



1. Customer Specifications Number : ---
2. NDK Specification Number : EXS00A-CS05258
3. Type : NX2520SG

## 4. Electrical Characteristics

	Parameters	SYM.	Electrical Spec.				Notes
			Min	TYP	MAX	Units	
1	Nominal Frequency	fnom	26			MHz	
2	Overtone order	-	Fundamental			-	
3	Frequency tolerance	-	-10	-	+10	ppm	at +25→C
4	Frequency versus temperature characteristics	-	-10	-	+10	ppm	at -25~+85→C The reference temperature shall be+25°C
5	Equivalent Resistance	-	-	-	30	Ω	-
6	Load capacitance	CL	-	7	-	pF	IEC ▲-Network
7	Level of drive	DL	-	100	100	μW	-
8	Temperature coefficient						
8-1	Third-order curve fitting coefficient	-	8.7	-	11	$\times 10^{-5}$ ppm/°C <sup>3</sup>	Fitting equation is defined by formula below and four kinds of temperature coefficient parameters, which are calculated from operating temperature under per 2 →C steps measurement data.
8-2	Second-order curve fitting coefficient	-	-12	-	-5	$\times 10^{-4}$ ppm/°C <sup>2</sup>	
8-3	First-order curve fitting coefficient	-	-0.35	-	-0.18	ppm/°C	
9	Frequency perturbation	-	-0.5	-	+0.5	ppm	*Measurement condition: Peak-to-peak deviation from the frequency versus temperature curve fit 3th order. Minimum of 1 frequency reading every 2°C over operating temperature range.
10	Temperature Hysteresis						
10-1	Full cycle temperature hysteresis	-	-0.5	-	+0.5	ppm	Difference in freq. measurement at any temperature when undergoing a thermal cycle over the entire operation temperature range from -40 °C to 85 °C.
10-2	Small cycle temperature hysteresis	-	-0.05	-	+0.05	ppm	Difference in freq. measurement at any temperature when undergoing a thermal cycle of a temperature range of 5 °C for each 1 °C test. *Measurement condition: Frequency measured for every 5 °C / Temperature drift rate is 1 °C / min.
11	Frequency slope error over Temperature	-	-0.05	-	+0.05	ppm	at -10 to +60 →C Freq. slope error between measured S curve (fL) data and 3rd order curve fitting data over operation temperature under per 2 °C test.
		-	-0.1	-	+0.1	ppm	at -30 to +85 →C Same as above.
12	Turning Sensitivity	-	-10%	28	+10%	ppm/pF	at CL = 7pF
13	Drive level dependency ( Drive level: 1nW to 100uW)						
13-1	DLD2	-	-	-	2.5	Ω	-
13-2	DLDH2	-	-	-	1.5	Ω	-
13-3	FDDL	-	-	-	2	ppm	-
13-4	FDLDH	-	-	-	0.7	ppm	-
14	G sensitivity	-	-	-	2	$\times 10^{-9}$ /G	Gamma vector of all three axes from 30Hz to 1.5kHz
15	Aging						
15-1	Aging (1 <sup>st</sup> year)	-	-1	-	+1	ppm	-
15-2	Aging (2 <sup>nd</sup> years)	-	-1.5	-	+1.5	ppm	-

15-3	Aging (5 years)	-	-2.5	-	+2.5	ppm	-
15-4	Aging (10 years)	-	-5	-	+5	ppm	-
16	Spurious mode resistance	-	500	-	-	$\Omega$	F nom within +/-1MHz
17	Insulation resistance	-	500	-	-	M $\Omega$	Terminal to terminal insulation resistance also terminal to cover insulation resistance when DC100V $\pm$ 15V is applied.
18	Operable temperature range	-	-30	-	+105	$^{\circ}$ C	-
19	Storage temperature range	-	-40	-	+125	$^{\circ}$ C	-
20	Air-tightness	-	-	-	$1.1 \times 10^{-9}$	Pa m <sup>3</sup> /s	Helium leak detector
21	MSL	-	-	-	-	-	MSL 1
22	ESD(HBM)	-	-	-	1000	V	Guarantee voltage
23	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%	k $\Omega$	at +25 $\rightarrow$ C
3	B const	-	-1%	4250	+1%	K	Evaluated from 25 $^{\circ}$ C to 50 $^{\circ}$ C
4	Rated power (at 25 $\rightarrow$ 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 Label : EXK17B-00422
- 6.5. Reliability assurance Item : EXS30B-01030

