



SPECIFICATION

Customer: ST MICROELECTRONICS

Item:	Crystal Unit
Type:	NX1612SA
Nominal Frequency:	50.000 MHz
Customer's Spec. No.:	---
NDK Spec. No.:	EXS00A-CS08403

Receipt

Revision Record						
Rev.	Rev. Date	Items	Contents	Approved	Checked	Drawn
-----	27.Oct.2014	Issue	---	I.Miyahara	--	H.Yamaguchi
A	23.Dec.2014	4.4 Frequency versus Temperature characteristics	Addition	I.Miyahara	--	A.Sakanashi
B	15.Dec.2015	4.4 Frequency versus Temperature characteristics	Add: -40 to +105°C	I.Miyahara	--	K.Tsukumo
		4.14 Operating temperature range	Revise : -40 to + 85 °C			
		4.15 Storage temperature range	→ -40 to +105°C			

1. Customer Specifications Number : ---
2. NDK Specification Number : EXS00A-CS08403
3. Type : NX1612SA

4. Electrical Characteristics

	Parameters	SYM.	Electrical Spec.				Notes
			min	typ	max	Units	
1	Nominal frequency	f_{nom}	50.000			MHz	
2	Overtone order	-	Fundamental			-	
3	Frequency tolerance	-	-10	-	+10	ppm	at +25°C
4	Frequency versus temperature characteristics	-	-12	-	+12	ppm	at -30 to +85°C The reference temperature shall be +25°C
		-	-20	-	+20	ppm	at -40 to +85°C The reference temperature shall be +25°C
		-	-32	-	+32	ppm	at -40 to +105°C The reference temperature shall be +25°C
5	Equivalent resistance	-	27	47	80	Ω	IEC π -Network Series
6	Shunt capacitance	C_0	-30%	0.72	+30%	pF	Cover grounded
			-30%	0.67	+30%	pF	Not grounded
7	Motional capacitance	C_1	-30%	2.10	+30%	fF	Cover grounded/Not grounded
8	Motional inductance	L_1	-30%	4.83	+30%	mH	Cover grounded/Not grounded
9	Pulling sensitivity	S	-30%	13.97	+30%	ppm/pF	CL=8pF (Not grounded) This value is calculated by following formula. $S=(C_1 \times 1,000) / \{2(C_0 + C_L)^2\}$ [ppm/pF] Unit C_0 : [pF], C_1 : [fF], C_L : [pF]
10	Load capacitance	C_L	-	6.5	-	pF	π -Network
			-	8	-		IEC π -Network
11	Level of drive	-	-	10	200	μ W	
12	Aging	-	-3	-	+3	ppm	1 st year (at +25°C)
			-5	-	+5		5 years (at +25°C)
			-10	-	+10		10 years (at +25°C)
13	Insulation resistance	-	500	-	-	M Ω	When terminal to terminal and terminal to cover were applied at DC100V \pm 15V.
14	Operating temperature range	-	-40	-	+105	°C	
15	Storage temperature range	-	-40	-	+105	°C	
16	Recommended oscillation margin	-	1000	-	-	Ω	When the circuit does not have enough value as above, please contact us.
17	Air-tightness	-	-	-	1.1×10^{-9}	Pa m ³ /s	Helium leak detector

5. Examination results document

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

6. Application drawing

6.1 Dimension Drawing	: EXD14B-00588
6.2 Taping and Reel figure	: EXK17B-00270
6.3 Packing	: EEK17B-00015
6.4 Holder Marking	: EXH11B-00317
6.5 Packing Label	: EXK17B-00213
6.6 Reliability assurance Item	: EXS30B-00250

7. Notice

- 7.1 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.
- 7.2 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.
- 7.3 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.
- 7.4 Where any change to the process condition is made due to the change(s) in the production line, inform personnel of the specifications.
- 7.5 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.
- 7.6 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.
- 7.7 In the company's production process whatever amount of ozone depleting substances (ODS) as specified in the Montreal protocol is not used.
- 7.8 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.
- 7.9 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.
- 7.10 The appearance color has a different case by purchasing it more than 2 suppliers of the component, but characteristic and reliability are guaranteed.
- 7.11 In case of the product long time keep at high temperature and humidity, may affect product characteristic (solder ability) and a packing condition. Please keep at storage condition of temperature +5°C ~+35°C, humidity ~85%RH.

