

1. Customer Specifications Number : ---
2. NDK Specification Number : EXS00A-CS11019
3. Type : NX2520SG

4. Electrical Characteristics

	Parameters	SYM.	Electrical Spec.				Notes
			Min	TYP	MAX	Units	
1	Nominal Frequency	f _{nom}	26			MHz	
2	Overtone order	-	Fundamental			-	
3	Frequency tolerance	-	-10	-	+10	ppm	at +25°C+/-2°C
4	Frequency versus temperature characteristics	-	-12	-	+10	ppm	at -30~+85°C The reference temperature shall be+30.5°C
5	Equivalent Resistance	-	-	-	50	Ω	-
6	Load capacitance	C _L	-	7	-	pF	IEC π-Network
7	Level of drive	DL	10	50	100	μW	-
8	Temperature coefficient						
8-1	Inflection point	-	29	30.5	32	°C	
8-2	To	-		30.5	-	°C	
8-3	Third-order curve fitting coefficient	-	8.5	-	11.5	x 10 ⁻⁵ ppm/°C ³	The curve can be modeled as a third-order polynomial. $f(t) = c_3(t - t_0)^3 + c_2(t - t_0)^2 + c_1(t - t_0)$
8-4	Second-order curve fitting coefficient	-	-4.5	-	+4.5	x 10 ⁻⁴ ppm/°C ²	
8-5	First-order curve fitting coefficient	-	-0.4	-	-0.1	ppm/°C	
9	Temperature Hysteresis						
9-1	Full cycle temperature hysteresis	-	-0.5	-	+0.5	ppm	Temp. range:-30°C to 85°C for each 1deg.c. Temp. rate: ~1.0°C/min Test flow: 25°C(1)->-30°C->85°C->25°C(2) (25°C(1) freq. drift subtract 25°C(2) freq. drift)
9-2	Small cycle temperature hysteresis	-	-0.05	-	+0.05	ppm	Temp. range: -30°C to 85°C for each 0.5°C Temp. rate: ~1.0°C/min Test flow: any 5°C cycle (ex.25°C (1)->-30->25°C (2), 25°C (1) freq. drift subtract 25°C (2) freq. drift)
10	Full Cycle Frequency stability slope		-50	-	+50	ppb/°C	Condition: Test condition (continuous Temperature rate change of ~ 1.0°C/min) The residual is defined as the difference between the crystal measured FT curve and the 5 th order polynomial fit of the FT curve. Frequency is measured between -30 to +85°C every 1°C.
11	Frequency hysteresis 1 (5°C small cycle)		-50	-	+50	ppb/°C	Condition Test condition(continuous temperature rate change of~ 1.0°C/min) -Measure FT points every 0.5°C while cycling temperature over a 5°C small temperature orbit, an example 5°C small orbit temperature Cycle is +30°C to +35°C to +30°C -During every individual heating/cooling cycle there should be 11 points; discard the first point of each heating and cooling cycle; this leaves 10 points for each heating and cooling cycle. Subtract the fifth-order polynomial best fit from 1A for each of the 10 points, and then calculate the slope of the Residual for each of these heating and cooling 10 point curves. -The residual slope should be within +/-50 ppb/°C

12	Turning Sensitivity	-	-	15	-	ppm/pF	at CL = 7pF
13	Q	-	75000				
14	Drive level dependency (Drive level: 10nW to 100uW)						
14-1	DLD2	-	-	-	2.5	Ω	
14-2	DLDH2	-	-	-	1.5	Ω	
14-3	FDDL	-	-	-	3.5	ppm	
14-4	FDLDH	-	-	-	0.7	ppm	
15	Frequency drift after reflow	-	-2	-	+2	ppm	After two reflows
16	Aging						
16-1	Aging (1 st year)	-	-0.7	-	+0.7	ppm	
16-2	Aging (2 nd years)	-	-1.4	-	+1.4	ppm	
16-3	Aging (5 years)	-	-2.5	-	+2.5	ppm	
16-4	Aging (10 years)	-	-5	-	+5	ppm	
17	Spurious mode resistance	-	500	-	-	Ω	F nom within +/-1000KHz
18	Insulation resistance	-	500	-	-	MΩ	Terminal to terminal insulation resistance also terminal to cover insulation resistance when DC100V ±15V is applied.
19	Operating temperature range	-	-30	-	+105	°C	
20	Storage temperature range	-	-40	-	+105	°C	
21	Air-tightness	-	-	-	1.1×10 ⁻⁹	Pa m ³ /s	Helium leak detector
22	MSL	-	Level 1			-	
23	ESD(HBM)	-	-	-	1000	V	Guarantee voltage
24	ESD(MM)	-	-	-	200	V	Guarantee voltage

Thermistor Characteristics

	Parameters	SYM.	Electrical Spec.				Notes
			Min	TYP	MAX	Units	
1	Size	-	0.6 x 0.3 x 0.3			mm	
2	Room temperature resistance	-	-1%	100	+1%	kΩ	at +25°C
3	B const	-	-1%	4250	+1%	K	Evaluated from 25°C to 50°C
4	Rated power (at 25°C)	-	-	-	100	mW	