#### 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

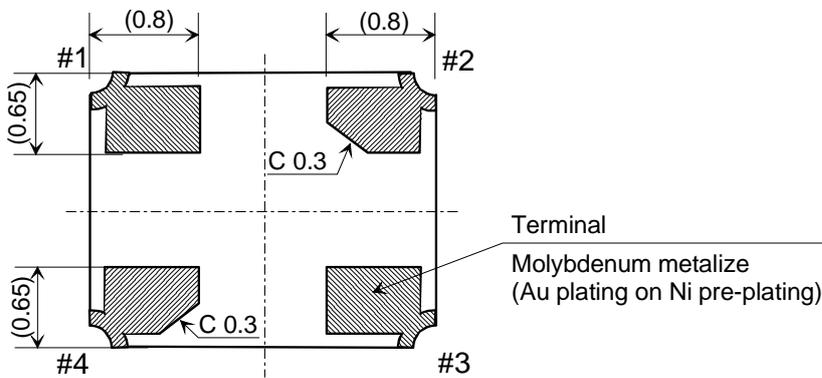
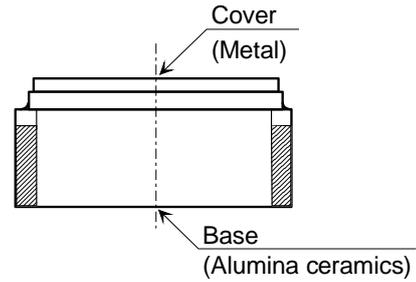
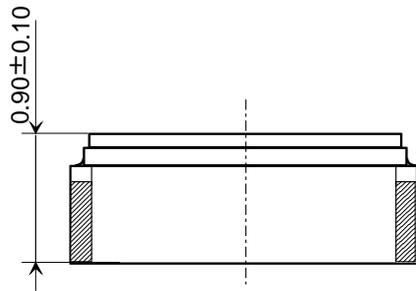
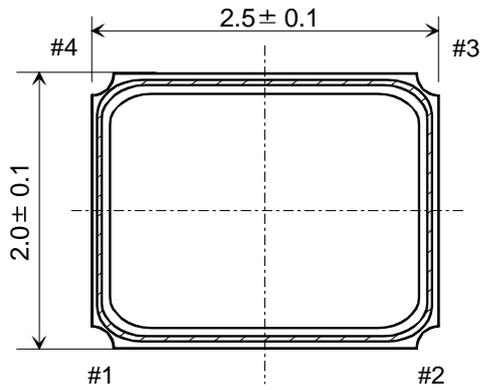
Heating: 230→C or higher, 40 sec

Preheating: 150→C to 180→C, 120 sec

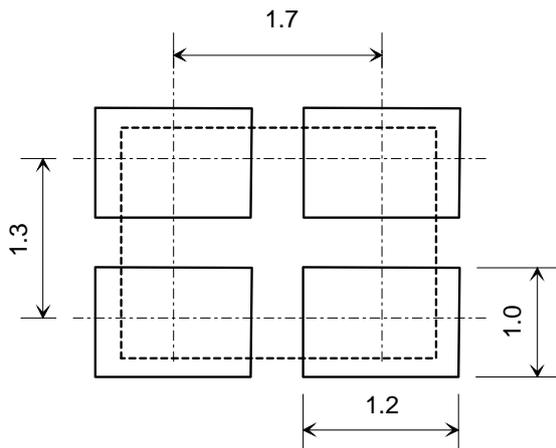
Reflow passage times: three times

##### (2) Manual soldering heat resistance

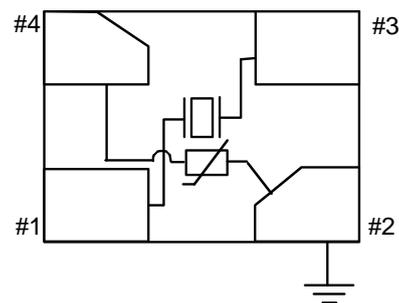
Pressing a soldering iron of 400→C on the terminal electrode for four seconds (twice).



