

## Specifications

|              |                            |
|--------------|----------------------------|
| Drawing No.  | UKY1C-H1-25067-01[37] 1/11 |
| Issued Date. | Mar.24,2025                |

**TO:**

**Note:** Part numbers may be revised in the event of any specifications change.  
Not applicable for military, automotive, implantable medical use, and applications  
which may cause loss of life or assets.

|                                                                                             |                                                   |
|---------------------------------------------------------------------------------------------|---------------------------------------------------|
| Product Type                                                                                | Quartz Crystal                                    |
| Series                                                                                      | CX2016FB                                          |
|  Frequency | 24,25,26,27,32,38.4,40,48,50 MHz                  |
| Customer Part Number                                                                        | -                                                 |
| Customer Specification Number                                                               | -                                                 |
| KYOCERA Part Number                                                                         | refer UKY1C-H1-25067-01[37] 4/11 Part Description |
| Remarks                                                                                     | Pb-Free, RoHS Compliant, MSL 1                    |

### Customer Approval

|                    |                  |  |
|--------------------|------------------|--|
| Approval Signature | Approved Date    |  |
|                    | Department       |  |
|                    | Person in charge |  |

### Seller

#### **KYOCERA Corporation**

Corporate Electronic Components Group  
Electronic Components Sales Division  
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612-8501 Japan  
TEL. No. 075-604-3500  
FAX. No. 075-604-3501

### Manufacturer

Corporate Electronic Components Group  
Electronic Devices Division

|                                                                                                                                                     |                   |             |            |                                                                                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-------------|------------|-----------------------------------------------------------------------------------------------------|
| Design Department                                                                                                                                   | Quality Assurance | Approved by | Checked by | Issued by                                                                                           |
| KYOCERA Corporation<br>Crystal Components Application Engineering Section 2<br>Electronic Devices Division<br>Corporate Electronic Components Group | A. Ito            | T. Nitobe   | F. Horie   | Y. Kikuchi<br> |

## Revision History

| Rev.No. | Description of revision                                                                                                                                                                         | Date        | Approved by | Checked by | Issued by  |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------------|------------|------------|
| 00      | First Edition                                                                                                                                                                                   | Feb.6,2025  | T. Nitobe   | F. Horie   | Y. Kikuchi |
| 01      | <p>①・Add: 27000 kHz specification added</p> <p>②・Change: Operating temperature<br/>-40 to +85°C → -40 to +105°C</p> <p>③・Add: Frequency stability,<br/>-40 °C to +105°C specification added</p> | Mar.24,2025 | T. Nitobe   | F. Horie   | Y. Kikuchi |

**ATTENTION**

[1] If you intend to use products on the controlling equipment that relate to medical, aeronautical, aerospace, military science, space and etc., please make sure to let us know your intentions in advance.

[2] Ultrasonic related process may cause damage to crystal blank by resonance itself. If ultrasonic related process is used, we strongly recommend to assess the damage risk under related ultrasonic conditions before use in production.

**1. Electrical Specifications****1.1 General specification**

| # | Parameter                                                                                           | Value/Description            | Unit | Remark                 |
|---|-----------------------------------------------------------------------------------------------------|------------------------------|------|------------------------|
| 1 |  Nominal frequency | 24,25,26,27,32,38.4,40,48,50 | MHz  | -                      |
| 2 | Cutting type                                                                                        | AT-cut                       | -    | -                      |
| 3 | Oscillation mode                                                                                    | Fundamental                  | -    | -                      |
| 4 | Moisture sensitivity level (MSL)                                                                    | Level 1                      | -    | J-STD-020              |
| 5 | ESD                                                                                                 | HBM $\geq$ 2000V             | -    | ANSI/ESDA/JEDEC JS-001 |

**1.2 Operation conditions**

| # | Parameter                                                                                                   | Min. | Typ. | Max. | Unit | Remark |
|---|-------------------------------------------------------------------------------------------------------------|------|------|------|------|--------|
| 1 |  Operating temperature 1 | -40  | -    | +105 | °C   | -      |
| 2 | Storage temperature                                                                                         | -55  | -    | +125 | °C   | -      |
| 3 | Load capacitance (C <sub>L</sub> )                                                                          | -    | 8.0  | -    | pF   | -      |
| 4 | Drive level                                                                                                 | -    | -    | 100  | μW   | -      |

