.1) for 100 cycle. 30 minutes +85 °C +/- 3 °C 30 minutes -40 °C +/- 3 °C ONE CYCLE (Fig.1)	a
6	VIBRATION	Frequency Range : 10 to 2000Hz Amplitude or Acceleration : 1.52 mm or 196m/s^2 1 cycle : 20 minutes Test time : Three mutually perpendicular axes each 12 times.	a
7	SHOCK 1	Shock : 3000 Gs 0.3 msec. Test time : Six mutually perpendicular axes each 1 times.	a
8	SHOCK 2	Shock : Device are put on the weight of 200 g and dropped on concrete board. Height : 1.5 m Drop times : Six mutually perpendicular axes each 10 times.	b
9	SOLDERABILITY	Residual heat temperature 150 °C Residual heat time 60 to 120 sec Peak temperature 240°C (more than 215 °C 10 to 30 sec)	c
10	REFLOW RESISTANCE	Temperature cycle as shown in (Fig2.) for 3 cycle.	a

Specification code	Specification
a	dF/F ≤ +/- 5ppm dCI ≤ +/- 5 kohm
b	dF/F ≤ +/- 15ppm dCI ≤ +/- 5 kohm
c	The electrodes shall acquire a new solder coat over at least 90 % of immersed area.

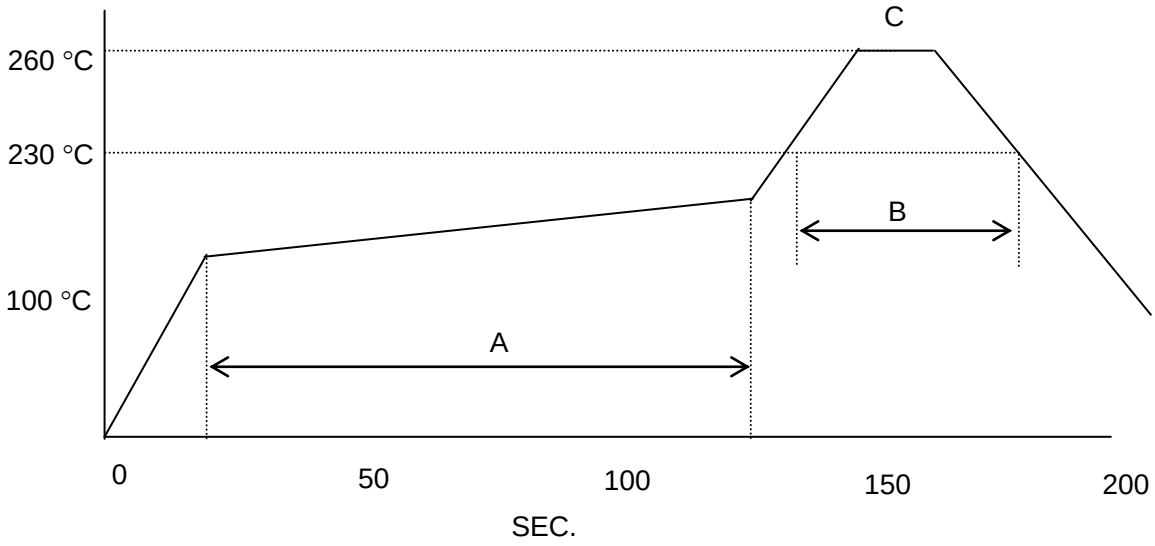
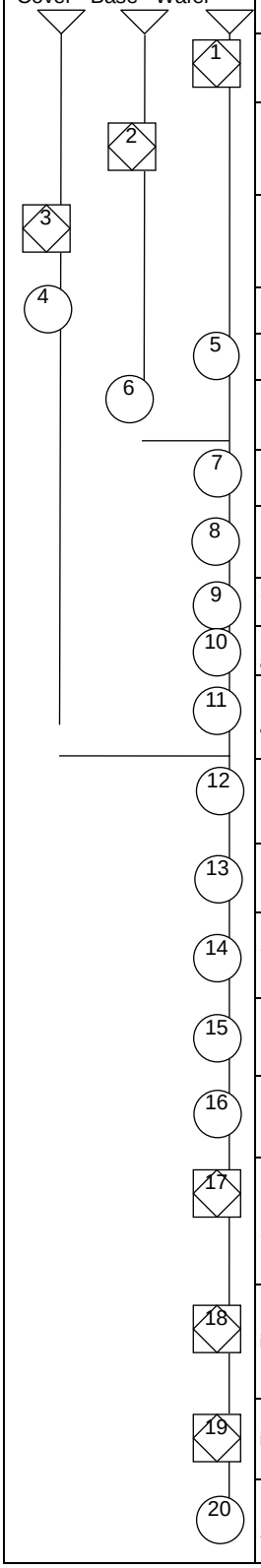


