

SPECIFICATION

SPEC. No. C463NAA01736 ISSUE 1

DATE: March 13, 2019

To

NEUSOFT AUTO

Customer's product name

TDK's product name

SPM4030T-○○○□-HZ

Receipt confirmation

DATE YEAR MONTH DAY

TDK Corporation

Sales
Electronic Components
Sales & Marketing Group

Engineering
TDK Corporation
Magnetics Business Group
Wire-wound Products B.U.

Approved	Person in charge

Approved	Checked	Person in charge
H.Sasaki	S.Sugimoto	K.Fujisawa

CAUTION WHEN HANDLING

Read the specification before use.

CAUTION FOR SAFETY USING

Follow the instructions for the safety design.



CAUTION

Storage

- Store this product under the conditions which are defined in the specification or the catalogue.
Confirm the solderability before use if the product has been stored outside of the conditions.
- Don't store this product under the influence of the poisonous gases, such as hydrogen sulfide, sulfuric acid, chlorine or ammonia gas.
- Keep away the product from the direct sunlight and dew condensation.

Usage environment and conditions

- Use this product under the conditions defined in the specification or the catalogue.
Pay special attention to the use temperature range and soldering conditions.
- Do not use this product in the place:
 - Exposed to water or seawater.
 - With dew condensation.
 - Under the influence of the poisonous gases, such as hydrogen sulfide, sulfuric acid, chlorine or ammonia gas.
 - With exceeded vibrations and impulses from the conditions defined in the specification or the catalogue.
- Soldering modification after mounting must be within the range of the conditions defined in the specification.
Please note that excess heat might cause short circuit, performance degradation, or shortening its life.
- Do not use the product if the exceeded mechanical stress has been loaded, such as dropping.
- When assembling a substrate with chips mounted into a set, do not load any residual stress on the chips by entire or partial flexure, such as substrate, screw fastening, e.g.
- Keep the sufficient margin for heat design due to self-heating of the product when applying an electrical current.
- Keep the product away from magnets or magnetized materials.
- When using any coating materials, evaluate the materials to avoid deterioration of the product performances.

Use application

The products listed on this specification sheet are intended for use in general electronic equipment (AV equipment, telecommunications equipment, home appliances, amusement equipment, computer equipment, personal equipment, office equipment, measurement equipment, industrial robots) under a normal operation and use condition.

The products are not designed or warranted to meet the requirements of the applications listed below, whose performance and/or quality require a more stringent level of safety or reliability, or whose failure, malfunction or trouble could cause serious damage to society, person or property.

Please understand that we are not responsible for any damage or liability caused by use of the products in any of the applications below or for any other use exceeding the range or conditions set forth in this specification sheet.

We will bear no responsibility for any loss or damage incurred due to use that exceeds the operation range and/or the conditions set forth in this specifications or due to using in the conditions below.

- | | |
|---|--|
| 1) Aerospace/Aviation equipment | 6) Transportation control equipment |
| 2) Medical equipment which directly endanger human life | 7) Military equipment |
| 3) Power-generation control equipment | 8) Safety equipment |
| 4) Atomic energy-related equipment | 9) Other applications that are not considered general-purpose applications |
| 5) Seabed equipment | |

If you intend to use the products in the following applications, please contact our sales office.

Transportation equipment (cars, electric trains, ships, etc.) , Public information-processing equipment, Electric heating apparatus / burning equipment , Disaster prevention/crime prevention equipment

When using this product in general-purpose applications, you are kindly requested to take into consideration securing protection circuit/equipment or providing backup circuits, etc., to ensure higher safety.

TDK Corporation

DWG No.

