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| NO. | ECAB2008043 |
|-----|-------------|

Acknowledgement Book

Customer : _____

Production name: HC-49S X'TAL 11.50×4.70×3.68

Nominal Freq. : 8.000000MHz

Customer P/N : _____

P/N : B08000J065

| |
|---|
| Receiver |
| |
| Please return one after acknowledgement |

| Approved By | MFG | QA | PE/RD |
|---|---|--|---|
|  |  |  |  |

BOOK OF MODIFICATION

| No. | DATE | CONTENT OF MODIFICATION | REASON OF MODIFICATION | PAGE | ITEM | APPROVE |
|-----|-----------|-------------------------|------------------------|------|------|---------|
| 0 | 2020-8-25 | INITIAL RELEASED | | | | |
| 1 | | | | | | |
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QUARTZ CRYSTAL UNITS

No:

ECAB2008043

Date:

2020-8-25

SPECIFICATION OF QUARTZ CRYSTAL UNITS

1.HOLDER TYPE HC-49S X'TAL 11.50×4.70×3.68

2.GENERAL

| | |
|---|--------------------------|
| 2-1 FREQUENCY (F0) | 8.000000MHz |
| 2-2 MODE OF OSCILLATION (Mn) | FUNDAMENTAL |
| 2-3 OPERATION TEMPERATURE RANGE (T ₀) | -20°C ~ +70°C |
| 2-4 STORAGE TEMPERATURE RANGE (T _s) | -50°C/+125°C |
| 2-5 TEST SET | S&A 250B ANALYSIS SYSTEM |
| 2-6 DRIVE LEVEL (DL) | 100μw TYPE (500μw MAX) |
| 2-7 LOADING CAPACITANCE (CL) | 20PF |

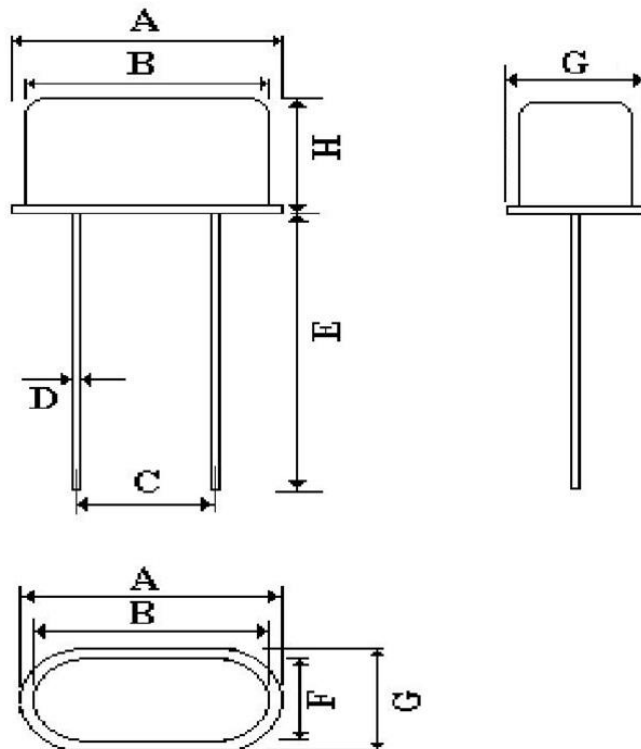
3.ELECTRICAL CHARACTERISTICS

(This test shall be performed under the condition of temperature at 25±3°C.)

| | |
|---|--|
| 3-1 FREQUENCY TOLERANCE (Δf) | ±20 ppmMAX |
| 3-2 EQUIVALENT RESISTANCE (Rr) | 40ΩMax/Series |
| 3-3 TEMPERATURE DRIFT (Tc) | ±20ppm/MAX -20°C+70°C |
| 3-4 SHUNT CAPACITANCE (C ₀) | <7.0PF |
| 3-5 INSULATION RESISTANCE | 500MΩmin/DC 100V±15V (Lead to lead ,case to lead) |

4.DIMENSIONS AND MARKING

4-1 HOLDER TYPE HC-49S X'TAL 11.50×4.70×3.68



**JinHua East Crystal Electronic
Co.,Ltd.**

DESIGN

陈振辉

INSPECTION

王晓东

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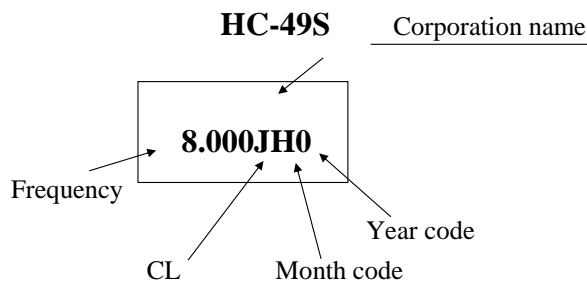
Date:

