

RoHS Compliant
Directive 2011/65/EU

REFERENCE SPECIFICATION

Customer: _____

Item:	CRYSTAL UNIT
Type:	NX3215SA
Nominal Frequency:	32.768kHz
Customer's Spec. No.:	---
NDK Spec. No.:	EXS00A-MU00466

For your reference we submit this specification.
Please study and keep in your related document file.

Charge:

Sales		
Engineer		

Approved

H.Matsudo

Checked

Drawn

Y.Hasuike

Revision Record

Rev.	Rev. Date	Items	Contents	Remarks
---	20.Sep.2013	Issue	---	---

1. Customer specifications number : ---
2. NDK specification number : EXS00A-MU00466
3. Type : NX3215SA
4. Electrical characteristics
- 4.1. Nominal Frequency (F_0) : 32.768 kHz
- 4.2. Overtone Order : Fundamental
- 4.3. Adjustment tolerance : $\pm 20 \times 10^{-6}$ Max. (at +25°C ,Not include aging)
- 4.4. Turning Point : +25°C \pm 5°C
- 4.5. Temperature coefficient : $-0.04 \times 10^{-6} / ^\circ\text{C}^2$ Max.
- 4.6. Equivalent Resistance (R_R) : 40k Ω Typ. 60 k Ω Max. (+25°C)
- 4.7. Shunt Capacitance (C_0) : 1.0 \pm 0.5 pF
- 4.8. Motional Capacitance (C_1) : 4.0 \pm 2.0 fF
- 4.9. Insulation Resistance : Terminal to terminal insulation resistance also terminal to cover insulation resistance must be 500M Ω (Min.) when DC100V \pm 15V is applied.
5. Measurement circuit
- 5.1. Frequency measurement
- Measuring instrument : Network Analyzer
(CNA-LF made in Transat corp.)
 - Load capacitance (C_L) : 12.5pF
 - Level of drive : 0.1 μ W
- 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 μ W
6. その他性能 / Other performances
- 6.1. Operating Temperature range : - 40 to + 85°C
- 6.2. Storage Temperature range : - 55 to + 125°C
- 6.3. Maximum drive level : 0.5 μ W 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. Application drawing
- 8.1. Dimension drawing : EXD14B-00462
- 8.2. Taping and reel figure : EXK17B-00303
- 8.3. Holder marking : EXH11B-00422
- 8.4. Reel Packing : EEK17B-00015
- 8.5. Reliability assurance Item : EXS30B-00661

9. Notice

- 9.1 Order items are manufactured according to specification. As to conditions, which are not indicated in this specification and unpredictable such as applied condition and oscillation margin, please check them beforehand.
- 9.2 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.
- 9.3 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.
- 9.4 Where any change to the process condition is made due to the change(s) in the production line, inform personnel of the specifications.
- 9.5 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.
- 9.6 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.
- 9.7 In the company's production process whatever amount of ozone depleting substances (ODS) as specified in the Montreal protocol is not used.
- 9.8 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.
- 9.9 The appearance color and so on have a different case by purchasing it more than 2 suppliers of the component, but characteristic and reliability are guaranteed.
- 9.10 Crystal units will be damaged by ultrasonic welding process due to resonance of crystal wafer itself. NDK does not recommend using ultrasonic welding. If Ultra Sonic welding used, NDK strongly recommend verifying crystal unit damage by ultrasonic weld.