Recommended land pattern



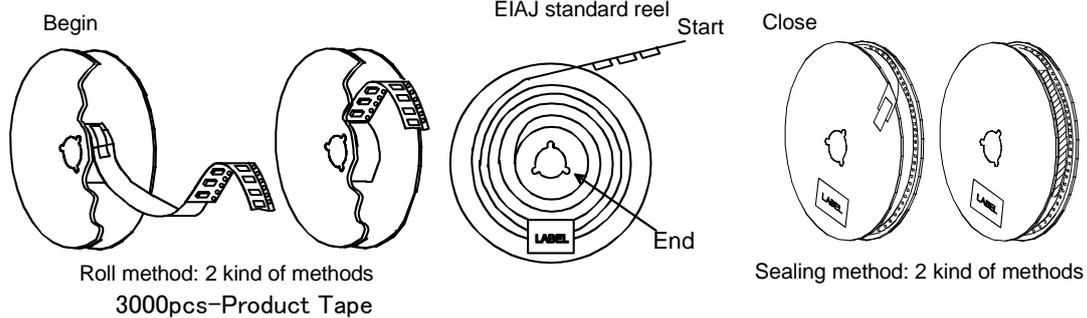
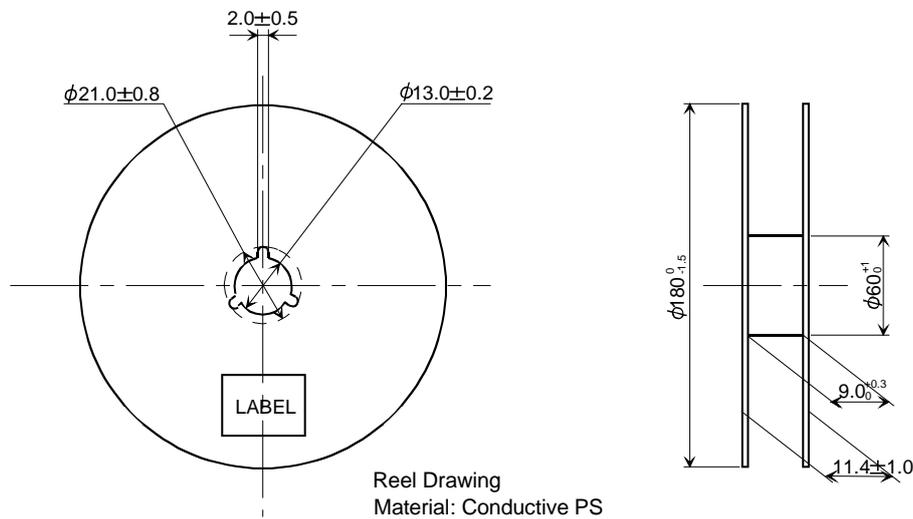
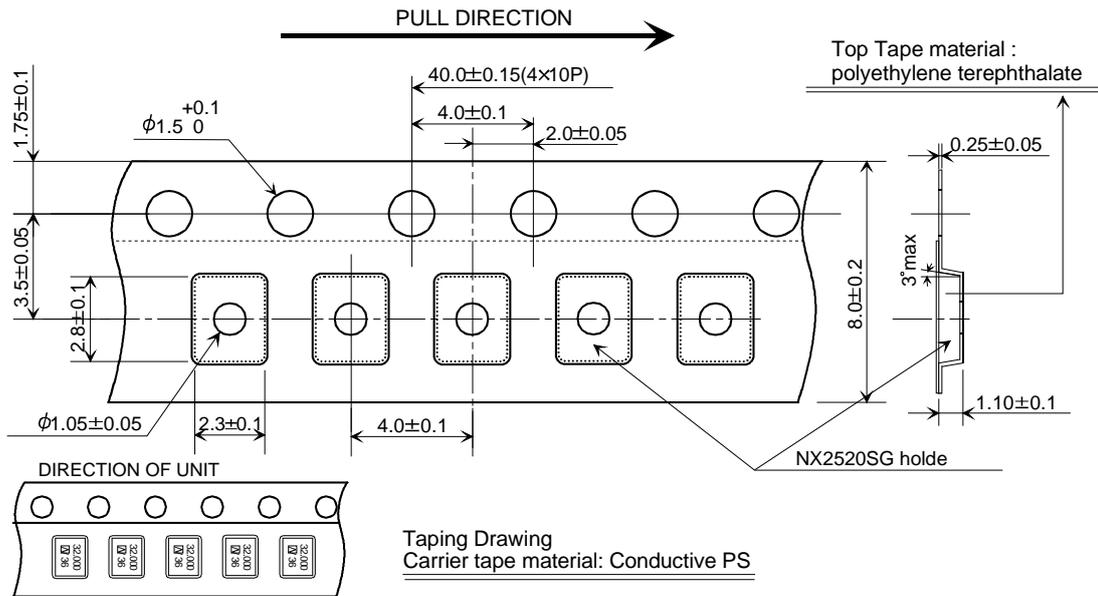
Terminal configuration (TOP VIEW)



