Crystal Bridge to the Future

RoHS Compliant
Directive 2011/65/EU

SPECIFICATION

Customer: NDK Europe Ltd. Italy Office

Item:	CRYSTAL OSCILLATOR
Type:	NT2520SF
Nominal frequency:	26 MHz
Customer's Spec. No.:	----
NDK Spec. No.:	END5749A

Receipt

Revision Record						
Rev.	Date	Items	Contents	Approved	Checked	Drawn
-----	May. 16. 2019	Issue	---	T.Hosoda	S.Kawahara	H.Kawabata

NIHON DEMPA KOGYO CO., LTD.

1. Type NT2520SF

2. Maximum Rating

	Item	Rating	unit
1	Supply voltage	-0.6 to +4.6	V
2	Input voltage range	-0.6 to Vcc+0.6 , Max.+4.6	V
3	Storage temp. range	-40 to +85	°C

3. Electrical specification

	Parameters	Electrical Spec.				Notes
		Min.	Typ.	Max.	Units	
1	Nominal frequency		26		MHz	
2	Supply voltage (Vcc)	+2.7	+3.0	+3.3	V	(-Earth)
3	Current consumption			2.0	mA	
4	Output voltage	0.8			Vp-p	Clipped sine wave (DC-Coupling)
5	Operating temp. range	-40		+85	°C	
6	Load impedance (resistance part)	9.5	10	10.5	kΩ	
7	Load impedance (parallel capacitance)	9.5	10	10.5	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. Frequency /Temperature characteristics	-1.0		+1.0	ppm	-30 to +85 °C
		-2.5		+2.5	ppm	-40 to -30 °C
						Based on frequency at +25+/-2 °C at control voltage (Vcont)=+1.65 V DC
	2. Frequency/Temperature slope	-1.0		+1.0	ppm/°C	-40 to +85 °C Minimum of one measurement every 2 °C
	3. Temperature hysteresis	-0.6		+0.6	ppm	Frequency change after reciprocal temperature ramped over the Operating range. Frequency measured before and after at +25 °C.)
	4. Frequency/Voltage coefficient	-0.2		+0.2	ppm	+3.0 V +/-5 %(at +25 °C)
	5. Frequency/Load coefficient	-0.2		+0.2	ppm	(10 kΩ//10 pF) +/-5 %
	6. Frequency tolerance	-1.0		+1.0	ppm	at +25+/-2 °C, before reflow soldering, based on nominal frequency at control voltage (Vcont)=+1.65 V DC
		-1.0		+1.0	ppm	at +25+/-2 °C, 1 H, after 2 times reflow soldering, based on frequency at before reflow at control voltage (Vcont)=+1.65 V DC
	7. Long-term frequency stability	-1.0		+1.0	ppm	Year(at +25+/-2 °C)

	Parameters	Electrical Spec.				Notes	
		Min.	Typ.	Max.	Units		
10	External adjustment						
	1.Control voltage (Vcont)	+0.5	+1.65	+2.8	V		
	2.Frequency control range			-6.0	ppm	Vcont= +0.5 V	based on frequency at (Vcont) = +1.65 V DC
		+6.0			ppm	Vcont= +2.8 V	
	3. Input impedance	500			kΩ		
	4.Frequency change polarity					Positive	
11	Phase noise		-61		dBc/Hz	@1 Hz offset	
			-91		dBc/Hz	@10 Hz offset	
			-116		dBc/Hz	@100 Hz offset	
			-139		dBc/Hz	@1 kHz offset	
			-150		dBc/Hz	@10 kHz offset	
			-155		dBc/Hz	@100 kHz offset	
						at +25+/-2 °C	

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

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

6. Inspection parameters
Para 3.1, 3.3, 3.4, 3.9.1, 3.10.2, 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(solderability etc.) and packaging condition may be deteriorated.
The product storage deadline is 6 months after delivery in unopened state. Please use within 6 months.
If you exceed 6 months please check the product characteristics etc, please use.
Please keep the oscillator under below condition.

MSL		Before taking out of dry bag	After taking out of dry bag
3	Temperature	+5 °C to +45 °C	+30 °C max.
	Humidity	10 % to 75 %	70 % max.
	Period	6 months	168 hours *

(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-01867
10.3 Packing
ETK17B-00461A
10.4 Land pattern
ETD15B-00022A
10.5 Marking
ETH11B-00441D

11. Notes on use
11.1 This product cannot be used for automotive applications.
11.2 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.), 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 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 CRYSTAL PIECE.)
(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) WHEN PERFORMING IMPROPER HANDLING THAT EXCEEDS THE GUARANTEED RANGE.
11.3 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.

