Crystal Bridge to the Future

RoHS Compliant
Directive 2011/65/EU

SPECIFICATION

Customer: ELTECH

Item:	CRYSTAL UNIT
Type:	NX2012SA
Nominal Frequency:	32.768kHz
Customer's Spec. No.:	---
NDK Spec. No.:	EXS00A-MU01313

Receipt

Revision Record						
Rev.	Date	Items	Contents	Approved	Checked	Drawn
-----	4.Apr.2019	Issue	---	S.Kawanishi	H.Iwai	Y.Saito

1. Customer's Spec. No. : ---

2. NDK Spec. No. : EXS00A-MU01313

3. Type : NX2012SA

4. Electrical Specifications

	Parameters	SYM	Electrical Spec.				Notes
			min	typ	max	Units	
4.1	Nominal Frequency	F_{nom}	32.768			kHz	---
4.2	Oscillation Mode	-	Fundamental			-	---
4.3	Load Capacitance	CL	7.0			pF	Network Analyzer(CNA-LF made in Transat corp.)
4.4	Frequency Tolerance	-	+/-20			ppm	at +25 +/-3°C ,Not include aging
4.5	Turning Point	-	+25 +/-5			°C	---
4.6	Temperature coefficient	-	-	-	-0.04	ppm/ $°C^2$	---
4.7	Operating Temperature range	-	-40	~	+85	°C	---
4.8	Aging	-	+/-3			ppm	1st year (at +25°C)
4.9	Drive level	DL	-	0.1	0.5	uW	---
4.10	Equivalent Resistance	R_r	-	-	80	kΩ	Network Analyzer(CNA-LF made in Transat corp.) / Series
4.11	Shunt Capacitance	C_0	1.0	1.3	1.6	pF	Network Analyzer(CNA-LF made in Transat corp.) / Series
4.12	Insulation Resistance	-	500	-	-	MΩ	Terminal to terminal insulation resistance must be 500MΩ (Min.) when DC100V ±15V is applied.
4.13	Storage Temperature range	-	-40	~	+85	°C	---
4.14	Motional Capacitance	C_1	4.0	5.0	6.0	fF	Network Analyzer(CNA-LF made in Transat corp.) / Series

5. Examination results document

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

6. Application drawing

6.1 Dimension drawing : EXD14B-00387
6.2 Taping and reel figure : EXK17B-00273
6.3 Holder marking : EXH11B-00366
6.4 Reel Packing : EEK17B-00015
6.5 Reliability assurance Item : EXS30B-00845

7. Notes on use

7-1 Even if the appearance color etc. of the product differs by purchasing the component parts by more than two companies, there is no influence on the characteristics and reliability.

7-2 IN THE CASE OF THE FOLLOWING ITEMS, WE ARE NOT RESPONSIBLE FOR WARRANTY / COMPENSATION.

(1) WHEN PRODUCTS OF THIS SPECIFICATION ARE USED FOR EQUIPMENT RELATED TO HUMAN LIFE OR PROPERTY, IT IS THE RESPONSIBILITY OF THE CUSTOMER TO CONFIRM THE INFLUENCE ON THIS PRODUCT AND EQUIPMENT TO BE USED BEFOREHAND, CONDUCT NECESSARY SAFETY DESIGN (INCLUDING REDUNDANT DESIGN, MALFUNCTION PREVENTION DESIGN, etc.), AND PLEASE USE IT AFTER SECURING SUFFICIENT SAFETY OF EQUIPMENT.

1. SAFETY-RELATED EQUIPMENT SUCH AS AUTOMOBILES, TRAINS, SHIPS, etc., OR EQUIPMENT DIRECTLY INVOLVED IN OPERATION
2. AIRCRAFT EQUIPMENT
3. SPACE EQUIPMENT
4. MEDICAL EQUIPMENT
5. MILITARY EQUIPMENT
6. DISASTER PREVENTION / CRIME PREVENTION EQUIPMENT
7. TRAFFIC LIGHT
8. OTHER EQUIPMENT REQUIRING THE SAME PERFORMANCE AS THE ABOVE-MENTIONED EQUIPMENT

(2) IN CASES WHERE IT IS NOT INDICATED IN THE REQUESTED STANDARD AND IS USED UNDER CONDITIONS OF USE (INCLUDING CIRCUIT MARGIN etc.) THAT CAN NOT BE PREDICTED AT THE PRODUCTION STAGE.

