

# Preliminary Specifications

|              |                   |
|--------------|-------------------|
| Drawing No.  | USY1M-H1-22094-00 |
| Issued Date. | Aug,31,2022       |

## Messrs: Mouser

**Note : Specifications are subject to change and part numbers will be revised in case of specifications change.**

|                               |                                                                                                                                                                |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product Type                  | Quartz Crystal                                                                                                                                                 |
| Series                        | CX1210SB                                                                                                                                                       |
| Frequency                     | 48000kHz                                                                                                                                                       |
| Customer Part Number          | -                                                                                                                                                              |
| Customer Specification Number | -                                                                                                                                                              |
| KYOCERA Part Number           | CX1210SB48000E9WZLCH                                                                                                                                           |
| Remarks                       | Pb-Free, RoHS Compliant, MSL 1<br>Not applicable for military, automotive, base station, medical use, and applications which may cause loss of life or assets. |

### Customer Approval

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

### Seller

#### **KYOCERA Corporation**

Corporate Electronic Components Group  
Electronic Components Sales Division  
6 Takeda Tobadono-cho, Fushimi-ku, Kyoto  
612-8501 Japan  
TEL. No. 075-604-3500 FAX. No. 075-604-3501

### Manufacturer

Corporate Electronic Components Group  
RF Devices Division  
Shiga Yohkaichi Plant  
1166-6 Hebimizo-cho, Higashiomi, Shiga  
527-8555 Japan  
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|                                                                                     |                   |             |             |             |
|-------------------------------------------------------------------------------------|-------------------|-------------|-------------|-------------|
| Design Department                                                                   | Quality/Assurance | Approved by | Examined by | Written by  |
| KYOCERA Corporation<br>Corporate Electronic Components Group<br>RF Devices Division | A. Muraoka        | A.Iwaguchi  | A.Hisako    | K.Takahashi |

## Revision History

| Rev.No. | Description of revision | Date        | Approved by | Checked by | Issued by   |
|---------|-------------------------|-------------|-------------|------------|-------------|
| 00      | First Edition           | Aug.31,2022 | A.Iwaguchi  | A.Hisako   | K.Takahashi |
|         |                         |             |             |            |             |
|         |                         |             |             |            |             |
|         |                         |             |             |            |             |
|         |                         |             |             |            |             |
|         |                         |             |             |            |             |

Preliminary

## 1. APPLICATION

This specification sheet is applied to quartz crystal "CX1210SB"

## 2. KYOCERA PART NUMBER

CX1210SB48000E9WZLCH

## 3. RATINGS

| Items                       | SYMB. | Rating   | Unit | Remarks |
|-----------------------------|-------|----------|------|---------|
| Operating Temperature Range | Topr  | -40~+105 | °C   |         |
| Storage Temperature Range   | Tstg  | -40~+105 | °C   |         |

## 4. CHARACTERISTICS

### ELECTRICAL CHARACTERISTICS

| Items                           | Electrical Specification |             |      |     |      | Test Condition                   | Remarks |
|---------------------------------|--------------------------|-------------|------|-----|------|----------------------------------|---------|
|                                 | SYMB.                    | Min         | Typ. | Max | Unit |                                  |         |
| Mode of Vibration               |                          | Fundamental |      |     |      |                                  |         |
| Nominal Frequency               | F0                       |             | 48.0 |     | MHz  |                                  |         |
| Nominal Temperature             | T <sub>NOM</sub>         |             | 25   |     | °C   |                                  |         |
| Load Capacitance                | CL                       |             | 9.9  |     | pF   |                                  |         |
| Frequency Tolerance             | df/F                     | -20         |      | +20 | PPM  | +25±3°C                          |         |
| Tolerance over Temperature      | df/F                     |             |      |     |      | -40~+100°C                       |         |
| Frequency Aging Rate            | df/F                     |             |      |     |      | 25°C 5years                      |         |
| Frequency Perturbation          | df/t                     |             |      |     |      | -40~+100°C                       |         |
| Frequency drift after reflow    | df/t                     |             |      |     |      | After two reflows                |         |
| Equivalent Series Resistance    | ESR                      | 10          |      | 25  | Ω    | $ESR=RS \sqrt{(CL + C0) / CL}^2$ |         |
| Spurious mode series resistance | -                        | 1100        |      |     | Ω    | ±0.7MHz                          |         |
| Motional inductance             | L1                       | 4.3         | 5.6  | 7.0 | mH   |                                  |         |
| Motional capacitance            | C1                       | 1.5         | 1.9  | 4.0 | fF   |                                  |         |
| Shunt capacitance               | C0                       | 0.3         | 0.6  | 1.0 | pF   |                                  |         |
| Drive Level                     | Pd                       | 0.01        | 200  | 300 | μW   |                                  |         |
| Insulation Resistance           | IR                       | 500         |      |     | MΩ   | 100V(DC)                         |         |