**1.3 Frequency stability & electrical parameters**

| #  | Parameter                                                                                                 | Min. | Typ. | Max. | Unit   | Remark                                                  |
|----|-----------------------------------------------------------------------------------------------------------|------|------|------|--------|---------------------------------------------------------|
| 1  | Initial frequency tolerance                                                                               | -10  | -    | +10  | ppm    | At 25±3°C and specific load, refer to nominal frequency |
| 2  | Frequency stability 1                                                                                     | -15  | -    | +15  | ppm    | Within -30°C to +85°C.                                  |
| 3  | Frequency stability 2                                                                                     | -20  | -    | +20  | ppm    | Within -40°C to +85°C.                                  |
| 4  |  Frequency stability 3 | -30  | -    | +30  | ppm    | Within -40°C to +105°C.                                 |
| 5  | Shunt capacitance (C <sub>0</sub> )                                                                       | -    | -    | -    | pF     | Note 1                                                  |
| 6  | Motional capacitance (C <sub>1</sub> )                                                                    | -    | -    | -    | fF     | Note 1                                                  |
| 7  | Motional inductance (L <sub>1</sub> )                                                                     | -    | -    | -    | mH     | Note 1                                                  |
| 8  | Frequency aging (First year)                                                                              | -3   | -    | +3   | ppm    | At 25±3°C                                               |
| 9  | Equivalent series resistance (ESR)                                                                        | -    | -    | -    | ohms   | Note 1                                                  |
| 10 | insulation resistance                                                                                     | 500  | -    | -    | M-ohms | At DC 100V                                              |

## 1. Electrical Specifications (Cont.)

### 1.3 Frequency stability & electrical parameters (Cont.)

Note 1:

| # | Part Description                     | ESR(ohms) | C0(pF)    | C1(fF)    | L1(mH)      | Remark |
|---|--------------------------------------|-----------|-----------|-----------|-------------|--------|
| 1 | CX2016FB24000D0FZZH1                 | 50        | 0.42~0.62 | 1.32~1.98 | 21.36~32.04 | -      |
| 2 | CX2016FB25000D0FZZH1                 | 100       | 0.46~0.68 | 1.28~1.90 | 20.47~30.69 | -      |
| 3 | CX2016FB26000D0FZZH1                 | 50        | 0.47~0.69 | 1.42~2.12 | 16.95~25.41 | -      |
| 4 | <a href="#">CX2016FB27000D0FZZH1</a> | 40        | 0.48~0.72 | 1.44~2.16 | 15.36~23.04 | -      |
| 5 | CX2016FB32000D0FZZH1                 | 60        | 0.53~0.79 | 1.66~2.48 | 9.58~14.36  | -      |
| 6 | CX2016FB38400D0FZZH1                 | 40        | 0.60~0.90 | 1.97~2.95 | 5.60~8.40   | -      |
| 7 | CX2016FB40000D0FZZH1                 | 40        | 0.65~0.97 | 2.12~3.16 | 4.80~7.20   | -      |
| 8 | CX2016FB48000D0FZZH1                 | 30        | 0.76~1.28 | 3.00~4.47 | 2.36~3.54   | -      |
| 9 | CX2016FB50000D0FZZH1                 | 50        | 0.50~0.74 | 1.84~2.76 | 3.53~5.29   | -      |

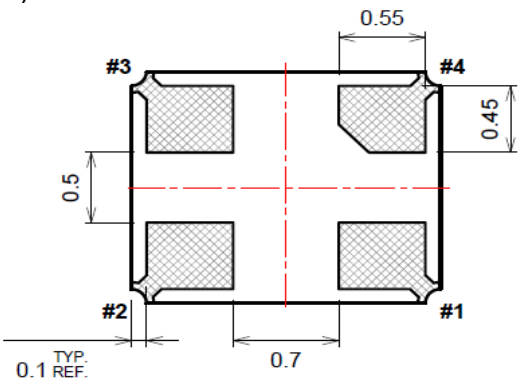
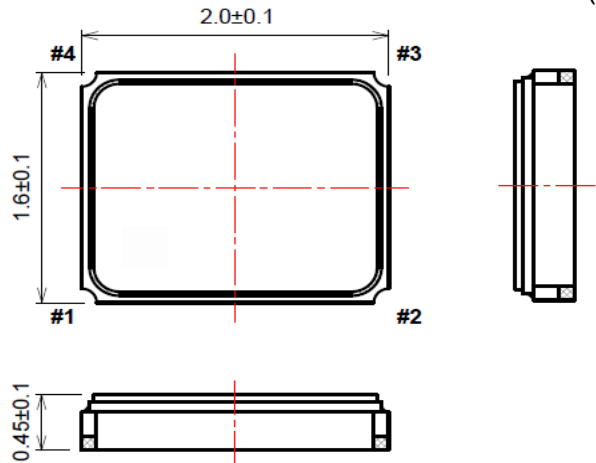
**Measure equipment:** Electrical characteristics is measured by S&A 250B or equivalent.