(3) WHEN USING ULTRASONIC WELDING MACHINE. (THERE IS A POSSIBILITY THAT THE CHARACTERISTIC DEGRADATION IS CAUSED BY THE RESONANCE PHENOMENON OF THE PIEZOELECTORIC MATERIAL.
(EXAMPLE; CRYSTAL PIECE))
WE WILL NOT TAKE ANY RESPONSIBILITY FOR THE INFLUENCE OF THE CUSTOMERS' PROCESS.
SO, PLEASE SUFFICIENTLY EVALUATE AT A SAMPLE STEP WHEN YOU USE ULTRASONIC WELDING MACHINE.

(4) USING RESIN MOLD MAY AFFECT THE PRODUCT CHARACTERISTIC.
PLEASE MAKE SURE TO TELL OUR SALES CONTACT WHEN YOU USE RESIN MOLD. WE WILL PERFORM INDIVIDUAL CORRESPONDENCE ABOUT A DELIVERY SPECIFICATION AND AN EVALUATION METHOD.
IN ADDITION, IF YOU USE RESIN MOLD WITHOUT CONTACTING US, AND CAUSES DAMAGES AGAINST A CUSTOMER OR A THIRD PARTY, WE WILL NOT BE LIABLE FOR THE DAMAGES AND OTHER RESPONSIBILITIES BECAUSE WE CONSIDER IT IS UNDER SELF-RESPONSIBILITY USING RESIN MOLD.
WE WILL NOT TAKE ANY RESPONSIBILITY FOR THE INFLUENCE OF THE CUSTOMERS' PROCESS. PLEASE SUFFICIENTLY EVALUATE AT A SAMPLE STEP WHEN YOU USE RESIN MOLD.

(5) WHEN PERFORMING IMPROPER HANDLING THAT EXCEEDS THE GUARANTEED RANGE.

7-3 This product cannot be used for equipment related to the safety of automobiles or equipment directly involved in operation.(example: air bag, TPMS, engine control, steering control, brake control etc.)

8. Notes on storage

8-1 When storing the product in high temperature and high humidity condition for a long time, product characteristics (solderability etc.) and packaging condition may be deteriorated. Please store product at temperature + 5°C ~ + 35°C, humidity 85% RH or less. The product is an electronic component, so please do not storage and use, under a dewing state.

8-2 The product storage deadline is 12 months after delivery in unopened state. Please use within storage deadline. If you exceed storage deadline, please check the product characteristics etc, please use.

9. Other Requests

9-1 Please use this specification only for confirmation of the specification of this product.

9-2 If there is a change request, please contact within three weeks from issue date. If there is no communication, we will deliver the product under the contents of this specification. In addition, if the product delivery date is within 3 weeks and there is a change request, we will consult the processing separately.