10. Prohibited items

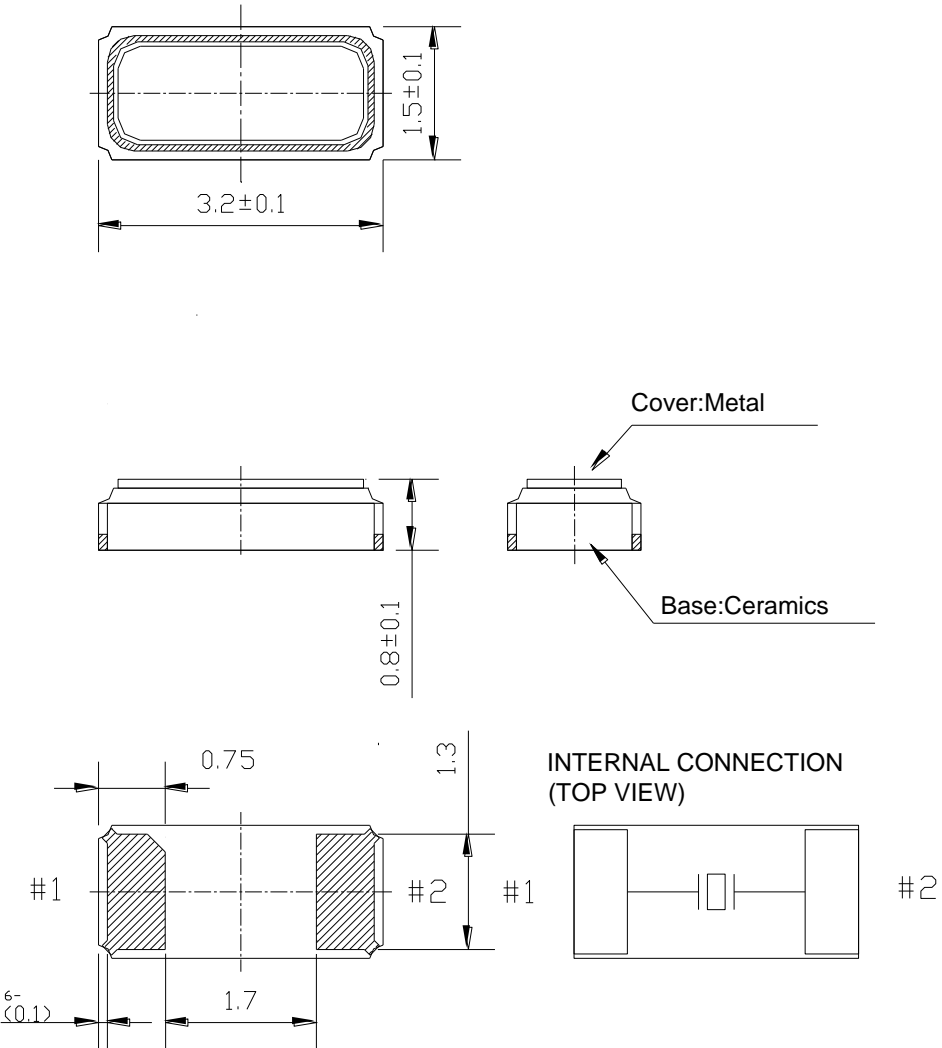
Be sure to use the product under the following conditions. Otherwise, the characteristics deterioration or destruction of the product may result.

(1)Reflow soldering heat resistance

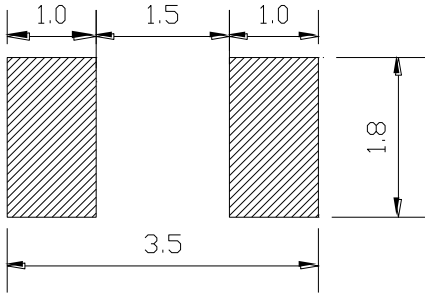