## 5. Measurement Condition

### 5.1 Frequency measurement

Measuring instrument : IEC PI-Network Test Fixture

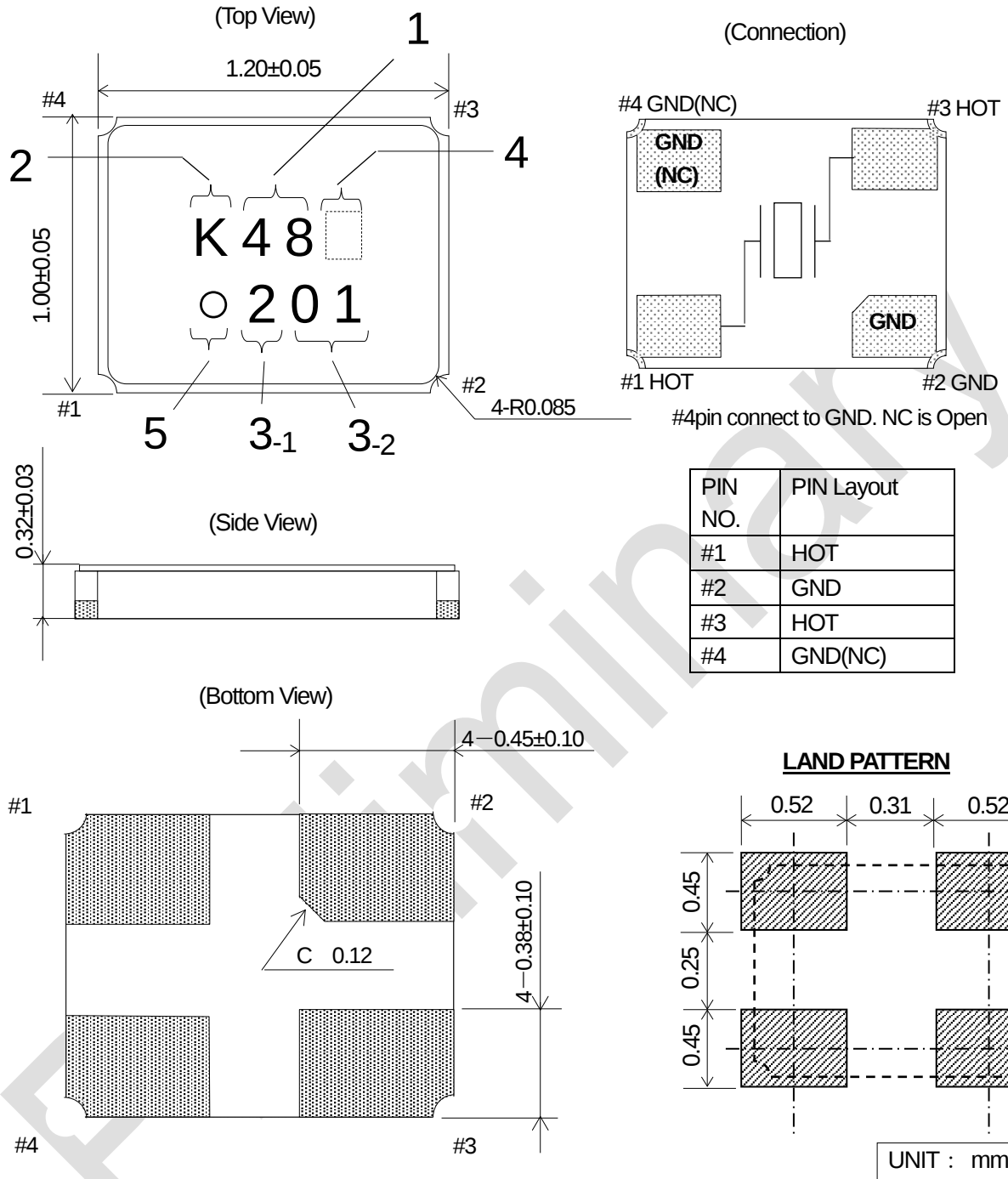
### 5.2 Equivalent series resistance (ESR) measurement