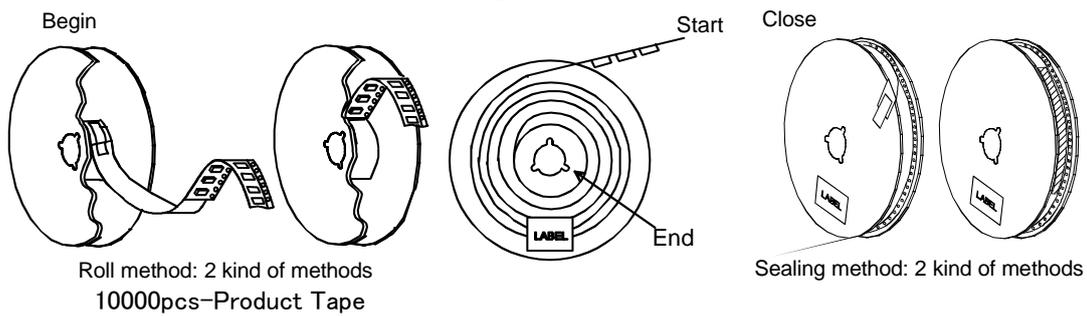
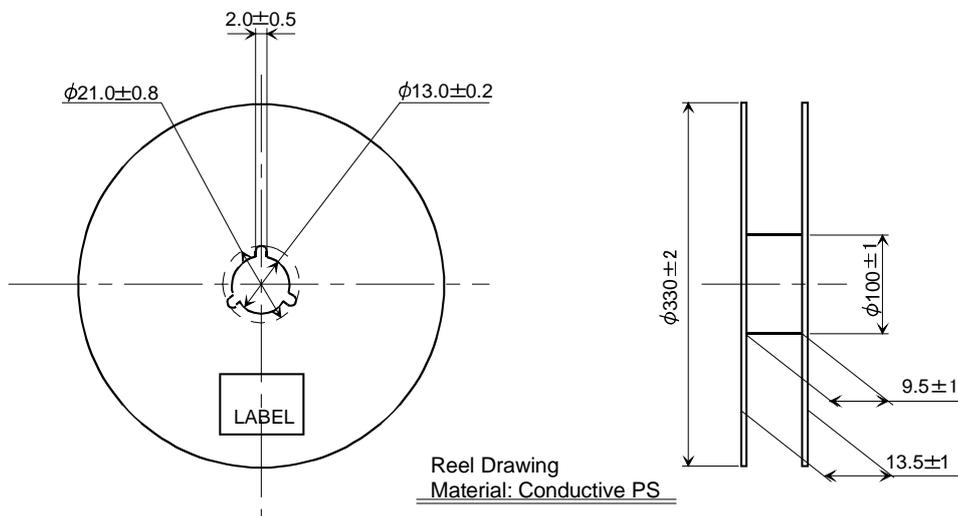
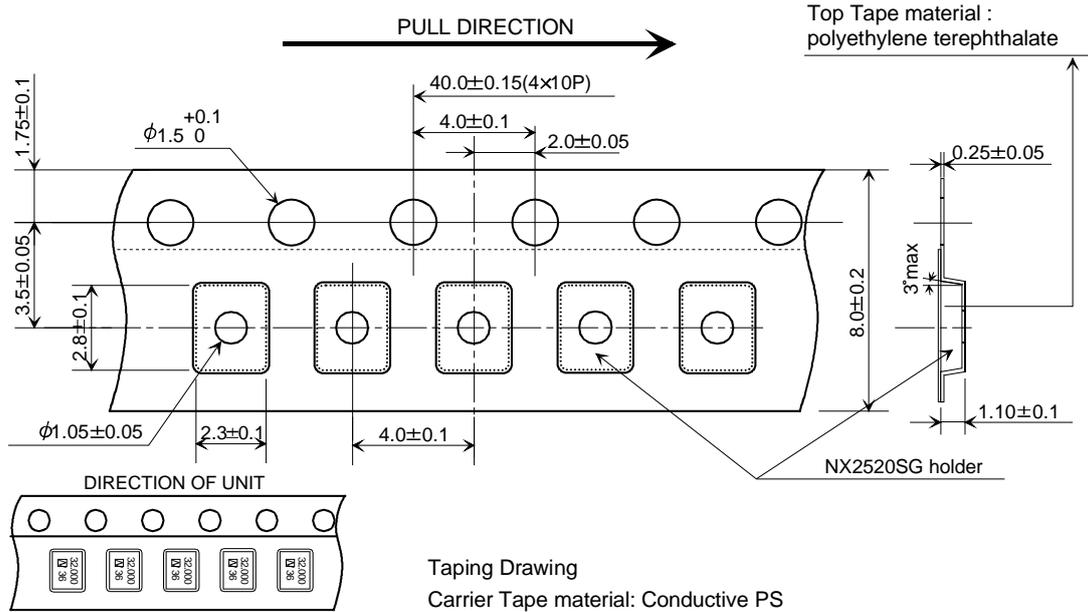
Terminal	Function
#1, #3	XTAL IN-OUT
#4	THERMISTOR IN
#2	THERMISTOR OUT
#2	GND (Connected with cover)