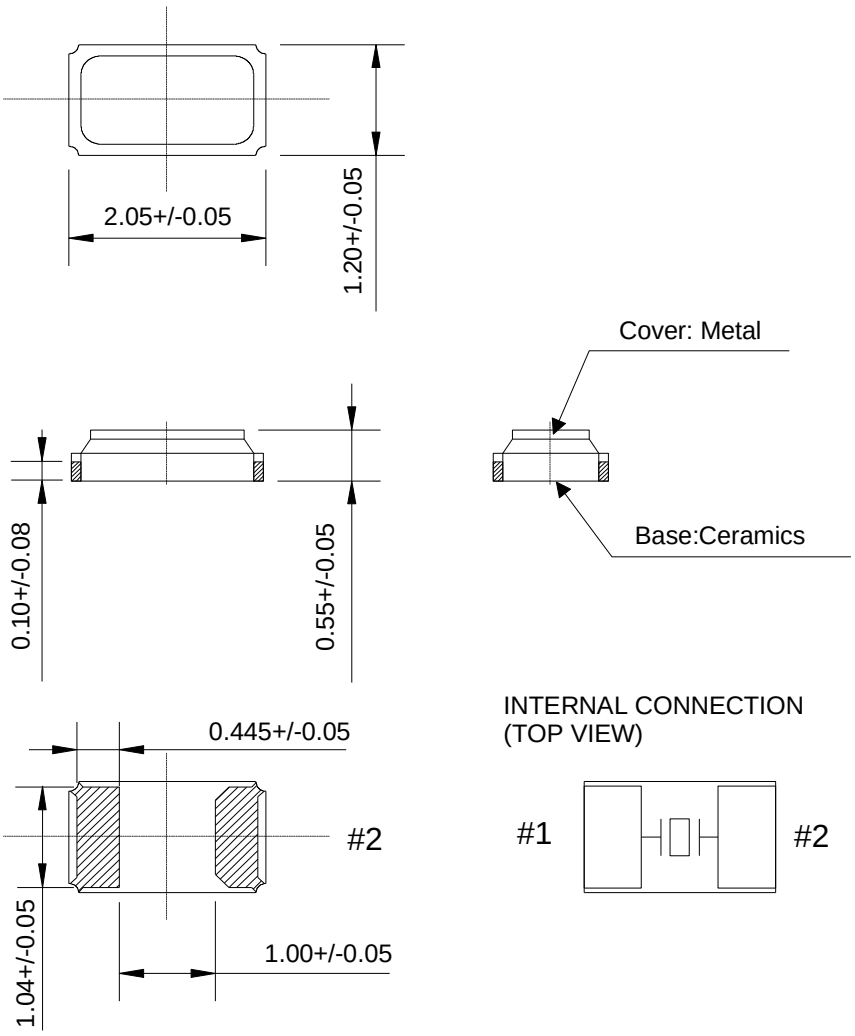
9-3 NOTES THAT ARE DESCRIBED IN THIS DOCUMENT, IF YOU DID NOT COMPLY WITH THE PROHIBITIONS, AND OTHER PLEASE, INCLUDING THE FAILURE CORRESPONDENCE OR COMPENSATION OR DAMAGES, WE CAN NOT ASSUME THE RESPONSIBILITY, PLEASE UNDERSTAND.

10. Prohibited items

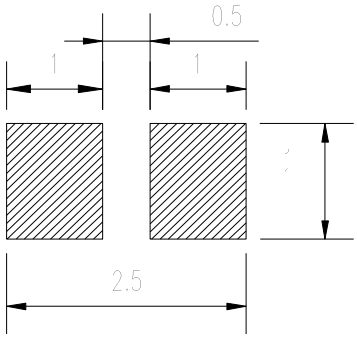
Be sure to use the product under the following conditions. Otherwise, the characteristics deterioration or destruction of the product may result.

(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: twice

(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
F	18.Jan.2018	Y.Hasuike	S.Sunaba	Added to type.

	Date	Name	Third Angle Projection	Tolerance	Scale
Drawn	17.July.2007	S.Kawanishi	Unit:mm	+/-0.2	---
Designed	17.July.2007	S.Kawanishi	Title: **NX2012SA/NX2012SE External Dimension Drawing**	Drawing No.: **EXD14B-00387**	Rev.: **F**
Checked	17.July.2007	M.Yoshimatsu			
Approved	17.July.2007	K.Ono			

