

SPECIFICATION

Customer:

NDK Reference: NX2016SA 52.000 MHz EXS00A-CS07103

Item: Crystal Unit

Type: NX2016SA

Nominal Frequency: 52.000 MHz

Customer's Spec. No.: ---

NDK Spec. No.: EXS00A-CS07103

Receipt

Revision Record						
Rev.	Date	Items	Contents	Approved	Checked	Drawn
---	01.Aug.2013	Issue	---	H.Fujii	---	M.Wada
A	01.Oct.2015	4.4 Frequency versus temperature characteristics 4.13 Operating temperature range	Add: -40~+85°C	I.Miyahara	---	K.Tsukumo
B	5.Apr.2018	4.4 Frequency versus temperature characteristics	Add: +/-20 ppm -30~-20°C	I.Miyahara	---	K.Tsukumo

1. Customer's Spec. No. : ---
2. NDK Spec. No. : EXS00A-CS07103
3. Type : NX2016SA
4. Electrical Specifications

	Parameters	SYM.	Electrical Spec.				Notes
			min	typ	max	Units	
1	Nominal frequency	f _{nom}	52.000			MHz	
2	Overtone order	-	Fundamental			-	
3	Frequency tolerance	-	-10	-	+10	ppm	at +25°C
4	Frequency versus temperature characteristics	-	-10	-	+10	ppm	at -20 to +70°C The reference temperature shall be 25°C
		-	-20	-	+20	ppm	at -30 to -20°C The reference temperature shall be 25°C
		-	-30	-	+30	ppm	at -40 to +85°C The reference temperature shall be 25°C
5	Equivalent resistance	-	-	-	50	Ω	IECπ-network / Series
6	Shunt Capacitance	C ₀	-30%	0.80	+30%	pF	Cover grounded
7	Motional Capacitance	C ₁	-30%	3.05	+30%	fF	Cover grounded
8	Motional Inductance	L ₁	-30%	3.10	+30%	mH	Cover grounded
9	Pulling sensitivity	PS	-30%	13.05	+30%	ppm/pF	CL=10pF/ Cover 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	-	10	-	pF	IECπ-network
11	Level of drive	-	-	10	100	μW	IECπ-network
12	Insulation resistance	-	500	-	-	MΩ	Terminal to terminal insulation resistance also terminal to cover insulation resistance must be 500MΩ (min) when DC100V ±15V is applied.
13	Operating Temperature range		-40	-	+85	°C	
14	Storage temperature range	-	-40	-	+85	°C	
15	Air-tightness	-	-	-	1.1 x10 ⁻⁹	Pa m ³ /s	Helium leak detector
16	Recommended oscillation margin	-	600	-	-	MΩ	When the circuit does not have enough value as above, please contact us.
17	G-sensitivity	-	< 2ppb/G, When using NDK standard osc. circuit.				

5. Examination results document

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

6. Application drawing

- 6.1 External dimension : EXD14B-00467
- 6.2 Taping and reel figure : EXK17B-00200
- 6.3 Holder marking : EXH11B-00319
- 6.4 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

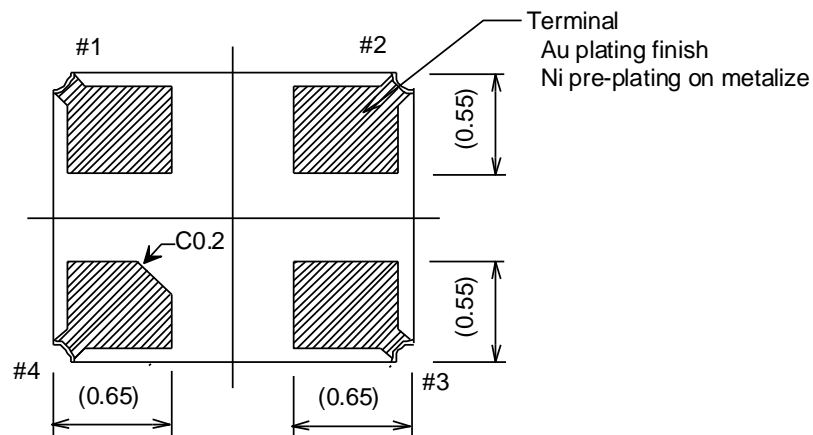
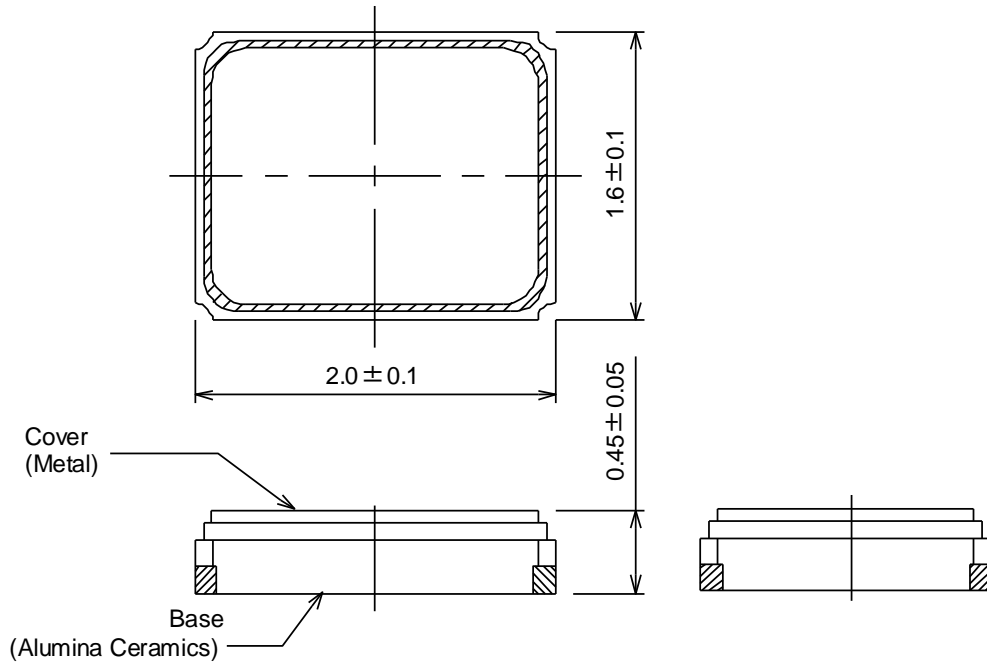
Heating: 230°C or higher, 40 sec