C463NAA01736

Issue

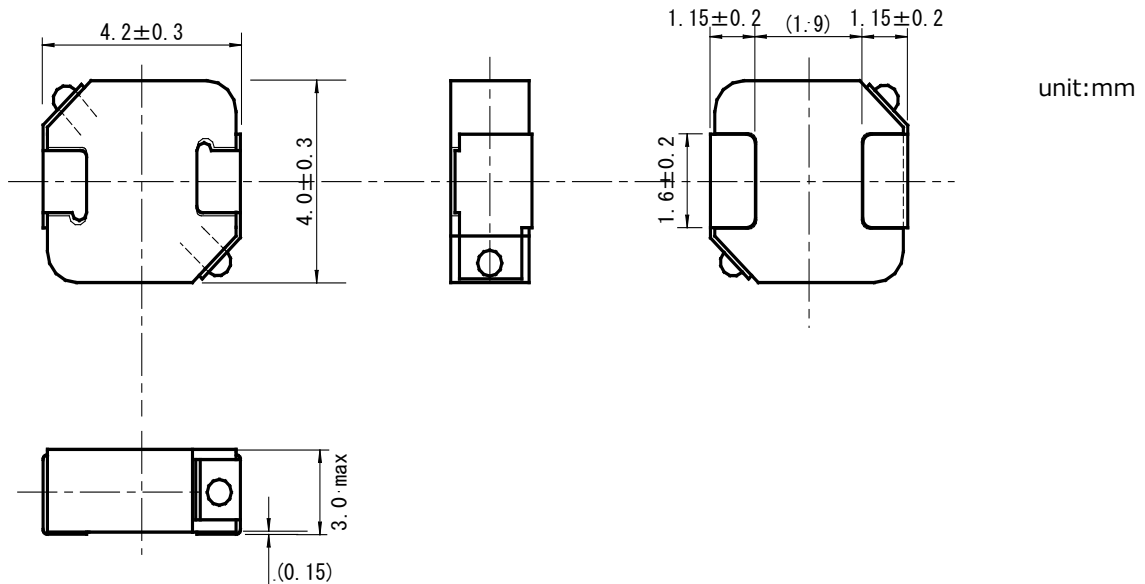
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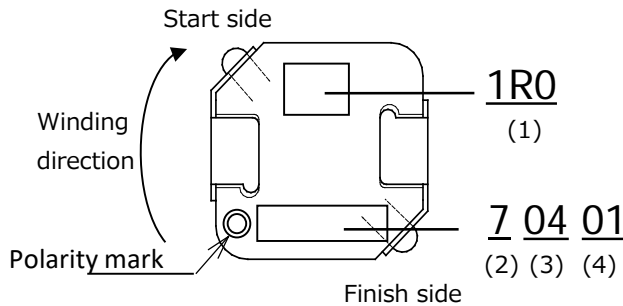
1. Shapes and dimensions and an equivalent circuit

1-1. Shapes and dimensions



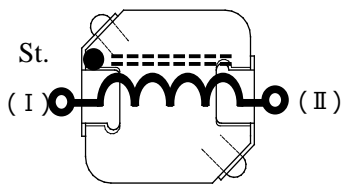
- 'Note) 1, Physical dimensions include solder.
 2, Dimensions without tolerance are reference value.
 3, Chips are acceptable if chips are less than 2.0 mm length and less than 0.5 mm depth.
 4, Cracks are acceptable if cracks are less than 1.0mm length.

1-2. Marking specification

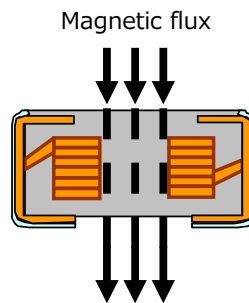


- (1) Inductance:(R40:0.40μH,1R0:1.0μH, 100:10μH)
 (2) Year:(2017:7, 2020:0)
 (3) Month:(April:04, December:12)
 (4) Day:(1st:01, 31th:31)

1-3. Equivalent circuit

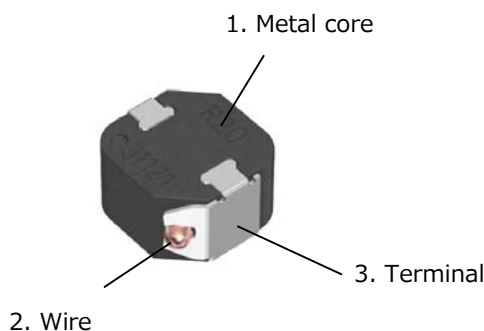


1-4. Polarity



If you have a high potential terminal side polarity mark Magnetic flux flows to the mounting surface (PCB side) from top side (marking surface).