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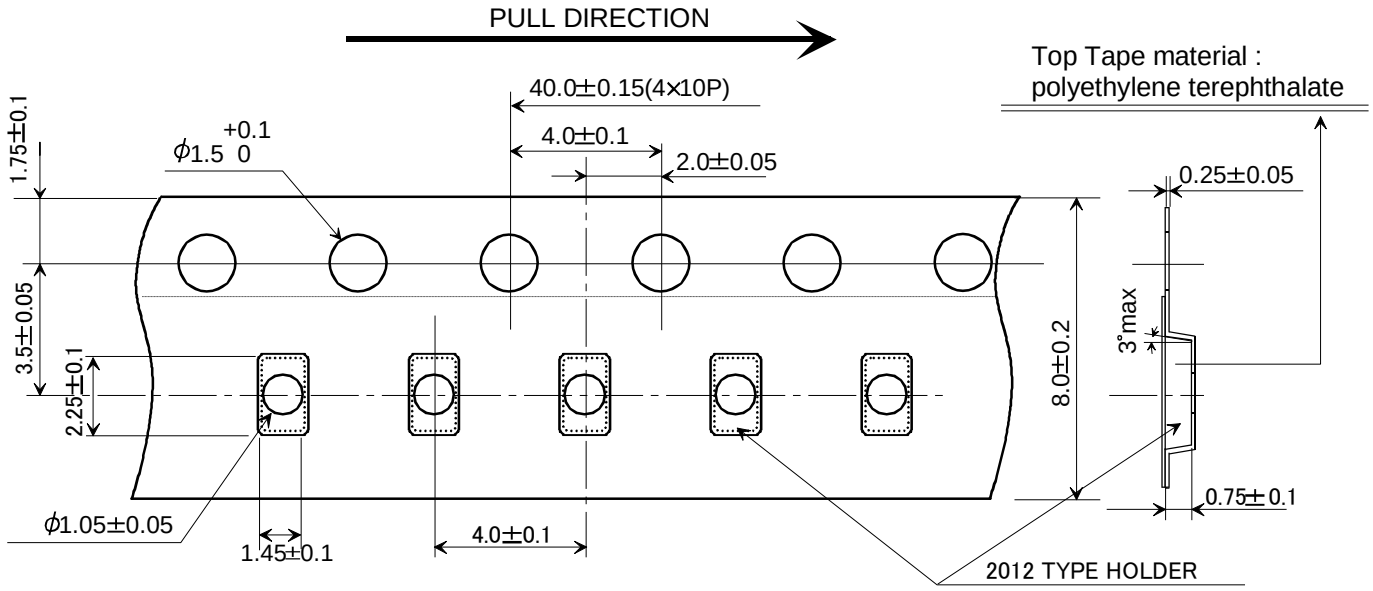
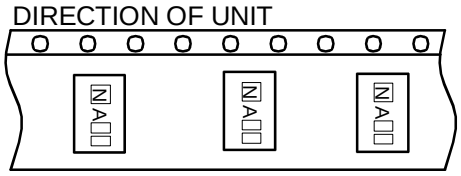
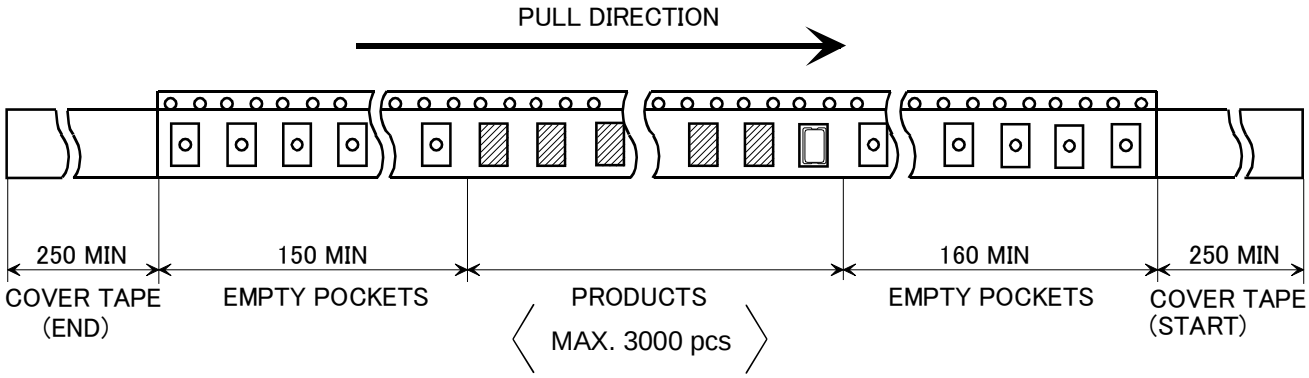
Form M-1





