



CONFIDENTIAL



SPECIFICATION

Customer: DIGI-KEY ELECTRONICS. _____

Item:	Crystal Unit
Type:	NX2016SA
Nominal Frequency:	24.305 MHz
Customer's Spec. No.:	---
NDK Spec. No.:	EXS00A-CS08560

Receipt

Revision Record						
Rev.	Date	Items	Contents	Approved	Checked	Drawn
---	04.Dec.2023	Issue	---	I.Miyahara	Y.Takaki	N.Kobayashi

1. Customer's Spec. No. : ---
2. NDK Spec. No. : EXS00A-CS08560
3. Type : NX2016SA

4. Electrical Specifications

	Parameters	SYM.	Electrical Spec.				Notes
			min	typ	max	Units	
1	Nominal frequency	f_{nom}	24.305			MHz	
2	Overtone order	-	Fundamental			-	
3	Frequency tolerance	-	-10	-	+10	$\times 10^{-6}$	at + 25°C
4	Frequency versus temperature characteristics	-	-19	-	+19	$\times 10^{-6}$	at -40~+85°C The reference temperature shall be +25°C
5	Frequency Aging(at +25°C)	-	-5	-	+5	$\times 10^{-6}$	5years
			-15	-	+15	$\times 10^{-6}$	15years
6	Equivalent resistance	-	-	-	80	Ω	IEC PI-network/Series
7	Shunt capacitance	C_0	-	-	1.5	pF	Not grounded
8	Motional capacitance	C_1	-30%	1.4	+30%	fF	Not grounded
9	Pulling Sensitivity	S	-30%	13.8	+30%	$\times 10^{-6}/pF$	at $C_L=8pF$ /Not grounded $S(\times 10^{-6}/pF)=C_1/\{2*(C_0+C_L)^2\}$
10	Load capacitance	C_L	-	7	-	pF	IEC PI-network
11	Level of drive	-	-	10	200	μW	
12	Operating temperature range	T_{opr}	-40	-	+85	°C	
13	Storage temperature range	T_{str}	-40	-	+85	°C	
14	Insulation resistance	-	500	-	-	M Ω	When terminal to terminal and terminal to cover were applied at DC100V $\pm 15V$.
15	Air-tightness	-	-	-	1.1×10^{-9}	Pa m ³ /s	

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-00317
- 6.4 Reliability assurance Item : EXS30B-00250

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 Since the crystal unit is a passive component, it is important to have appropriate circuit conditions.

Please be sure to check the circuit conditions before using the crystal units, and ensure the necessary circuit margin, and confirm that the desired frequency is output. Moreover, please check the circuit conditions when using an existing crystal unit for another model or board.

If the circuit conditions are not appropriate, there is a risk of oscillation stop or frequency deviation.

7-3 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 PIEZOELECTRIC 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.

7-4 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

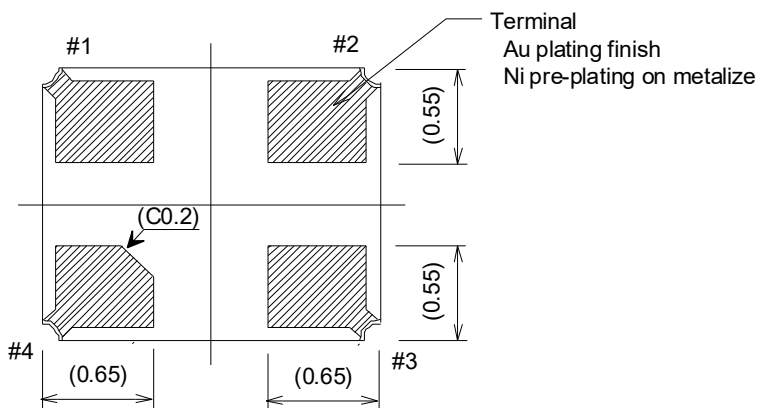
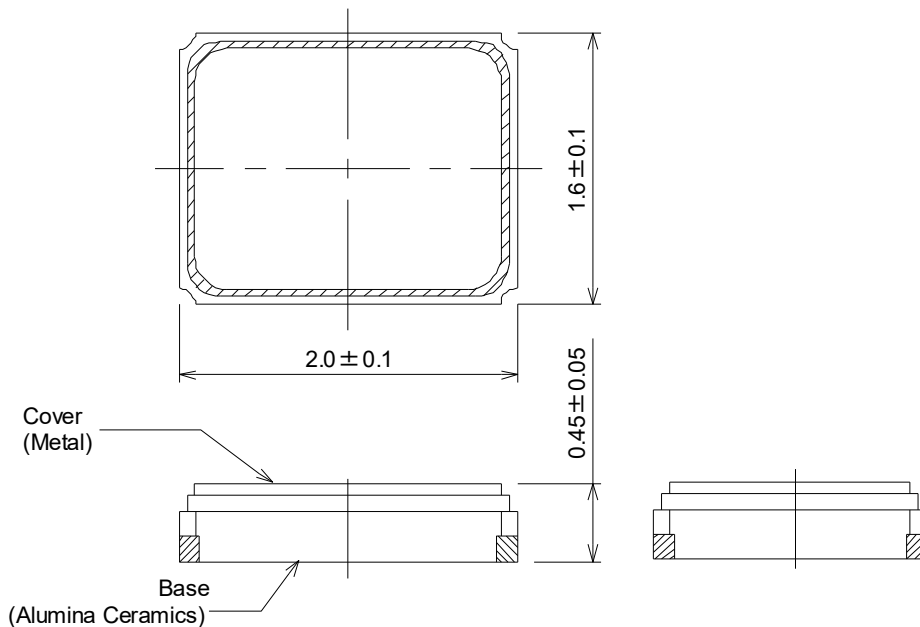
Heating: 230°C or higher, 40 sec