**Standard atmospheric conditions:**

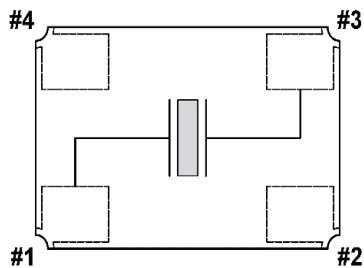
Unless otherwise specified, the standard environmental conditions for performance measurement and tests are under ambient temperature at (25±3)°C and relative humidity: 40% to 70%.

2. Product Design

2.1 Package dimensions and pad functions (Unit : mm)

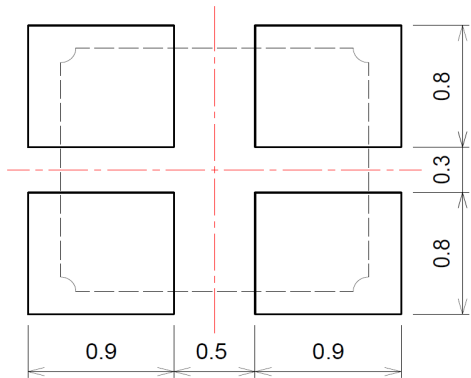


Unit : mm  
Tolerance unless otherwise specified:  $\pm 0.1$  mm.

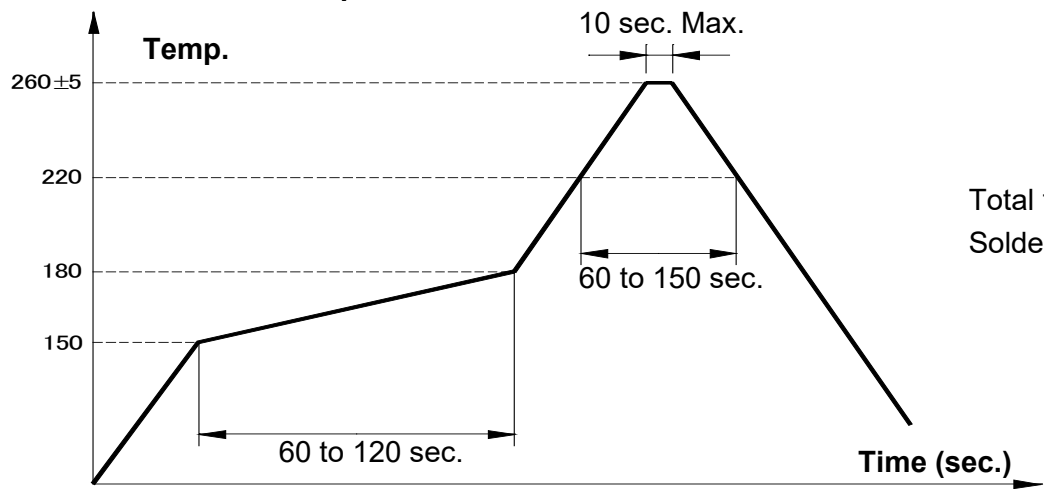


| Pad | Function                      |
|-----|-------------------------------|
| #1  | X'tal terminal (Input/output) |
| #2  | GND terminal                  |
| #3  | X'tal terminal (Input/output) |
| #4  | GND terminal                  |

