

Specifications

| | |
|--------------|--------------------------|
| Drawing No. | USY1M-H1-16424-00 1 / 11 |
| Issued Date. | Apr,19,2016 |

Messrs: KED USA

Note: Part Number will be revised in case of specification change.

| | |
|--|---|
| Product Type | Quartz Crystal |
| Series | CX2016DB |
| Frequency | Refer to Doc No.USY1M-H1-16424-00 Page 3/11 |
| Customer Part Number | - |
| Customer Specification Number | - |
| KYOCERA Part Number | Refer to Doc No.USY1M-H1-16424-00 Page 3/11 |
| Remarks Pb-Free, RoHS Compliant, MSL 1 | |

Customer Approval

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

Seller

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 Crystal Units Division
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 FAX. No. 0237-43-5615

| Design Department | Quality Assurance | Approved by | Checked by | Issued by |
|--|-------------------|-------------|------------|-----------|
| KYOCERA Crystal Device Corporation Crystal Unit Application Engineering Section Crystal Units Division | S.Itoh | T.Soda | A.Muraoka | Y.Nozaki |

Revision History

| Rev.No. | Description of revise | Date | Approved by | Checked by | Issued by |
|---------|-----------------------|-------------|-------------|------------|-----------|
| 00 | First Edition | Apr,19,2016 | T.Soda | A.Muraoka | Y.Nozaki |
| | | | | | |
| | | | | | |

[Parts Number list]

| Nominal Frequency (MHz) | KYOCERA Part Number | ESR (Ω) | Nominal Frequency Code |
|-------------------------|----------------------|------------------|------------------------|
| 19.200 | CX2016DB19200D0FLJC1 | 200 | 19200 |
| 24.000 | CX2016DB24000D0FLJC6 | 150 | 24000 |
| 24.576 | CX2016DB24576D0FLJC1 | 150 | 24576 |
| 25.000 | CX2016DB25000D0FLJC2 | 150 | 25000 |
| 26.000 | CX2016DB26000D0FLJC4 | 60 | 26000 |
| 27.000 | CX2016DB27000D0FLJC1 | 60 | 27000 |
| 30.000 | CX2016DB30000D0FLJC1 | 60 | 30000 |
| 38.400 | CX2016DB38400D0FLJC2 | 60 | 38400 |
| 48.000 | CX2016DB48000D0FLJC1 | 50 | 48000 |

1. APPLICATION

The purpose of this document is applied to CX2016DB quartz crystal.

2. KYOCERA PART NUMBER

Refer to Doc No.USY1M-H1-16424-00 Page 3/11

3. RATINGS

| Items | SYMB. | Rating | Unit | Remarks |
|-----------------------------|-------|---------|--------|---------|
| Operating Temperature range | Topr | -30~+85 | deg. C | |
| Storage Temperature range | Tstg | -40~+85 | deg. C | |

4. CHARACTERISTICS

4-1 ELECTRICAL CHARACTERISTICS

| Items | Electrical Specification | | | | | Test Condition | Remarks |
|---------------------------------------|--------------------------|-------------|------|-------|------|----------------------|---------|
| | SYMB. | Min | Typ. | Max | Unit | | |
| Mode of Vibration | | Fundamental | | | | | |
| Nominal Frequency | F0 | | (*1) | | MHz | | |
| Nominal Temperature | T _{NOM} | | +25 | | °C | | |
| Load Capacitance | CL | | 8.0 | | pF | | |
| Frequency Tolerance | df/F | -10.0 | | +10.0 | PPM | +25±3°C | |
| Frequency Temperature characteristics | df/F | -15.0 | | +15.0 | | -30°C ~+85°C | |
| Frequency Ageing Rate | | -1.0 | | +1.0 | | 1 ST year | +25±3°C |
| Equivalent Series Resistance | ESR | | (*2) | | Ω | | |
| Drive Level | Pd | 0.01 | | 100 | μW | | |
| Insulation Resistance | IR | 500 | | | MΩ | 100V(DC) | |

Measurement Condition

Frequency measurement

Measuring instrument : IEC PI-Network Test Fixture

IEC 60444-8 STD (Pi circuit 41901A)