TAPING material: Conductive PS



	Date of Revise	Charge	Approved	Reason
C	3 Aug.2012	Y.Hasuike	H.matsudo	Added of quantity

	Date	Name	Third Angle Projection	Tolerance	Scale
Drawn	31.Jul.2007	K.Oguri	Dimension:mm		/
Designed	31.Jul.2007	S. Kawanishi	Title	Drawing No.	Rev.
Checked	----------	----------	**2012 TYPE Taping and Reel Spec.**	**EXK17B-00273 1/2**	C
Approved	31.Jul.2007	K. Ono			

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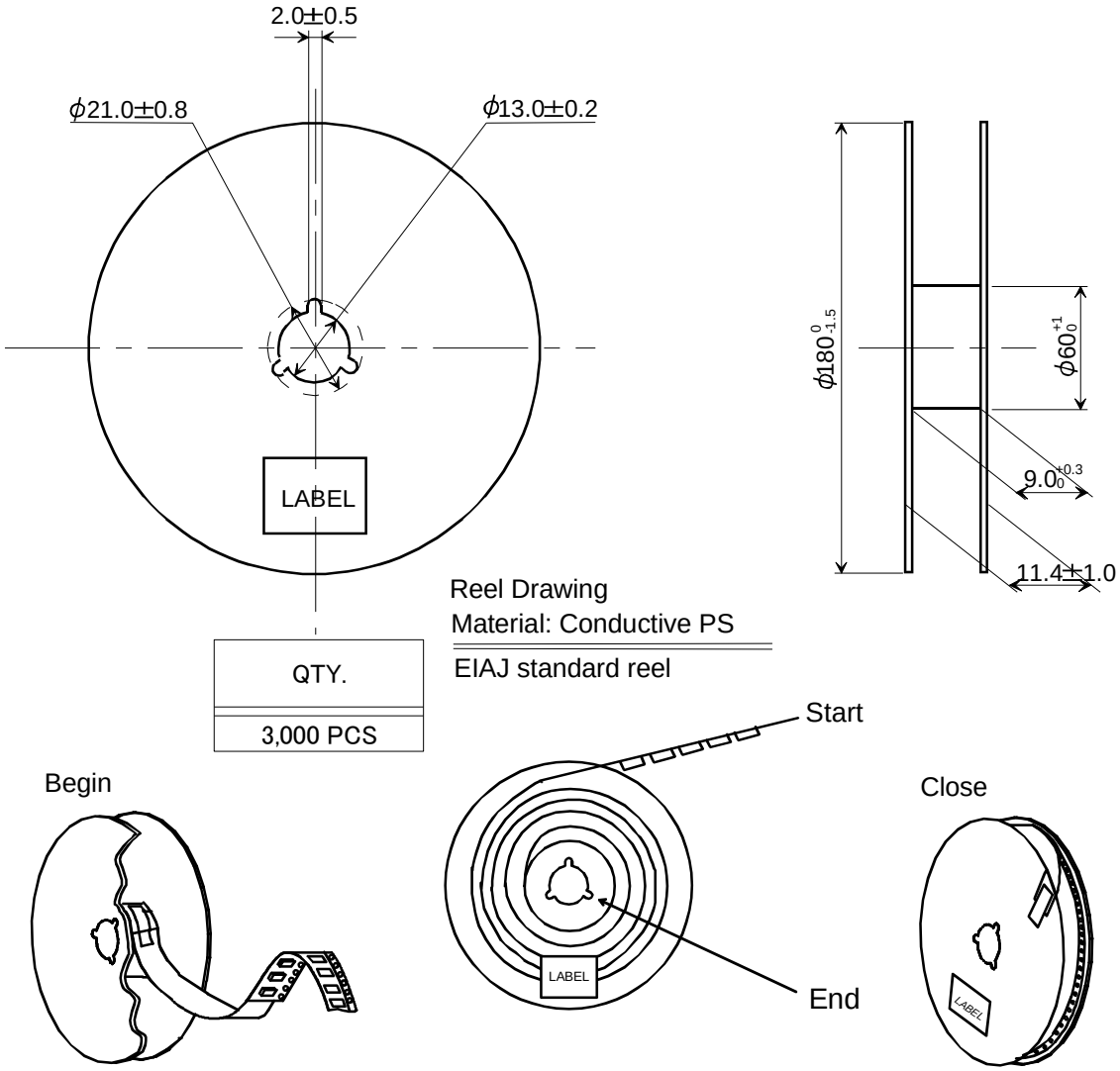
Form M-1