8. 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

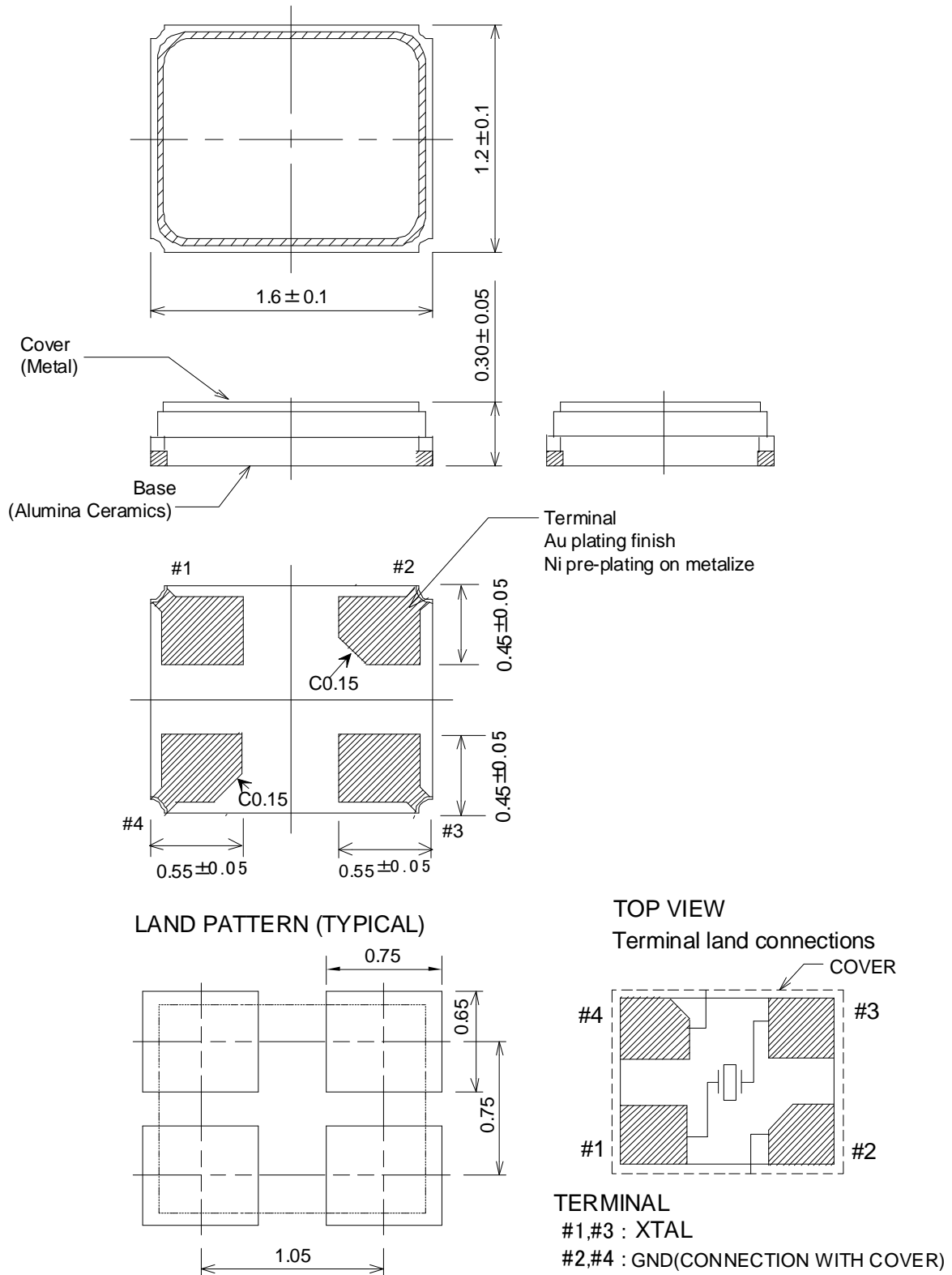
Heating: 230°C or higher, 40 sec

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).

