RoHS Compliant
Directive 2011/65/EU
Directive (EU) 2015/863

SPECIFICATION

Customer: NDK Europe Ltd. Italy Office

Item:	Temperature compensated crystal oscillator (TCXO)
Type:	NT5032BF
Nominal frequency:	12.800 MHz
Customer's Spec. No.:	---
NDK Spec. No.:	END6429A

Receipt

Revision Record						
Rev.	Date	Items	Contents	Approved	Checked	Drawn
---	19. Dec. 2024	Issue	---	K. Koyama	T. Abe	Y. Sato

NIHON DEMPA KOGYO CO., LTD.

1. Type NT5032BF

2. Maximum Rating

	Item	Rating	unit
1	Supply Voltage	-0.6 to +4.6	V
2	Control Voltage	-0.6 to V_{CC} +0.6, Max.+4.6	V
2	Storage Temperature Range	-40 to +105	°C

3. Rating

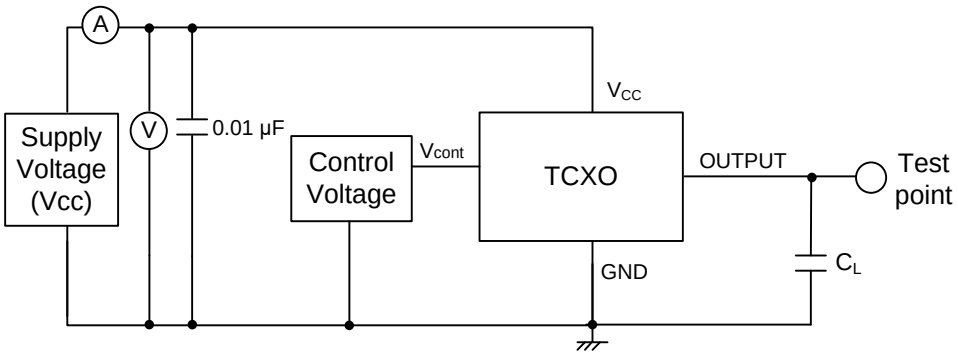
	Item	Rating				Notes
		Min.	Typ.	Max.	Units	
1	Nominal Frequency		12.800		MHz	
2	Supply Voltage (V_{CC})	+3.135	+3.3	+3.465	V	(-Earth)
3	Control Voltage (V_{cont})	0	+1.65	+3.3	V	
4	Operating Temp. Range	-40		+105	°C	
5	Load Capacitance	13.5	15	16.5	pF	

4. Electrical specification

Unless otherwise specified, measuring condition at T = +25 ±2 °C, V_{CC} =+3.3 V, V_{cont} =+1.65 V, C_L = 15 pF

	Parameters	Electrical Spec.				Notes	
		Min.	Typ.	Max.	Units		
1	Current Consumption			12.0	mA		
2	Frequency Stability						
	1. Overall Frequency Tolerance	-4.6		+4.6	ppm	Total of Para. 4.2.2 to 4.2.6	
	2. Frequency /Temperature Characteristics	-0.5		+0.5	ppm	-40 to +105 °C Based on frequency at +25 °C at control voltage (V_{cont}) =+1.65 V	
	3. Frequency/Voltage Coefficient	-0.1		+0.1	ppm	+3.3 V ±5 %	
	4. Frequency/Load Coefficient	-0.2		+0.2	ppm	15 pF ±10 %	
	5. Frequency Tolerance	-0.8		+0.8	ppm	at +25 ±2 °C, Before reflow soldering, based on nominal frequency at control voltage (V_{cont}) =+1.65 V	
	6. Long-term Frequency Stability	-1.0		+1.0	ppm	1 year	
		-3.0		+3.0	ppm	15 years	
						at +25 ±2 °C	
3	Output	CMOS					
	1. Output Voltage			10 % V_{CC}	V	V_{OL}	
		90 % V_{CC}			V	V_{OH}	
	2. Symmetry	40		60	%	50 % V_{CC}	
	3. Rise Time(t_r)			8	ns	10 % to 90 % V_{CC}	
	4. Fall Time(t_f)			8	ns	90 % to 10 % V_{CC}	
4	Frequency Controlled Characteristics						
	1.Frequency Control Range			-5.0	ppm	V_{cont}= 0 V	based on frequency at (V_{cont}) = +1.65 V
		+5.0			ppm	V_{cont}= +3.3 V	
	2.Frequency Change Polarity	Positive					