2. Structure and used material



No.	Item	Material
1	Metal core	Fe-based powder metal
2	Wire	Coated copper wire
3	Terminal	Cu + Inter Ni Plated:100% + Surface Sn Plated:100%

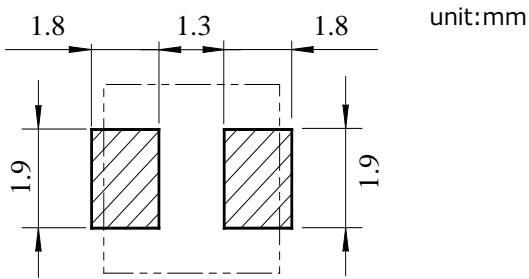
4. Reliability test

Item	Specification	Test conditions
Temperature Characteristics	$\Delta L/L20^{\circ}\text{C} \leq \pm 15\%$	Measure the inductance value at ambient temperature -40°C to +125°C and calculate the rate of change based on the value at 20°C. (Measurement frequency:100 kHz, Voltage:0.5V)
Short time over load	There shall be no damage such as smoke or sparks.	Solder the sample to the board with reflow method and conduct the test under the following conditions. 1.5 times Itemp for 5 minutes shall be applied.
Substrate bending	$\Delta L/L0 \leq \pm 10\%$ There shall be no mechanical damages.	Solder the sample to the board, and hold the board vertically for 3 mm with it bent for 30 seconds.
Resistance to soldering heat	$\Delta L/L0 \leq \pm 10\%$ There shall be no mechanical damages.	Solder the sample to the board with reflow method and conduct the test under the following conditions. Number of reflow: 2 times Test profile: P7. Refer to the recommended reflow profile of lead-free solder After completion of the test, leave it for 1 hour or more in normal temperature and normal humidity before measurement.
Solderability	The product shall be connected to the test circuit board by the fillet.	Pretreatment: Pressure cooker test 105°C, 100%, 4h After coating the flux (rosin:JIS-K-5902 and IPA:JIA-K-1522) on the electrode part, it was preheated at 130 to 150°C for 2 min., and a lead-free solder M705 (Senju Metal) with a temperature of 245±5°C for 3±1 sec at the bottom of the sample.
Low temperature exposure	$\Delta L/L0 \leq \pm 10\%$ There shall be no mechanical damages.	Solder the sample to the board with reflow method and conduct the test under the following conditions. Temperature:-40±2°C Hours:500±12h After completion of the test, leave it for 1 hour or more in normal temperature and normal humidity before measurement.

Item	Specification	Test conditions
High temperature exposure	$\Delta L/L0 \leq \pm 10\%$ There shall be no mechanical damages.	Solder the sample to the board with reflow method and conduct the test under the following conditions. Temperature: $125 \pm 2^\circ\text{C}$ Hours: $500 \pm 12\text{h}$ After completion of the test, leave it for 1 hour or more in normal temperature and normal humidity before measurement.
Humidity exposure	$\Delta L/L0 \leq \pm 10\%$ There shall be no mechanical damages.	Solder the sample to the board with reflow method and conduct the test under the following conditions. Temperature: $60 \pm 2^\circ\text{C}$ Humidity: $90 \sim 95\% \text{RH}$ Hours: $500 \pm 12\text{h}$ After completion of the test, leave it for 1 hour or more in normal temperature and normal humidity before measurement.
Thermal shock	$\Delta L/L0 \leq \pm 10\%$ There shall be no mechanical damages.	Solder the sample to the board with reflow method and conduct the test under the following conditions. Temperature: $-40 \sim 125^\circ\text{C}$ each 30min. Hours: 1000 cyc. After completion of the test, leave it for 1 hour or more in normal temperature and normal humidity before measurement.
Vibration	$\Delta L/L0 \leq \pm 10\%$ There shall be no mechanical damages.	Solder the sample to the board with reflow method and conduct the test under the following conditions. Frequency/h: $10 \sim 500 \sim 10\text{Hz}/1\text{min}$. Range amplitude: 1.5mmP-P Hours: X,Y,Z each 2h, Total 6h
Drop	$\Delta L/L0 \leq 10\%$ There shall be no mechanical damages.	Drop the sample from the height of 20 cm onto the vinyl tile.
Mechanical shock	$\Delta L/L0 \leq \pm 10\%$ There shall be no mechanical damages.	Solder the sample to the board with reflow method and conduct the test under the following conditions. Acceleration: 980m/s^2 Hours: 6ms Direction and number: X,Y,Z,X',Y',Z' each 3times, Total 18times

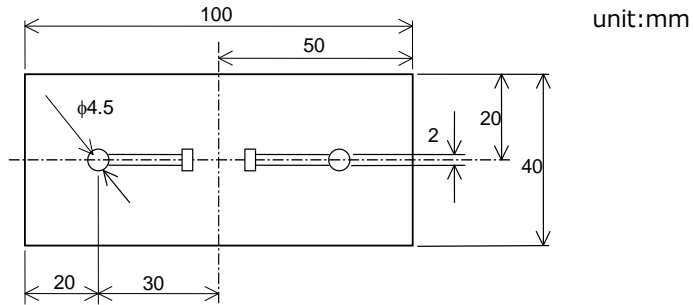
5. Recommended land pattern dimension and test board

5-1. Recommended land pattern(Ref.)

