



SPECIFICATION

Customer: DJI CREATIVE

Item:	Quartz Crystal Controlled Oscillators
Type:	NT2016SA
Nominal frequency:	38.4 MHz
Customer's Spec. No.:	---
NDK Spec. No.:	END4848D

Receipt

Revision Record						
Rev.	Date	Items	Contents	Approved	Checked	Drawn
---	Aug. 17. 2021	Issue	---	K.Koyama	S.Kawahara	S.Kawahara

1. Type NT2016SA

2. Maximum Rating

	Item	Rating	unit
1	Supply Voltage	-0.6 to +4.6	V
2	Storage temp. range	-40 to +105	°C

3. Electrical specification

	Parameters	Electrical Spec.				Notes
		Min.	Typ.	Max.	Units	
1	Nominal frequency		38.4		MHz	
2	Supply voltage (V_{cc})	+1.7	+1.8	+1.9	V	(-Earth)
		+2.3	+2.4	+2.5	V	
		+2.7	+2.8	+2.9	V	
3	Current consumption			1.7	mA	
4	Output voltage	0.7		1.9	V_{p-p}	Clipped sine wave (DC-Coupling)
5	Operating temp. range	-40		+105	°C	
6	Load impedance (resistance part)	9	10	11	k Ω	
7	Load impedance (parallel capacitance)	9	10	11	pF	
8	DC-cut capacitor					DC-cut capacitor of output is not put in TCXO. Please add DC-cut capacitor (1000 pF) in output line.
9	Frequency stability					
	1. Overall frequency tolerance	-3.6		+3.6	ppm	Total of Para.3.9.2(-30 to +85 °C), 3.9.3 to 3.9.6
	2. Frequency /Temperature characteristics	-0.6		+0.6	ppm	-30 to +85 °C
		-1.0		+1.0	ppm	-40 to -30 °C
		-10.0		+10.0	ppm	+85 to +105 °C
						Based on frequency at +25 \pm 2 °C
	3. Frequency/Voltage coefficient	-0.05		+0.05	ppm	+1.8 V \pm 0.1 V (+2.4 V \pm 0.1 V or +2.8 V \pm 0.1)
4. Frequency/Load coefficient	-0.05		+0.05	ppm	(10 k Ω //10 pF) \pm 10 %	
5. Frequency tolerance	-1.4		+1.4	ppm	at +25 \pm 2 °C, after 2 times reflow soldering, based on nominal frequency	
6. Long-term frequency stability	-1.5		+1.5	ppm	3 years (at +25 \pm 2 °C)	
10	Symmetry	46.5		53.5	%	Based on GND after DC removal.
11	Start up time			1.0	ms	More than 90 % of final output voltage
12	Phase noise			-127	dBc/Hz	@ 1 kHz offset (-30 to +85 °C)
				-126	dBc/Hz	@ 1 kHz offset (-40 to +105 °C) (T.B.D)

4. Reflow soldering

Conditions of temperature profile (Refer to Fig.1)
Soldering peak temp. +260 °C

5. Marking

- (1) Lot No.
- (2) Manufacture Name (NDK symbol mark)
- (3) Nominal frequency (MHz)
- (4) Trace code

6. Inspection parameters

Para 3.1, 3.3, 3.4, 3.9.2, 5, 10.2 are inspected.
The other parameters are guaranteed to be within specified characteristics by NDK design.
Inspection data is not submitted for mass production lot. But only if requested, a copy of first lot production data will be submitted.

7. Precaution in the storage

When storing the product in high temperature and high humidity condition for a long time, product characteristics (solder ability etc.) and packaging condition may be deteriorated.
The product storage deadline is 1 year after delivery in unopened state. Please use within 1 year.
If you exceed 1 year please check the product characteristics etc, please use.
Please keep the oscillator under below condition.

