

# Specification

|              |                      |
|--------------|----------------------|
| Drawing No.  | KB101-12306-431 1/12 |
| Issued Date. | 2012/ 6/29           |

TO: Digi-Key

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

|                               |                                           |
|-------------------------------|-------------------------------------------|
| Product Name                  | Quartz Crystal                            |
| Product Model                 | CX3225GA                                  |
| Frequency                     | per KB101-12306-431 3/12                  |
| Customer Part Number          | -                                         |
| Customer Specification Number | -                                         |
| KYOCERA Part Number           | per KB101-12306-431 3/12                  |
| Remarks                       | RoHS Compliant, MSL 1, AEC-Q200 compliant |

Confirmation of stable oscillation of a crystal oscillation circuit is necessary at the design stage to prevent critical failures for automotive crystal units which are used to control vehicles and secure safety. It is strongly recommended to provide us a test circuit board and let us implement the circuit verification upon your use of our automotive crystal units.

## Customer Acceptance

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

Seller

**KYOCERA Corporation**

(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

**KYOCERA Crystal Device Corporation**

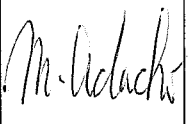
(Marketing & Sales Engineering Division)

1-8-1, Izumi-hontyo, Komae-shi, Tokyo

201-8648 Japan

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|                                                                                                                  |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
|------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Design Department                                                                                                | Quality Assurance                                                                   | Approved by                                                                          | Checked by                                                                            | Issued by                                                                             |
| KYOCERA Crystal Device Yamagata Corporation<br>Crystal Units Overseas Design Section<br>Crystal Units Division 1 |  |  |  |  |

**KYOCERA Crystal Device Corporation**

KBS-5079D

## Revision History

| Rev.No. | Description of revise | Date        | Approved by                                                                         | Checked by                                                                          | Issued by                                                                           |
|---------|-----------------------|-------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 1       | First Edition         | JUN.29,2012 |  |  |  |

**[PART NUMBER LIST]**

| Nominal<br>Frequency<br>(MHz) | Part number          | ESR<br>( $\Omega$ ) | Nominal<br>Frequency<br>Code |
|-------------------------------|----------------------|---------------------|------------------------------|
| 9.84375                       | CX3225GA09843D0PTVZ1 | 500                 | 9843                         |
| 10                            | CX3225GA10000D0PTVZ1 | 500                 | 10000                        |
| 12                            | CX3225GA12000D0PTVZ1 | 300                 | 12000                        |
| 13.56                         | CX3225GA13560D0PTVZ1 | 300                 | 13560                        |
| 16                            | CX3225GA16000D0PTVZ1 | 100                 | 16000                        |
| 20                            | CX3225GA20000D0PTVZ1 | 100                 | 20000                        |
| 24                            | CX3225GA24000D0PTVZ1 | 100                 | 24000                        |
| 25                            | CX3225GA25000D0PTVZ1 | 100                 | 25000                        |
| 26                            | CX3225GA26000D0PTVZ1 | 100                 | 26000                        |
| 27                            | CX3225GA27000D0PTVZ1 | 100                 | 27000                        |
| 28.63636                      | CX3225GA28636D0PTVZ1 | 100                 | 28636                        |
| 30                            | CX3225GA30000D0PTVZ1 | 100                 | 30000                        |
| 32                            | CX3225GA32000D0PTVZ1 | 100                 | 32000                        |
| 40                            | CX3225GA40000D0PTVZ1 | 100                 | 40000                        |

**1. APPLICATION**

This specification sheet is applied to quartz crystal "CX3225GA"

**2. KYOCERA PART NUMBER**

per KB101-12306-431 3/12

**3. RATINGS**

| Items                     | SYMB. | Rating   | Unit | Remarks |
|---------------------------|-------|----------|------|---------|
| Operating Temperature     | Topr  | -40~+150 | °C   |         |
| Storage Temperature Range | Tstg  | -40~+150 | °C   |         |