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.

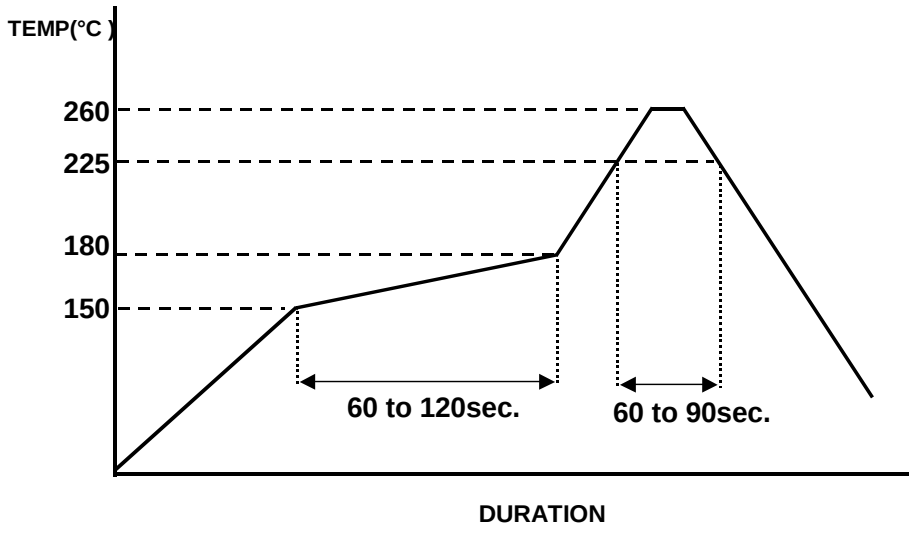
13. Prohibited items

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.



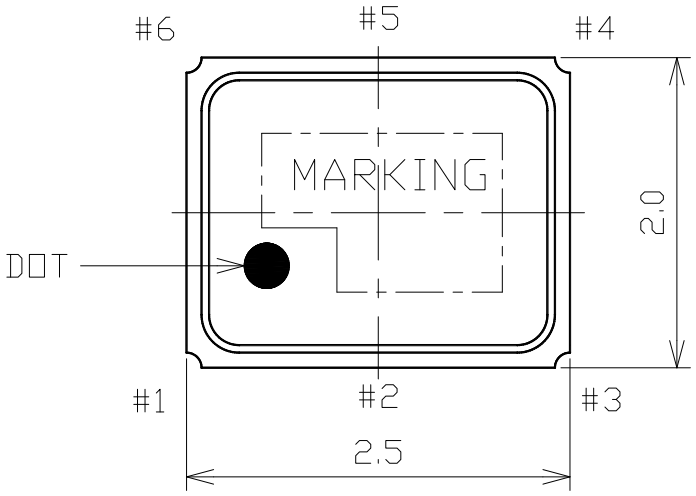
(Fig.1)

Reliability assurance item

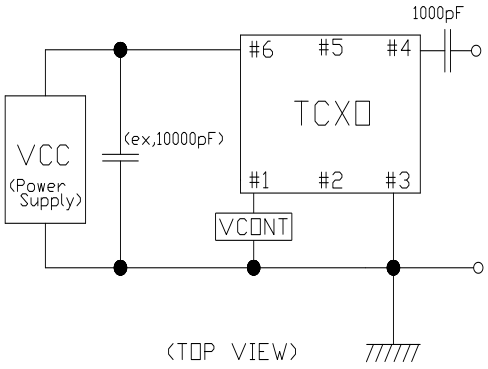
(page: 1/1)

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

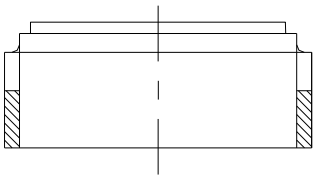
Specification code	Specification
A	After the test, shall meet electrical specification.