5. Test Circuit



C_L including capacitance of probe and jig

Fig. 1 Test Circuit

6. Mounted Conditions

Reflow solder mounting is recommended. The temperature profile is as follows.
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: 260 °C /10 s

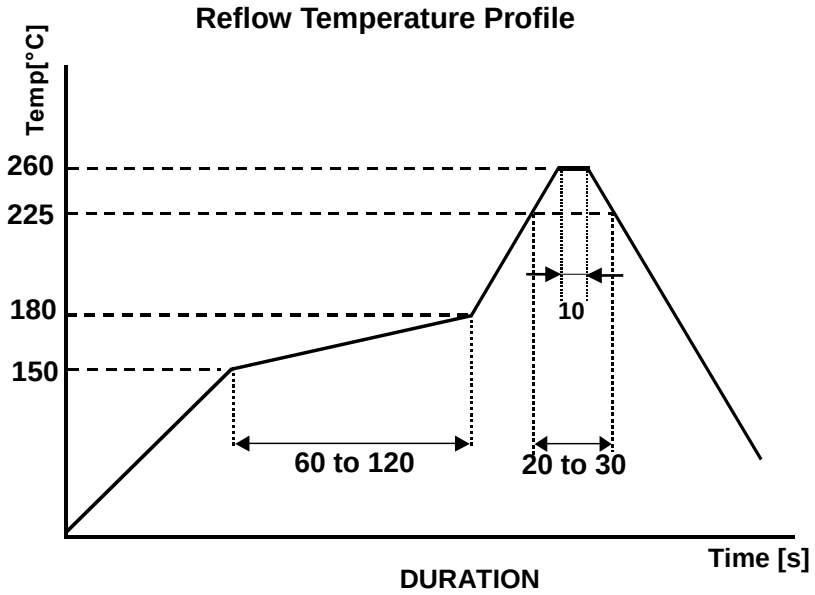
Heating: +225 °C or higher, 30 s

Preheat: 150 °C to 180 °C /120 s

Number of reflow passes: 2 times

(2) Iron heat resistance

Apply iron of 350 °C on the product for 5 s. (2 times)



7. Washing
Not available for washing.

8. Environmental Conditions

	Item	Condition	Specification
8.1	Vibration Test	IEC60068-2-6,test Fc 10 to 500 Hz, 98.1 m/s^2, 2 hours, 3 directions.	After following test, Complies with all items of electrical characteristic specification.
8.2	Shock Test	IEC60068-2-27,test Ea 981 m/s^2,6 ms, Half Sine, 3 bumps, 6 directions.	

9. 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 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 %	60 % max.
	Period	6 months	168 hours *

(table)

10. Application drawing
10.1 Dimension of External
ETD14B-02522
10.2 Packing
ETK17B-00549

11. Notes on use
11.1 This product cannot be used for automotive applications.
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 PIEZOELECTORIC 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 using this product, please insert a bypass capacitor between the power supply and GND. (Closer to the product terminal is desirable.)
The bypass capacitor values shown in our specifications and drawings are for reference only. (They are not guaranteed values.)
In actual use, please select the appropriate bypass capacitor value for your circuit.
NDK shall not be liable for any and all events resulting from or in connection with the use of this product in a manner that does not comply with the above instruction.