- Peak temperature : 265°C, 10 sec
Heating : 230°C or higher, 30 sec
Preheating : 150°C to 180°C, 120 sec
Reflow passage times : Two times

(2)Manual soldering heat resistance

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

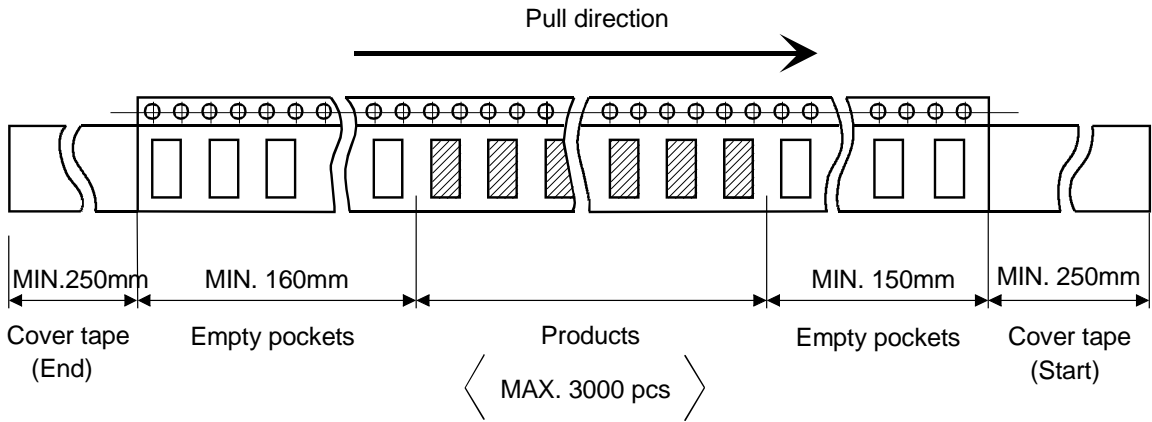
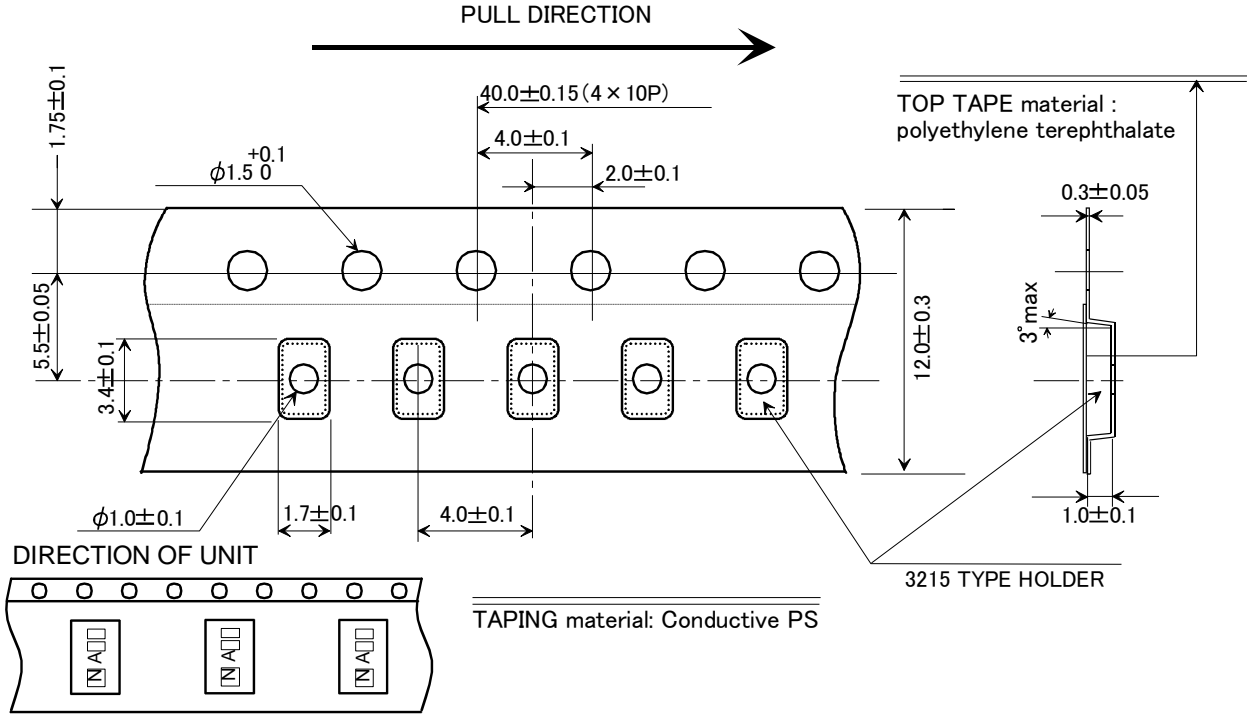