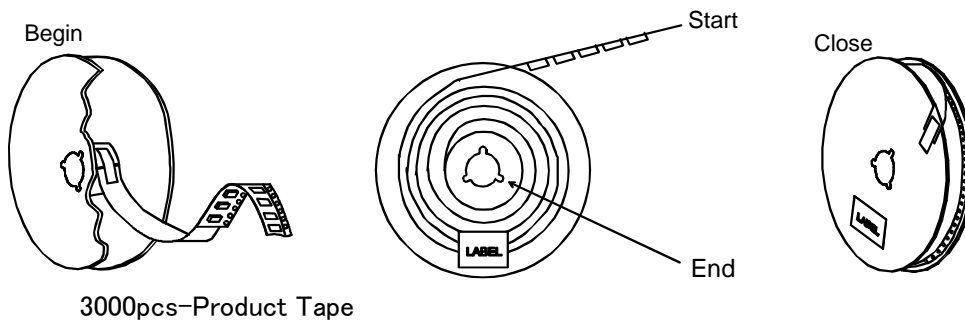
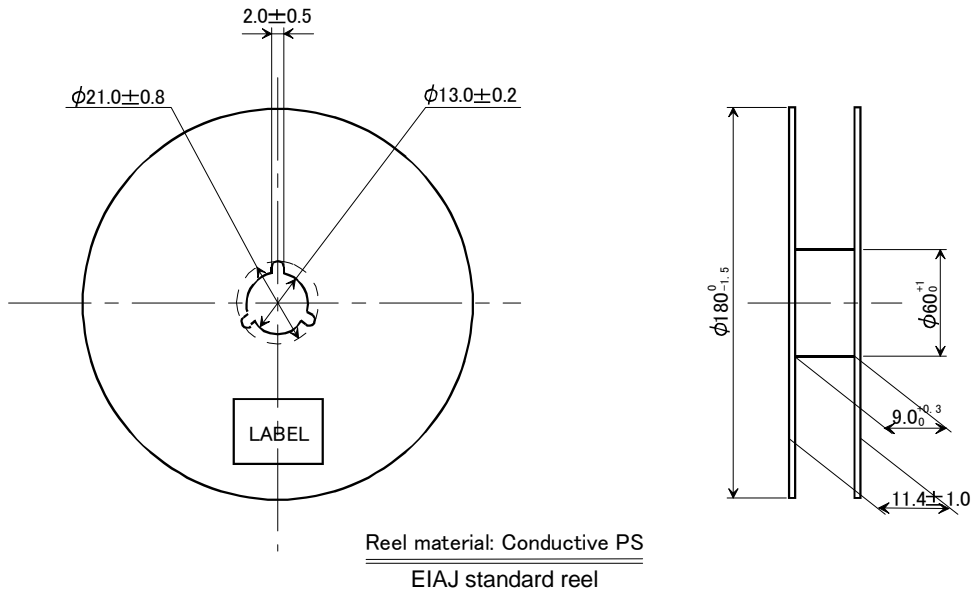
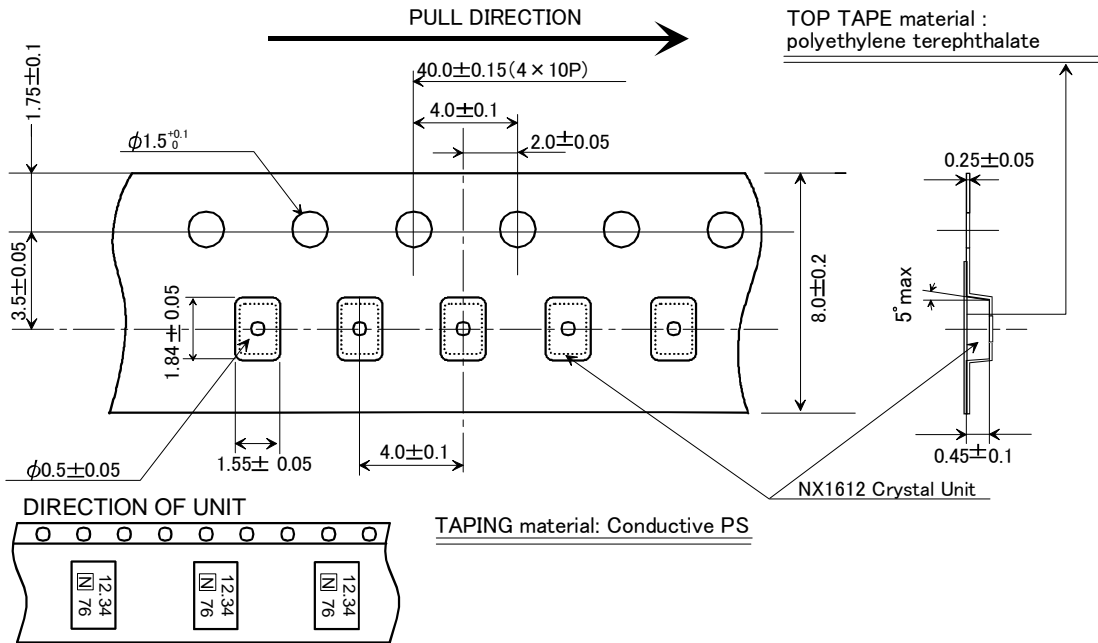