Measuring instrument : IEC PI-Network Test Fixture

Load Capacitance : Series

## 6. APPEARANCES, DIMENSIONS

### OUTLINE DIMENSION (not to scale)



### MARKING

1 Nominal Frequency

Move the number of maximum indication beams of the frequency to two digits, and omit less than 1MHz.

2 Identification [K] mark is KYOCERA Corporation.

3-1 Date Code Year (Ex) 2022 → 2

3-2 Date Code Week (Ex) Jan,3 → 01

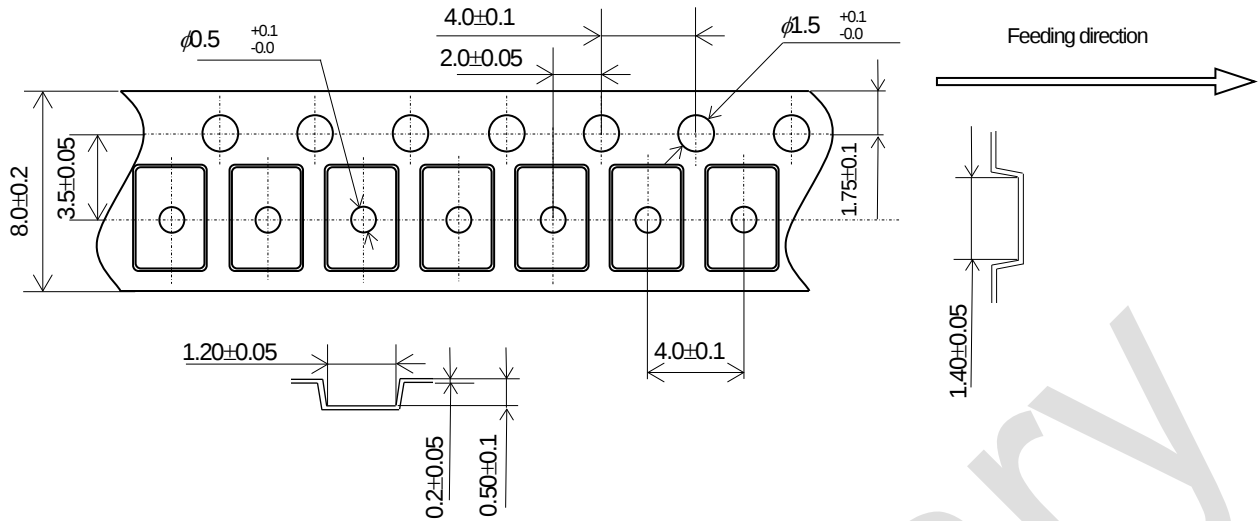
4 Option Code

5 1Pin mark

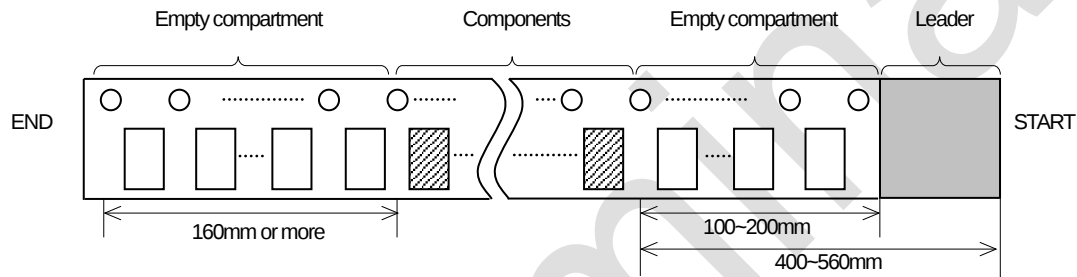
**\*The font of marking is for reference only.**

## 7.TAPING & REEL

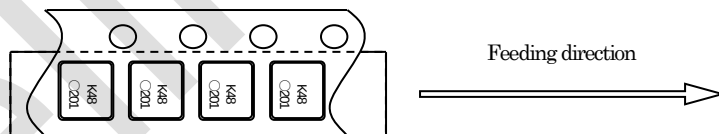
### 7-1.Dimensions



### 7-2.Leader and trailer tape

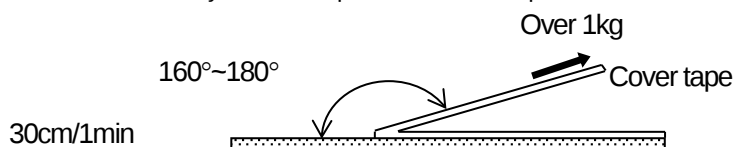