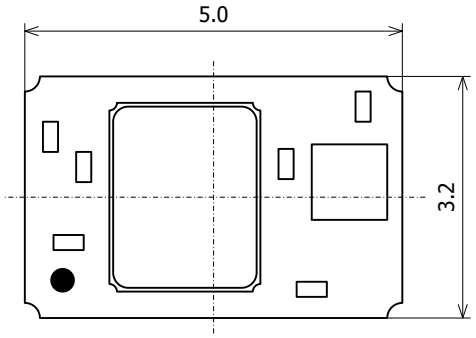
(7) WHEN PERFORMING IMPROPER HANDLING THAT EXCEEDS THE GUARANTEED RANGE.

12. Other Requests

12.1. Please use this specification only for confirmation of the specification of this product.

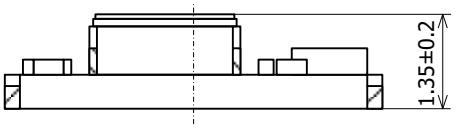
12.2. If there is a change request, please contact within three weeks from issue date. If there is no communication, we will deliver the product under the contents of this specification. In addition, if the product delivery date is within 3 weeks and there is a change request, we will consult the processing separately.

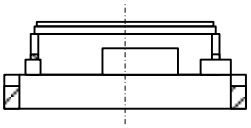
12.3. NOTES THAT ARE DESCRIBED IN THIS DOCUMENT, IF YOU DID NOT COMPLY WITH THE PROHIBITIONS, AND OTHER PLEASE, INCLUDING THE FAILURE CORRESPONDENCE OR COMPENSATION OR DAMAGES, WE CAN NOT ASSUME THE RESPONSIBILITY, PLEASE UNDERSTAND.

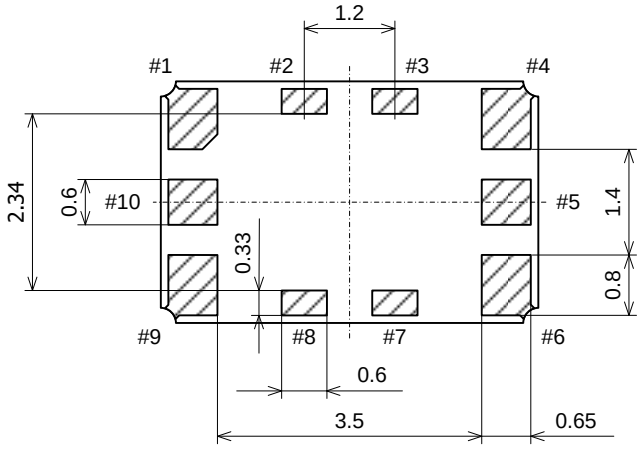


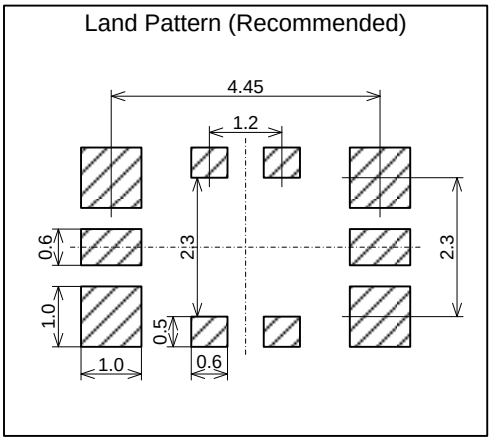
Terminal Land Connections

#1	Vcont
#2	NC
#3	NC
#4	GND
#5	NC
#6	OUTPUT
#7	NC
#8	NC
#9	Vcc
#10	NC









(Note)

1. Please connect the bypass capacitor (for example: 0.01 μF) near the Vcc terminal.

	Date of Revise	Charge	Approved	Reason

	Date	Name	Third Angle Projection	Tolerance	Scale
Drawn	17 Dec. 2024	Y. Sato	Dimension: mm	±0.1	---
Designed	17 Dec. 2024	Y. Sato	Title	Drawing No.	Rev.
Checked	17 Dec. 2024	T. Abe	**External Dimension**	**ETD14B-02522**	
Approved	17 Dec. 2024	K. Koyama			