Recommended soldering pattern

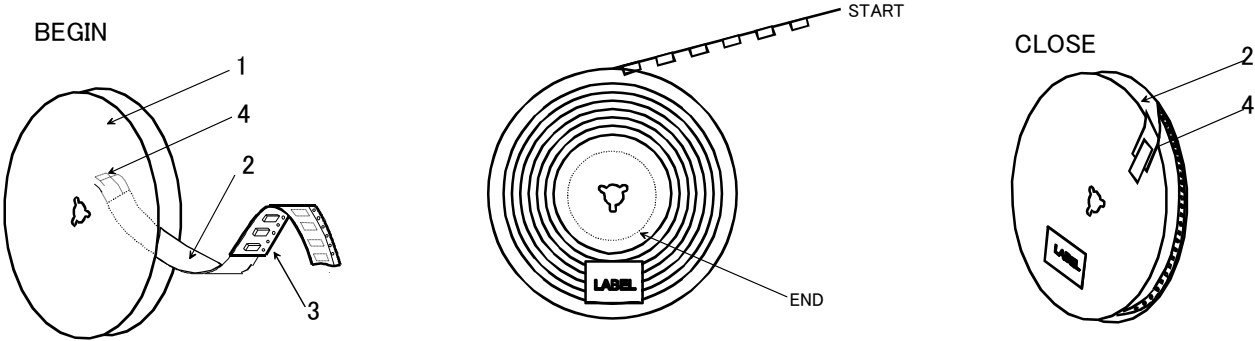
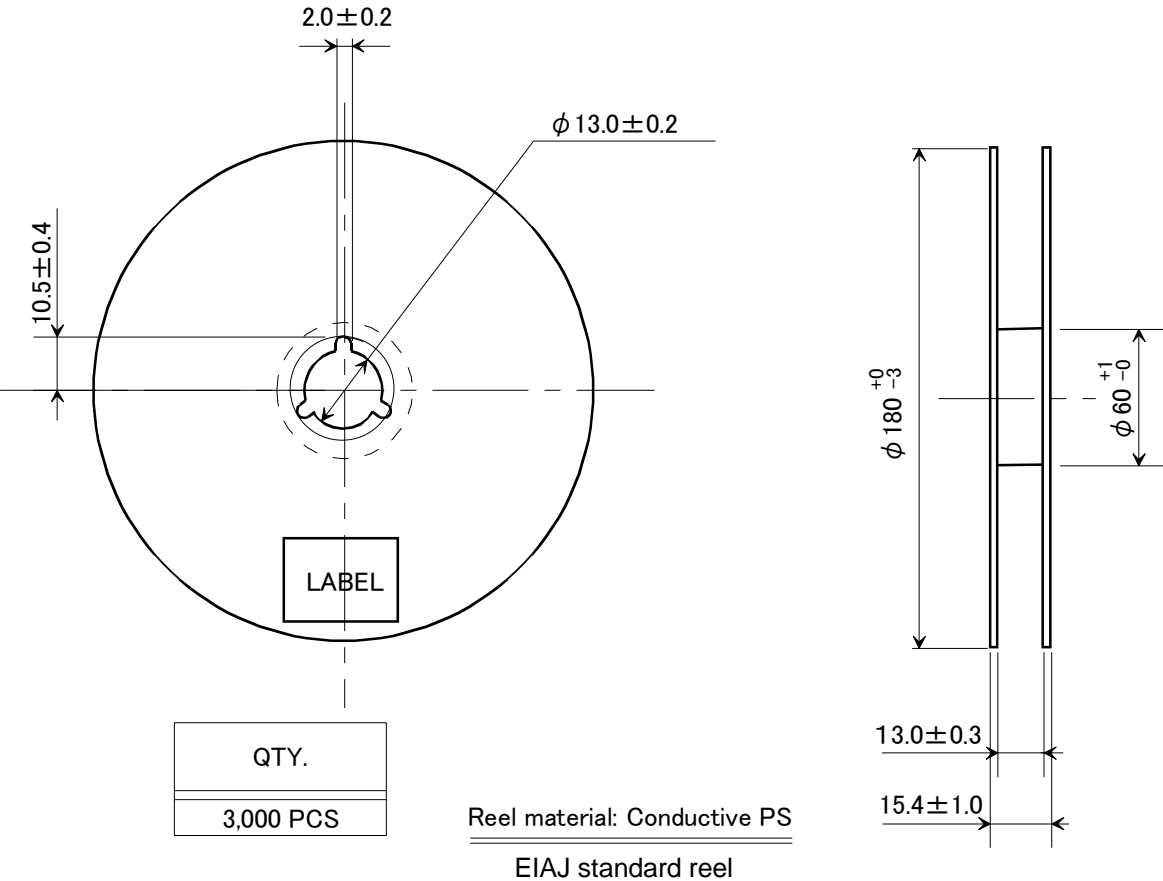