MSL		After taking out of dry bag
2	Temperature	+30 °C max.
	Humidity	60 % max.
	Period	1 year max. *

(table)

* Please pack the oscillator into used dry bag with a desiccant and seal it up by heat sealer etc.
In case the heat sealer is not available, sealing up with cellophane tape or a vinyl tape will do.

8. Frequency establishment condition

When output frequency is set, we suppose to have the ground pattern under the oscillator.

9. Washing

Not available for washing.

10. Application drawing

- 10.1 Reliability assurance item
ETS30B-00399
- 10.2 Dimension of External
ETD14B-01324A
- 10.3 Packing
ETK17B-00525
- 10.4 Land pattern
ETD15B-00020A
- 10.5 Marking
ETH11B-00443B

11. Notes on use

11.1 This product cannot be used for automotive applications.

We have other products available for automotive applications so please contact us.

11.2 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.

11.3 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, EFFECT OF HEAT GENERATION OF PARTS USED ETC.) THAT CANNOT 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 A 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 EFFICIENTLY EVALUATE AT A SAMPLE STEP WHEN YOU USE RESIN MOLD.

(5) OPERATION IN HIGH HUMIDITY OR CONDENSATION CONDITIONS WILL AFFECT THE CHARACTERISTICS. IF SUCH ENVIRONMENT USE, PLEASE TAKE MEASURES AGAINST WATERPROOF.

(6) WHEN PERFORMING IMPROPER HANDLING THAT EXCEEDS THE GUARANTEED RANGE.

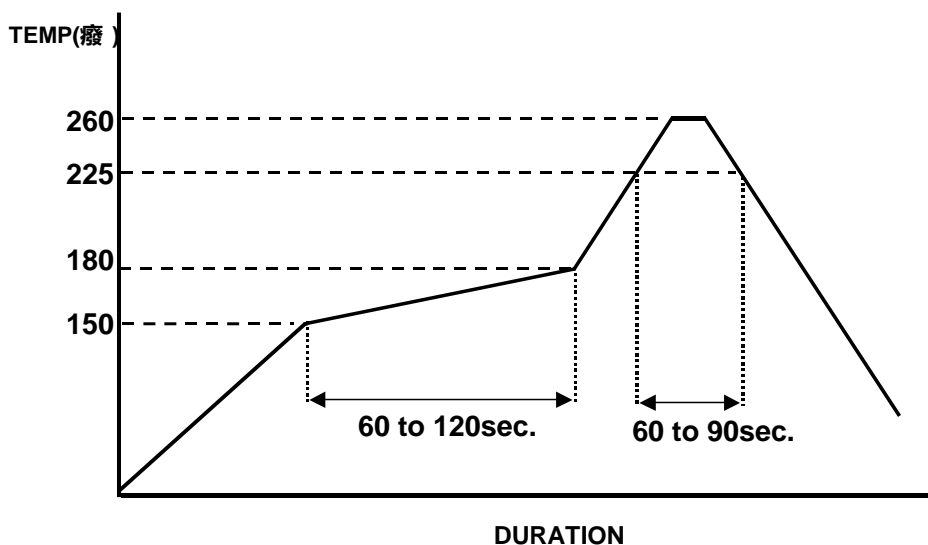
12. Other Requests

- 12.1 Please use this specification only for confirmation of the specification of this product.
- 12.2 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.
- 12.3 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 CANNOT ASSUME THE RESPONSIBILITY, PLEASE UNDERSTAND.

13. 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
 - Heating: +225 °C or higher, 90 sec
- (2) Manual soldering heat resistance
 - Pressing a soldering iron of +350 ±5 °C on the terminal electrode for 3 ±1 seconds.
- (3) Hot air heat resistance
 - Blow hot air of +350 ±5 °C on the product for 3 ±1 seconds.