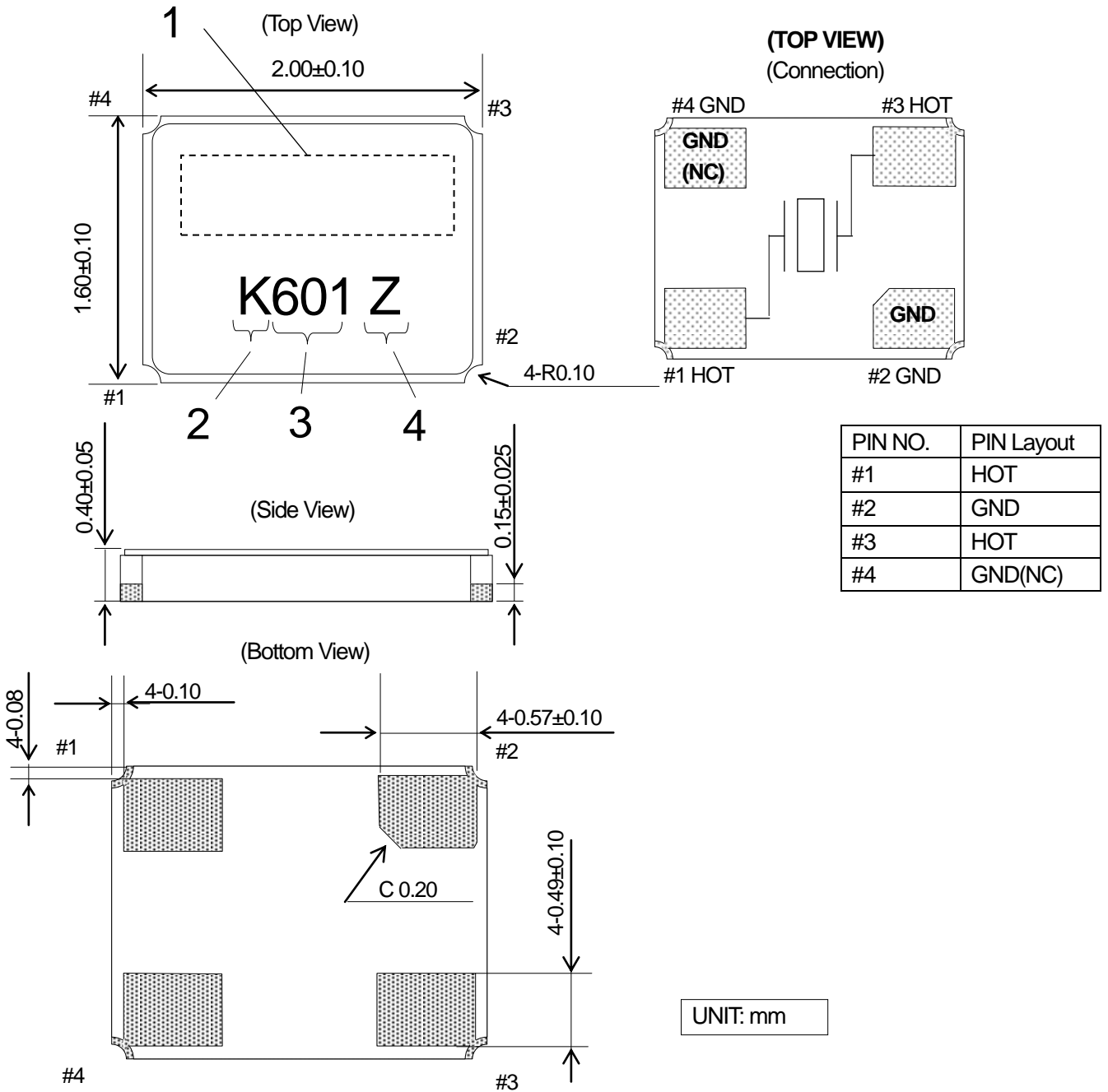
Equivalent series resistance (ESR) measurement