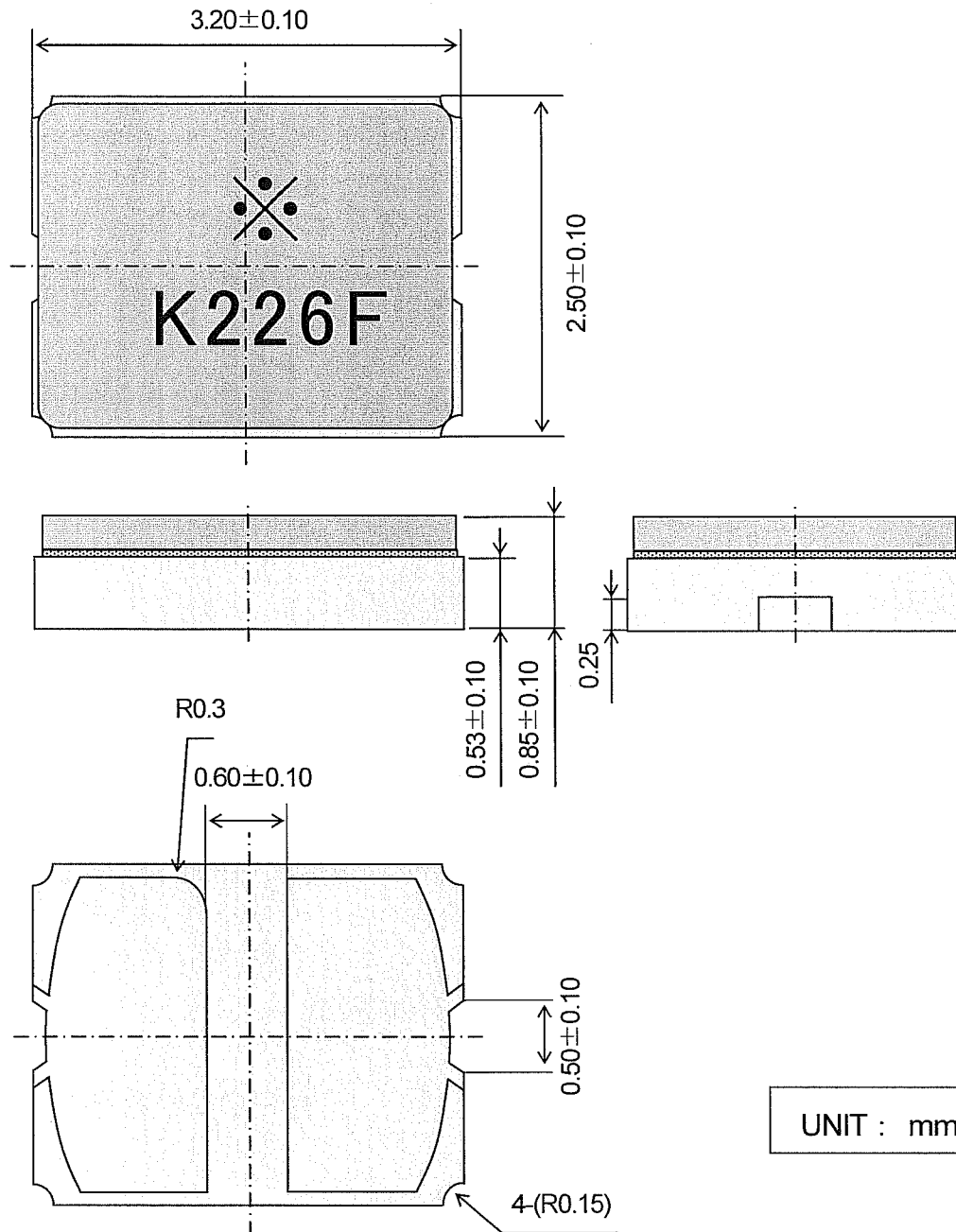
**4. CHARACTERISTICS****4-1 ELECTRICAL CHARACTERISTICS**