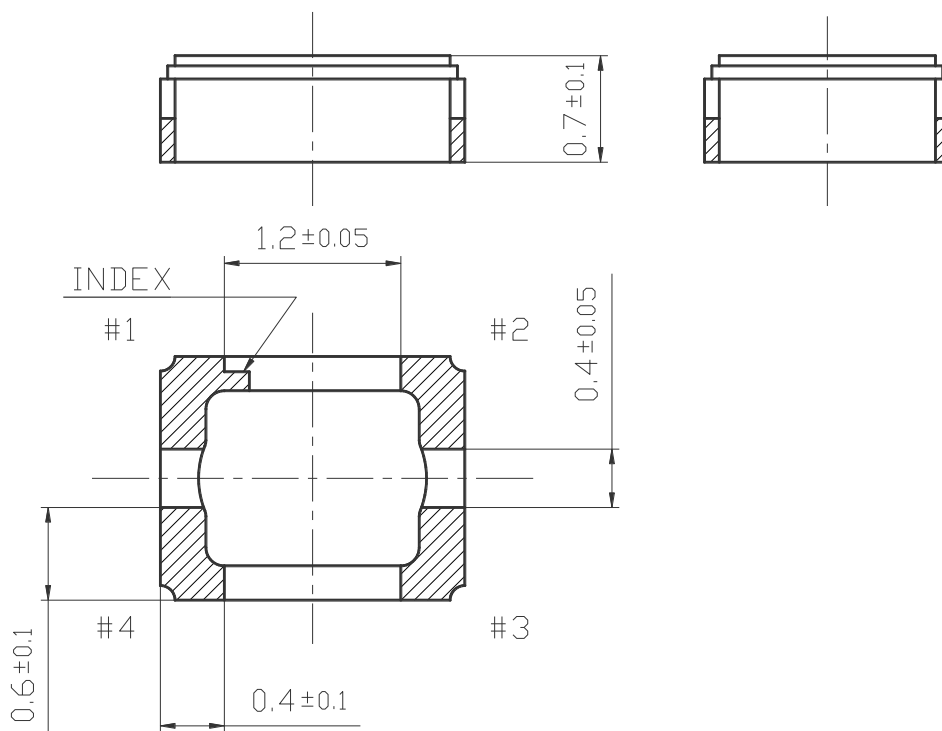
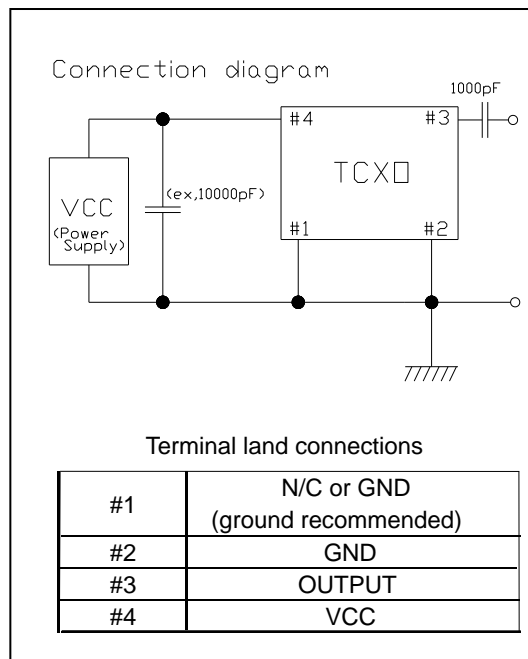
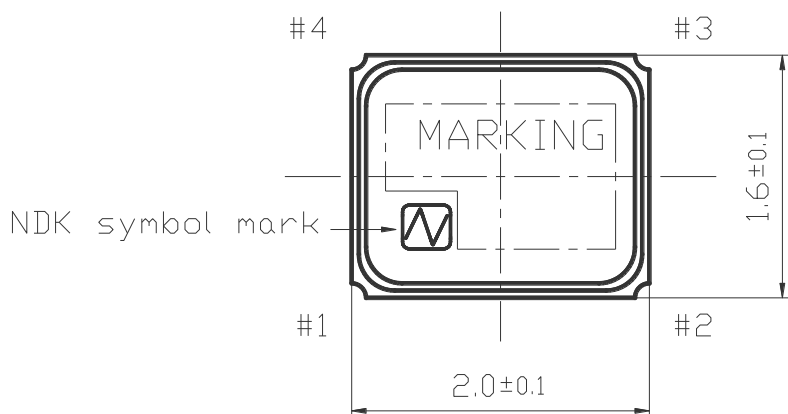
(Fig.1)