	Date of Revise	Charge	Approved	Reason
B	10.May.2012	Hasuike	Matsudo	Add bilingual
	Date	Name	Third Angle Projection	Tolerance
Drawn	30.Aug.2009	Miyahara	Dimension:mm	± 0.2
Designed	30.Aug.2009	Miyahara	Title	Drawing No.
Checked	---	---		
Approved	30.Aug.2009	K. Ueki	NX3215SA External Dimension	EXD14B-00462
				Rev. B

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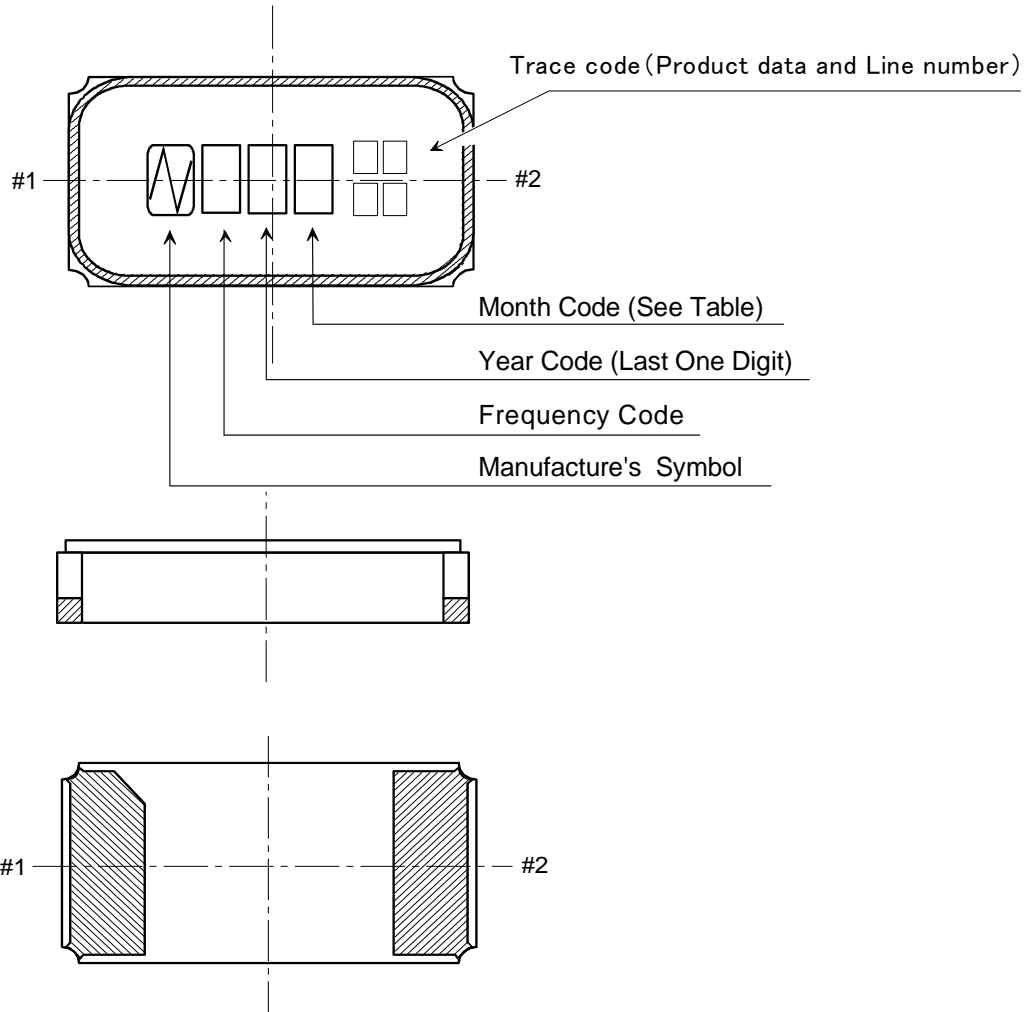