5. Examination results document

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

6. Application drawing

- 6.1. Dimension Drawing : EXD14B-00482
- 6.2. Taping and Reel figure : EXK17B-00318, EXK17B-00411
- 6.3. Holder Marking : EXH11B-00319
- 6.4. Packing : EEK17B-00015, EEK17B-00012
- 6.5. Packing Label : EXK17B-00422
- 6.6. Reliability assurance Item : EXS30B-01042

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

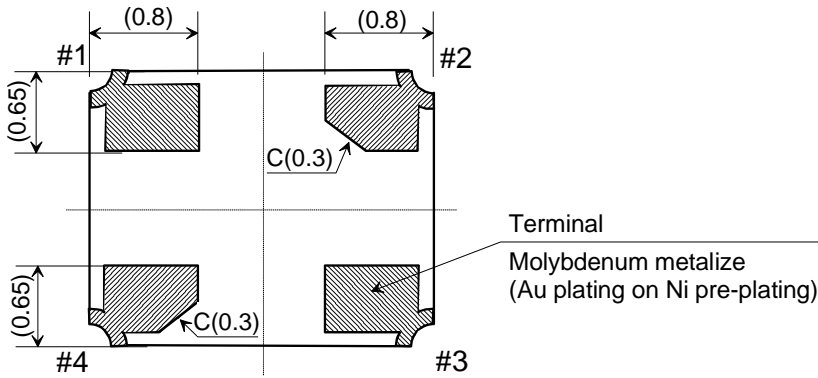
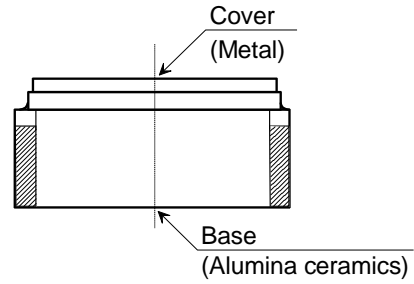
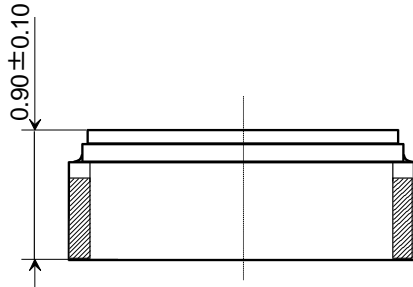
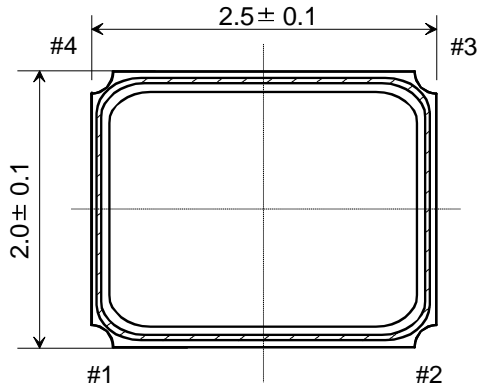
Heating: 230°C or higher, 40 sec

Preheating: 150°C to 180°C, 120 sec

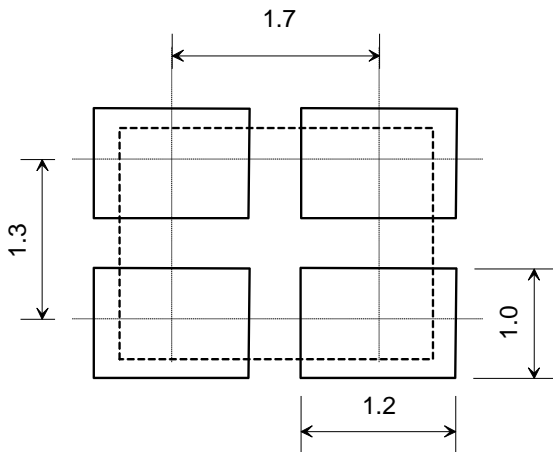
Reflow passage times: three times

(2) Manual soldering heat resistance

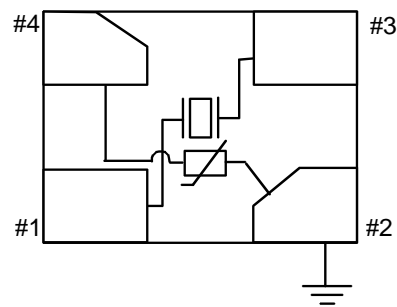
Pressing a soldering iron of 400°C on the terminal electrode for four seconds (twice).