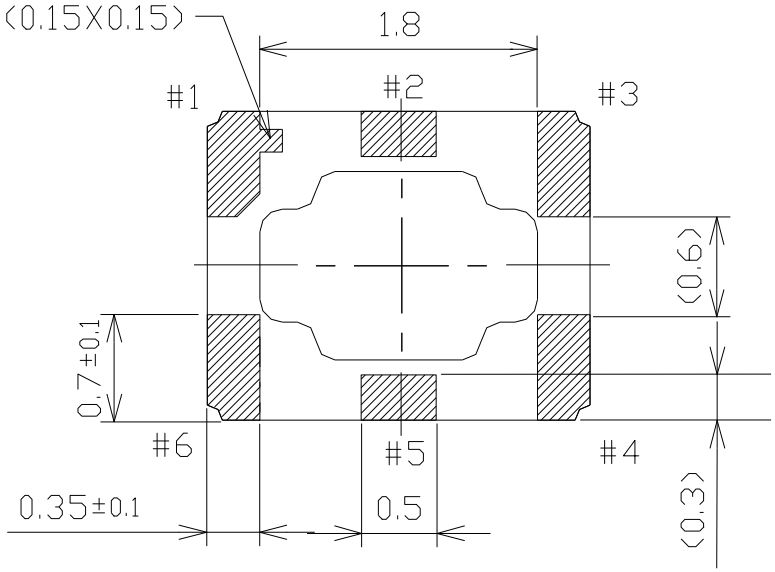


Connection diagram



Terminal land connections	
#1	VCONT
#3	GND
#4	OUTPUT
#6	VCC
#2／#5	N/C or GND





	Date of Revise	Charge	Approved	Reason
-				

	Date	Name	Third Angle Projection	Tolerance	Scale
Drawn	3.Jul.2015	K.Koyama	Dimension:mm	+/- 0.2	20/1
Designed	3.Jul.2015	K.Koyama	Title	Drawing No.	Rev.
Checked	3.Jul.2015	K.Koyama	**Dimension of External**	**ETD14B-01867**	-
Approved	3.Jul.2015	K.Moriya			

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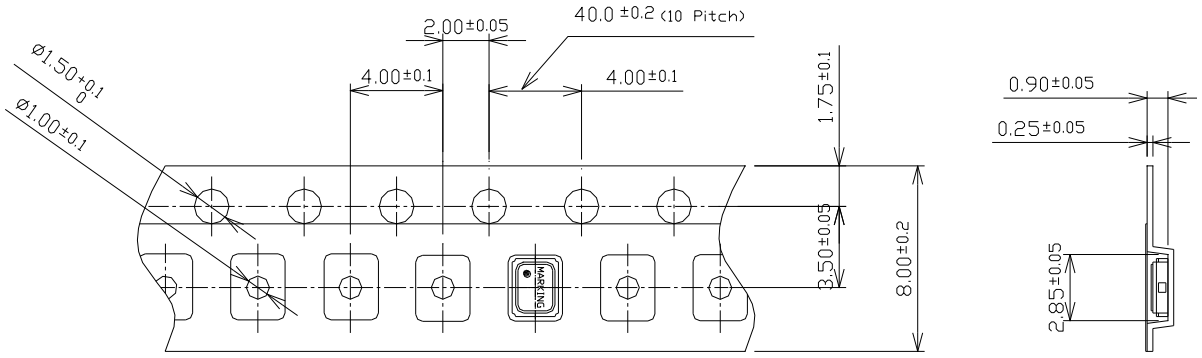

	Embossed carrier tape	Top cover tape
Materials	PS	PET + PE + Adhesive layer
Disposition	Antistatic	Antistatic

	Date of Revise	Charge	Approved	Reason
A	28. Mar. 2017	E.Hoshi	T.Abe	Addition of product pcs

	Date	Name	Third Angle Projection	Tolerance	Scale
Drawn	26.Aug.2016	K.Koyama	Dimension:mm	-----	-----
Designed	26.Aug.2016	K.Koyama	Title	Drawing No.	Rev.
Checked	26.Aug.2016	K.Koyama	**Packing**	**ETK17B-00461 (1/3)**	**A**
Approved	26.Aug.2016	K. Moriya			