| Items                                 | Electrical Specification |             |      |        |      | Test Condition | Remarks  |
|---------------------------------------|--------------------------|-------------|------|--------|------|----------------|----------|
|                                       | SYMB.                    | Min.        | Typ. | Max.   | Unit |                |          |
| Mode of Vibration                     |                          | Fundamental |      |        |      |                |          |
| Nominal Frequency                     | F0                       |             | ※    |        | MHz  |                |          |
| Nominal Temperature                   | T <sub>NOM</sub>         |             | 25   |        | °C   |                |          |
| Load Capacitance                      | CL                       |             | 8.0  |        | pF   |                |          |
| Frequency Tolerance                   | df/F                     | -50.0       |      | +50.0  | PPM  | +25 ±3°C       |          |
| Frequency Temperature Characteristics | df/F                     | -150.0      |      | +150.0 |      | -40~+150°C     |          |
| Frequency Aging Rate                  |                          | -5.0        |      | +5.0   |      | 1 year         | +25 ±3°C |
| Equivalent Series Resistance          | ESR                      |             |      | ※      | Ω    |                |          |
| Drive Level                           | Pd                       | 0.01        |      | 200    | μW   |                |          |
| Insulation Resistance                 | IR                       | 500         |      |        | MΩ   | 100V(DC)       |          |

※ per KB101-12306-431 3/12

## 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.

※ per KB101-12306-431 3/12

- ② Identification

- ③ Date Code

Year···LAST 1 DIGIT of YEAR AND WEEK

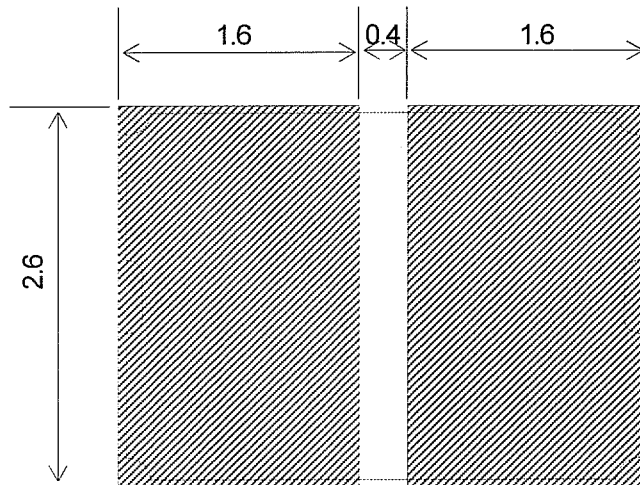
※ For details to LOT CALENDAR

(Ex) JUN.29, 2012 → 226

- ④ Manufacturing Location F···KYOCERA Crystal Device Philippines, Inc

※The font of marking is reference.

## 6. RECOMMENDED LAND PATTERN (not to scale)



UNIT : mm

## 7. Quality Assurance

### Location

KYOCERA Crystal Device Philippines, Inc. : KYOCERA Crystal Device Philippines, Inc.