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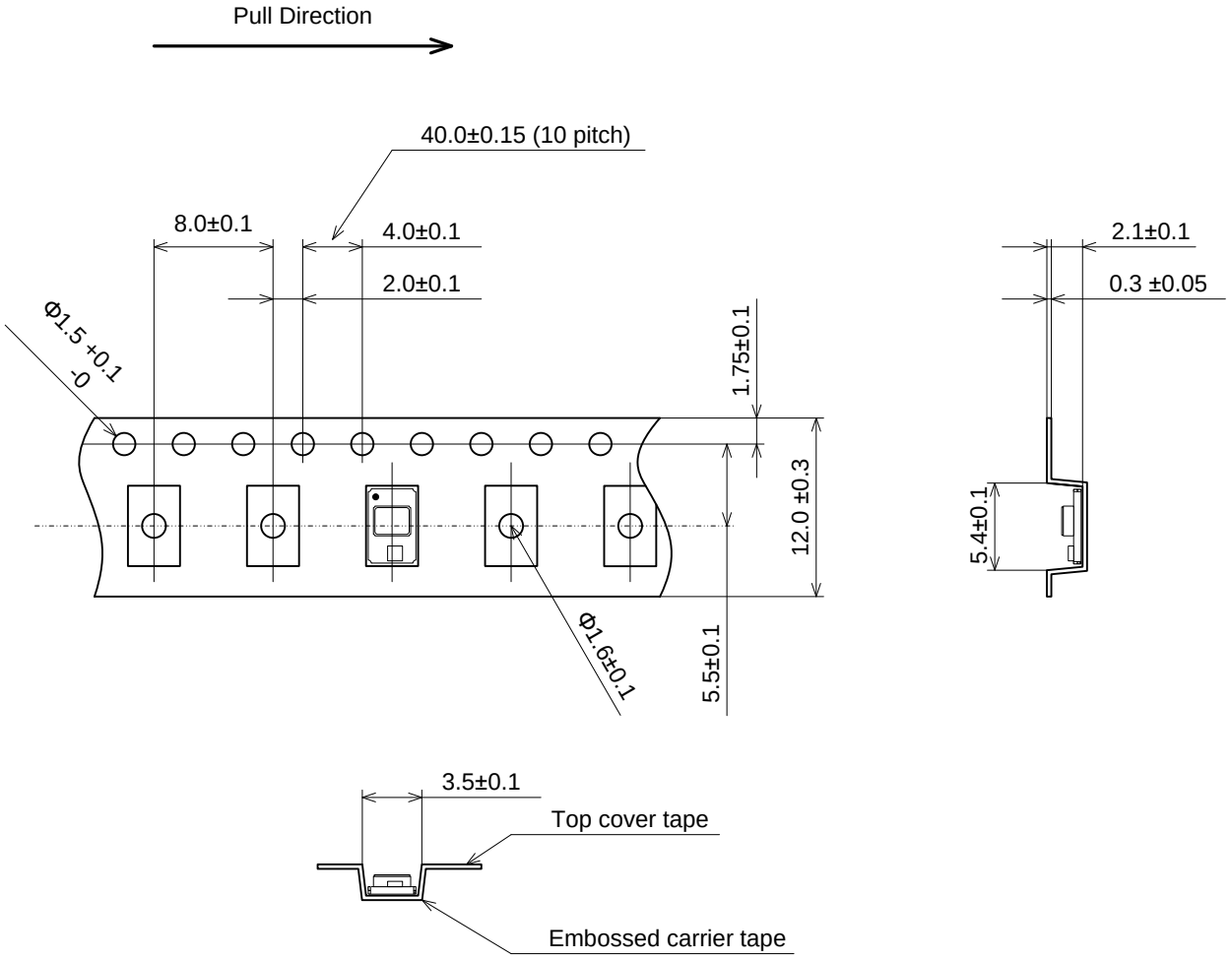