NOTE

1. The appearance color has a different case by purchasing it more than 2 suppliers, but reliability is guaranteed

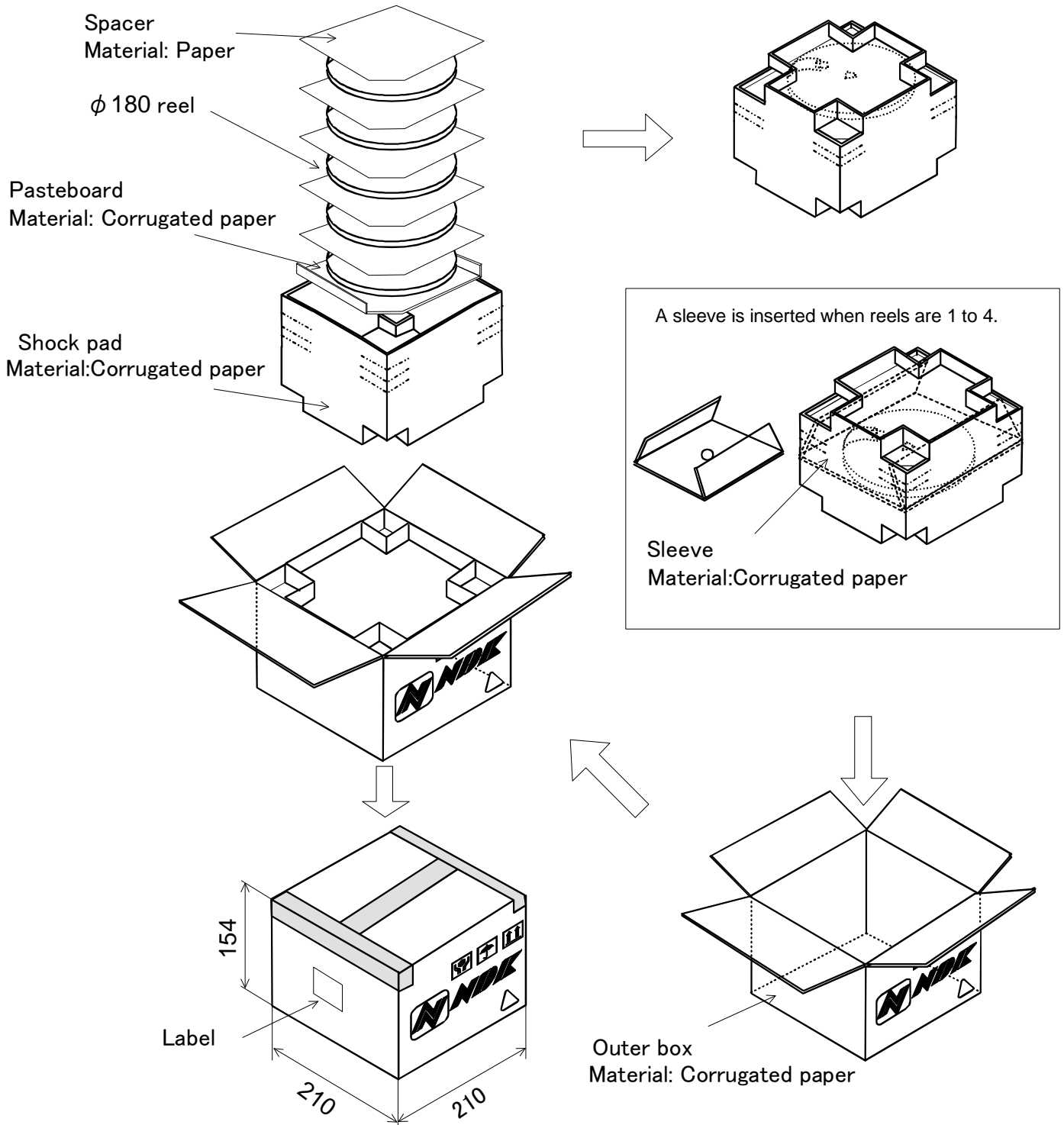
	Date of Revise	Charge	Approved	Reason	
B	23.Dec.2014	N.Wakisaka	H.Kobayashi	Re-revised the same as first rev.	
	Date	Name	Third Angle Projection	Tolerance	
Drawn	14.May.2013	H.Yamaguchi	Dimension:mm	----	
Designed	14.May.2013	H.Yamaguchi	Title NX1612SA Dimension Drawing	Drawing No. EXD14B-00588	
Checked	14.May.2013	M.Kubota			Rev. B
Approved	14.May.2013	H.Kobayashi			

