

Specifications

| | |
|--------------|----------------------|
| Drawing No. | K1101-13745-372 1/11 |
| Issued Date. | Jan,23,2014 |

TO: Digi-Key

Note: In case of specification change, KYOCERA Part Number also will be changed.

| | |
|-------------------------------|---|
| Product Name | Quartz Crystal |
| Product Model | CX2016DB |
| Frequency | Refer to K1101-13745-372 3/11 Nominal Frequency |
| Customer Part Number | - |
| Customer Specification Number | - |
| KYOCERA Part Number | Refer to K1101-13745-372 3/12 KYOCERA Part Number |
| Remarks | Pb-Free, RoHS Compliant, MSL 1 |

Customer Acceptance

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

Seller

KYOCERA Corporation

6 Takeda Tobadono-cho, Fushimi-ku, Kyoto

612-8501 Japan

TEL. No. 075-604-3500

FAX. No. 075-604-3501

Manufacturer

KYOCERA Crystal Device Corporation

5850, Higashine-Koh, Higashine-Shi, Yamagata

999-3701 Japan

TEL. No. 0237-43-5611

FAX. No. 0237-43-5615

| Design Department | Quality Assurance | Approved by | Checked by | Issued by |
|---|-------------------|-------------|------------|------------|
| KYOCERA Crystal Device Corporation Crystal Units Engineering Section Crystal Units Division | A. Kikuchi | Y.Takahashi | T. Nitoube | Y. Kikuchi |

Revision History

| Rev.No. | Description of revise | Date | Approved by | Checked by | Issued by |
|---------|--|-------------|-------------|------------|------------|
| 1 | First Edition | Jul,29,2013 | Y.Takahashi | T. Nitoube | Y. Kikuchi |
| 2 | •Frequency Addition. 16000kHz, 20000kHz | Jan,23,2014 | Y.Takahashi | T. Nitoube | Y. Kikuchi |

[PART NUMBER LIST]

| | Nominal Frequency (MHz) | KYOCERA Part Number | ESR (Ω) | Nominal Frequency Code |
|---|-------------------------|----------------------|---------|------------------------|
| △ | 16.000 | CX2016DB16000D0FLJCC | 200 | 16000 |
| △ | 20.000 | CX2016DB20000D0FLJCC | 150 | 20000 |
| | 26.000 | CX2016DB26000D0FLJCC | 80 | 26000 |
| | 32.000 | CX2016DB32000D0FLJCC | 80 | 32000 |
| | 38.400 | CX2016DB38400D0FLJCC | 60 | 38400 |
| | 40.000 | CX2016DB40000D0FLJCC | 50 | 40000 |

1. APPLICATION

This specification sheet is applied to quartz crystal “CX2016DB”