	Embossed carrier tape	Top cover tape
Material	PS	PET+PE+Adhesive Layer
Disposition	Antistatic	Antistatic

	Date of Revise	Charge	Approved	Reason

	Date	Name	Third Angle Projection	Tolerance	Scale
Drawn	29 Jul.2024	Y. Sato	Dimension: mm	---	---
Designed	29 Jul.2024	Y. Sato	Title	Drawing No.	Rev.
Checked	29 Jul.2024	T. Abe	**Packing**	**ETK17B-00549 (1/4)**	
Approved	29 Jul.2024	K. Koyama			

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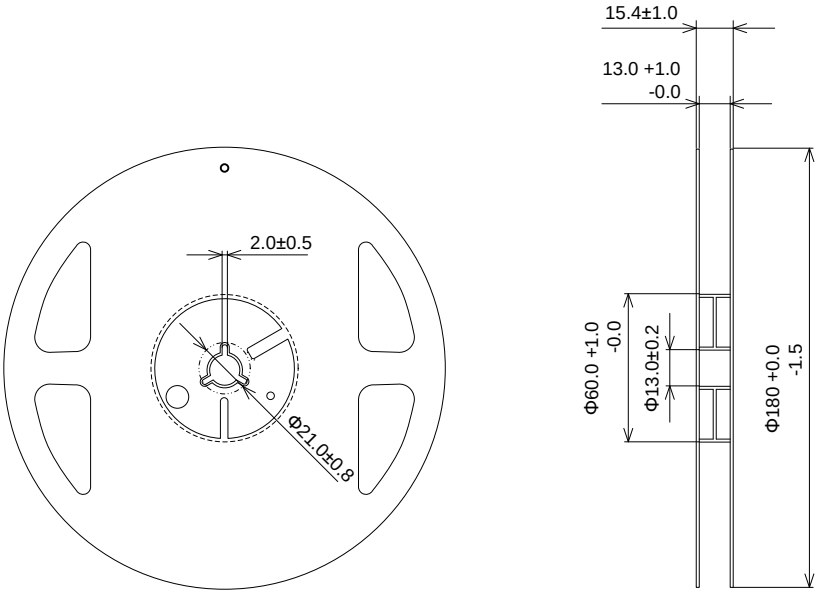
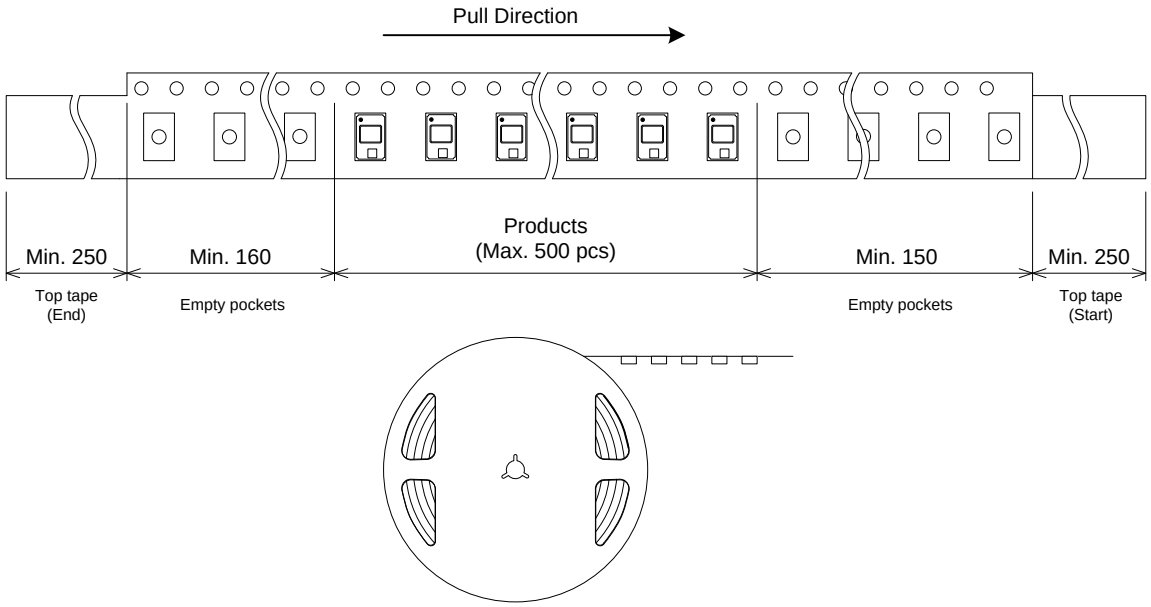