Preheating: 150°C to 180°C, 120 sec

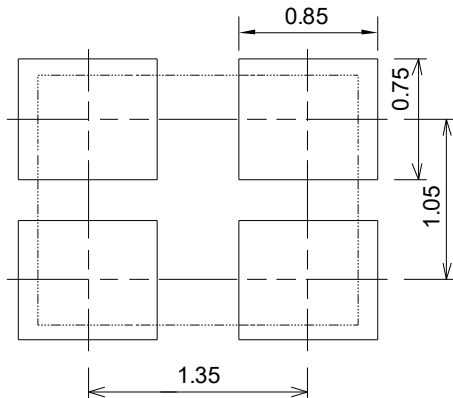
Reflow passage times: twice

(2) Manual soldering heat resistance

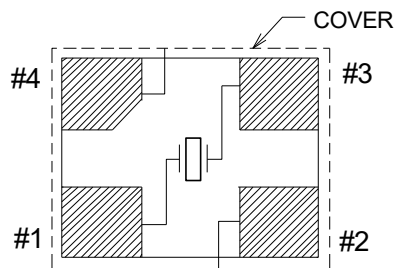
Pressing a soldering iron of 400°C on the terminal electrode for four seconds (twice).



LAND PATTERN (Recommended)



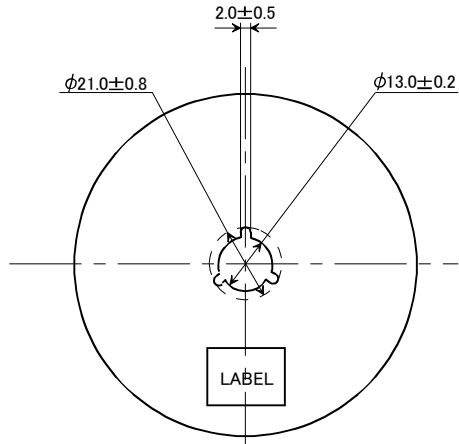
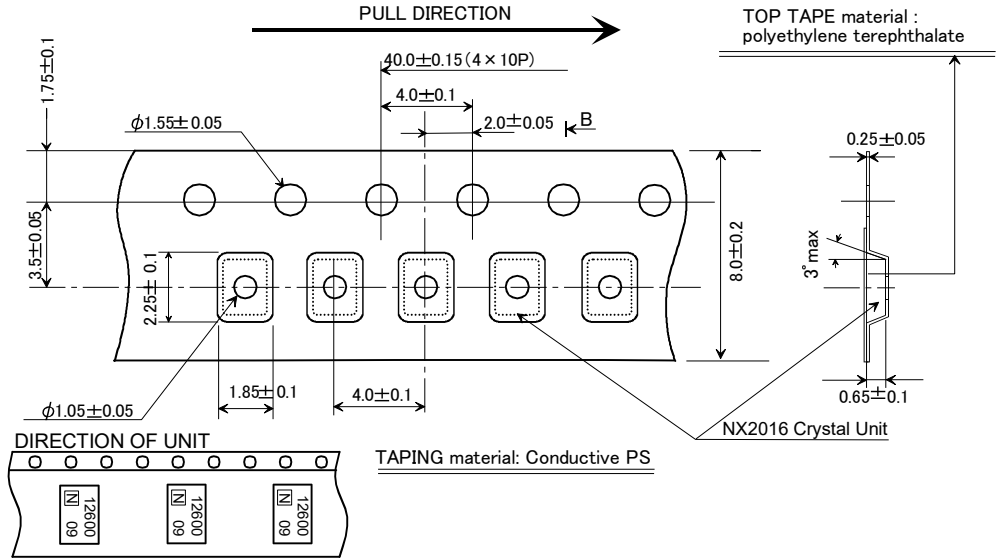
PIN CONNECTION (TOP VIEW)