Recommended land pattern



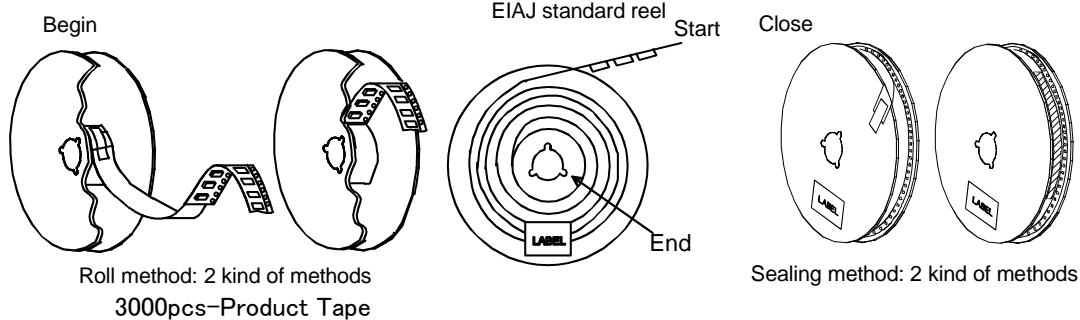
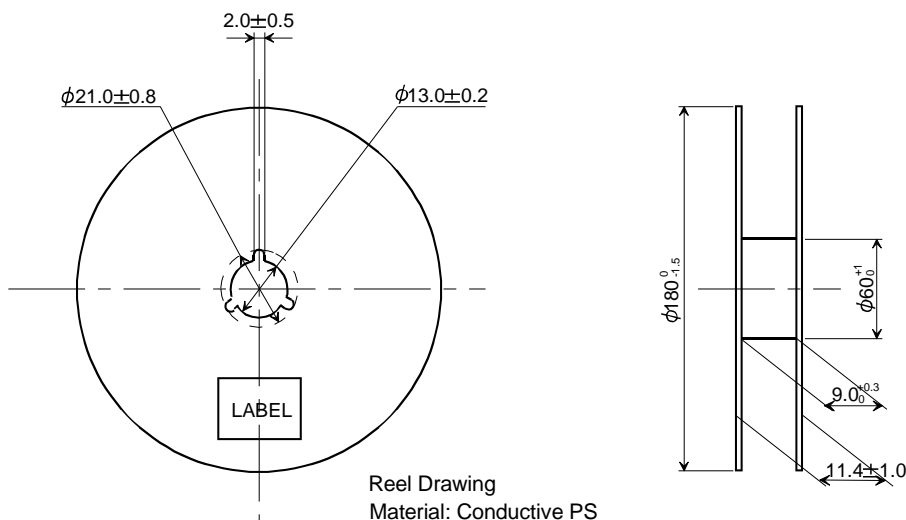
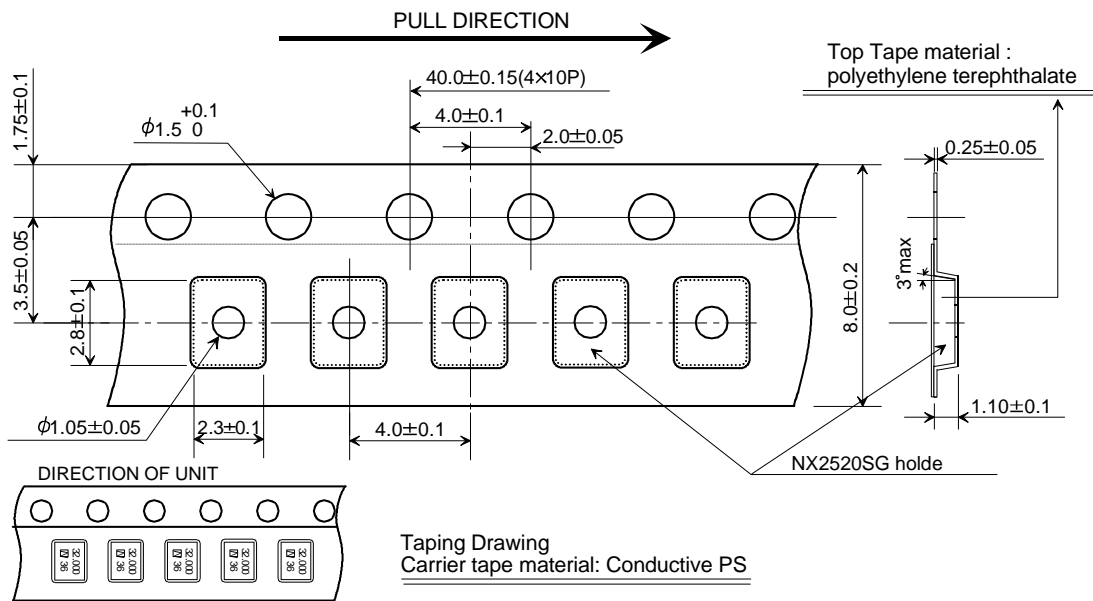
Terminal configuration (TOP VIEW)