	Date of Revise	Charge	Approved	Reason
C	3 Aug.2012	Y.Hasuike	H.matsudo	Added of quantity

	Date	Name	Third Angle Projection	Tolerance	Scale
Drawn	31.Jul.2007	K.Oguri	Dimension:mm		/
Designed	31.Jul.2007	S. Kawanishi	Title	Drawing No.	Rev.
Checked	----------	----------	**2012 TYPE Taping and Reel Spec.**	**EXK17B-00273 2/2**	C
Approved	31.Jul.2007	K. Ono			

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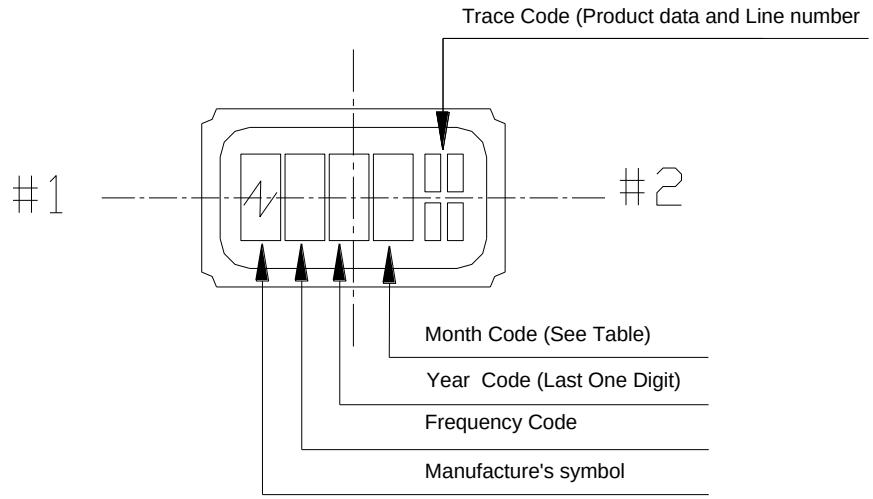

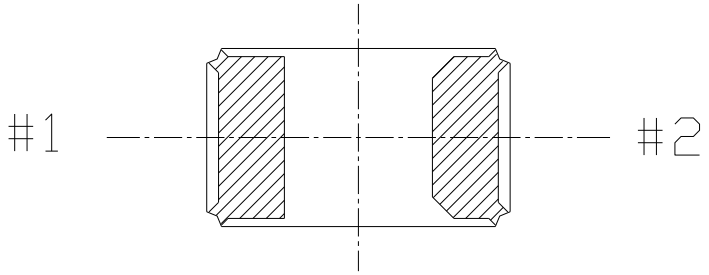

NOTE

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
B	9.June.2010	S.Kawanishi	M.Umeki	To change the direction of crystal unit