Preheating: 150°C to 180°C, 120 sec

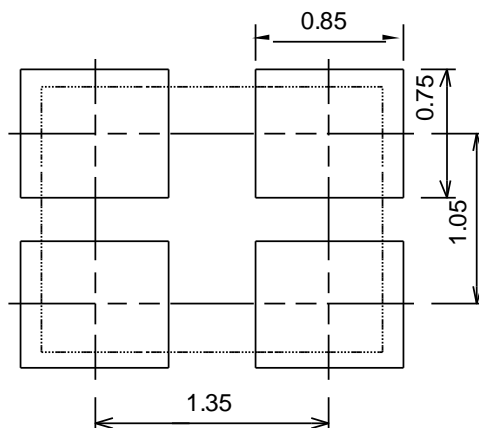
Reflow passage times: twice

(2) Manual soldering heat resistance

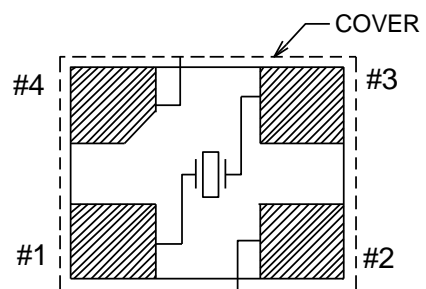
Pressing a soldering iron of 400°C on the terminal electrode for four seconds (twice).



LAND PATTERN (TYPICAL)



PIN CONNECTION (TOP VIEW)



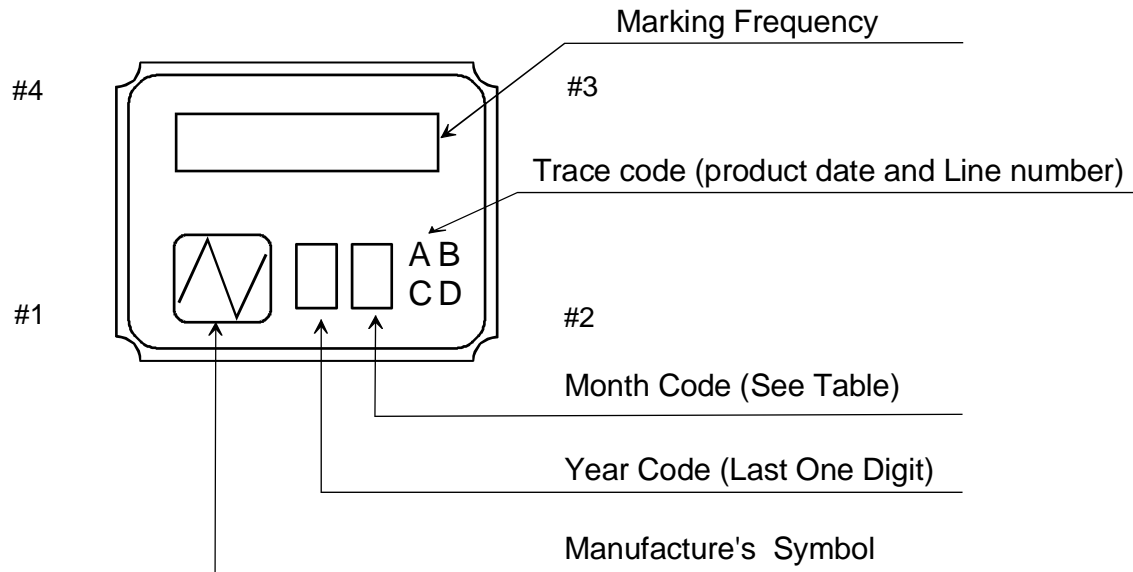
TERMINAL

#1,#3 : XTAL

#2,#4 : GND(CONNECTION WITH COVER)

	Date of Revise	Charge	Approved	Reason	
A	15.Feb.2011	H.Ouchi	K.Ueki	Index position correction.	
	Date	Name	Third Angle Projection	Tolerance	Scale
Drawn	19.Oct.2009	M.Harada	Dimension:mm	----	--/--
Designed	19.Oct.2009	M.Harada	Title NX2016SA Dimension Drawing	Drawing No. EXD14B-00467	Rev.
Checked	---	---			A
Approved	20.Oct.2009	K.Ueki			

NIHON DEMPA KOGYO CO., LTD.



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	
Checked	14. Feb. 2006	I.Miyahara			Rev. A	
Approved	14. Feb. 2006	K.Okamoto				

NIHON DEMPA KOGYO CO., LTD.

Reliability assurance item

(page: 1/1)

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	$\Delta f/f \leq \pm 3 \text{ ppm}$ $\Delta C/I \leq \pm 15 \% \text{ or } 5 \Omega \text{ make use larger value}$
B	The electrodes should be covered by a new solder at least 90% of immersed area.