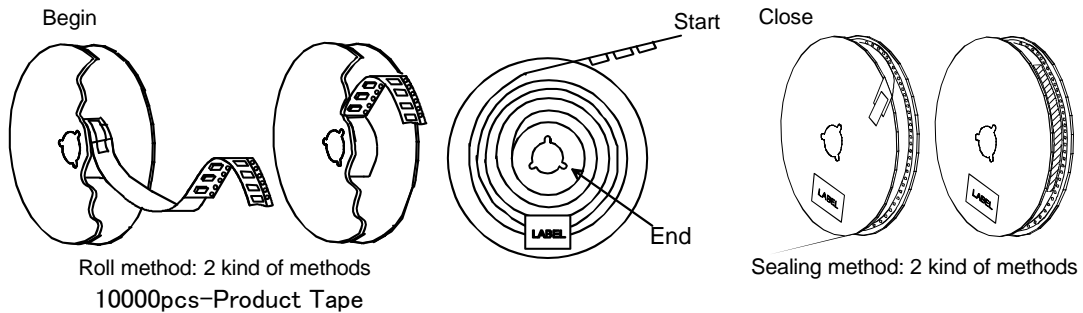
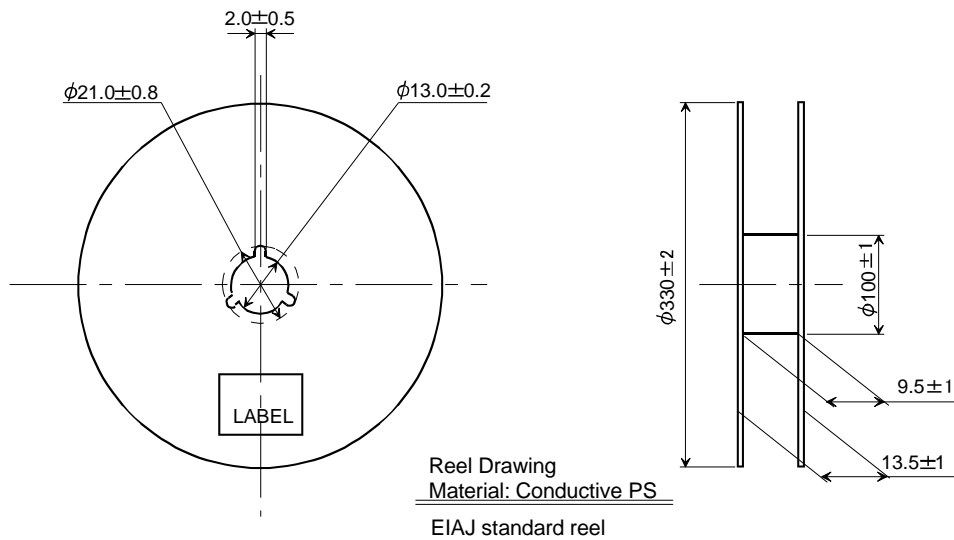
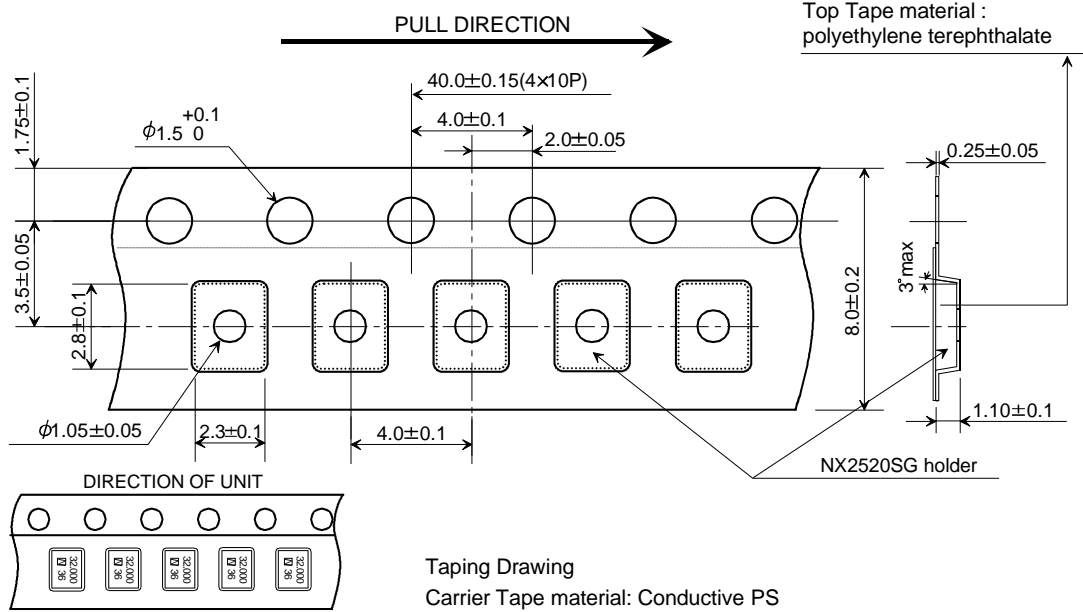
Terminal	Function
#1, #3	XTAL IN-OUT
#4	THERMISTOR IN
#2	THERMISTOR OUT
#2	GND (Connected with cover)

Date of Revise	Charge	Approved	Reason			
21. Apr. 2016	T. Asamizu	T. Miyahara	Changed to terminal size			
Date	Name	Third Angle Projection	Tolerance	Scale		
17. Dec. 2010	T. Asamizu	Dimension: mm	---	---		
Drawn	Designed	Checked	Approved	Title	Drawing No.	Rev.
17. Dec. 2010	17. Dec. 2010	17. Dec. 2010	17. Dec. 2010	NX2520SG Dimension Drawing	EXD14B-00482	C
T. Asamizu	I. Miyahara	K. Ueki				