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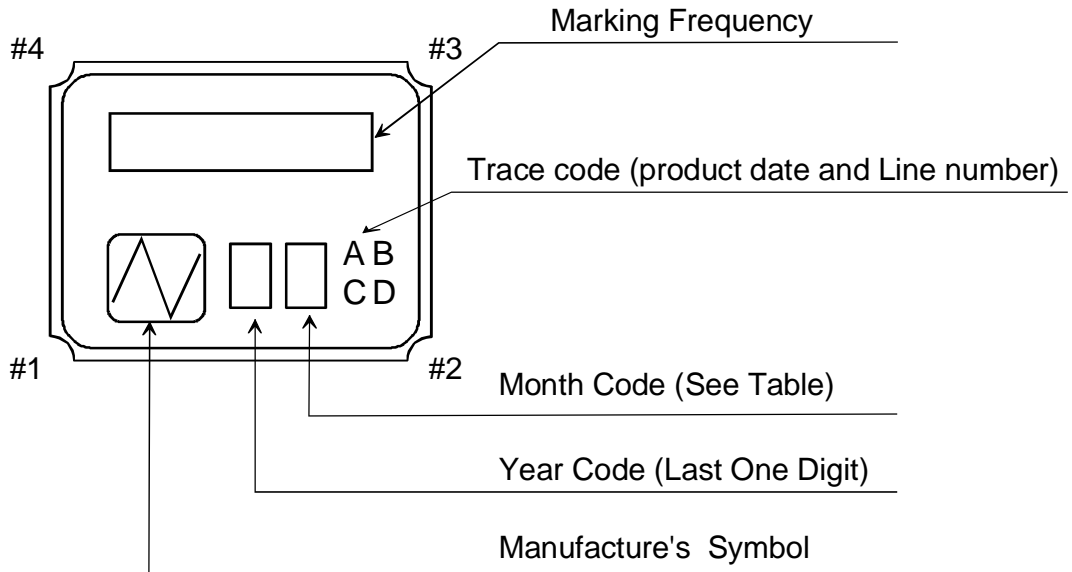
	Date of Revise	Charge	Approved	Reason	
E	7 Oct. 2015	H. Ohkubo	H. Murakoshi	Drawing title was changed.	
	Date	Name	Third Angle Projection	Tolerance	
Drawn	22.Jun.2007	K.Oguri	Dimension:mm	mm	
Designed	22.Jun.2007	K.Oguri	Title NX1612AA, SA, SC Taping and Reel Spec.	Drawing No. EXK17B-00270	
Checked	-----	-----			Rev.
Approved	22.Jun.2007	K. Miyashita			E

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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	
Drawn	26 Feb. 2010	H. Ohkubo	Dimension:mm	-----	
Designed	26 Feb. 2010	K. Oguri	Title 180 dia. Reel package	Drawing No. EEK17B-00015	
Checked	26 Feb. 2010	K. Oguri			Rev. C
Approved	26 Feb. 2010	J. Nakamura			

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NOTE

1. Frequency Code

Marking Frequency is consist of five digits, first five digits of Nominal Frequency