2.2 Recommended land pattern (Unit : mm)

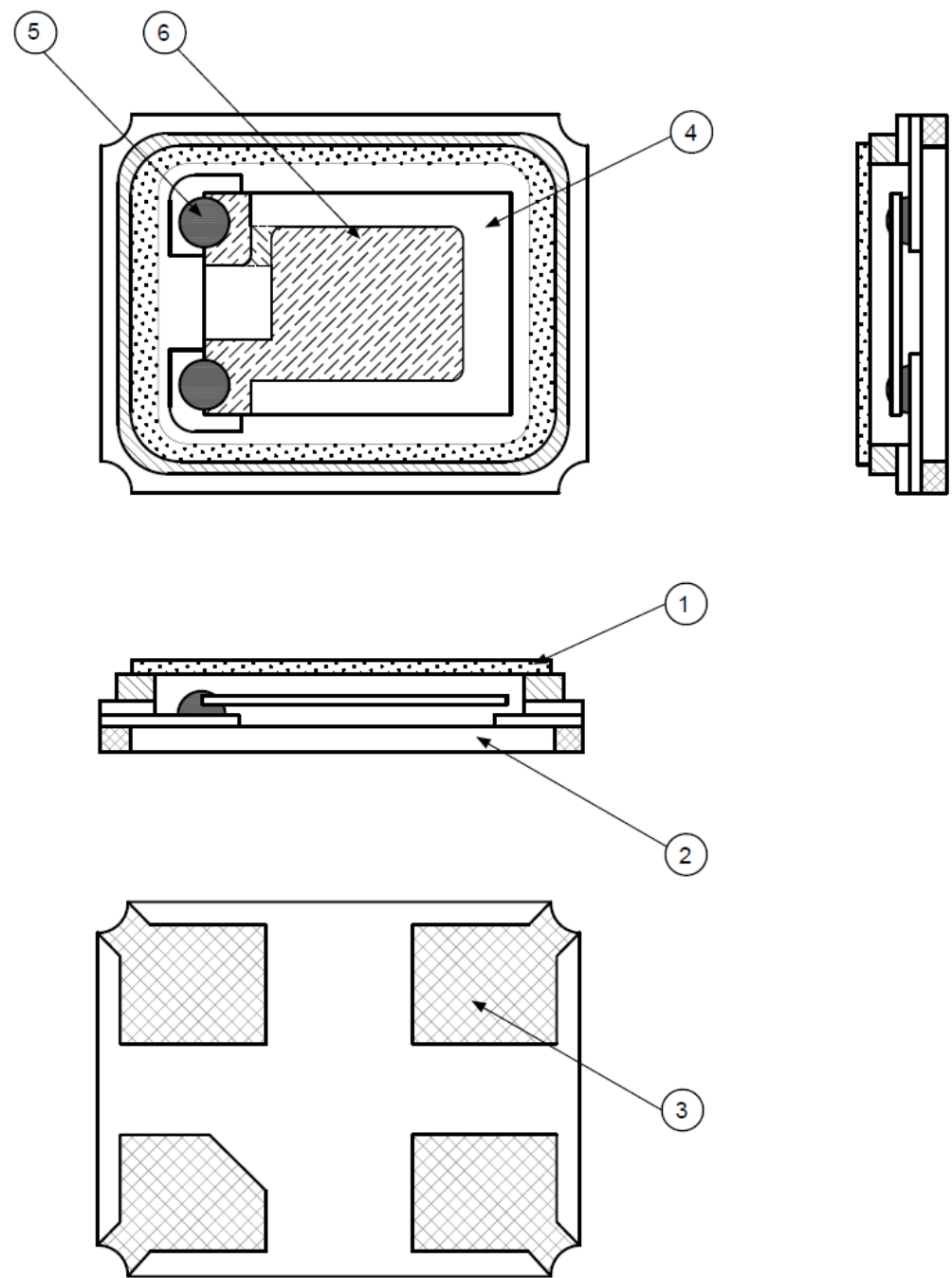


2.3 Recommended reflow profile



2. Product Design (Cont.)

2.4 Illustration to product structure



| # | Components          | Materials                                         | Finish          |
|---|---------------------|---------------------------------------------------|-----------------|
| 1 | Cap (Lid)           | Kovar (Fe-Co-Ni)                                  | Ni plating      |
| 2 | Base (Package)      | Almina ceramics (Al <sub>2</sub> O <sub>3</sub> ) | -               |
| 3 | Pad (Package)       | Ni + Au                                           | Ni + Au plating |
| 4 | Crystal blank       | SiO <sub>2</sub>                                  | -               |
| 5 | Conductive adhesive | Ag                                                | Silicone resin  |
| 6 | Electrode           | Noble metal                                       | -               |