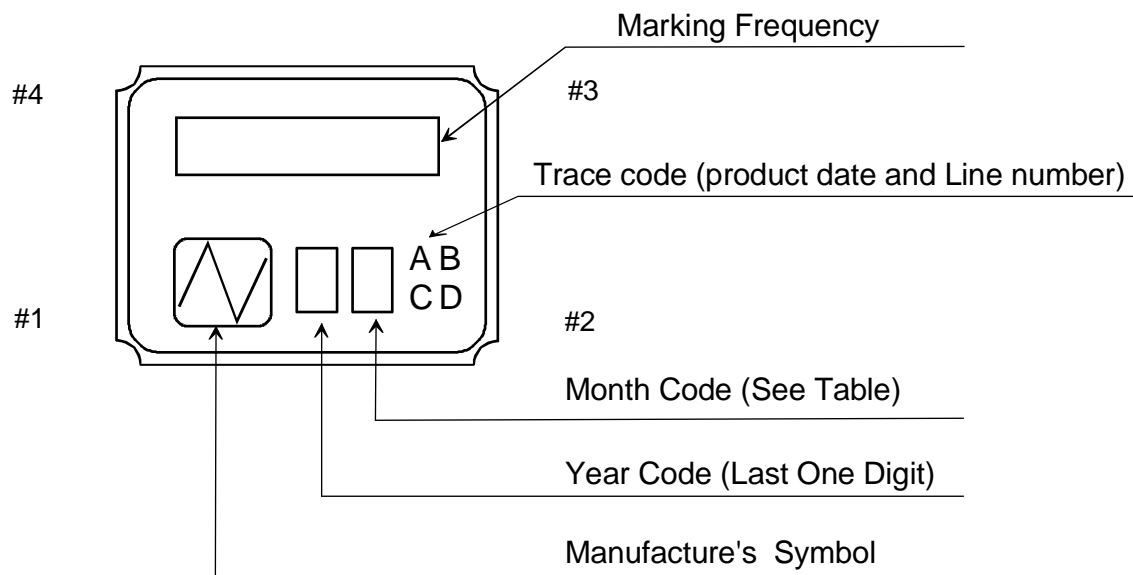
NIHON DEMPA KOGYO CO., LTD.



	Date of Revise	Charge	Approved	Reason	
A	7 Oct. 2016	H. Ohkubo	H. Murakoshi	Addition of roll method and sealing method.	
	Date	Name	Third Angle Projection	Tolerance	
Drawn	06. Jan. 2011	T.Asamizu	Dimension: mm	----	
Designed	06. Jan. 2011	T.Asamizu	Title NX2520SG Taping and Reel Spec.	Drawing No. EXK17B-00318	
Checked	06. Jan. 2011	I.Miyahara			Rev.
Approved	06. Jan. 2011	K.Ueki			A



	Date of Revise	Charge	Approved	Reason
A	7 Oct. 2016	H. Ohkubo	H. Murakoshi	Addition of roll method and sealing method.
	Date	Name	Third Angle Projection	Tolerance
Drawn	2 Sep. 2016	H. Ohkubo	Dimension: mm	----
Designed	2 Sep. 2016	H. Ohkubo	Title	Drawing No.
Checked	---	---		
Approved	2 Sep. 2016	H. Ohkubo		
			NX2520SG Taping and Reel Spec.	EXK17B-00411
				Rev.
				A