Example

Nominal Frequency	28.636363 MHz
Frequency Code	28.636

2. Month Code Table

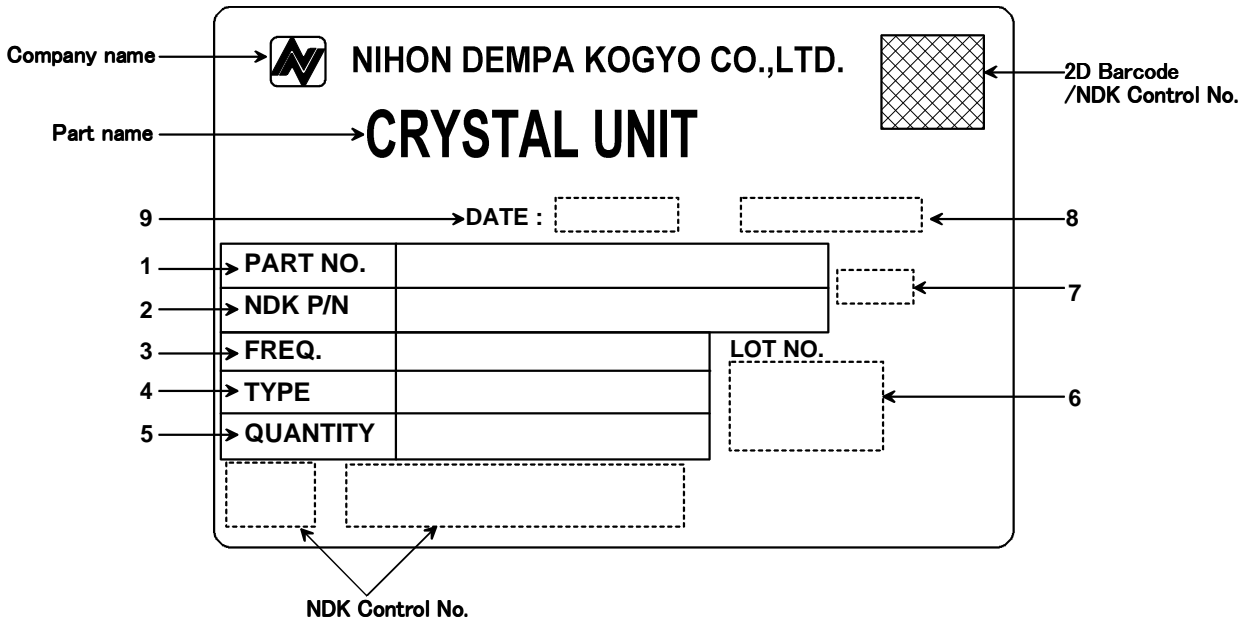
Month	1 Jan.	2 Feb.	3 Mar.	4 Apr.	5 May.	6 Jun.	7 Jul.	8 Aug.	9 Sep.	10 Oct.	11 Nov.	12 Dec.
Month Code	1	2	3	4	5	6	7	8	9	X	Y	Z

*Marking digits are not include a decimal point and dot mark.

	Date of Revise	Charge	Approved	Reason			
D	19. Jun 2012	H.Ouchi	M. Kubota	Added terminal number information.			
	Date	Name	Third Angle Projection	Tolerance		Scale	
Drawn	16.Jan.2006	I.Miyahara	Dimension:mm			/	
Designed	16.Jan.2006	I.Miyahara	Title Crystal Holder Marking		Drawing No. EXH11B-00317		Rev.
Checked	16.Jan.2006	---					D
Approved	16.Jan.2006	K.Okamoto					

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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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Reliability assurance item

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No.	Test Item	Test Methods	Spec. Code
1	High Temperature Storage	+85±3°C 720h	A
2	Low Temperature Storage	-40±3°C 500h	A
3	Temperature Humidity	+85±3°C 80~85%RH 500h	A
4	Temperature Cycling	-40±3°C / +85±3°C It is 1000 cycles using 30 minutes each as 1 cycle.	A
5	Vibration	Frequency Range : 10~2000Hz Amplitude or Acceleration : 1.52mm or 196m/s ² 1 cycle : 20 minutes Test time : Three mutually perpendicular axes each 4 hours.	A
6	Shock	Devices are shocked to half sine wave (29418m/s ² , 0.3msec) six mutually perpendicular axis each 1 times.	A
7	Drop	Preparation : Test pieces should be fixed on the dummy load with 200g weight. Condition : Height 1.5m onto concrete Drop times : 10 times in 6 mutually perpendicular axes	A
8	Solderability	Pre-heat temperature : +150±10°C Pre-heat time : 60~120s When the temperature of the specimen is reached at +215±3°C, it shall be left for 30±1sec. Peak temperature 240±5°C Material: Pb-free (Sn-3.0Ag-0.5Cu) Flux : Rosin resin methyl alcohol solvent (1 : 4)	B
9	Reflow resistance	Pre-heat temperature : +150~180°C Pre-heat time : 90±30s Heat temperature : more than +230°C Heat time : 30s ±10s Peak temperature : +260±5°C Peak time : less than 10s	A

Specification code	Specification
A	$\Delta f/f \leq \pm 3$ ppm $\Delta Cl/Cl \leq \pm 15$ % or 5 Ω make use larger value
B	The electrodes should be covered by a new solder at least 90% of immersed area.