Date of Revise	Charge	Approved	Reason
20. Apr. 2011	M. Wada	Y. Sakuma	Changed to terminal function table
Date	Name	Third Angle Projection	Tolerance
17. Dec. 2010	T. Asamizu	Dimension: mm	---
Date	Name	Title	Scale
17. Dec. 2010	T. Asamizu	<b>NX2520SG Dimension Drawing</b>	---
17. Dec. 2010	I. Miyahara		<b>EXD14B-00482</b>
17. Dec. 2010	K. Ueki		

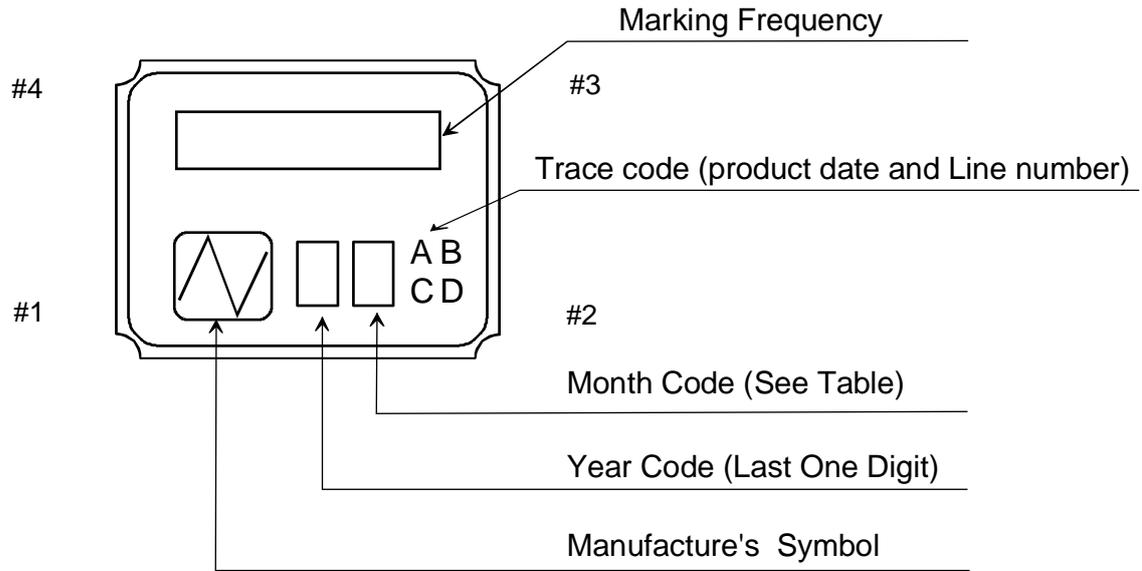
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	Date of Revise	Charge	Approved	Reason	
A	7 Oct. 2016	H. Ohkubo	H. Murakoshi	Addition of roll method and sealing method.	
	Date	Name	Third Angle Projection	Tolerance	
Drawn	06. Jan. 2011	T.Asamizu	Dimension: mm	----	
Designed	06. Jan. 2011	T.Asamizu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