2. KYOCERA PART NUMBER

Refer to K1101-13745-372 3/11 KYOCERA Part Number

3. RATINGS

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

4. CHARACTERISTICS

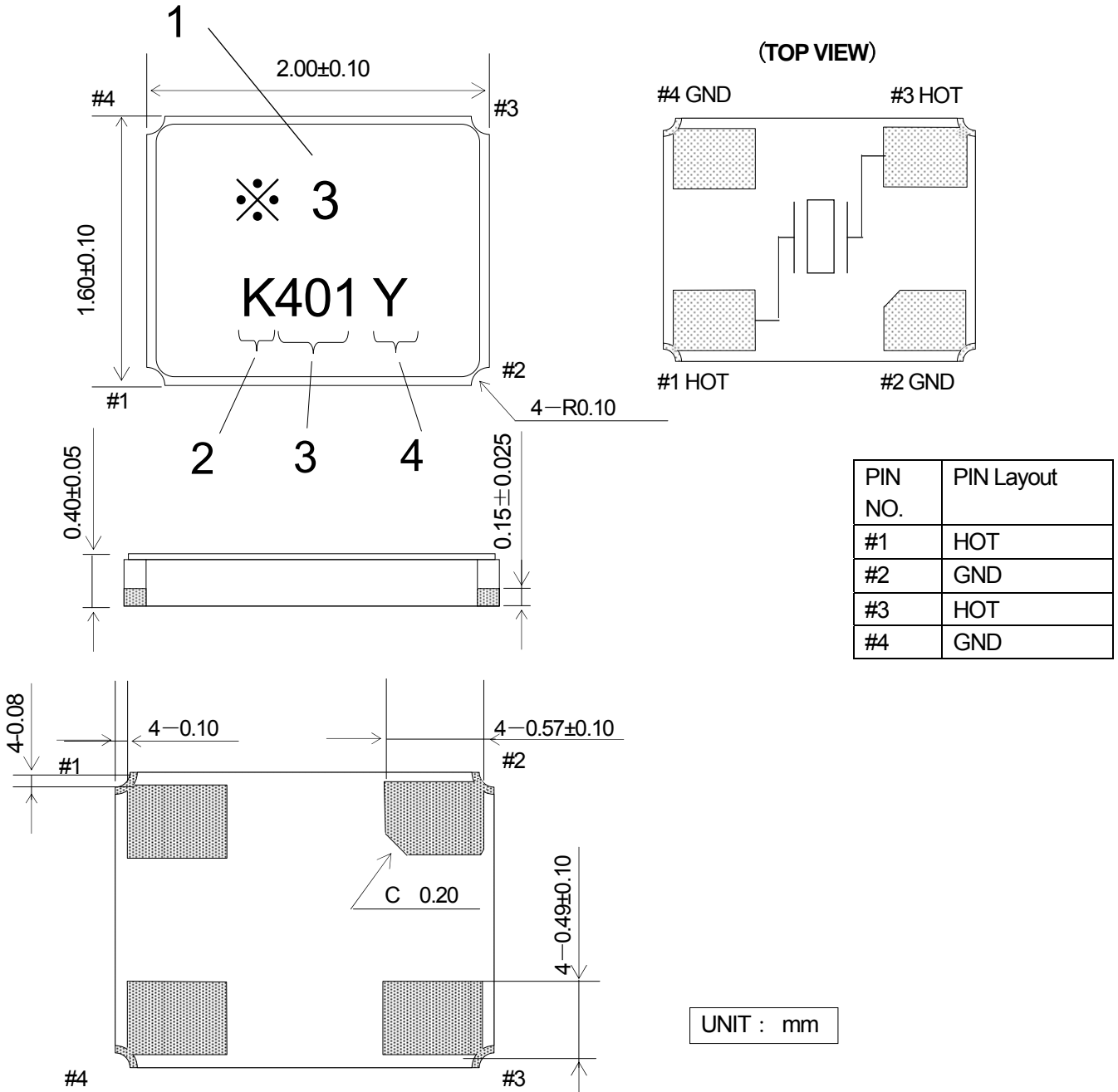
ELECTRICAL CHARACTERISTICS

| 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 to +85°C | |
| Frequency Ageing Rate | | -1.0 | | +1.0 | | 1 year | +25±3°C |
| Equivalent Series Resistance | ESR | | | ※2 | Ω | | |
| Drive Level | Pd | 0.01 | | 100 | μW | | |
| Insulation Resistance | IR | 500 | | | MΩ | 100V(DC) | |

※1 Refer to K1101-13745-372 3/11 Nominal Frequency

※2 Refer to K1101-13745-372 3/11 ESR

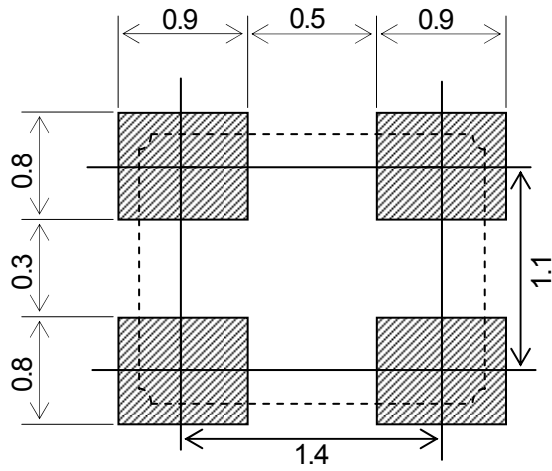
5. APPEARANCES, PHYSICAL DIMENSION
OUTLINE DIMENSION (not to scale)



MARKING

- 1 Nominal Frequency Move the number of maximum indication beams of the frequency to five digits, and omit less than kHz.
- 2 Identification [K] mark is surely 1Pin direction.
- 3 Date Code Year · · LAST 1 DIGIT of YEAR AND WEEK
(Ex)Jan,01, 2014 → 401
- 4 Manufacturing Location Y··Yamagata
Z··Shiga Yohkaichi
T··Thailand
F··Philippines