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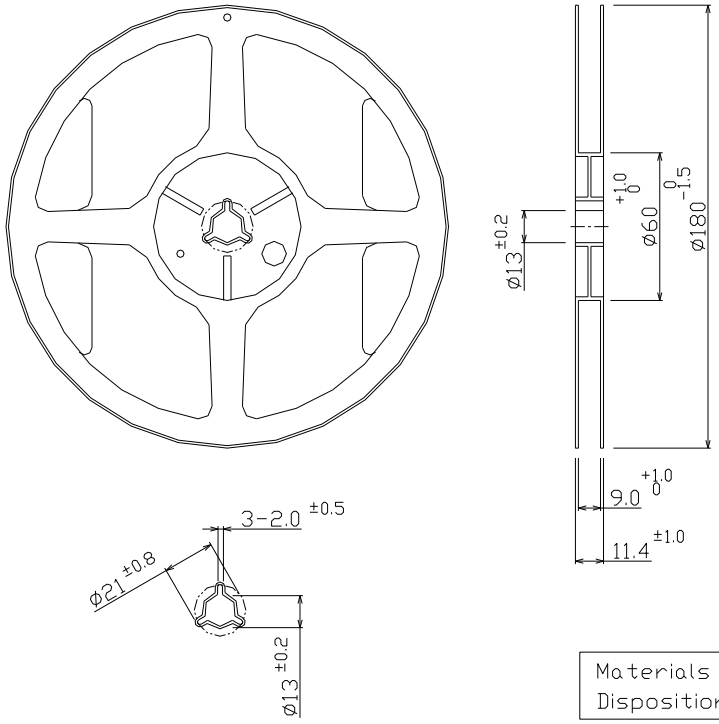
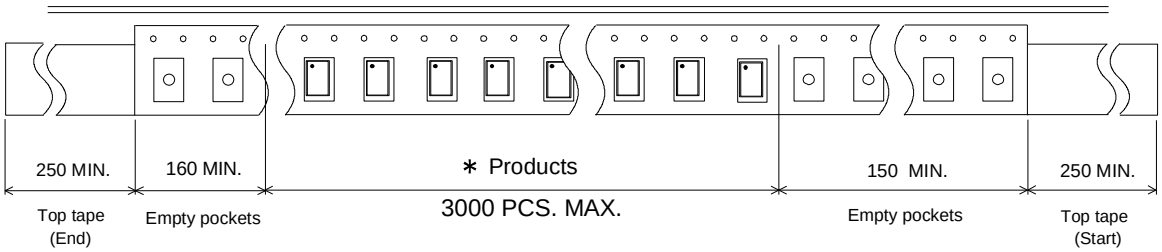
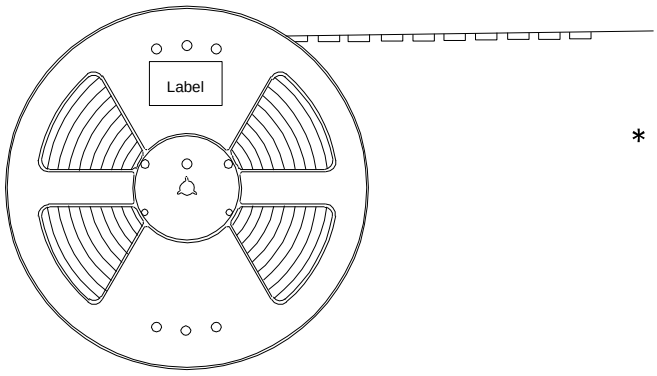
Form M-1



Materials : PS
Disposition : Antistatic





∗ There are no vacant pockets for this area.

	Date of Revise	Charge	Approved	Reason
A	28. Mar. 2017	E.Hoshi	T.Abe	Addition of product pcs

	Date	Name	Third Angle Projection	Tolerance	Scale
Drawn	26.Aug.2016	K.Koyama	Dimension:mm	-----	-----
Designed	26.Aug.2016	K.Koyama	Title	Drawing No.	Rev.
Checked	26.Aug.2016	K.Koyama	**Packing**	**ETK17B-00461 (2/3)**	**A**
Approved	26.Aug.2016	K. Moriya			