Reliability assurance item

(page: 1/1)

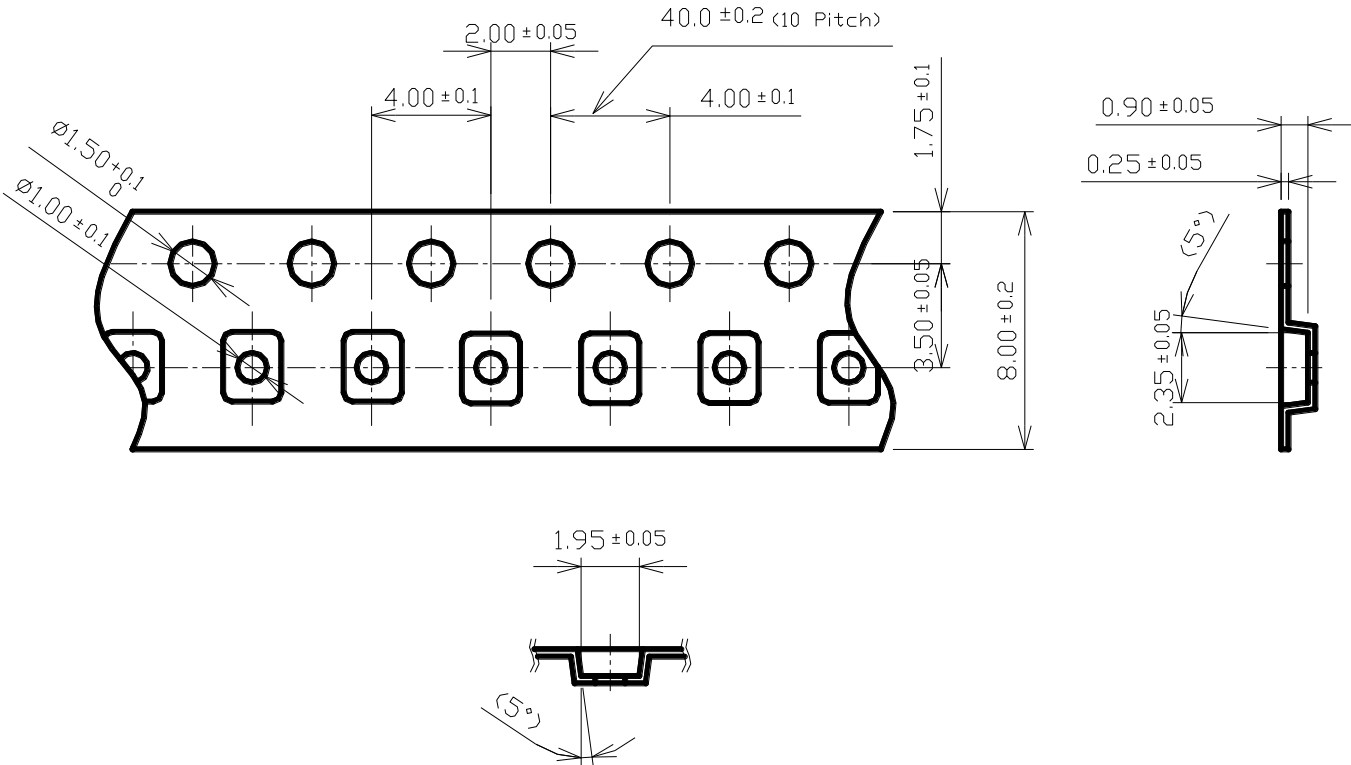
No.	Test Item	Test Methods	Specification Code
1	Vibration	5 to 26Hz: 1.52mm (total amplitude) 26 to 500Hz: 19.6m/s ² 20 minutes per 1 cycle. 2 hours for each 3 planes.	A
2	Shock	Half sine wave 6ms, 980 m/s ² . 3 times for each 3 planes.	A
3	Drop Test	Drop freely on the concrete from the height of 150cm With jig(150g). 3time for each 6 planes.	A
4	Humidity	+60°C, 95% RH for 48H. And normal temperature, with normal humidity for 24H.	A

Specification code	Specification
A	After the test, shall meet electrical specification.