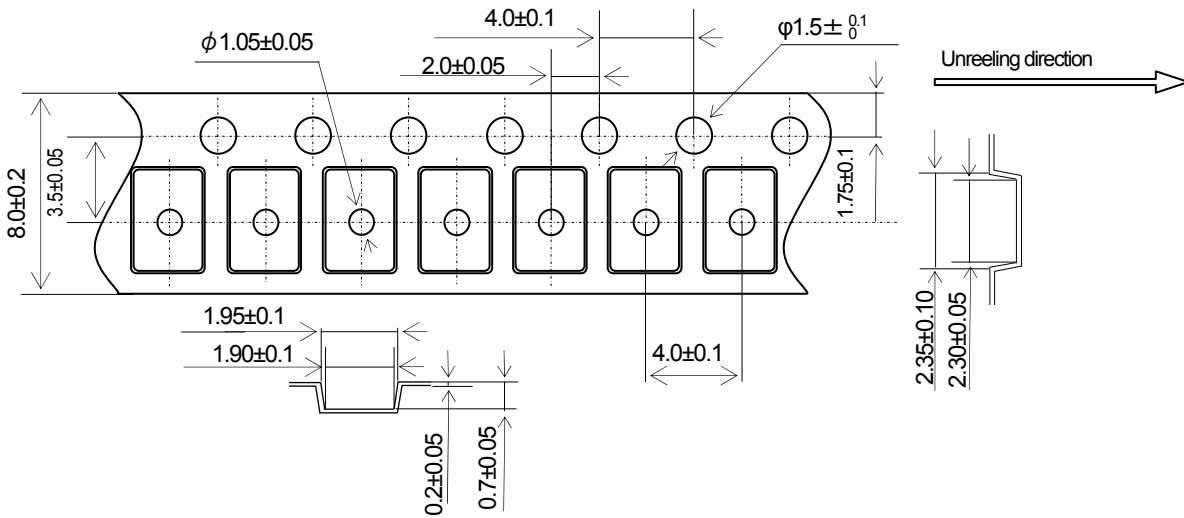
※3 Refer to K1101-3745-372 3/11 Nominal Frequency Code
 The font of marking is reference.

6. RECOMMENDED LAND PATTERN (not to scale)

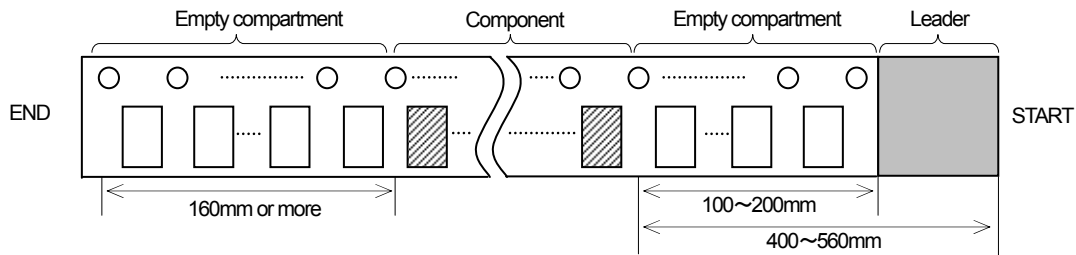
UNIT : mm

7. TAPING&REEL

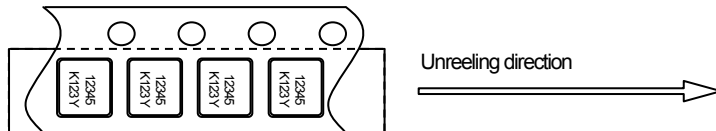
7-1.Dimensions



7-2.Leader and trailer tape

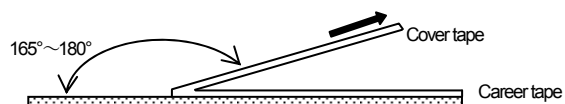


7-3.Direction (The direction shall be seen from the top cover tape side)