	Date	Name	Third Angle Projection	Tolerance	Scale
Drawn	20.July.2007	S.Kawanishi	Dimension:mm		/
Designed	20.July.2007	S.Kawanishi	Title: **NX2012SA Marking Drawing**	Drawing No.: **EXH11B-00366**	Rev.: B
Checked	20.July.2007	M.Yoshimatsu			
Approved	20.July.2007	K.Ono			

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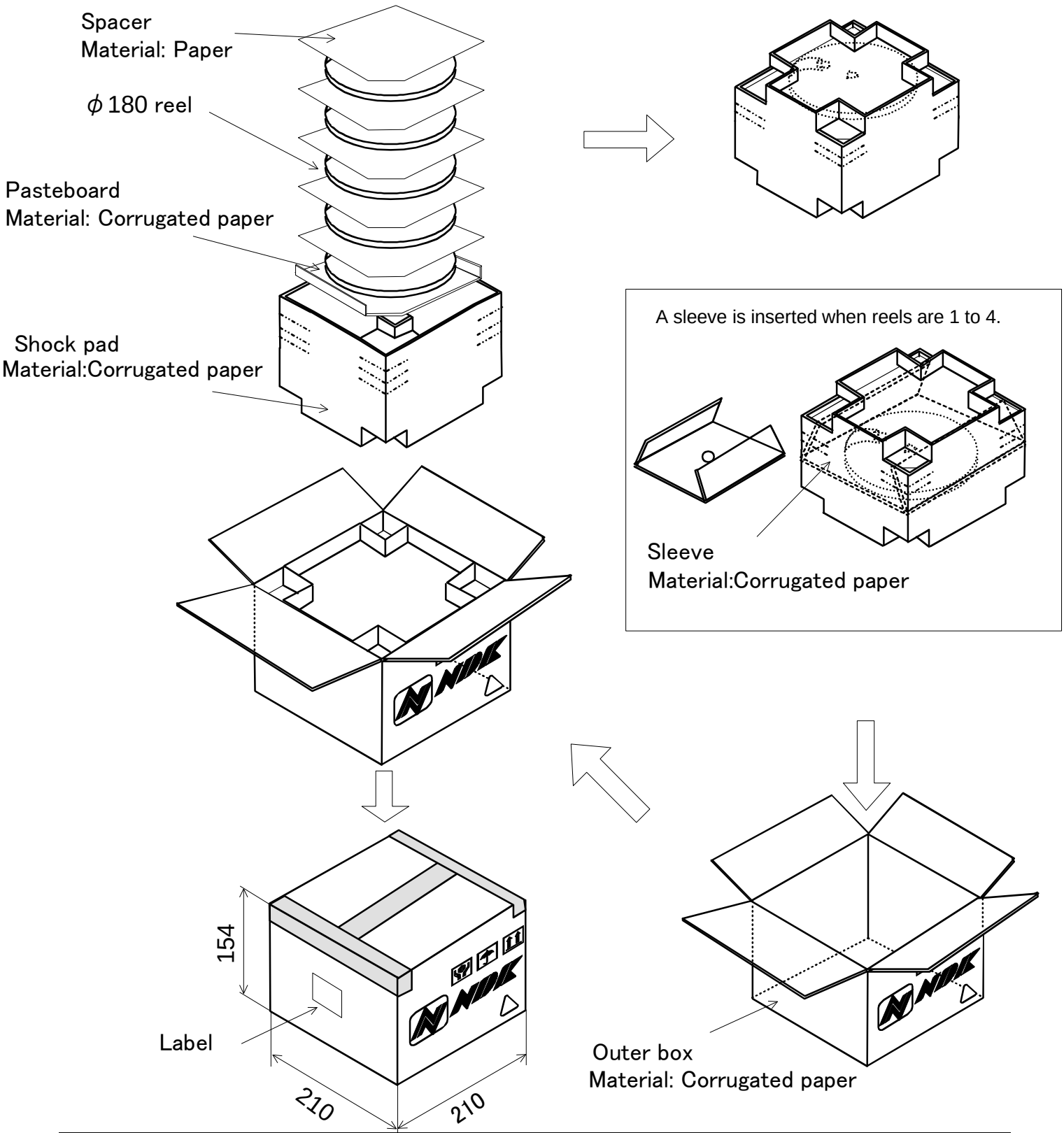

	Date of Revise	Charge	Approved	Reason
C	4 Jul. 2012	H.Ohkubo	K.Oguri	Addition of condition when reels are 1 to 4.