	Date of Revise	Charge	Approved	Reason	
A	24.Oct.2013	C.Sakurai	A.Konda	change of Hatching and connection diagram (I According to EEN01A-0005)	
	Date	Name	Third Angle Projection	Tolerance	Scale
Drawn	8.Oct.2009	M.Kashiwamura	Dimension:mm	+/- 0.2	20 / 1
Designed	8.Oct.2009	Y.Kanehira	Title Dimension of External	Drawing No. ETD14B-01324	Rev. A
Checked	8.Oct.2009	K.Moriya			
Approved	8.Oct.2009	K.Moriya			

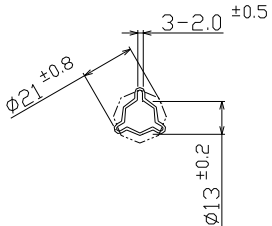
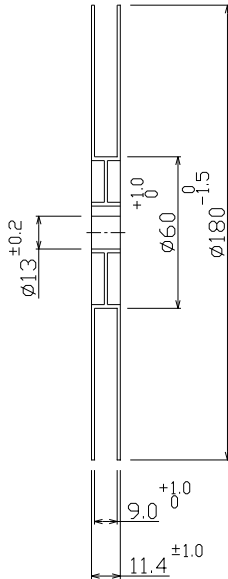
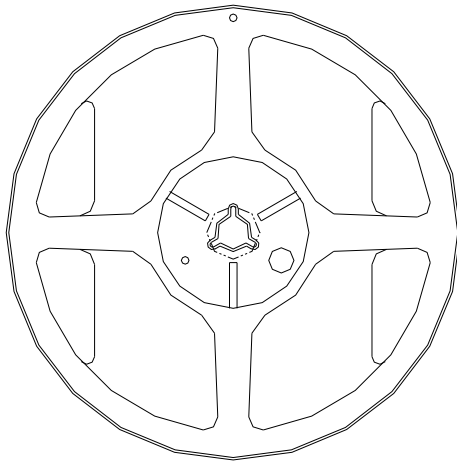
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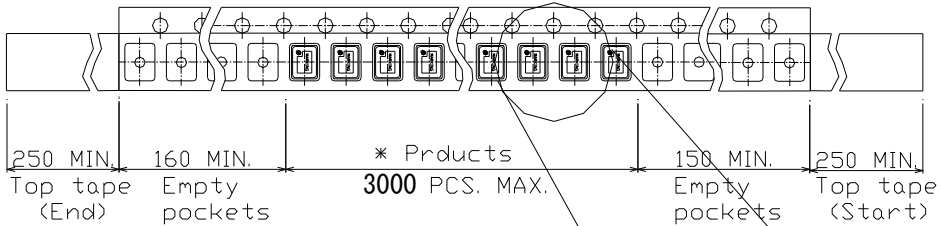
	Embossed carrier tape	Top cover tape
Materials	PS	PET + PE + Adhesive layer
Disposition	Antistatic	Antistatic

Date of Revise	Charge	Approved	Reason		
A					
	Date	Name	Third Angle Projection	Tolerance	Scale
Drawn	3. Sep. 2020	S. Kawahara	Dimension:mm	-----	-----
Designed	3. Sep. 2020	S. Kawahara	Title	Drawing No.	Rev.
Checked	3. Sep. 2020	S. Kawahara			-
Approved	3. Sep. 2020	T. Hosoda			
			Packing	ETK17B-00525 (1/3)	