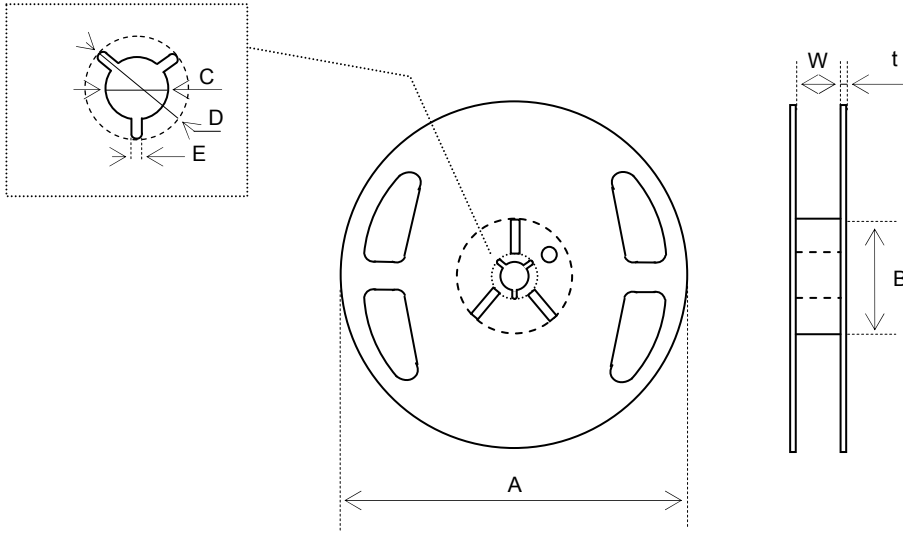


7-4.Specification

1. Material of the carrier tape shall be polystyrene or A-PET (ESD).
2. Material of the seal tape shall be polyester (ESD).
3. The seal tape shall not cover the sprocket holes. And not protrude from the carrier tape.
4. Tensile strength of the tape: 10N or more.
5. The R of the corner without designation is 0.2RMAX.
6. The alignment between centers of the cavity and sprocket hole shall be 0.05mm or less.
7. Cumulative pitch tolerance of "P₀" shall be ±0.2mm at 10 pitches.
8. Suppose that it unifies as shown in the above-mentioned figure to the directivity of printing in an embossing tape.
9. Peeling force of the seal tape: 0.1 to 1.0N.
10. The component can fall headlong naturally from taping in the environment, such dry conditions, when this components were transferred to, cover was removed and the component was moved upside down.



7-5.Reel Specification



In the case of $\phi 180$ Reel (3,000 pcs max, every 1,000 pcs)

| | | | | |
|-----------|------------------|-----------------|-------------------|-------------------|
| Symbol | A | B | C | D |
| Dimension | $\phi 180 +0/-3$ | $\phi 60 +1/-0$ | $\phi 13 \pm 0.2$ | $\phi 21 \pm 0.8$ |
| Symbol | E | W | t | |
| Dimension | 2.0 ± 0.5 | 9 ± 1 | 2.0 ± 0.5 | |

(Unit : mm)

In the case of $\phi 330$ Reel (12,000 pcs max, every 1,000 pcs)

| | | | | |
|-----------|--------------------|--------------------|-------------------|-------------------|
| Symbol | A | B | C | D |
| Dimension | $\phi 330 \pm 2.0$ | $\phi 100 \pm 1.0$ | $\phi 13 \pm 0.2$ | $\phi 21 \pm 0.8$ |
| Symbol | E | W | t | |
| Dimension | 2.0 ± 0.5 | 9.5 ± 0.5 | 2.2 ± 0.1 | |

(Unit : mm)

8.Environmental requirements

After following test, frequency shall not change more than $\pm 10 \times 10^{-6}$
And CI, $\pm 20\%$ or 5Ω of large value.

8.1 Resistance to Shock

Test condition
Natural dropped from height 100cm onto hard wood board in 3 times

8.2 Resistance to Vibration

Test condition
frequency : 10 - 55 - 10 Hz
Amplitude : 1.5mm
Cycle time : 15 minutes
Direction : X,Y,Z (3direction), 2 h 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 500 h.
Then it shall be subjected to standard atmospheric conditions for 1 h ,after whichi measurement shall be made.

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 500 h.
Then it shall be subjected to standard atmospheric conditions for 1 h ,after whichi measurement shall be made.