	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		
			<b>NX2520SG Taping and Reel Spec.</b>	<b>EXK17B-00411</b>
				Rev. <b>A</b>



NOTE

1. Month Code Table

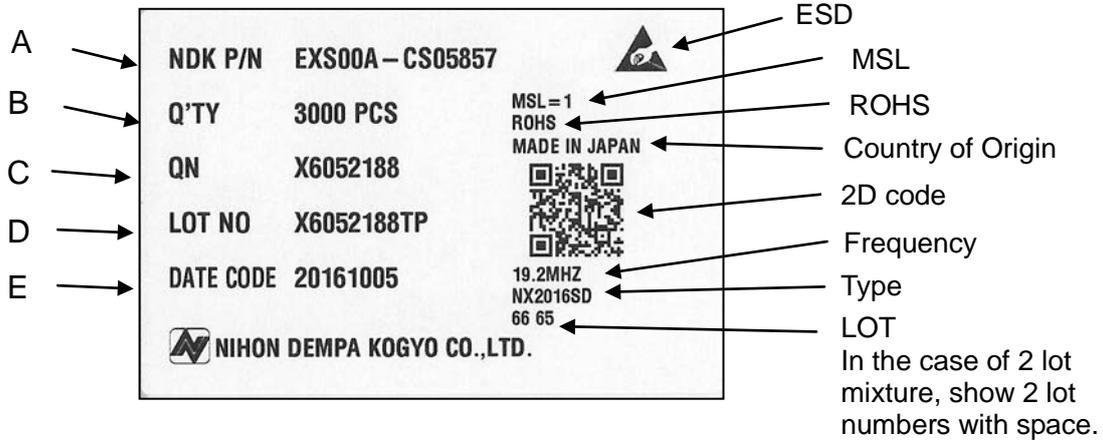
Month	1 Jan.	2 Feb.	3 Mar.	4 Apr.	5 May.	6 Jun.	7 Jul.	8 Aug.	9 Sep.	10 Oct.	11 Nov.	12 Dec.
Month Code	1	2	3	4	5	6	7	8	9	X	Y	Z

\*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 <b>Crystal Holder Marking</b>	Drawing No. <b>EXH11B-00319</b>	Rev.
Checked	14. Feb. 2006	I.Miyahara			A
Approved	14. Feb. 2006	K.Okamoto			

**NIHON DEMPA KOGYO CO., LTD.**

LABEL SIZE: 76▶50mm



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	---	---			
Approved	27. Mar. 2017	I. Miyahara			
Packing Label			<b>EXK17B-00422</b>		---