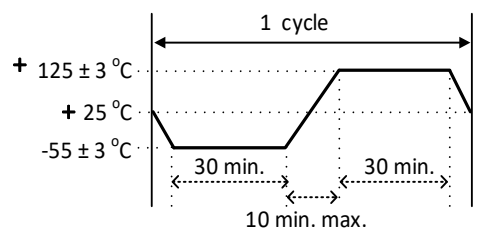
### 3. Reliability

#### 3.1 Mechanical endurance

| # | Item                         | Test Condition                                                                                                                                                                              | Reference               |
|---|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| 1 | Drop test                    | 150cm height, fall freely onto hard board 3 times                                                                                                                                           | JIS C6701               |
| 2 | Mechanical shock             | Specimen is shocked to half sine wave, 1000 g, 0.5msec duration along three mutually perpendicular axes ( $\pm X$ , $\pm Y$ , and $\pm Z$ ). Each direction for 3 shocks (total 18 shocks). | MIL-STD-202 Method 213  |
| 3 | Vibration                    | Frequency range (10 to 55) Hz<br>Amplitude 1.52 mm<br>Test time of each perpendicular axis 2 hours ( $\pm X$ , $\pm Y$ , and $\pm Z$ )<br>Total test time 6 hours                           | MIL-STD-202 Method 201  |
| 4 | Gross leak                   | Standard sample for automatic gross leak detector test pressure $2\text{kg/cm}^2$                                                                                                           | MIL-STD-883 Method 1014 |
| 5 | Fine leak                    | Helium bombing $5.0\text{kg/cm}^2$ for 2 hours                                                                                                                                              | MIL-STD-883 Method 1014 |
| 6 | Solderability                | Temperature $(245 \pm 5)^\circ\text{C}$<br>Immersing depth 0.5 mm minimum<br>Immersion time $(5 \pm 1)$ sec.<br>Flux Rosin resin methyl alcohol solvent (1 : 4)                             | J-STD-002               |
| 7 | Resistance to soldering heat | Test temperature $(260 \pm 5)^\circ\text{C}$<br>Test time $(10 \pm 1)$ sec.                                                                                                                 | MIL-STD-202 Method 210  |

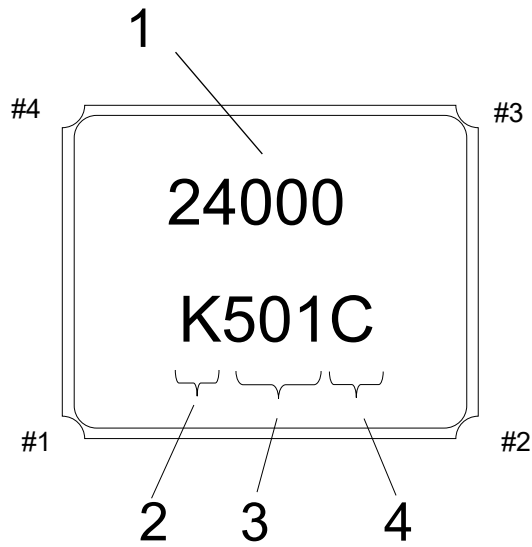
### 3. Reliability (Cont.)

#### 3.2 Environmental endurance

| # | Item                             | Test Condition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Reference                    |
|---|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| 1 | High temperature storage (Aging) | +125 °C ± 3 °C for 500 hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | MIL-STD-202<br>Method 108    |
| 2 | Low temperature storage          | -40 °C ± 3 °C for 500 hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | IEC 60068-2-1                |
| 3 | Thermal shock                    | <p>Total 100 cycles of the following temperature cycle</p>  <p>The diagram illustrates a thermal shock cycle. It begins at a high temperature of <math>+125 \pm 3 \text{ }^{\circ}\text{C}</math>. The temperature then drops to a low temperature of <math>-55 \pm 3 \text{ }^{\circ}\text{C}</math> and is held there for 30 minutes. Next, the temperature rises to <math>+25 \text{ }^{\circ}\text{C}</math> and is held there for a maximum of 10 minutes. Finally, the temperature drops back to <math>-55 \pm 3 \text{ }^{\circ}\text{C}</math> and is held there for 30 minutes. The entire sequence is labeled as '1 cycle'.</p> | MIL-STD-883<br>Method 1011.9 |
| 4 | High temperature & humidity      | +85°C ±3°C, RH 85%, 500 hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | JIS C5023                    |
| 5 | High temperature operating life  | 1000 hours at +85°C with $V_{DD}$ applied                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | MIL-STD-202<br>Method 108    |