8.5 Thermal Shock

Test condition
The quartz crystal unit shall be subjected to 500 succesive change of temperature cycles , each as shown in table below, Then it shall be subjected to standard atmospheric conditions for 1h, after which measurements shall be made.
Cycle : $-40 \pm 2^\circ\text{C}$ (30min.) to $+25 \pm 2^\circ\text{C}$ (5min.)
to $+85 \pm 2^\circ\text{C}$ (30min.) to $+25 \pm 2^\circ\text{C}$ (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 standard atmospheric conditions for 1h, after which measurements shall be made

8.7 Soldering condition

1.) Material of solder

Kind ... lead free solder paste

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

2.) Reflow temp.profile

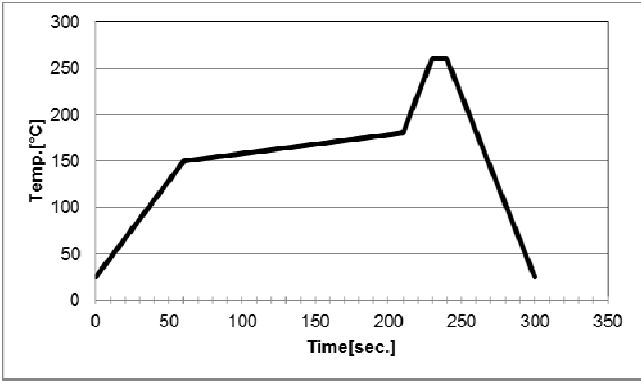
| | Temp [$^\circ\text{C}$] | Time[sec] |
|------------|---------------------------|------------|
| Preheating | +150 to +180 | 150 (typ.) |
| Peak | $+260 \pm 5$ | 10 (max.) |
| Total | — | 300 (max.) |

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

3.) Hand Soldering + 350°C 3 sec MAX

4.) Reflow Times 2 times

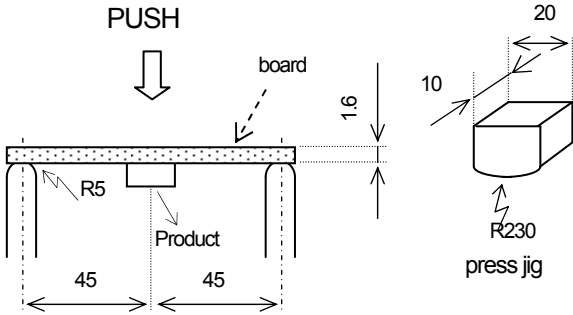
Reflow temp.profile



8.8 Intensity for bending in circuit board

Solder this product in center of the circuit board of $40\text{mm} \times 100\text{mm}$, and add the deflection of 3mm as the bottom figure.

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



UNIT : mm

9. Cautions for use

(1) Automatic mounting machine use

Please use after affirmation that select the mounting machine model with a shock small if possible in the case of use of an automatic mounting machine, and it does not have breakage. There is a risk of a crystal oscillating child's breakage occurring and not functioning normally by too much shock etc.

(2) Conformity of a circuit

In case of use of an oscillation circuit, please insert in a crystal oscillating child in series resistance 5 times as many as the standard value of equivalent in-series resistance, and confirm oscillating. Please remove resistance which inserted after the notes above-mentioned examination in the crystal oscillating child in series, and use it.

10. Storage conditions

Storage at prolonged high temperature or low temperature and the storage by high humidity cause degradation of frequency accuracy, and degradation of soldering nature. Storage is performed at the temperature of +18 to +30°C, and the humidity of 20 to 70 % in the state of packing, and a term is 6 months.

11. Manufacturing location

Kyocera Crystal Device Corporation
Kyocera Crystal Device Corporation Shiga Yohkaichi Plant
Kyocera Crystal Device (Thailand) Co., Ltd
Kyocera Crystal Device Philippines, Inc.

12. Quality Assurance

Kyocera Crystal Device Quality Assurance Division

13. Quality guarantee

When the failure by the responsibility of our company occurs clearly after delivery within 1 year, a substitute article etc. is appropriated gratuitously and this is guaranteed. However, when passing 1 year after delivery, there is a case where I am allowed to consider as onerous repair after both consultation.

14. Others

When any questions and opinions are in the written matter of these delivery specifications, I will ask connection of you from the company issue day within 45 days. In a connection no case, a written matter is consented to it and employed within a term.