Material : PS+Carbon
Disposition : Conductive



	Date of Revise	Charge	Approved	Reason

	Date	Name	Third Angle Projection	Tolerance	Scale
Drawn	29 Jul.2024	Y. Sato	Dimension: mm	---	---
Designed	29 Jul.2024	Y. Sato	Title	Drawing No.	Rev.
Checked	29 Jul.2024	T. Abe	**Packing**	**ETK17B-00549 (2/4)**	
Approved	29 Jul.2024	K. Koyama			

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Tape break force, peel strength and angle

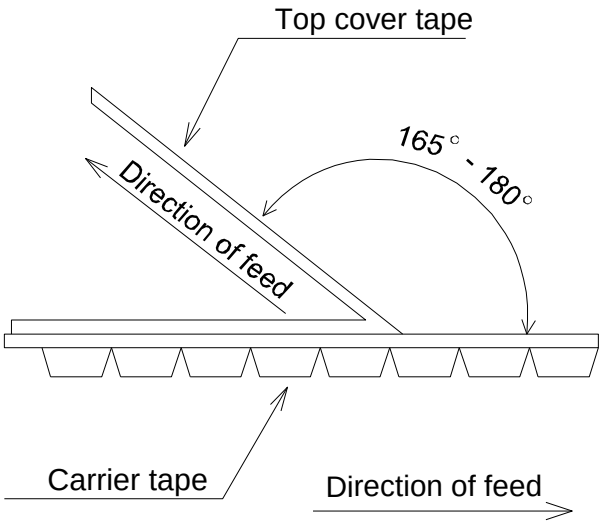
Required setting:

Tape break force: Min 10 N

Top cover tape strength: Min 10 N

Top cover tape peel force : 0.1-1.3 N(0.1-1.0 for 8 mm carrier tapes), at a peel speed of 300 +/-10 mm/min.

Angle between the top cover tape and the direction of feed during peel off.
165-180°



The cover tapes not extend over the edge of the carrier tape or cover any part of the sprocket holes.

	Date of Revise	Charge	Approved	Reason

	Date	Name	Third Angle Projection	Tolerance	Scale
Drawn	29 Jul.2024	Y. Sato	Dimension: mm	---	---
Designed	29 Jul.2024	Y. Sato	Title	Drawing No.	Rev.
Checked	29 Jul.2024	T. Abe	**Packing**	**ETK17B-00549 (3/4)**	
Approved	29 Jul.2024	K. Koyama			