	Date of Revise	Charge	Approved	Reason
B	24.Apr.2013	Sato	Matsudo	Added English
	Date	Name	Third Angle Projection	Tolerance
Drawn	9.Jul.2009	N.Yamamoto	mm	Scale
Designed	9.Jul.2009	N.Yamamoto	Title	Drawing No.
Checked	---	---	3215 TYPE Taping and Reel Spec.	EXK17B-00303 1/2
Approved	9.Jul.2009	K.Ueki		
				B



	Date of Revise	Charge	Approved	Reason	
B	24.Apr.2013	Sato	Matsudo	Added English	
	Date	Name	Third Angle Projection	Tolerance	Scale
Drawn	9.Jul.2009	N.Yamamoto	mm		/
Designed	9.Jul.2009	N.Yamamoto	Title	Drawing No.	Rev.
Checked	---	---	3215 TYPE Taping and Reel Spec.	EXK17B-00303 2/2	B
Approved	9.Jul.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

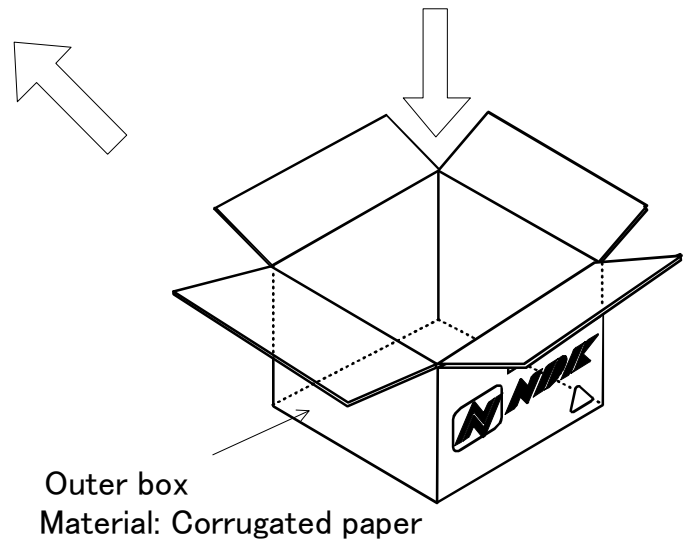
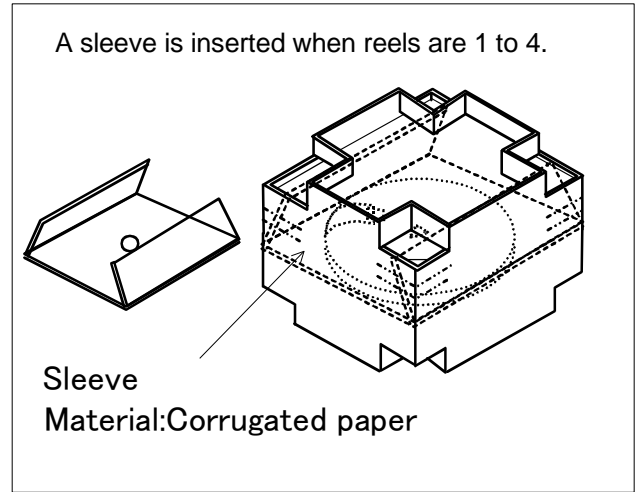
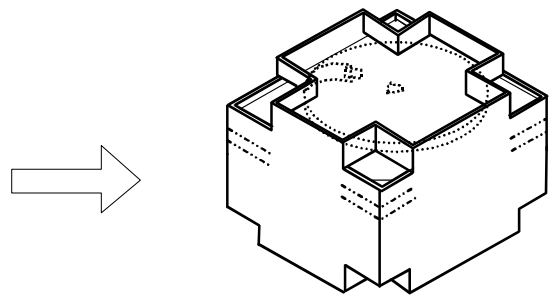
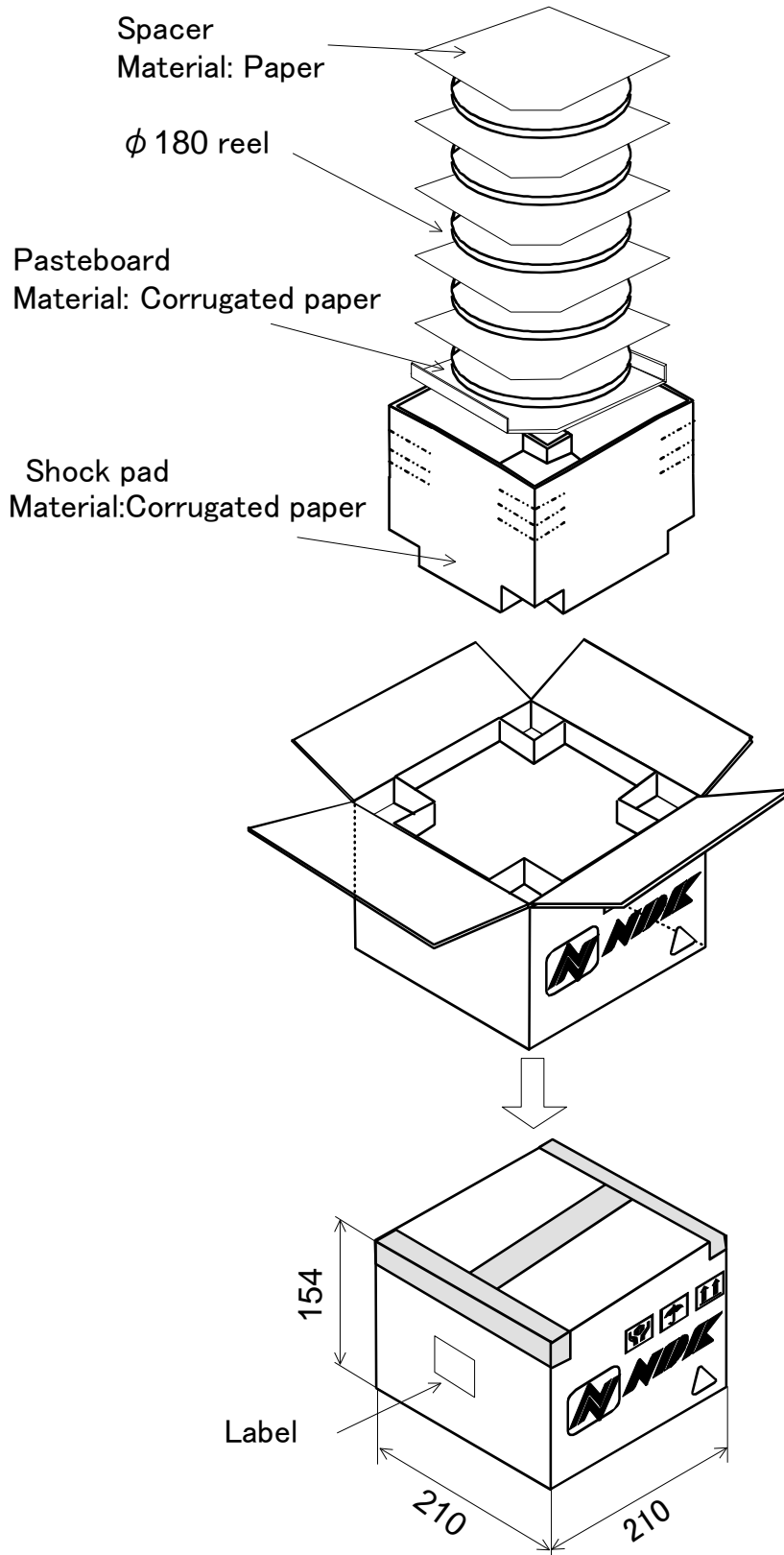
A : 32.768kHz

3. Marking Method

Marking Method is Laser Trimming.