**NIHON DEMPA KOGYO CO., LTD.**

**Reliability assurance item (1/1)**

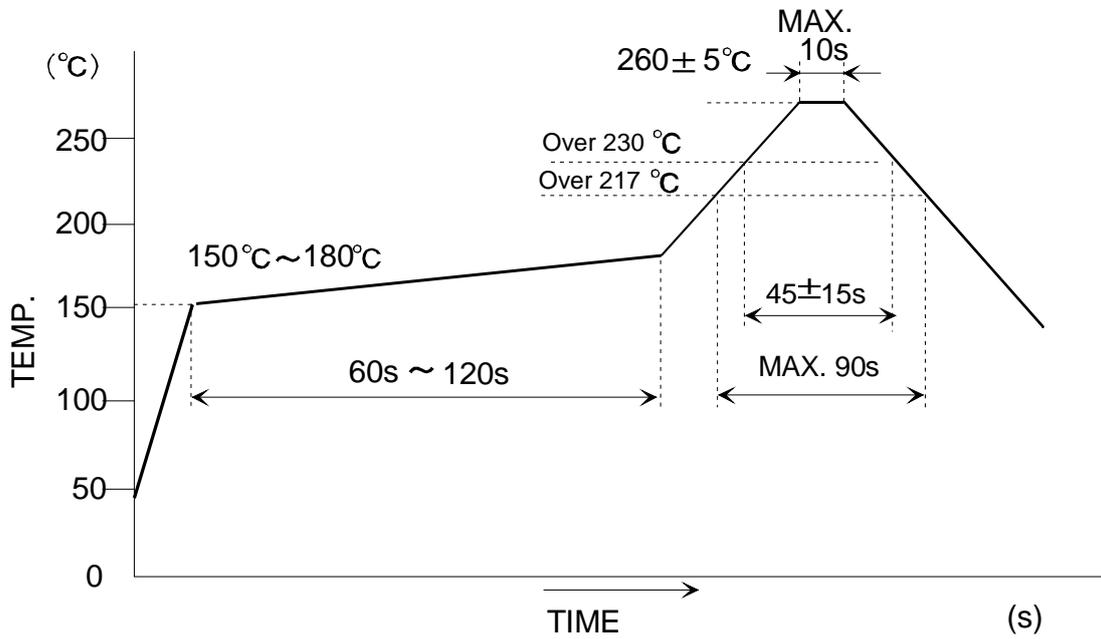
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No.	Test Item	Test Methods	Spec. Code
1	High temperature	Temperature: +125 →C Test time: 1000 Hr.	A, B
2	Cold resistance	Temperature: -40 →C Test time: 1000 Hr.	A, B
3	Humidity	at +85 →C with 80 to 85 % RH for 1000 hr.	A, B
4	Thermal shock (TS)	-40±3→C / +125±3→C 300Cycle/1H per cyc.	A, B
5	Thermal cycle(TC)	-40±3→C / +125±3→C 300Cycle/1H per cyc.	A, B
6	Vibration	Frequency Range	10 to 2000Hz
		Amplitude or Acceleration	1.55 mm or 100m/s <sup>2</sup>
		Test time	3 axis each 2H.
7	Bending	Test board	100mm x 40mm x 1.6mm
		Test time	bending 5mm (1mm/s) , Time 5 sec
8	Shock 1	Shock	Device are put on the weight of 200 g onto concrete..
		Height	1.8 m
		Drop times	3 times for each six side derrection and four corner. Totally 30 drops.
9	Shock 2	Shock	Device are put on the weight of 200g and concrete.
		Height	1.0 m
		Drop times	300 drops . 12drops/ min.
10	Blank Shear Test	Pull the center of crystal blank vertically.	---
11	Reflow resistance	Temperature cycle as shown in (Fig2.) for 3 cycle.	A, B
12	Air Tightness	Helium leak test.	C
13	瞬停 Test	Devices are shocked to half sine wave (10,000G) six mutually perpendicular axis each 3 times.	D

Specification code	Specification
A	↔F/F ↑ ← 2.0 ppm ↔Cl ↑ ← 20 % or ←15 _ greater value
B	Thermistor resistance: ↔R/R ↑ 5%
C	No leak
D	No 瞬停

## 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→C ← 5 →C (10sec. max.)
- D: 217 →C Min. (90 sec. max.)