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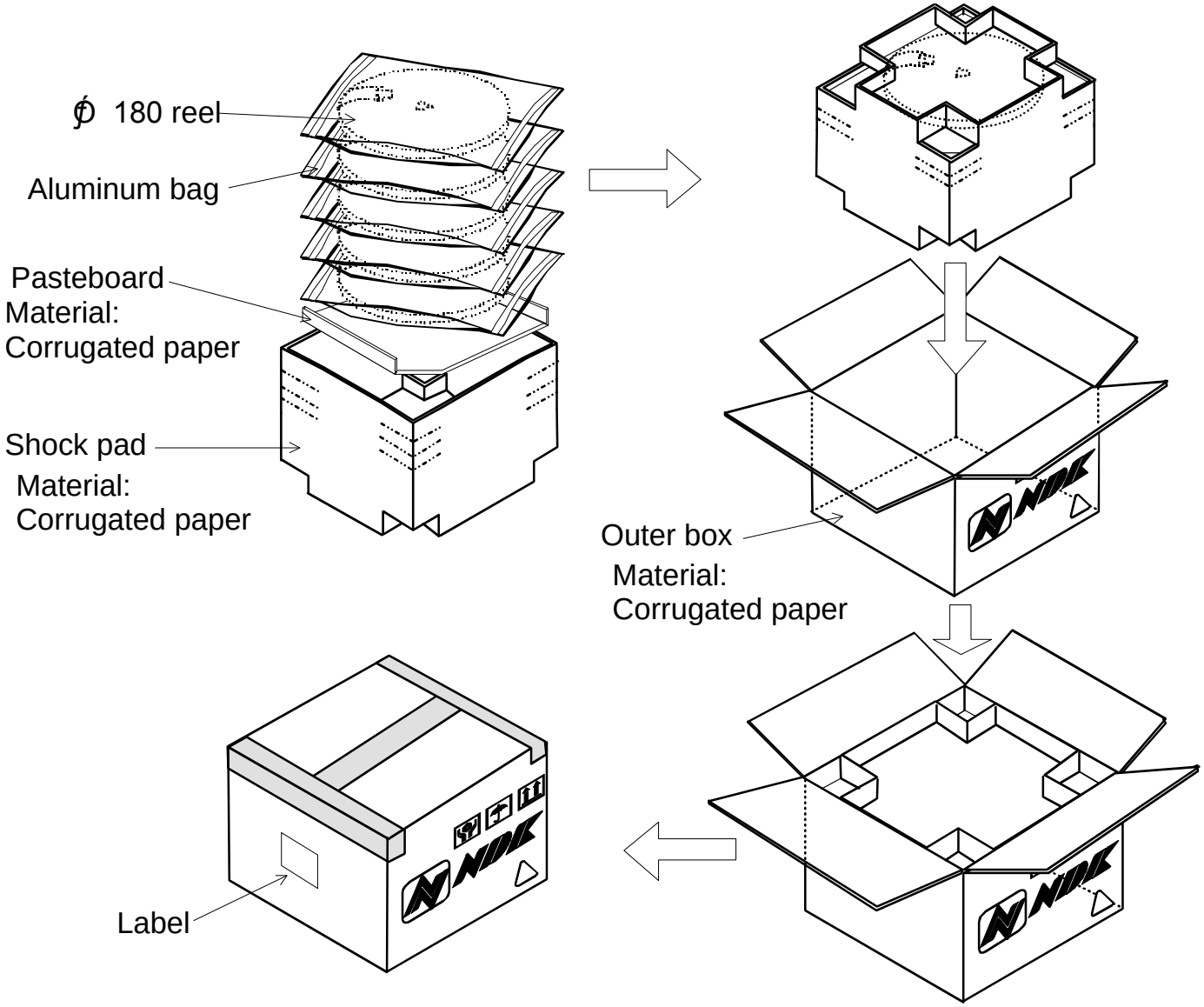
Form M-1

-3000pcs. Max. / Reel
-5 Reels Max. / Carton



	Date of Revise	Charge	Approved	Reason
A	28. Mar. 2017	E.Hoshi	T.Abe	Addition of product pcs

	Date	Name	Third Angle Projection	Tolerance	Scale
Drawn	26.Aug.2016	K.Koyama	Dimension:mm	-----	-----
Designed	26.Aug.2016	K.Koyama	Title	Drawing No.	Rev.
Checked	26.Aug.2016	K.Koyama	**Packing**	**ETK17B-00461 (3/3)**	**A**
Approved	26.Aug.2016	K. Moriya			