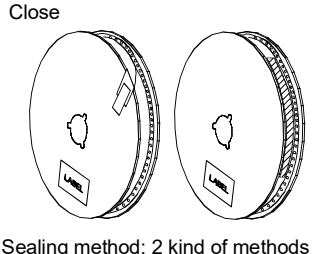
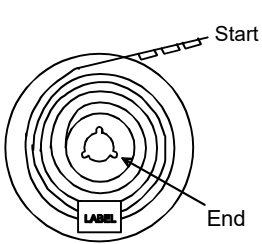
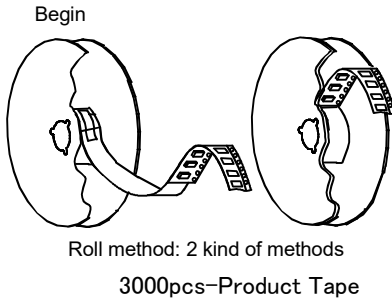
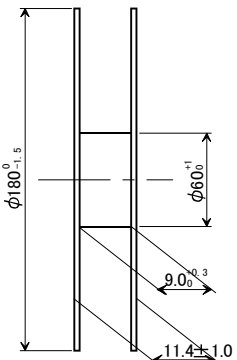
TERMINAL
 #1,#3 : XTAL
 #2,#4 : GND(CONNECTION WITH COVER)

	Date of Revise	Charge	Approved	Reason
C	24.Sep.2019	R.Omomo	K.Komada	Revise Land pattern to Recommended.
Drawn	Date	Name	Third Angle Projection	Tolerance
19.Oct.2009	M.Harada	Dimension:mm	----	Scale
19.Oct.2009	M.Harada	Title	Drawing No.	Rev.
---	---	NX2016SA	EXD14B-00467	C
20.Oct.2009	K.Ueki	Dimension Drawing		

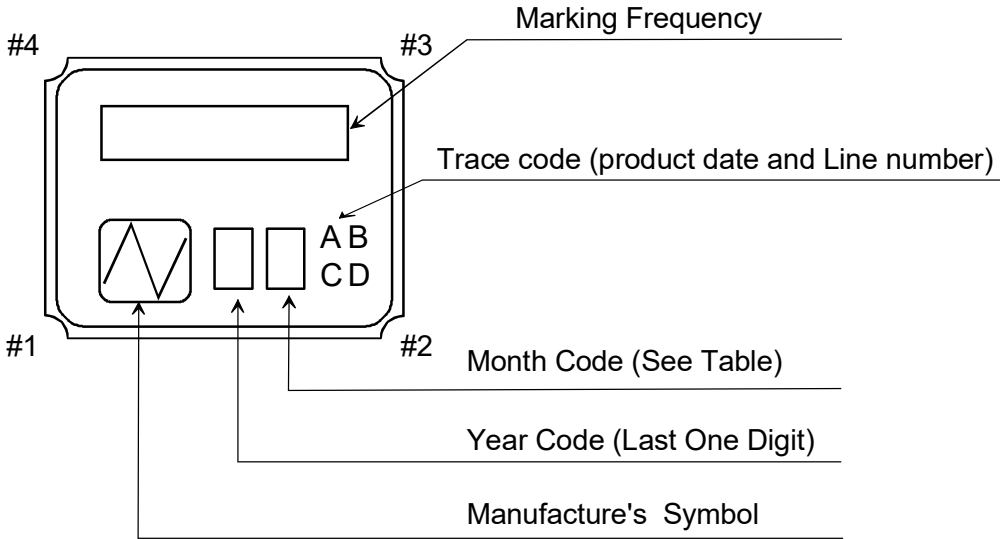
NIHON DEMPA KOGYO CO., LTD.



Reel material: Conductive PS
EIAJ standard reel



	Date of Revise	Charge	Approved	Reason
B	3 Oct. 2016	H. Ohkubo	H. Murakoshi	Addition of roll method and sealing method.
Drawn	Date	Name	Third Angle Projection	Tolerance
Designed	12.Apr.2005	K.Oguri	Dimension:mm	Scale
Checked	-----	-----	Title	Drawing No.
Approved	12.Apr.2005	K. Miyashita		
				Rev.
				B



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	10. Dec 2014	Y.Sakurai	H.Kobayashi	Added terminal number information.	
	Date	Name	Third Angle Projection	Tolerance	
Drawn	16.Jan.2006	I.Miyahara	Dimension:mm	Scale	
Designed	16.Jan.2006	I.Miyahara	Title Crystal Holder Marking	Drawing No. EXH11B-00317	
Checked	16.Jan.2006	---			Rev. D
Approved	16.Jan.2006	K.Okamoto			

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 $\Delta C/C \leq \pm 15$ % or 5 Ω make use larger value
	The electrodes should be covered by a new solder at least 90% of immersed area.