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

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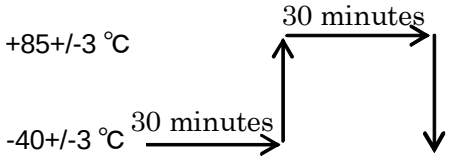
Reliability assurance item

(page: 1/2)

No.	Test Item	Test Methods	Specification Code
1	HEAT RESISTANCE	at +85 °C for 1000 hours.	a
2	COLD RESISTANCE	at –40 °C for 1000 hours.	a
3	HUMIDITY	at +85 °C with 80 to 85 % RH for 1000 hours.	a
4	THERMAL SHOCK	Temperature cycle as shown in (Fig.1) for 1000 cycle.  ONE CYCLE (Fig.1)	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 G 0.3 msec. Test time: Six mutually perpendicular axes each 1 time.	a
7	SHOCK 2	Shock: Device are put on the weight of 140 g and dropped on concrete board. Height: 1.5 m Drop times: Three 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 ≤ +/- 10ppm dCI ≤ +/- 20 kohm
b	dF/F ≤ +/- 20ppm dCI ≤ +/- 20 kohm
c	The electrodes shall acquire a new solder coat over at least 90 % of immersed area.

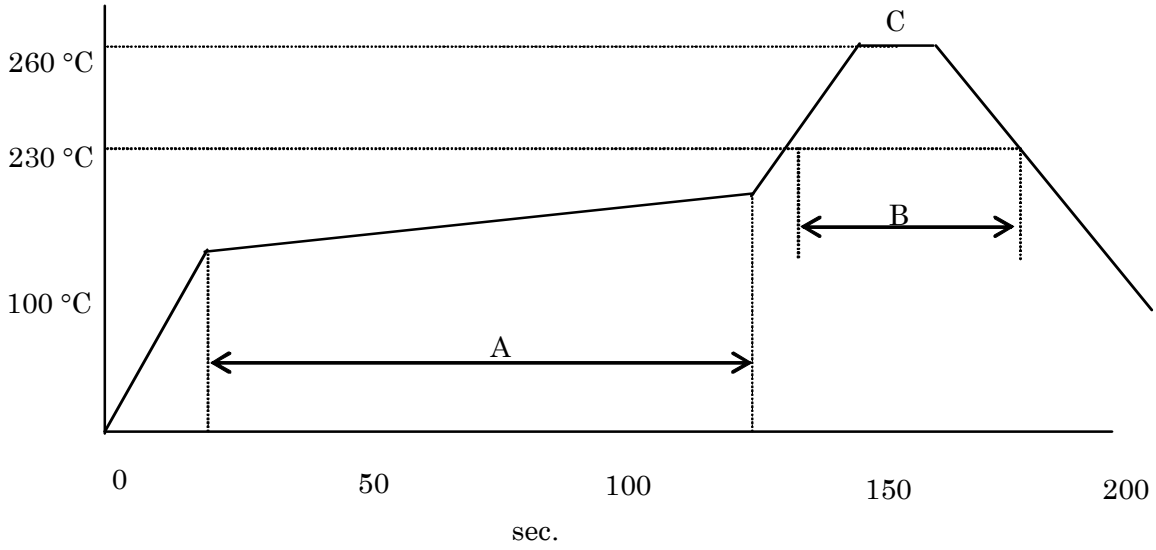


Fig.2 REFLOW

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.)