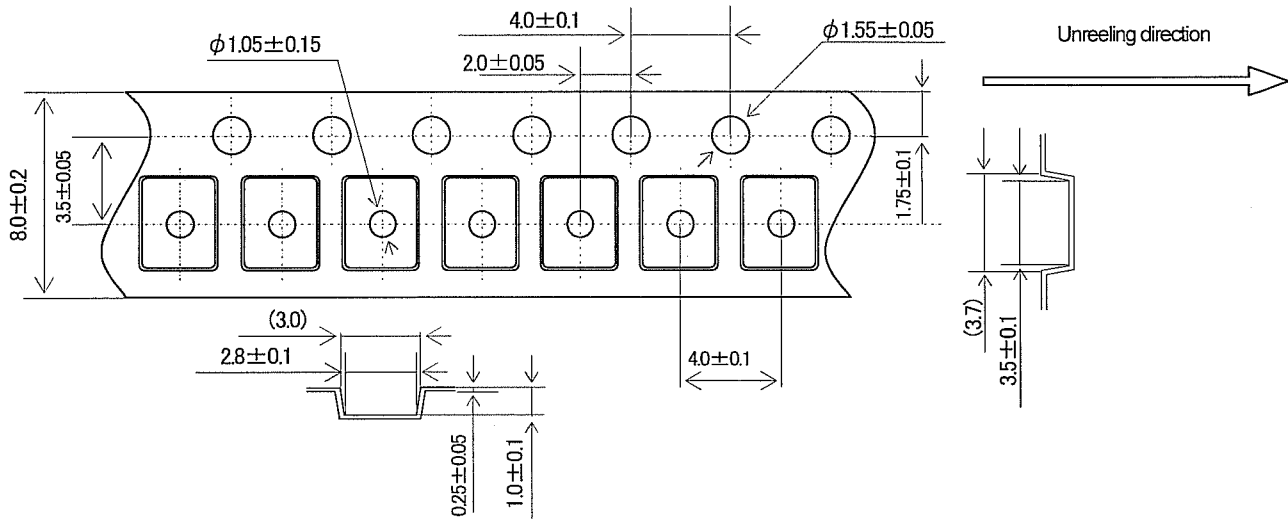
Quality Assurance Division

### Quality guarantee

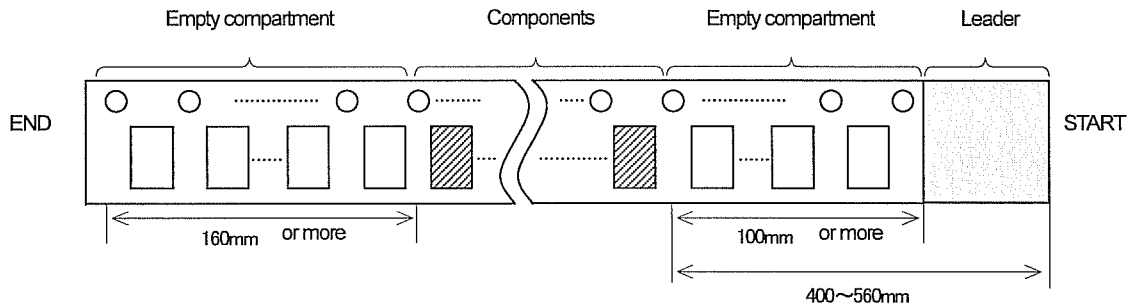
When the failure by the responsibility of our company occurs clearly after delivery within 1 year, a substitute article etc. is appropriated gratuitously and this is guaranteed. However, when passing 1 year after delivery, there is a case where I am allowed to consider as onerous repair after both consultation.