NOTE

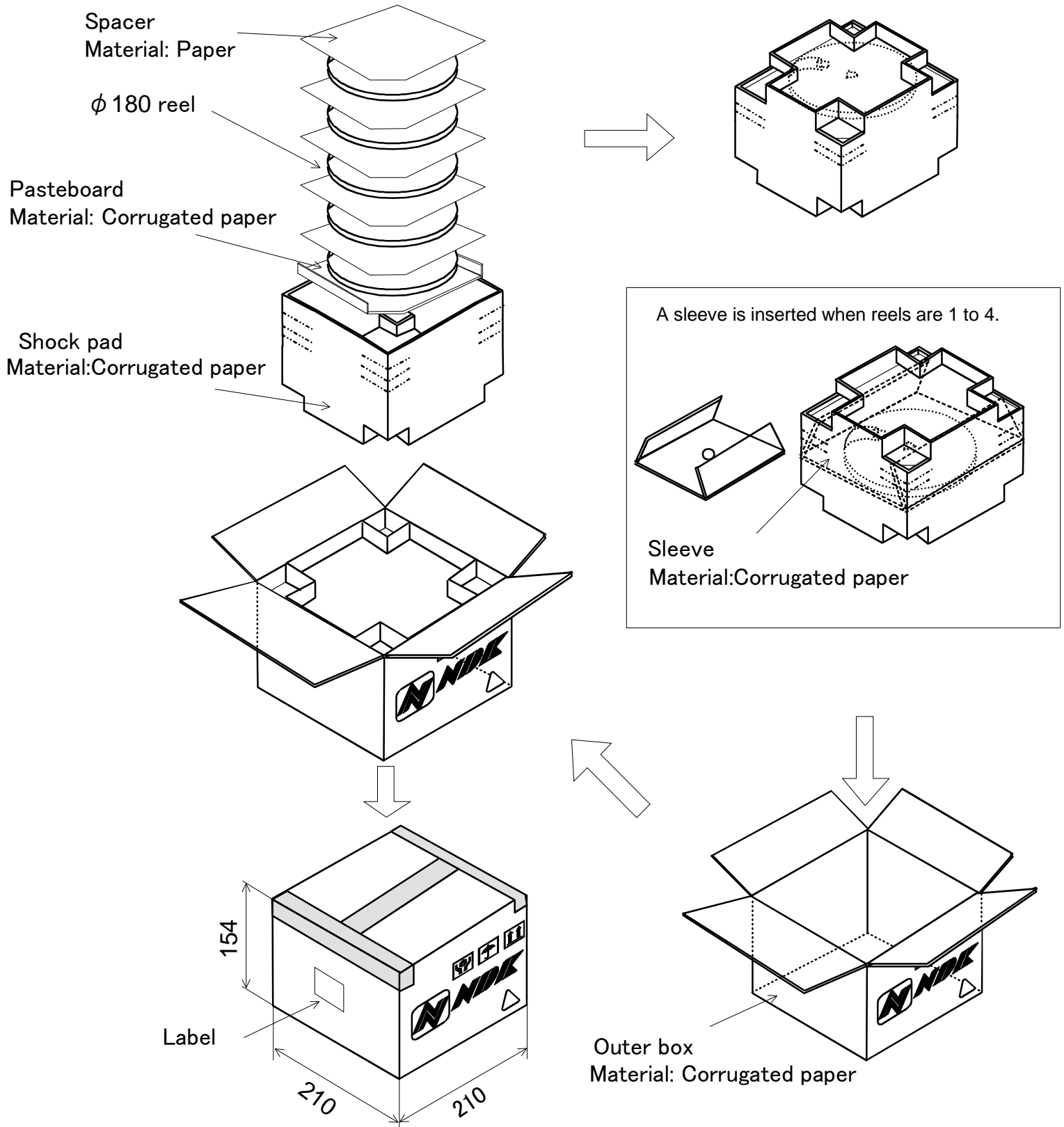
1. Month Code Table

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.

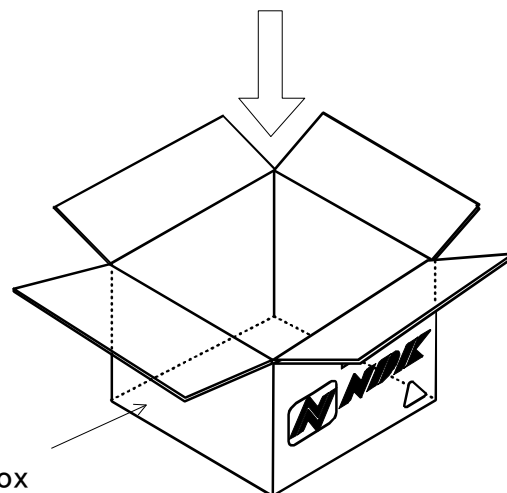
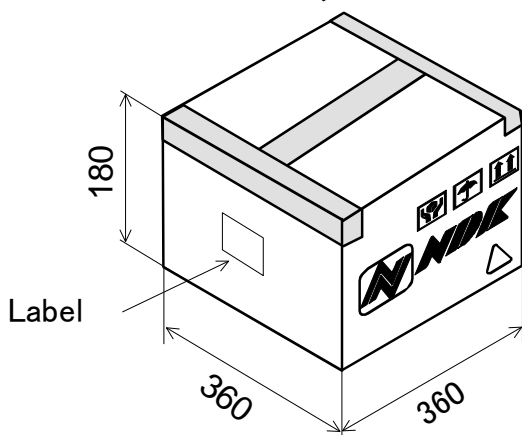
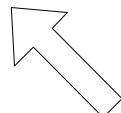
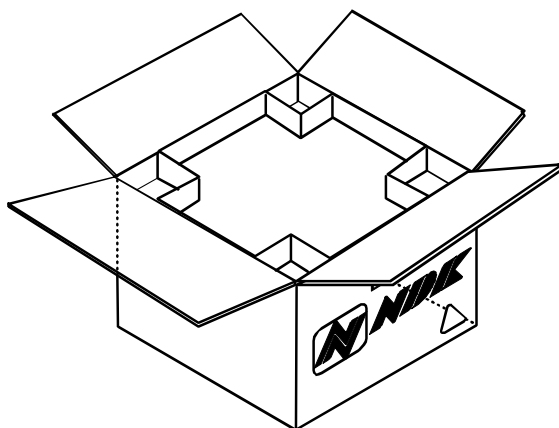
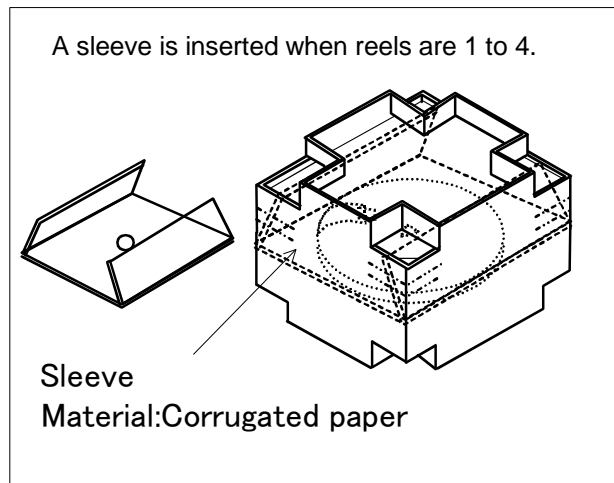
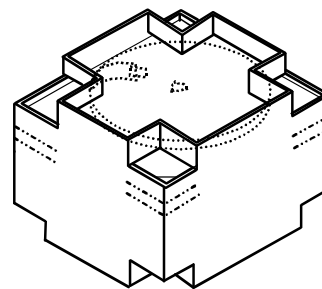
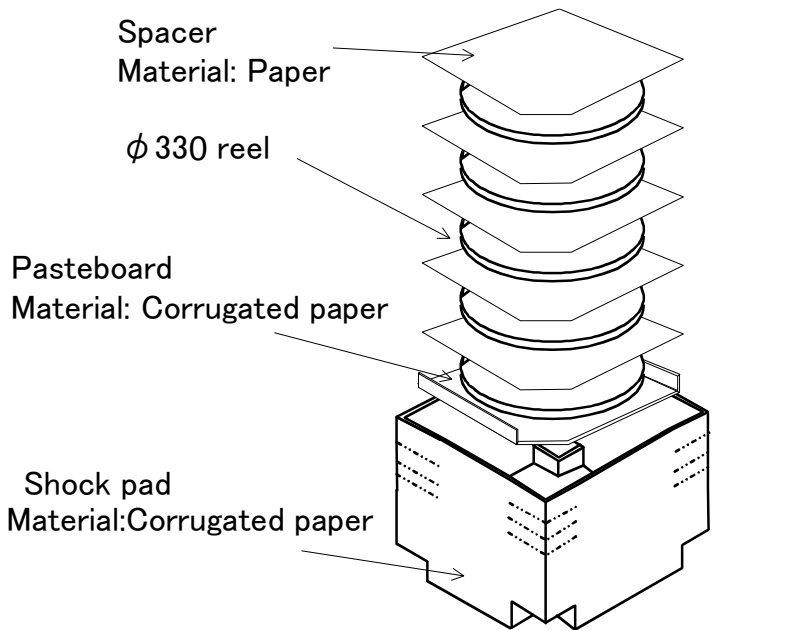
	Date of Revise	Charge	Approved	Reason	
A	10. Jul. 2008	T.Asamizu	K.Kubota	Delete application period.	
	Date	Name	Third Angle Projection	Tolerance	Scale
Drawn	14. Feb. 2006	T.Asamizu	Dimension:mm		/
Designed	14. Feb. 2006	T.Asamizu	Title Crystal Holder Marking	Drawing No. EXH11B-00319	Rev.
Checked	14. Feb. 2006	I.Miyahara			A
Approved	14. Feb. 2006	K.Okamoto			