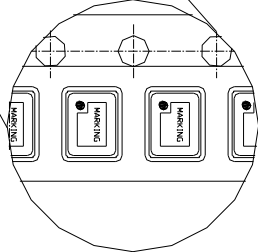
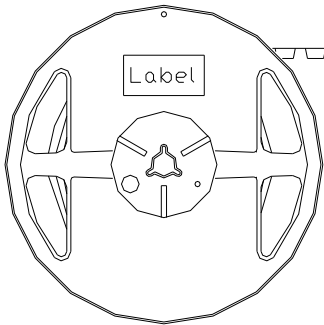
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Materials : PS
Disposition : Antistatic



* There are no vacant pockets for this area.

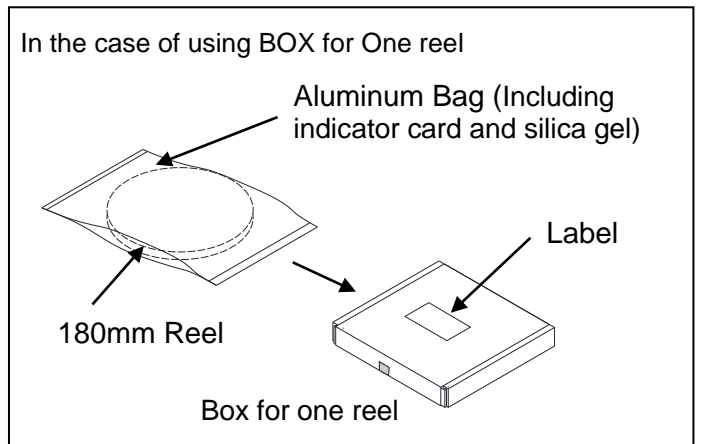
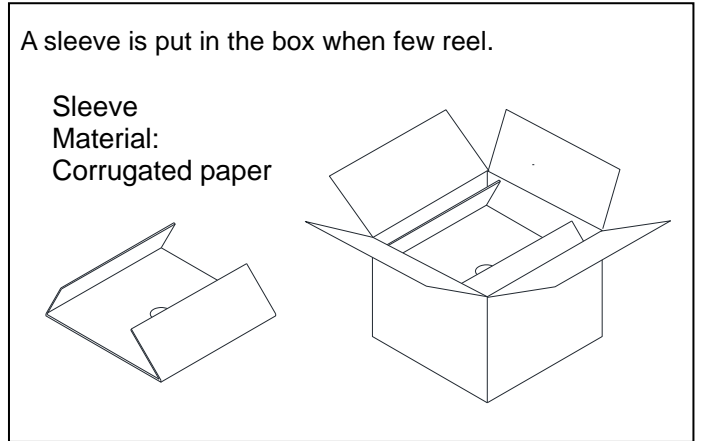
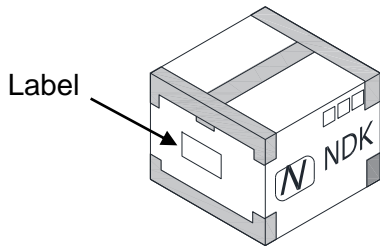
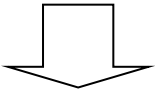
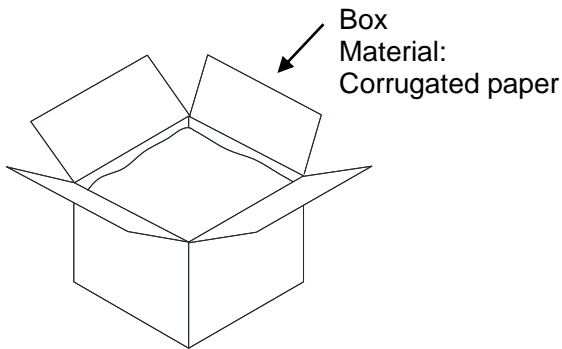
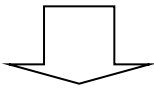
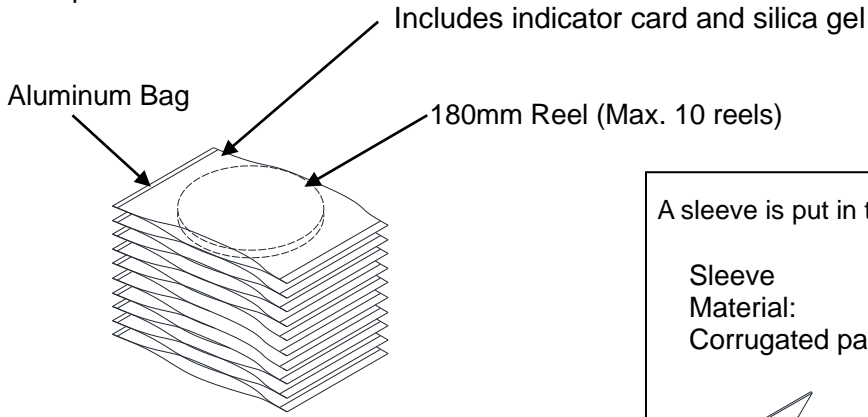