## 8.TAPING & REEL

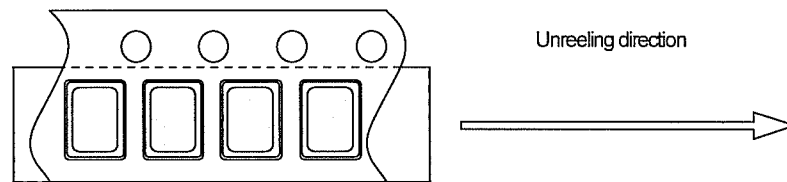
### 8-1.Dimensions



### 8-2.Leader and trailer tape

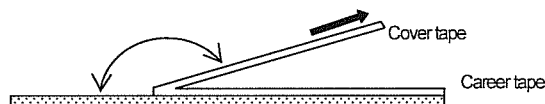


### 8-3.Direction (The direction shall be seen from the top cover tape side)

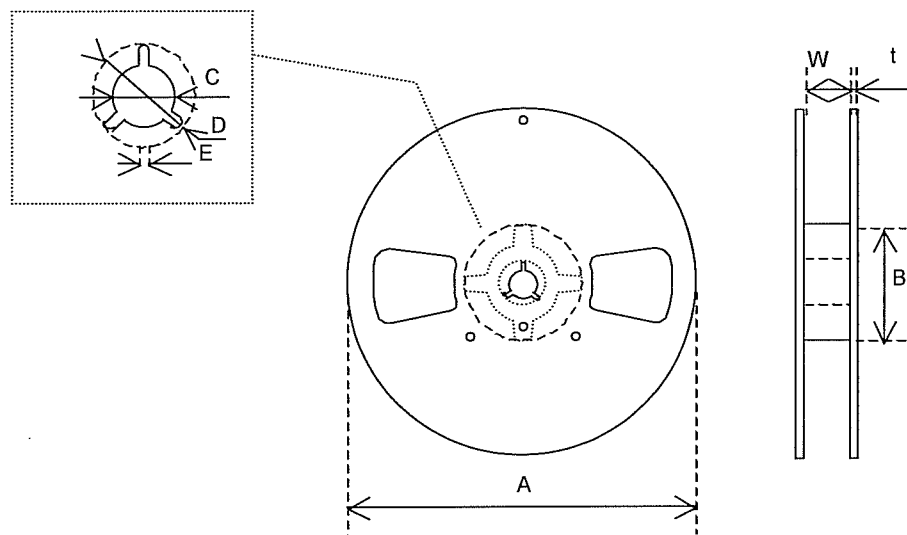


### 8-4.Specification

1. Material of the carrier tape shall be PS (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. Disalignment between centers of the cavity and sprocket hole shall be 0.05mm or less.
7. Cumulative pitch tolerance of "P<sub>0</sub>" shall be  $\pm 0.2$ mm at 10 pitches.
8. The number of lack is 0.1% of 1 reel total part number (the number of the table letters) or the part following whose 1 either is big.  
(But, the thing which lack of the continuance is not in.)
9. The marking on parts is not fixed its direction, its electrical characteristic is equal.
10. Peeling force of the seal tape: 0.1 to 1.0N.



## 8-5.Reel specifications



(Nonconductor type Reel)

In the case of  $\Phi 180$  Reel (3000 pcs max)

|           | A                  | B               | C                 | D                 |
|-----------|--------------------|-----------------|-------------------|-------------------|
| Dimension | $\phi 180 +0/-1.5$ | $\phi 60 +1/-0$ | $\phi 13 \pm 0.2$ | $\phi 21 \pm 0.8$ |
| Symbol    | E                  | W               | t                 |                   |
| Dimension | $2.0 \pm 0.5$      | $9 \pm 1$       | $2.0 \pm 0.5$     |                   |

(Unit : mm)

## 9. Enviromental requirements

After following test, frequency shall not change more than  $\pm 10 \times 10^{-6}$

And CI,  $\pm 20\%$  or  $5\Omega$  of large value.

### 9.1 Resistance to Shock

#### Test condition

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

### 9.2 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.

### 9.3 Resistance to Heat

#### Test condition

The quartz crystal unit shall be stored at a temperature of  $+150 \pm 2^\circ\text{C}$  for 500 h.

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

### 9.4 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 which measurement shall be made.

### 9.5 Thermal Shock

#### Test condition

The quartz crystal unit shall be subjected to 500 successive 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.)  $\sim 25 \pm 2^\circ\text{C}$  (5min.)  
 $\sim +150 \pm 2^\circ\text{C}$  (30min.)  $\sim 25 \pm 2^\circ\text{C}$  (5min.)