NIHON DEMPA KOGYO CO., LTD.



	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	Drawing No.
Checked	26 Feb. 2010	K. Oguri	180 dia. Reel package	EEK17B-00015
Approved	26 Feb. 2010	J. Nakamura		
				C

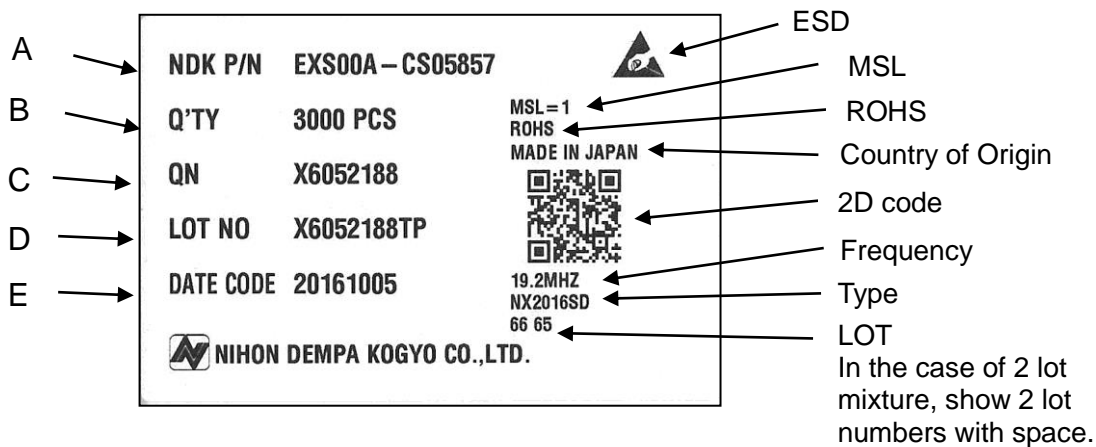
NIHON DEMPA KOGYO CO., LTD.