Measuring instrument : IEC PI-Network Test Fixture

Load Capacitance : Series

*1 *2 Refer to Doc No.USY1M-H1-16424-00 Page 3/11

5. APPEARANCES, PHYSICAL DIMENSION
OUTLINE DIMENSION (not to scale)



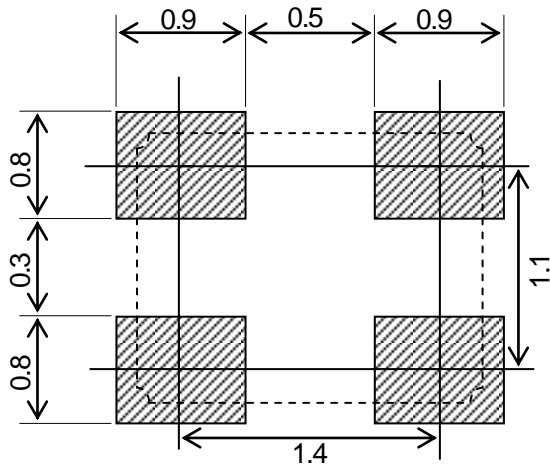
MARKING

- | | | |
|---|------------------------|---|
| 1 | Nominal Frequency | First 5digit of the frequency is indicated. *3 |
| 2 | Identification | [K] is to indicate 1Pin direction. |
| 3 | Date Code | Last 1 Digit of YEAR and WEEK (Ex) 2016,Jan,01 → 601 |
| 4 | Manufacturing Location | Y→Japan (Yamagata) Z→Japan (Shiga Yohkaichi) T→Thailand |

*The font of marking is for reference only.

*3 Refer to Doc No.USY1M-H1-16424-00 Page 3/11

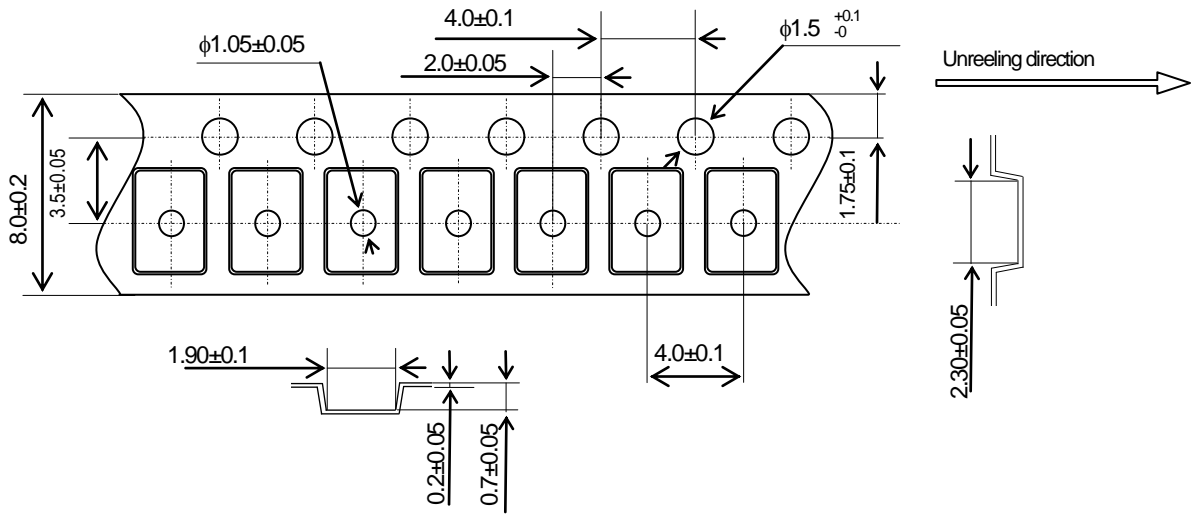
6. RECOMMENDED LAND PATTERN (not to scale)



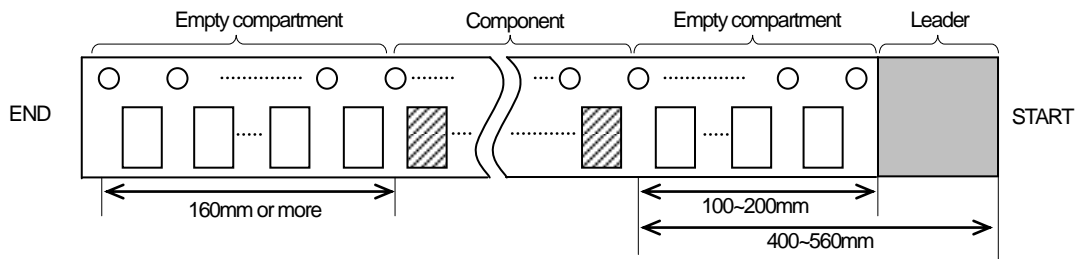
UNIT: mm

7. TAPING & REEL

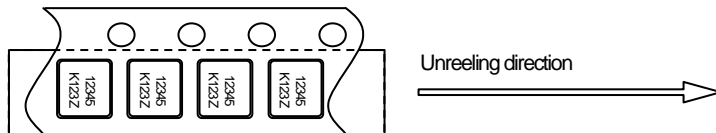
7-1. Dimensions



7-2. Leader and Carrier tape

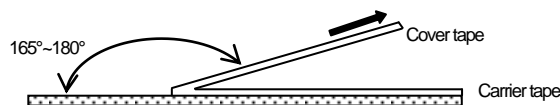


7-3. Direction (Orientation shall be checked from the top cover tape side)