## 9.6 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

## 9.7 Soldering condition

## 1) Material of solder

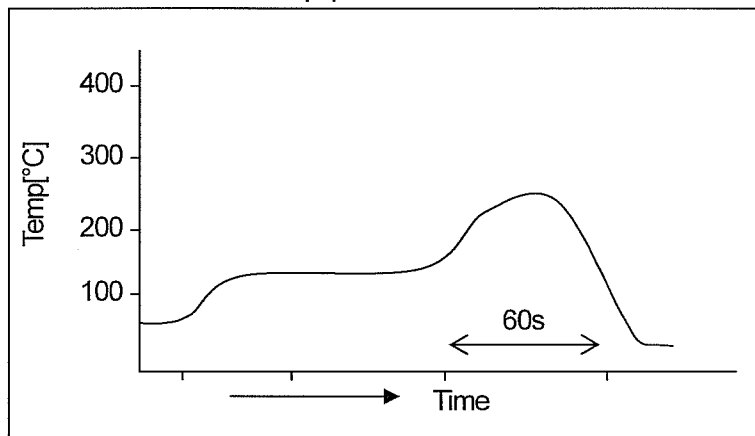
Kind ... lead free solder paste

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

## 2) Temp.profile of reflow soldering system

|            | Temp [ $^\circ\text{C}$ ] | Time[sec]  |
|------------|---------------------------|------------|
| Peak       | $260 \pm 5$               | 10 (max.)  |
| Preheating | 180 (typ.)                | 100 (typ.) |
| Total      | —                         | 200 (max.) |

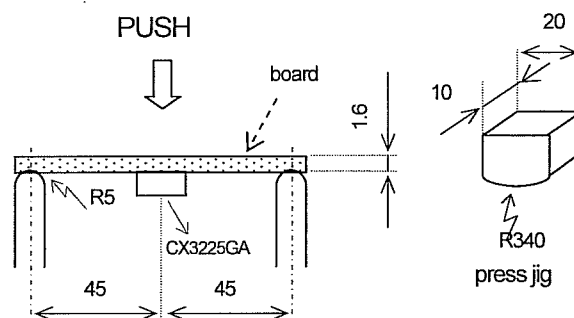
Temp. profile of reflow

3) Hand Soldering Temperature:  $350^\circ\text{C}$ , Time: 3sec

## 9.8 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

## 10.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 quartz crystal unit 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 quartz crystal unit in series resistance 5 time 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 quartz crystal unit in series, and use it.

### (3) After making the Quartz Crystal mount on a printed circuit board ,if it is required to divide the printed circuit board into another one, use it with attentive confirmation so that a warp caused by this dividing might not affect any damage. When designing a printed circuit board as well as handling the mounting As much as possible. The quartz crystal shall be passed through the reflow furnace. Then it shall be subjected to standard atmospheric conditions, after which cleaning shall be made.

## 11.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 18-30 degrees C, and the humidity of 20-70 Percent in the state of packing, and a term is 6 months.