	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					

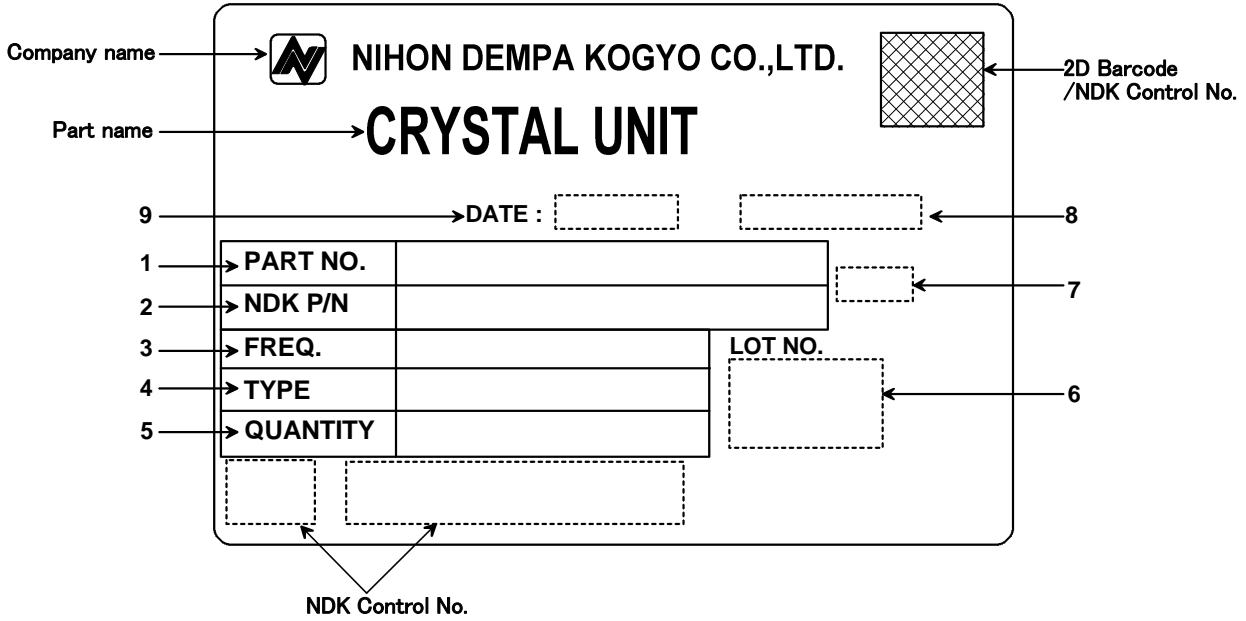
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	Date of Revise	Charge	Approved	Reason	
C	4 Jul. 2012	H.Ohkubo	K.Oguri	Addition of condition when reels are 1 to 4.	
	Date	Name	Third Angle Projection	Tolerance	Scale
Drawn	26 Feb. 2010	H. Ohkubo	Dimension:mm	-----	-----
Designed	26 Feb. 2010	K.Oguri	Title 180 dia. Reel package	Drawing No. EEK17B-00015	Rev.
Checked	26 Feb. 2010	K.Oguri			C
Approved	26 Feb. 2010	J. Nakamura			

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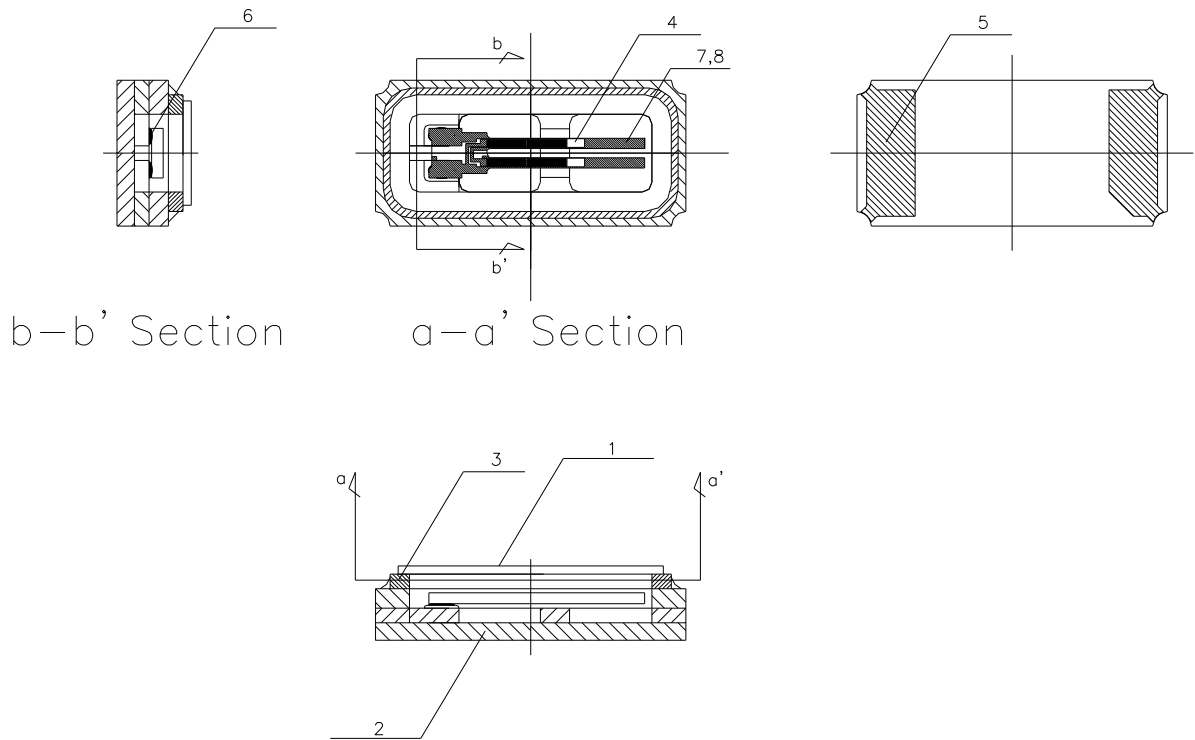
LABEL SIZE: 76×50mm



No.	Marking Item	Marking Contents
1	PART NO.	Customer's Part Number
2	NDK P/N	NDK Part Number
3	FREQ.	Frequency
4	TYPE	NDK Type name
5	QUANTITY	Total quantity
6	LOT NO.	* Lot No.: A lot marking indicated on the product (EIA code, Lot No., etc.) * Marking Method : Lot No.-QTY. Example of mixed 2 lots.; 54-1000pcs , 55-1000pcs
7	OTHERS	The marking corresponded to ROHS * The "ROHS" is indicated for products corresponded to ROHS.
8	COUNTRY OF ORIGIN	Country of Origin
9	DATE	Production date DD/MM/YYYY