	Date of Revise	Charge	Approved	Reason
A				
	Date	Name	Third Angle Projection	Tolerance
Drawn	3. Sep. 2020	S. Kawahara	Dimension:mm	-----
Designed	3. Sep. 2020	S. Kawahara	Title	Drawing No.
Checked	3. Sep. 2020	S. Kawahara		
Approved	3. Sep. 2020	T. Hosoda		
			Packing	ETK17B-00525 (2/3)
				Scale

				Rev.
				-

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-3000pcs. Max. /Reel



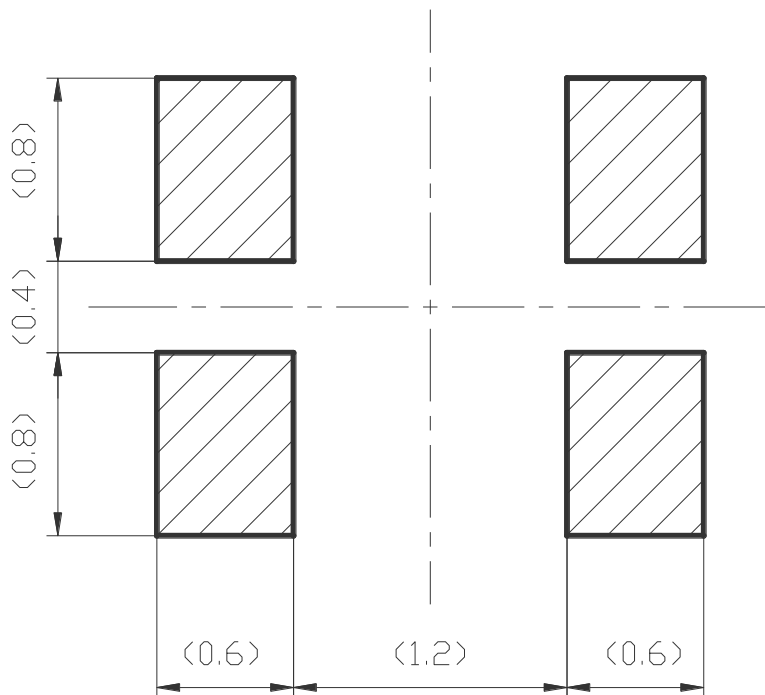
Box size (mm)

Type	L	W	H
Big box	200	200	165
Middle box	200	200	105
Box for one reel	195	215	35

*Big Box: (Max. 10 reels), Middle Box: (Max. 5 reels) or BOX for One reel is used accordance with reel quantity.