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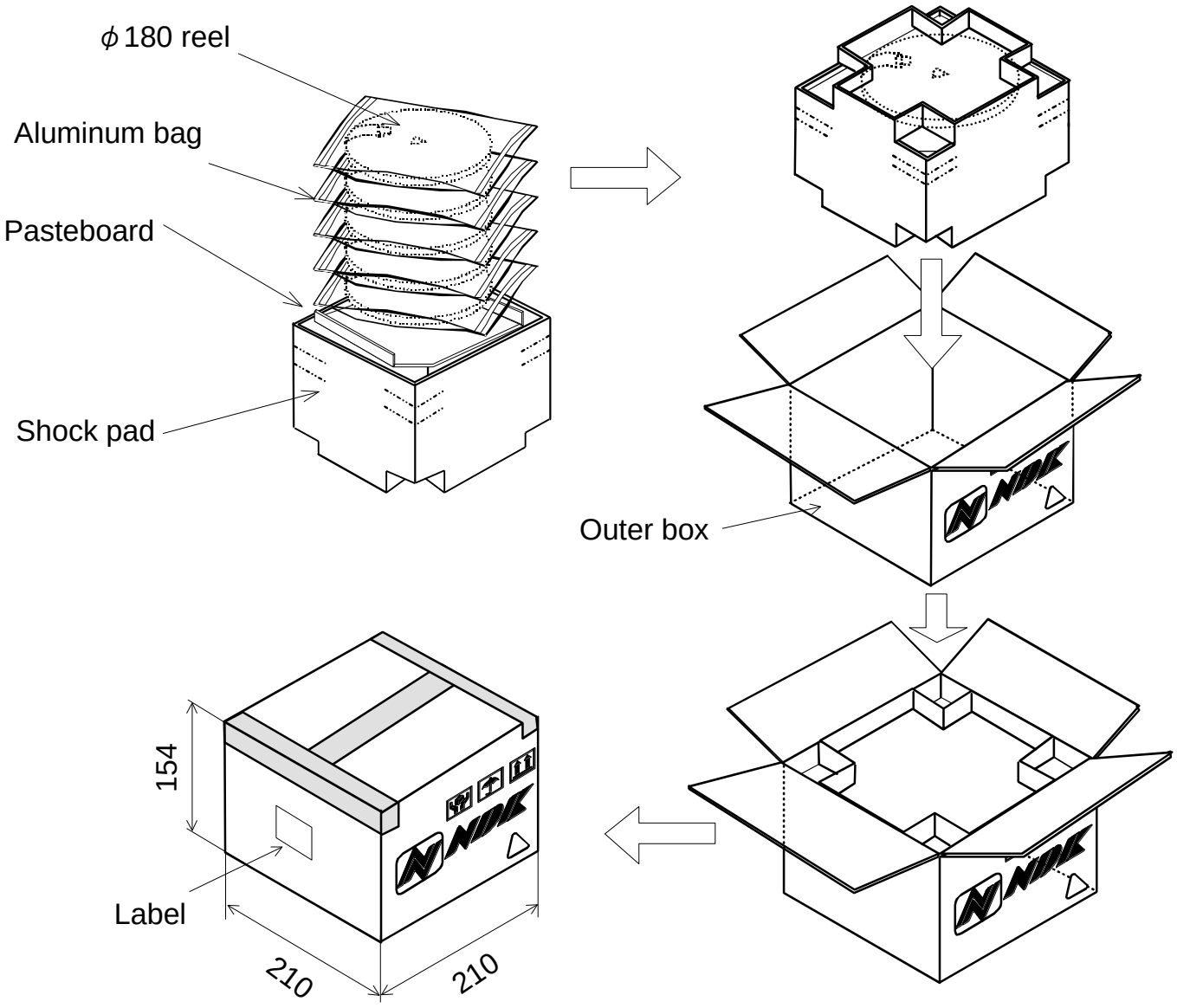

	Date of Revise	Charge	Approved	Reason

	Date	Name	Third Angle Projection	Tolerance	Scale
Drawn	29 Jul.2024	Y. Sato	Dimension: mm	---	---
Designed	29 Jul.2024	Y. Sato	Title	Drawing No.	Rev.
Checked	29 Jul.2024	T. Abe	**Packing**	**ETK17B-00549 (4/4)**	
Approved	29 Jul.2024	K. Koyama			

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