	Date of Revise	Charge	Approved	Reason	
C	15 May 2008	T. Shimizu	K. Miyashita	No. 8 and 9 were added.	
	Date	Name	Third Angle Projection	Tolerance	Scale
Drawn	13.May.2005	K.Oguri	Dimension:mm	-----	-----
Designed	13.May.2005	K.Oguri	Title	Drawing No.	Rev.
Checked	-----	-----			
Approved	13.May.2005	K. Miyashita			
			Packing Label	EXK17B-00213	C

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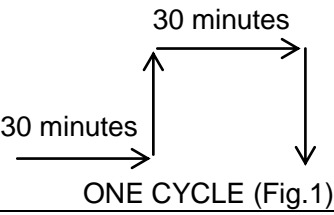
Seal		Seam weld		Mass(Reference: Typ.)		0.0129g
No.	Part	Material		No.	Part	Material
1	Lid	Kover Ni plating		5	Terminal	Tungsten Au plating (0.3 to 1.0µm) Ni pre-plating(1.27 to 8.89µm)
2	Base	Ceramic / Al ₂ O ₃				
3	Base	Kover ring	kover Au plating Ni pre-plating	6	Conductive adhesive	Silicon + Ag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

Date of Revise	Charge	Approved	Reason
---	---	---	---
Date	Name	Third Angle Projection	Tolerance
14. Jul. 2011	Y.Hasuike	:mm	----
Date	Name	Title	Scale
14. Jul. 2011	Y.Hasuike	NX3215SA Structural Drawing	- / -
Checked	---		Drawing No.
14. Jul. 2011	H.Matsudo	EXD13B-00243	---
Approved	---		

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Reliability assurance item

(page: 1/2)

No.	Test Item	Test Methods	Specification Code
1	AGING	1 year at 25 °C +/- 3°C	a
2	COLD RESISTANCE	at -40 °C for 500 hours.	a
3	HUMIDITY	at +85 °C with 80 to 85 % RH for 500 hours.	a
4	THERMAL SHOCK	Temperature cycle as shown in (Fig.1) for 100 cycle. 	a
5	VIBRATION	Frequency Range : 10 to 2000Hz Amplitude or Acceleration : 1.52 mm or 20 G 1 cycle : 20 minutes Test time : Three mutually perpendicular axes each 12 times.	a
6	SHOCK 1	Shock : 3000 Gs 0.3 msec. Test time : Six mutually perpendicular axes each 1 times.	a
7	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
8	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
9	REFLOW RESISTANCE	Temperature cycle as shown in (Fig2.) for 3 cycle.	a

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

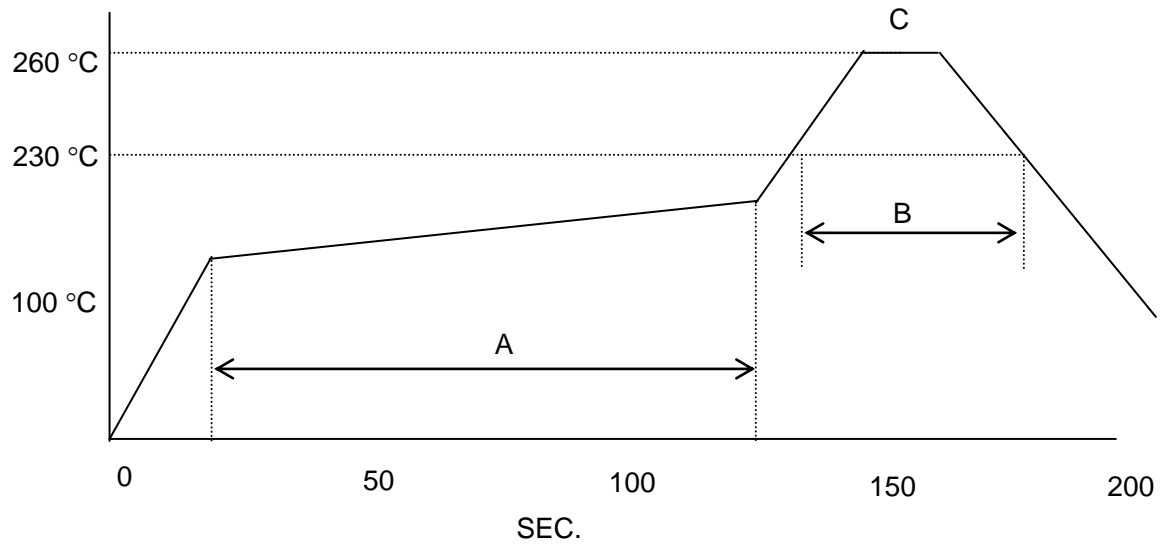


Fig.2 REFLOW

- 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.)