Fig.2 REFLOW

A: 150 to 180 °C (60 to 120 sec.)
B: 230 °C min. (30 sec. max.)
C: PEAK-TEMP. 260 °C +/- 5 °C (10sec. max.)

EXQ11B-00387 Product Group: Crystal Unit Type:NX3215SA Factory: NDK	Date		3.Dec.2008		
	QA Dept		1st. Engineering Dept.		
	Approved	Checked	Approved	Checked	Drawn
	M.Morimoto	N.Ohira	K.Kubota		M.Sato



Process Name	Department	Machine, Device Jig, Tools	Check Item Test Item Control Item	Control Method	Standards/ Specification	Remarks
---	---	---	---	---	---	A Working procedure
Wafer incoming Inspection (Check sampling)	Furukawa NDK	Visual, Confirmation of the data	Frequency, Dimension	Once / lot	Blank Incoming Inspection Standards	B Process control tag
Base incoming Inspection (Check sampling)	Ditto	Visual, Confirmation of the data	Dimension, Appearance Insulation	Once / lot	Components Incoming Inspection Standards	C Design sheet
Cover incoming Inspection (Check sampling)	Ditto	Visual, Confirmation of the data	Dimension, Appearance	Once / lot	Components Incoming Inspection Standards	D Individual specificati on sheet
Cover degassing	Ditto	Annealing Oven	Temperature, Time	Every time	A,B	
Chip break	Ditto	Chip break jig	Pressure	Once / day	A,B	
Base cleaning	Ditto	Blow & Vacuum M/C	Pressure	Once / day	A,B	
Support & Bonding	Ditto	Support bonding M/C	Bonding position Bonding volume	100%	A,B	
Curing and baking	Ditto	Tunnel type oven	Belt speed Temperature O_2 Density	Once / day	A,B	
Turn-over	Ditto	Turn-over M/C	Pressure	Once / day	A,B	
Frequency adjustment	Ditto	Frequency adjustment M/C	Vacuum rate Pressure	Once / day	A,B,D	
Frequency check & Turn-over	Ditto	Freq. check M/C Turn-over M/C	Frequency	100%	A,B,D	
			Pressure	Once / day	A,B	
1st Sealing	Ditto	Sealing M/C	Current	100%	A,B	
			O2 Density, Dew point	Once / day	A,B	
Unit loading	Ditto	Loading M/C	Pressure	Once / day	A,B	
Annealing & 2nd Sealing	Ditto	Annealing & Sealing M/C	Current	100%	A,B	
			Vacuum rate Temperature	Once / day	A,B	
Reflow (100%)	Ditto	Reflow oven	Belt speed Temperature	Once / day	A,B	
He pressure (100%)	Ditto	He pressure tub	Pressure Time	Once / day	A,B	
Product inspection & Taping	Ditto	Auto inspection M/C	Frequency, ESR, Insulation, C0	100%	A,B,D	
		Laser marking M/C	Content of marking	100%	A,B,D	
		Taping M/C	Temperature Taping strength	Once / day	A,B	
Confirmation inspection (Sampling)	Ditto	Network analyzer TC measurement system Quality confirmation sheet	Frequency, ESR, C0, Temp. characteristics	Once / QN	A,B,D	
Quality Guarantee inspection (Checking)	Ditto	Visual Quality confirmation sheet	Dimension, Appearance, Frequency, ESR, C0, Temp. characteristics	Once / QN	A,B,D	
Packing & Shipping	Ditto	Visual	Packing appearance Quantity Contents of label	100%	A,B,D	