### 7-3.Direction (Orientation shall be checked from the top cover tape side)

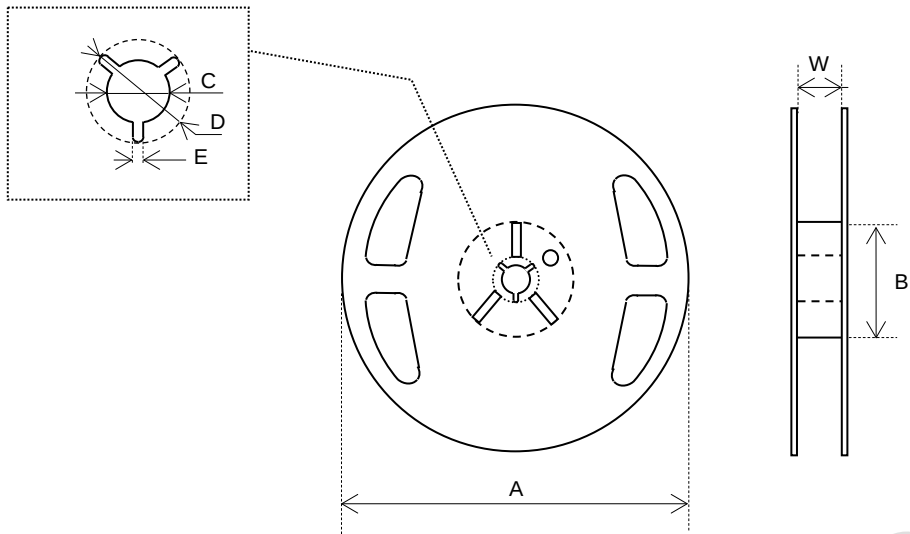


### 7-4.Specification

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.
10. Surface resistivity  $\rightarrow$  Carrier tape:  $\geq 1 \times 10^7$ , Cover tape:  $> 1 \times 10^{11}$



### 7-5.Reel Specification



#### φ180 Reel (5000pcs max)

| Symbol    | A          | B         | C       |
|-----------|------------|-----------|---------|
| Dimension | φ180 +0/-3 | φ60 +1/-0 | φ13±0.2 |
| Symbol    | D          | E         | W       |
| Dimension | φ21±0.8    | 2.0±0.5   | 9±1     |

(Unit : mm)