Outer box
Material: Corrugated paper

	Date of Revise	Charge	Approved	Reason	
B	18 Nov. 2016	H. Ohkubo	H. Murakoshi	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 330 dia. Reel package		Drawing No. EEK17B-00012
Checked	26 Feb. 2010	K. Oguri			
Approved	26 Feb. 2010	J. Nakamura			

LABEL SIZE: 76x50mm



No.	Marking Item	Marking Contents
A	NDK P/N	NDK Part Number
B	Q'TY	Total quantity
C	QN	Serial Number
D	LOT NO.	Serial Number + TP
E	DATA CODE	Date of making label

改訂日/ Date of Revise		担当/ Charge	承認/ Approved	理由/ Reason	
---	---	---	---	---	
	Date	Name	三角法/ Third Angle Projection	公差/ Tolerance	尺度/ Scale
Drawn	27. Mar. 2017	Y. Takaki	単位:mm	-----	-----
Designed	27. Mar. 2017	Y. Takaki	名称/Title	図番/ Drawing No.	改訂/ Rev.
Checked	---	---	Packing Label	EXK17B-00422	---
Approved	27. Mar. 2017	I. Miyahara			

Reliability assurance item (1/2)

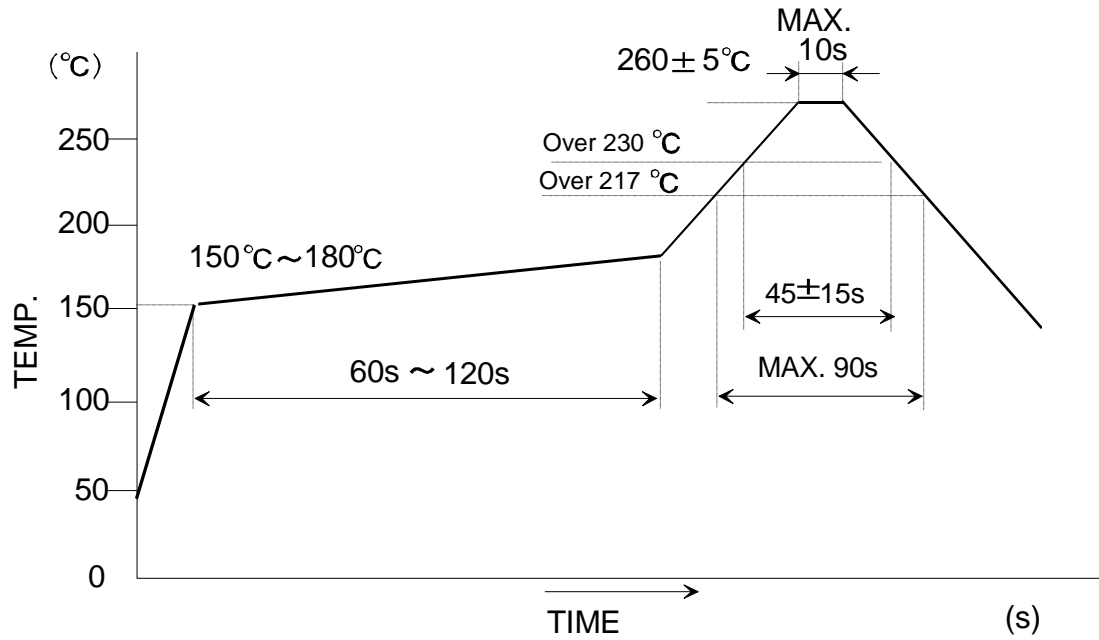
(page: 1/2)

No.	Test Item	Test Methods	Spec. Code
1	High temperature	Temperature: +125 °C Test time: 1000 Hr.	C, D
2	Cold resistance	Temperature: -40 °C Test time: 1000 Hr.	B, D
3	Humidity	at +85 °C with 85 % RH for 1000 hr.	B, D
4	Thermal shock (TS)	-55 +/- 3°C / +125 +/- 3°C 300 cycles/1H per cycles	C, D
5	Vibration	Frequency Range	10 to 2000Hz
		Amplitude or Acceleration	1.52 mm or 10G
		1 cycle	20 minutes
		Test time	Three mutually perpendicular axes each 6 times.
6	Bending	Push the center of the substrate down with indenter, speed 1mm/s, bends, 5 mm, the state is held for 5 s +/- 1 s	A, D
7	Shock 1	Shock	Device are put on the weight of 200 g onto marble.
		Height	1.8 m
		Drop times	1 time for each 6 side direct 1 time 4 corners Totally 10 drops.
8	Shock 2	Shock	PCB (36mm '90mm) attached by 6 screws to a housing of 150g.
		Height	1.0 m onto concrete
		Equipment	1.0mm +/- 0.1mm thick
		Drop times	300 drops . 12 rotation / min.
9	Reflow resistance	Temperature cycle as shown in (Fig2.) for 3 cycle.	A, D
10	Air Tightness	Helium leak test.	E

Specification code	Specification
A	$\Delta F/F \leq \pm 1.0$ ppm $\Delta CI \leq \pm 15$ % or $\pm 2 \Omega$ greater value
B	$\Delta F/F \leq \pm 2.0$ ppm $\Delta CI \leq \pm 25$ % or $\pm 2 \Omega$ greater value
C	$\Delta F/F \leq \pm 5.0$ ppm $\Delta CI \leq \pm 15$ % or $\pm 2 \Omega$ greater value
D	Thermistor resistance: $\Delta R/R \leq 5\%$
E	No leak

Reliability assurance item(2/2)

Recommended reflow profile



- A: 150 to 180 °C (90 ± 30 sec.)
- B: 230°C min. (30 sec. max.)
- C: Peak temperature. $260^\circ\text{C} \pm 5^\circ\text{C}$ (10sec. max.)
- D: 217 °C Min. (90 sec. max.)