## 12.Others

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

## 13.LOT CALENDAR

| WEEK | MONTH | MON | TUE | WED | THU | FRI | SAT | SUN | WEEK | MONTH | MON | TUE | WED | THU | FRI | SAT | SUN |
|------|-------|-----|-----|-----|-----|-----|-----|-----|------|-------|-----|-----|-----|-----|-----|-----|-----|
| 週    | 月     | 月   | 火   | 水   | 木   | 金   | 土   | 日   | 週    | 月     | 月   | 火   | 水   | 木   | 金   | 土   | 日   |
| 152  | 1     |     |     |     |     |     |     | 1   | 227  | 7     | 2   | 3   | 4   | 5   | 6   | 7   | 8   |
| 201  |       | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 228  |       | 9   | 10  | 11  | 12  | 13  | 14  | 15  |
| 202  |       | 9   | 10  | 11  | 12  | 13  | 14  | 15  | 229  |       | 16  | 17  | 18  | 19  | 20  | 21  | 22  |
| 203  |       | 16  | 17  | 18  | 19  | 20  | 21  | 22  | 230  |       | 23  | 24  | 25  | 26  | 27  | 28  | 29  |
| 204  |       | 23  | 24  | 25  | 26  | 27  | 28  | 29  | 231  | 8     | 30  | 31  | 1   | 2   | 3   | 4   | 5   |
| 205  | 2     | 30  | 31  | 1   | 2   | 3   | 4   | 5   | 232  |       | 6   | 7   | 8   | 9   | 10  | 11  | 12  |
| 206  |       | 6   | 7   | 8   | 9   | 10  | 11  | 12  | 233  |       | 13  | 14  | 15  | 16  | 17  | 18  | 19  |
| 207  |       | 13  | 14  | 15  | 16  | 17  | 18  | 19  | 234  |       | 20  | 21  | 22  | 23  | 24  | 25  | 26  |
| 208  |       | 20  | 21  | 22  | 23  | 24  | 25  | 26  | 235  | 9     | 27  | 28  | 29  | 30  | 31  | 1   | 2   |
| 209  | 3     | 27  | 28  | 29  | 1   | 2   | 3   | 4   | 236  |       | 3   | 4   | 5   | 6   | 7   | 8   | 9   |
| 210  |       | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 237  |       | 10  | 11  | 12  | 13  | 14  | 15  | 16  |
| 211  |       | 12  | 13  | 14  | 15  | 16  | 17  | 18  | 238  |       | 17  | 18  | 19  | 20  | 21  | 22  | 23  |
| 212  |       | 19  | 20  | 21  | 22  | 23  | 24  | 25  | 239  |       | 24  | 25  | 26  | 27  | 28  | 29  | 30  |
| 213  | 4     | 26  | 27  | 28  | 29  | 30  | 31  | 1   | 240  | 10    | 1   | 2   | 3   | 4   | 5   | 6   | 7   |
| 214  |       | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 241  |       | 8   | 9   | 10  | 11  | 12  | 13  | 14  |
| 215  |       | 9   | 10  | 11  | 12  | 13  | 14  | 15  | 242  |       | 15  | 16  | 17  | 18  | 19  | 20  | 21  |
| 216  |       | 16  | 17  | 18  | 19  | 20  | 21  | 22  | 243  |       | 22  | 23  | 24  | 25  | 26  | 27  | 28  |
| 217  |       | 23  | 24  | 25  | 26  | 27  | 28  | 29  | 244  | 11    | 29  | 30  | 31  | 1   | 2   | 3   | 4   |
| 218  | 5     | 30  | 1   | 2   | 3   | 4   | 5   | 6   | 245  |       | 5   | 6   | 7   | 8   | 9   | 10  | 11  |
| 219  |       | 7   | 8   | 9   | 10  | 11  | 12  | 13  | 246  |       | 12  | 13  | 14  | 15  | 16  | 17  | 18  |
| 220  |       | 14  | 15  | 16  | 17  | 18  | 19  | 20  | 247  |       | 19  | 20  | 21  | 22  | 23  | 24  | 25  |
| 221  |       | 21  | 22  | 23  | 24  | 25  | 26  | 27  | 248  | 12    | 26  | 27  | 28  | 29  | 30  | 1   | 2   |
| 222  | 6     | 28  | 29  | 30  | 31  | 1   | 2   | 3   | 249  |       | 3   | 4   | 5   | 6   | 7   | 8   | 9   |
| 223  |       | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 250  |       | 10  | 11  | 12  | 13  | 14  | 15  | 16  |
| 224  |       | 11  | 12  | 13  | 14  | 15  | 16  | 17  | 251  |       | 17  | 18  | 19  | 20  | 21  | 22  | 23  |
| 225  |       | 18  | 19  | 20  | 21  | 22  | 23  | 24  | 252  |       | 24  | 25  | 26  | 27  | 28  | 29  | 30  |
| 226  | 7     | 25  | 26  | 27  | 28  | 29  | 30  | 1   | 253  |       | 31  |     |     |     |     |     |     |