#### φ330 Reel (21000pcs max)

| Symbol    | A        | B        | C       |
|-----------|----------|----------|---------|
| Dimension | φ330±2.0 | φ100±1.0 | φ13±0.2 |
| Symbol    | D        | E        | 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  $5\Omega$  whichever is larger

- 8.1 Resistance to Shock      Test condition  
3 times natural drop from 100cm onto hard wooden board.
- 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

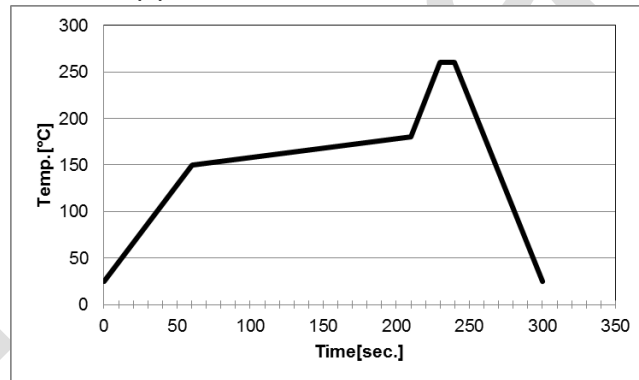
Melting point :  $+220\pm 5^{\circ}\text{C}$

#### 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.) |

#### 3.) Reflow Times    2 times in below Reflow temp. profile

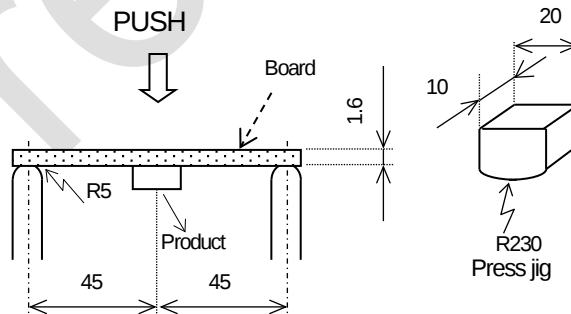
Reflow temp.profile



### 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.

### (4) In case of the manual soldering, please do not apply the excess heat to the product. There's a risk that Au/Sn melts down at 270 deg.C and above, which may cause the malfunction of the crystal unit.

### (5) When removing the product from the board manually, please do not apply the excess heat to the product and try to remove in a short time. There's a risk that Au/Sn melts down when the high heat is applied for a long time, which may cause the malfunction of the crystal unit.

### (6) When the solder is attached to the Au/Sn sealing part, melting temp of the sealing part will become lower. Accordingly, there's a risk that Au/Sn melts down, which may cause the malfunction of the crystal unit.

### (7) Application instructions

This product is designed to be used for general electronic device and is not designed in the high reliability application listed below.

Please inform the department in charge when using the product for following applications.

|                                                                   |                                      |
|-------------------------------------------------------------------|--------------------------------------|
| Utility in nuclear power plant                                    | Traffic signal control system        |
| Utility in space                                                  | security and disaster-prevention     |
| Aircraft                                                          | Transporter (car, train, ship, etc.) |
| under water or ground                                             | Medical                              |
| other - applications requires same environmental status as above. |                                      |

This product must not be used in every application which are primary - intended to damage human race or their property.

Arms (missile, bomb and other application to damage human)  
 Weapons (transports act for combat )  
 Controller with primary – intended to military use.

### (8) This product is not applicable for molding.

## 10. Storage conditions

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

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

## 11. Manufacturing location

KYOCERA Corporation Shiga Yohkaichi Plant

KYOCERA Corporation Yamagata Higashine Plant

## 12. Quality Assurance

Location

KYOCERA Corporation Yamagata Higashine Plant: Quality Assurance Division

KYOCERA Corporation Shiga Yohkaichi Plant: Quality Assurance Division

KYOCERA Corporation

**13. Quality guarantee**

In the 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.

**14. Others**

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

Preliminary

# Mouser Electronics

Authorized Distributor

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[CX1210SB48000E9WZLCH](#)