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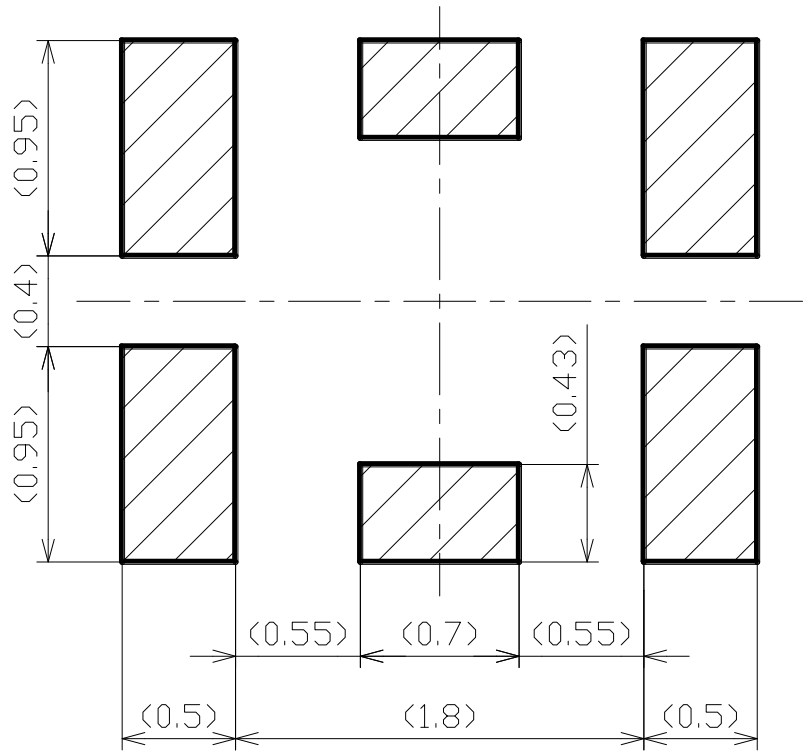
Form M-1



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

	Date of Revise	Charge	Approved	Reason
A	17. Nov. 2011	A.Fujii	K.Moriya	Note change

	Date	Name	Third Angle Projection	Tolerance	Scale
Drawn	18.Apr.2007	H.Harima	Dimension:mm	-----	30 / 1
Designed	18.Apr.2007	H.Harima	Title	Drawing No.	Rev.
Checked	18.Apr.2007	K.Moriya	**Land pattern**	**ETD15B-00022**	A
Approved	18.Apr.2007	H.Mizumura			

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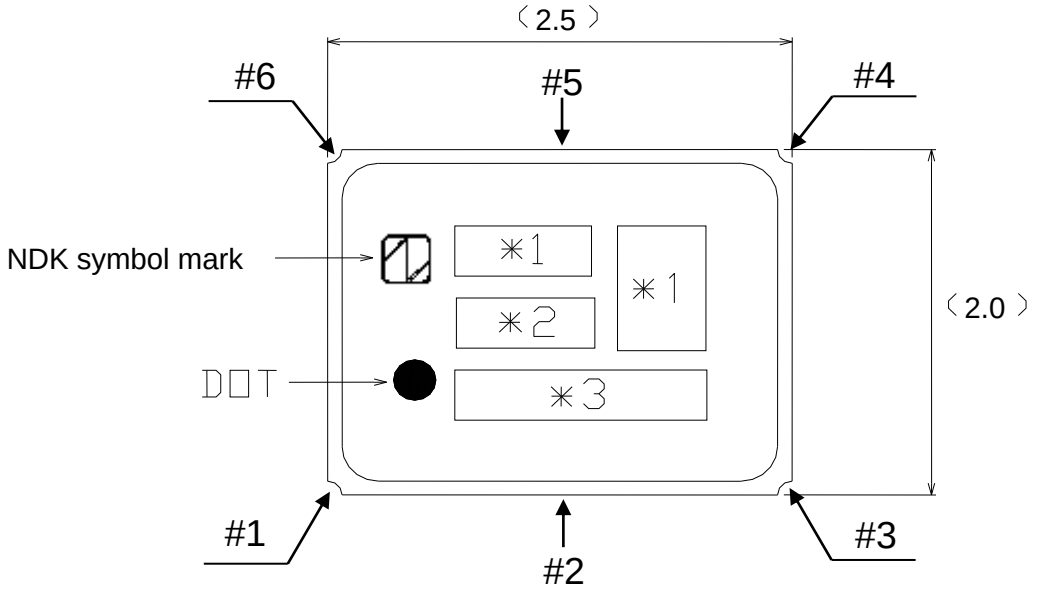
Form M-1



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

(Marking Contents)

*1 Trace code

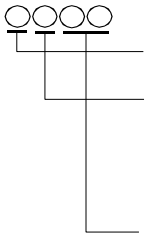
Trace code indicates production date and production line number.

*2 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)

*3 Lot No.



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

Marking Method : Laser Trimming

	Date of Revise	Charge	Approved	Reason
D	25. May. 2015	Y.Inazawa	K.Moriya	Correction of a font

	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-00441**	**D**
Approved	16. Apr. 2013	K. Moriya			

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