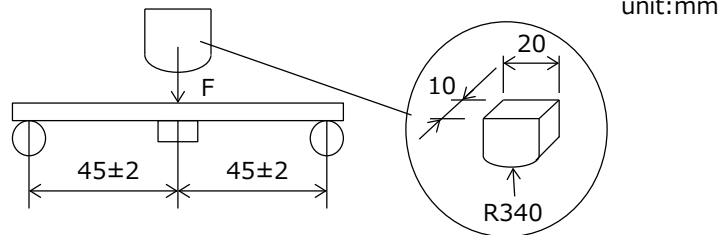


5-2. Test board

Substrate for deflection test
Glass epoxy:t=1.6mm



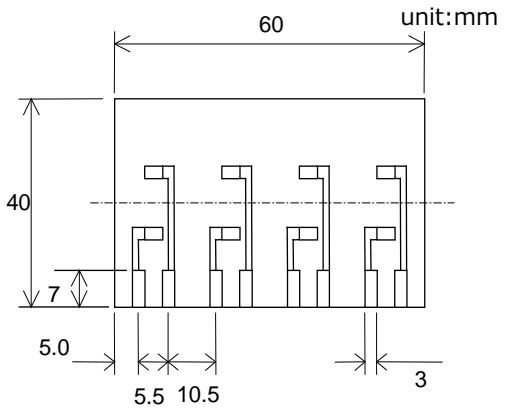
Fixture for
Substrate bending test



For Other Test Board

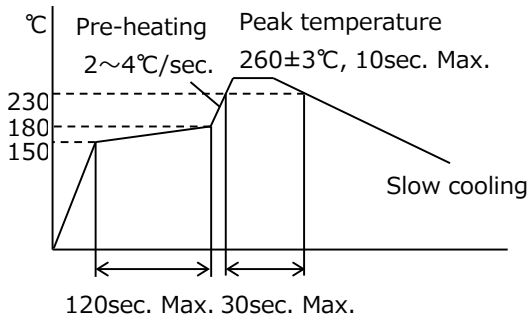
The mounting direction of the coil and
the quantity of the coil should be set it free.

The Recommended thickness of Solder paste:150~200um



6. Recommended soldering conditions (Please use this product by reflow soldering)

6-1. Lead-free solder recommended reflow profile



6-2. Iron soldering

When soldering, do not allow the solder iron tip directly touch
the metal body out side of the terminal electrode. 3+1/-0 sec., At 350±5 °C.

7. Attention in case of using

1) In case of using this product, please avoid following matters.

Splashing water or salt water

Dew condenses

Toxic gas (Hydrogen sulfide, Sulfurous acid, Chlorine, Ammonia, etc.)

Vibrations or shocks which exceed the specified condition

2) Since cracks may occur in the product due to bending of the board after mounting, be careful not to exceed the conditions of this specification as the warp and deflection of the board.

3) This product should not be washed in a solvent.

4) Since a function may deteriorate when you use a coating material etc., please carry out sufficient evaluation in advance.

5) Please do good mounting test in case of using.

6) If acoustic noise was occurred by magnetostrictive, it is preferable that reject or attenuate the audible frequency of current.

7) Do not use falling items.

However, if it falls from a height of 20 cm or more on a relatively soft material such as a vinyl tile, it can be used after confirming that the appearance and characteristics of the product are normal.

8) Please don't apply the stress more than 19.6N(2kgf) onto the top of the product.

9) This product should not be washed in a solvent.

10) Please pay attention to safety distance between the inductors and other parts etc.

11) If the products are used in the moisture circumstances for a long term, the rust may appear on the surface on rare occasions. The rust doesn't affect the electrical characteristics.

8. Label notation

The packaging must be done not to receive any damage transporting and storing.

The following matters are mentioned on bar code label.