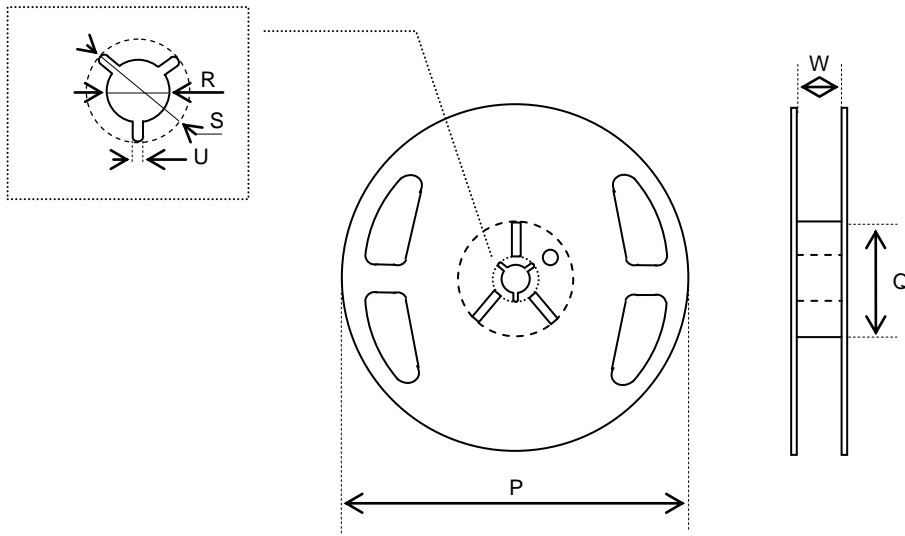


7-4. Specification

1. Material of the carrier tape is either polystyrene or A-PET (ESD).
2. Material of the cover tape is polyester (ESD).
3. The seal tape shall not cover the sprocket holes and not protrude from the carrier tape.
4. Tensile strength of carrier tape: 10N or more.
5. The R of the corner of each cavity is 0.2RMAX.
6. The alignment between centers of the cavity and sprocket hole shall be 0.05mm or less.
7. The orientation shall be checked from the top cover tape side as shown in 7-3.
8. Peeling force of cover tape: 0.1 to 1.0N.
9. The component will fall out naturally when cover tape is removed and set upside down.



7-5.Reel Specification



φ330 Reel (15,000 pcs Max.)

| | | | |
|-----------|----------|----------|---------|
| Symbol | P | Q | R |
| Dimension | φ330±2.0 | φ100±1.0 | φ13±0.2 |
| Symbol | S | U | W |
| Dimension | φ21±0.8 | 2.0±0.5 | 9.4±1.0 |

(Unit: mm)

8. Environmental requirements

After conducting the following tests, component needs to meet below conditions.

Frequency: Fluctuation within $\pm 10 \times 10^{-6}$

CI: Fluctuation within $\pm 20\%$ or 5Ω whichever is larger

- 8.1 Resistance to Shock Drop Test - test conditions
 Part is mounted to 200g fixture and dropped from a height of 150cm to a cement floor. The drop must be conducted on all 6 mutually perpendicular axes.
- Mechanical Shock Rating
 Peak Value 100g 6ms Half-Sine
- 8.2 Resistance to Vibration Test condition
- | | |
|------------|-------------------------------|
| frequency | : 10 - 55 - 10 Hz |
| Amplitude | : 1.5mm |
| Cycle time | : 15 minutes |
| Direction | : X,Y,Z (3direction),2h each. |
- 8.3 Resistance to Heat Test condition
 The quartz crystal unit shall be stored at a temperature of $+85\pm 2^\circ\text{C}$ for 500h and subjected to room temperature for 1h before measurement.
- 8.4 Resistance to Cold Test condition
 The quartz crystal unit shall be stored at a temperature of $-40\pm 2^\circ\text{C}$ for 500h and subjected to room temperature for 1h before measurement.
- 8.5 Thermal Shock Test condition
 The quartz crystal unit shall be subjected to 500 temperature cycles shown in table below, Then it shall be subjected to room temperature for 1h before measurement.
- | | |
|-------|--|
| Cycle | : $-40\pm 2^\circ\text{C}$ (30min.) \rightarrow $+25\pm 2^\circ\text{C}$ (5min.) |
| | \rightarrow $+85\pm 2^\circ\text{C}$ (30min.) \rightarrow $+25\pm 2^\circ\text{C}$ (5min.) |