4. Marking and Packing

4.1 Marking definition



- 1: Nominal Frequency

2: Identification

3: Date Code

4: Manufacturing Location
- First 5digit of the frequency is indicated

"K" is to indicate 1Pin direction

Last 1 Digit of Year and Week

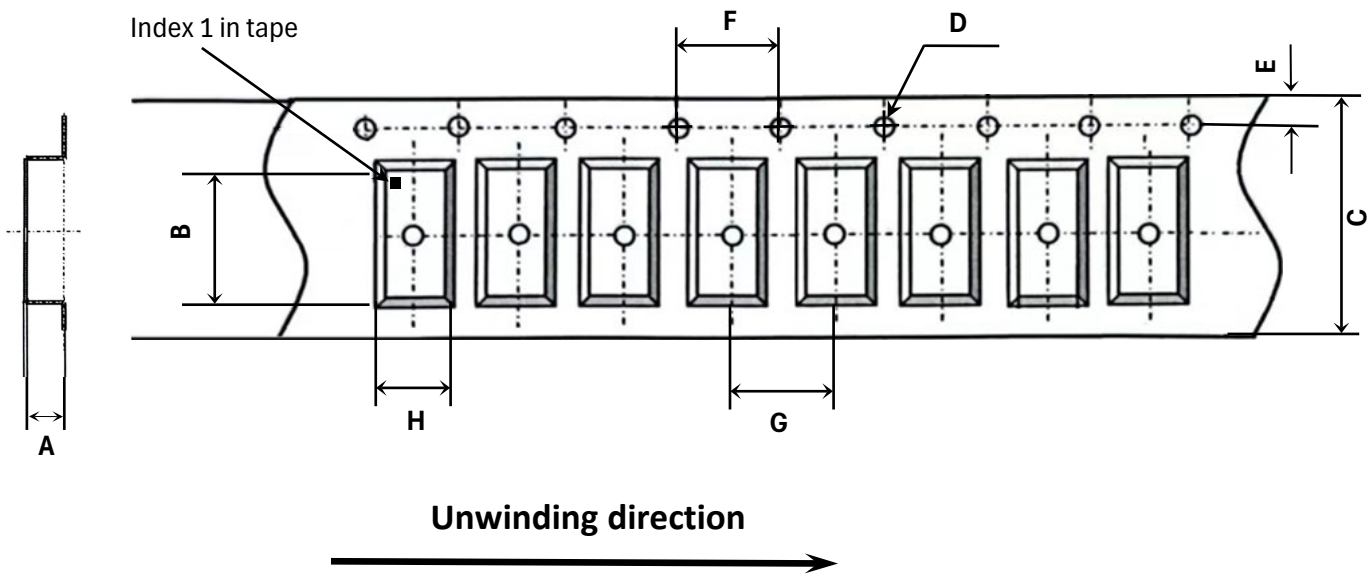
(Ex)Jan,01,2025 →>501

C...Oversea

\*The Font of marking is for reference only

4.2 Packing (EIA-481-2)

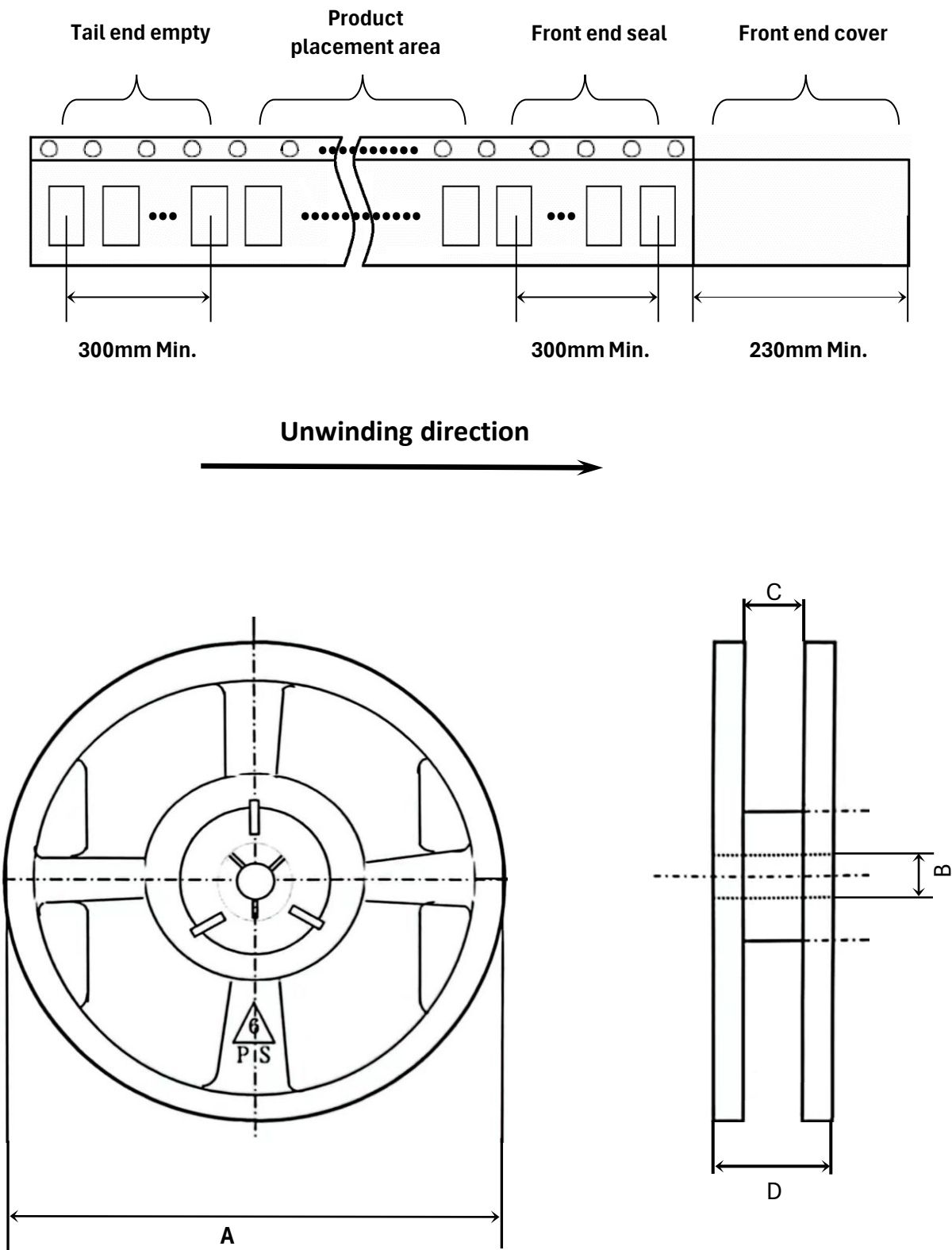
8mm-4mm, 3000pcs / reel, φ178;



| Tape dimension (Unit : mm) |         |         |           |          |          |          |          |
|----------------------------|---------|---------|-----------|----------|----------|----------|----------|
| A                          | B       | C       | D         | E        | F        | G        | H        |
| 0.65±0.1                   | 2.3±0.1 | 8.0±0.3 | 1.55±0.05 | 1.75±0.1 | 4.00±0.2 | 4.00±0.1 | 1.90±0.1 |

4. Marking and Packing (Cont.)

4.2 Packing (EIA-481-2) (Cont.)



3,000 pcs/reel

| Reel dimension (Unit : mm) |          |         |          |
|----------------------------|----------|---------|----------|
| A                          | B        | C       | D        |
| 178±2.0                    | 13.2±0.5 | 9.0±0.5 | 11.5±1.4 |

## **5. Product storage conditions:**

- [1] Temperature: 15 to 35°C.
- [2] Humidity: 30 to 70% RH.
- [3] Time: within 6 months after delivery.
- [4] Please store the products in a dry, clean, well-ventilated area and avoid direct sunlight exposure, heat, and vibration.

## **6. Quality Assurance**

To be guaranteed by Kyocera Corporation Quality Assurance Division

## **7. Quality guarantee**

In case when Kyocera Corporation rooted failure occurred within 1year after its delivery, substitute product will be arranged based on discussion. Quality guarantee of product after 1year of its delivery is waived.

## **8. Others**

In case of any questions or opinions regarding the Specification, please have it in written manner within 45 days after issued date.

If you do not contact us within the deadline, we will assume that the items listed are approved.