1) Your product part number

2) Our product part number

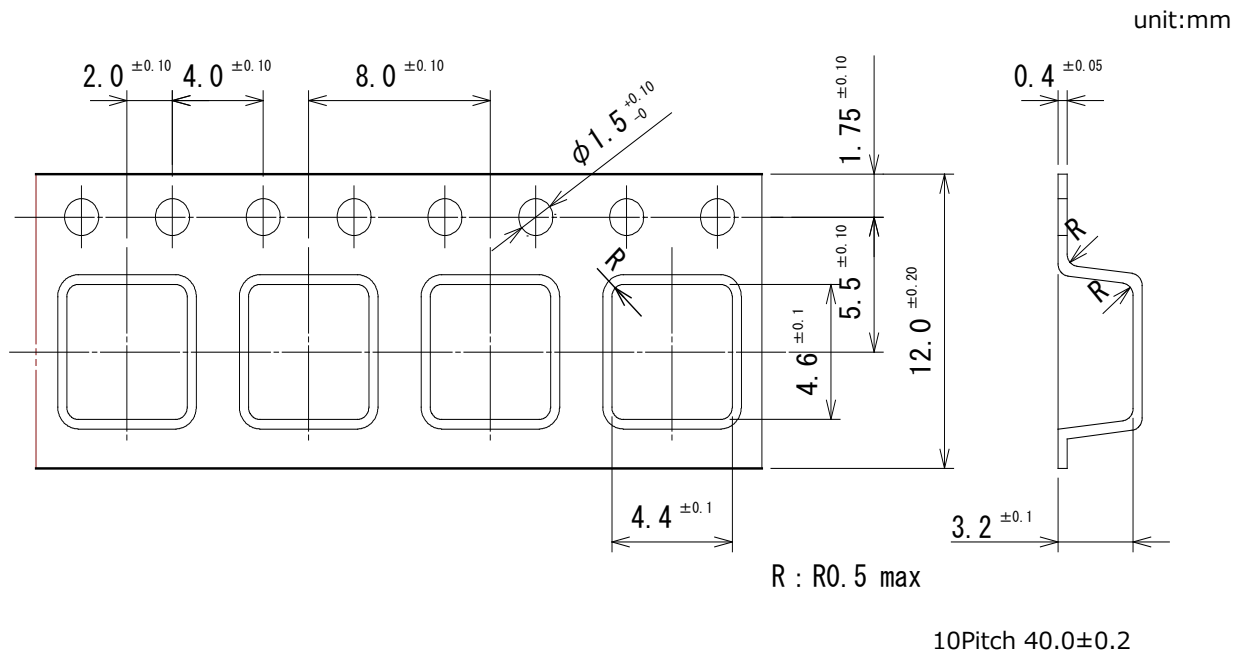
3) Shipment number

4) Quantity

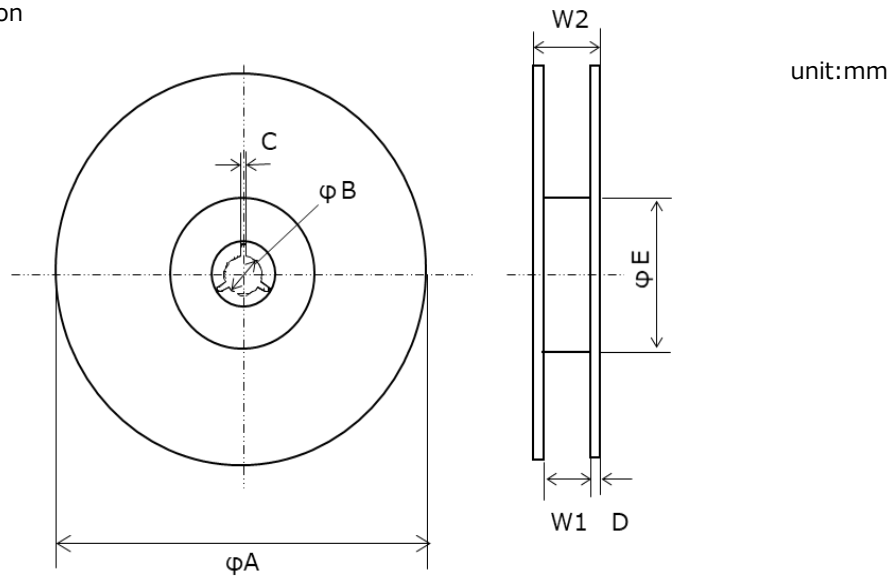
5) Shipment day

9. Taping specification

9-1. Carrier tape dimension

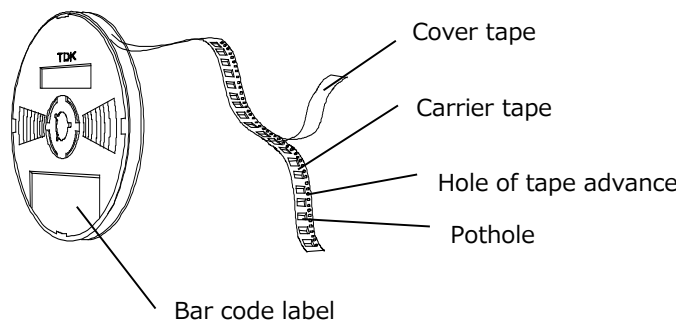


9-2. Reel dimension

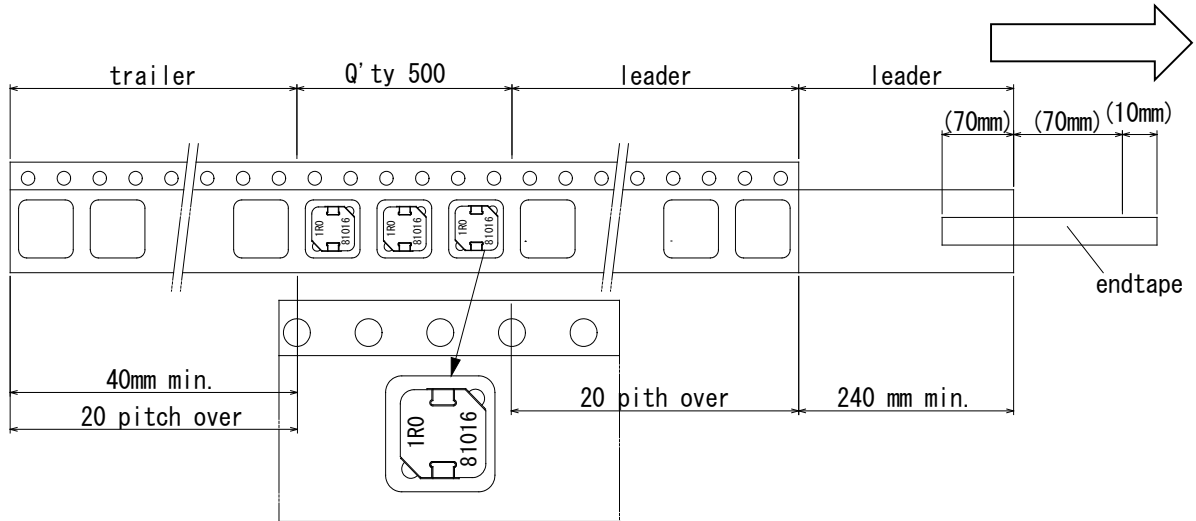


φA	φB	C	D	φE	W1	W2
φ178±1.0	φ13.3±0.5	2.2+0.5/-0	1.2+0.2/-0.1	φ59.3±0.5	12.4±0.1	15.1 or less

9-3. Taping figure



9-4. Packaging form