	Date of Revise	Charge	Approved	Reason	
A					
	Date	Name	Third Angle Projection	Tolerance	Scale
Drawn	3. Sep. 2020	S. Kawahara	Dimension:mm	-----	-----
Designed	3. Sep. 2020	S. Kawahara	Title	Drawing No.	Rev.
Checked	3. Sep. 2020	S. Kawahara			
Approved	3. Sep. 2020	T. Hosoda			
			Packing	ETK17B-00525 (3/3)	-

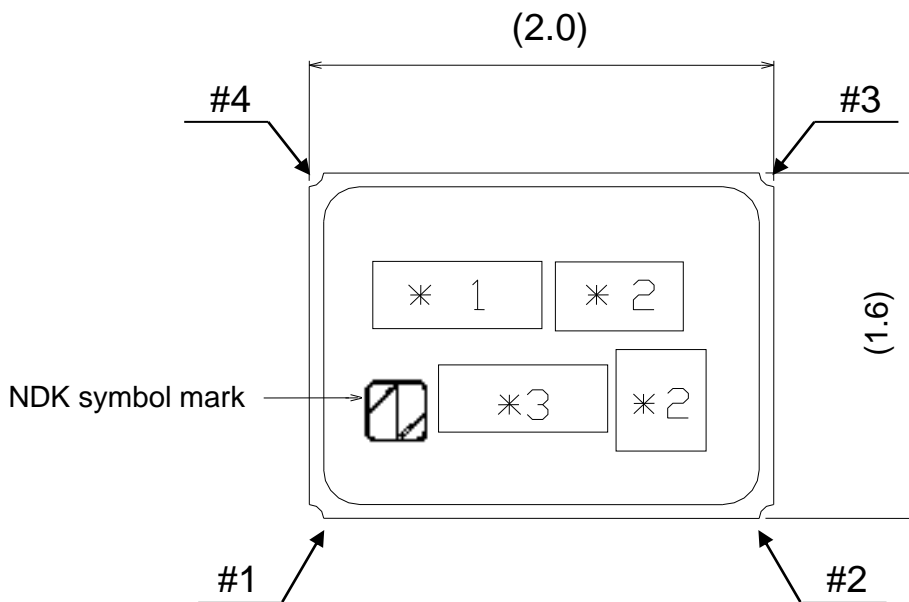
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Note) Please reserve a large ground pattern on the PCB where the oscillator is installed.

	Date of Revise	Charge	Approved	Reason	
A	8.Jul.2011	Y.Kanehira	A.Konda	Change Note	
	Date	Name	Third Angle Projection	Tolerance	Scale
Drawn	19.Mar.2007	H.Harima	Dimension:mm	----	30 / 1
Designed	19.Mar.2007	H.Harima	Title	Drawing No.	Rev.
Checked	19.Mar.2007	K.Moriya			
Approved	19.Mar.2007	H.Mizumura			
			Land pattern	ETD15B-00020	A

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Terminal land connections: Please refer to “Dimension of External”.

(Marking Contents)

*1 Lot No.



Year Code(Last one digit)

Month Code(see table)

Month	1	2	3	4	5	6	7	8	9	10	11	12
Month Code	1	2	3	4	5	6	7	8	9	O	N	D

Following No.

*2 Trace code

Trace code indicates production date and production line number.

*3 Nominal Frequency

- A unit (MHz) is not written.
- A decimal point omits.

(Example : (2digits) 26MHz → 26 , (3digits) 19.2MHz → 192, (4more digits) 16.368MHz → 163)

Marking Method : Laser Trimming

	Date of Revise	Charge	Approved	Reason			
B	4. Mar. 2015	E.Hoshi	A.Konda	Clerical error Correction			
	Date	Name	Third Angle Projection	Tolerance	Scale		
Drawn	16. Apr. 2013	R.Yoshizaki	Dimension:mm	---	---		
Designed	16. Apr. 2013	R.Yoshizaki	Title	Drawing No.	Rev.		
Checked	16. Apr. 2013	M.Kashiwamura			Marking	ETH11B-00443	B
Approved	16. Apr. 2013	K.Moriya					

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