8.6 Resistance to Moisture

Test condition

The quartz crystal unit shall be stored at a temperature of $+60\pm 2^{\circ}\text{C}$ with relative humidity of 90% to 95% for 240 h. Then it shall be subjected to room temperature for 1h before measurement.

8.7 Soldering condition

1.) Type of solder

Material → lead free solder paste

Melting point → $+220\pm 5^{\circ}\text{C}$

2.) Reflow temp.profile

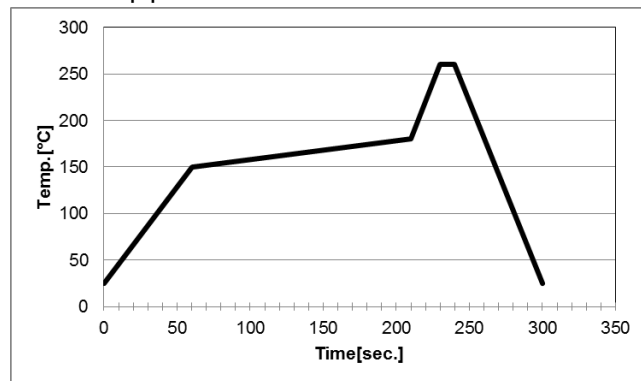
| | Temp [$^{\circ}\text{C}$] | Time[sec] |
|------------|-----------------------------|------------|
| Preheating | +150 to +180 | 150 (typ.) |
| Peak | $+260\pm 5$ | 10 (max.) |
| Total | - | 300 (max.) |

Frequency shift : $\pm 2\text{ppm}$

3.) Hand Soldering $+350^{\circ}\text{C}$ 3 sec max

4.) Reflow Times 2 times in below Reflow temp. profile

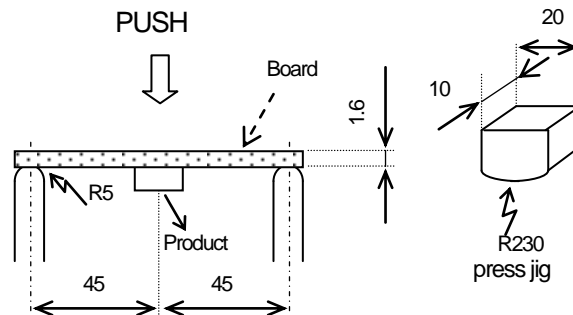
Reflow temp.profile



8.8 Bending Strength

Solder this product in center of the circuit board (40mm X 100mm), and add deflection of 3mm.

Test board : $t=1.6\text{mm}$



UNIT: mm

9. Cautions for use

(1) Soldering upon mounting

There is a possibility to influence product characteristics when Solder paste or conductive glue comes in contact with product lid or surface.

(2) When using mounting machine

Please minimize the shock when using mounting machine to avoid any excess stress to the product.

(3) Conformity of a circuit

We strongly recommend to make sure that Negative resistance (Gain) of IC is designed to be 3 times the ESR (Equivalent Series Resistance) of crystal unit.

10. Storage conditions

Please store product in below conditions, and use within 6 months.

Temperature +18 to +30°C, and Humidity of 20 to 70 % in the packaging condition.

11. Manufacturing location

Kyocera Crystal Device Corporation Yamagata Plant

Kyocera Crystal Device Corporation Shiga Yohkaichi Plant

Kyocera Crystal Device (Thailand) Co., Ltd

12. Quality Assurance

To be guaranteed by Kyocera Crystal Device Quality Assurance Division

13. Quality guarantee

In case when Kyocera Crystal Device 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.

14. Others

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