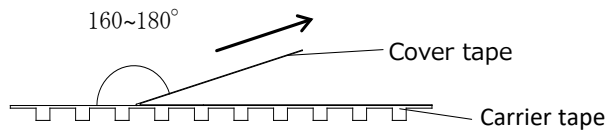


9-5. Taping quantity

Q'ty : 500pcs./Reel

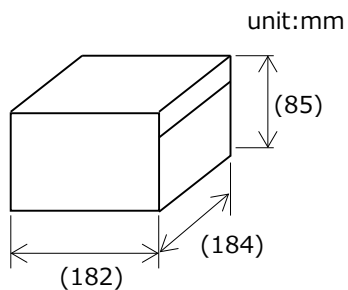
9-6. Cover tape peel strength

The force for tearing off cover tape is 0.1~1.3(N) in the arrow direction at the following conditions.



10. Packaging form and Dimensions

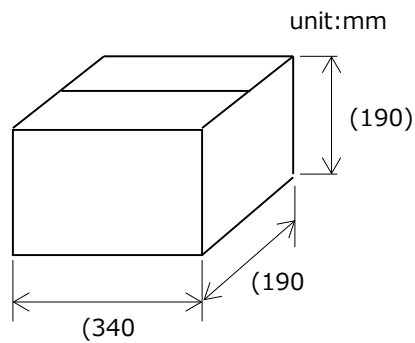
10-1. Inner box



Max. 4 Reel/Inner box

Q'ty : 2,000pcs./Inner box

10-2. Outer box



Max. 4 Inner box/Outer box

Q'ty : 8,000pcs./Outer box