2020-8-25

4-2 DIMENSION (mm)

| | HC-49U/S |
|---|-----------|
| A | 11.50MAX |
| B | 10.30MAX |
| C | 4.88±0.2 |
| D | 0.45±0.05 |
| E | 13.2±0.5 |
| F | 3.80MAX |
| G | 4.70MAX |
| H | 3.68MAX |

4-3 MARKING



Frequency: as shown in the table

EX)

| | | | |
|----------------|----------|------------|-----------|
| Frequency | 4.000MHz | 16.9344MHz | 20.000MHz |
| Frequency Code | 4.000 | 16.934 | 20.000 |

Month code: as shown in the table

EX) December shall be marked as "M"

| | | | | | | | | | | | | |
|--------|------|------|------|------|------|------|------|------|------|------|------|------|
| Month | Jan. | Feb. | Mar. | Apr. | May. | Jun. | Jul. | Aug. | Sep. | Oct. | Nov. | Dec. |
| Symbol | A | B | C | D | E | F | G | H | J | K | L | M |

Year code: as shown in the table

EX) 2010 shall be marked as "0"

| | | | | | | | | | | | | |
|--------|------|------|------|------|------|------|------|------|------|------|------|-------|
| Year | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | ----- |
| Symbol | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | ----- |

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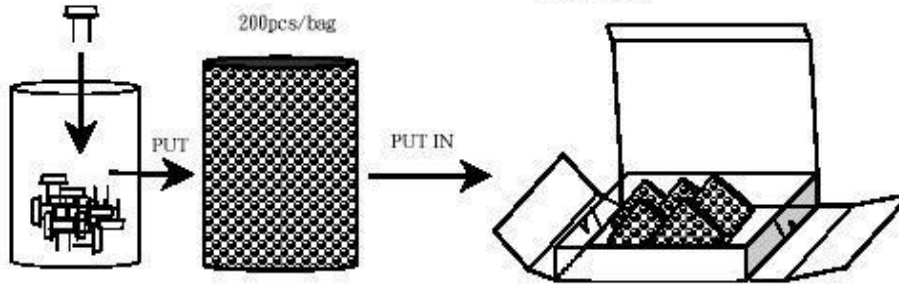
Date:

2020-8-25

4-4 PACKING

Put 200pcs crystals into a plastic bags with bubbly sheet surrounded into inner-box, put 20 inner-boxes with foam sheet surrounded into a paper case, then write HOLD.FREQ.QTY in inner-box and paper case.

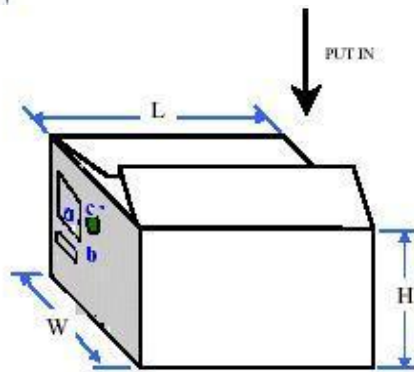
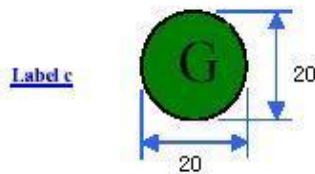
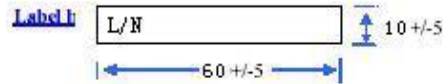
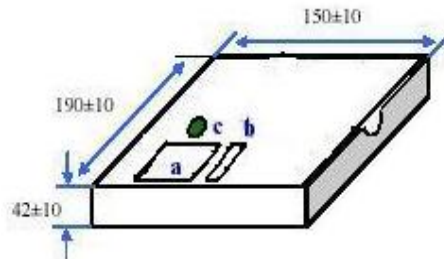
1. INNER BOX : (Unit : mm)



2. LOGO STICKER(CARTON and INNER BOX) : (Unit : mm)

Label a

| CRYSTAL UNITS | |
|---------------|--|
| CUST P/N | |
| ECEC P/N | |
| P/O | |
| FREQUENCY | |
| QTY | |
| MARKING | |
| MADE IN CHINA | |



| | | |
|--|---------------------|-----------------|
| | Box type | size (L×W×H) mm |
| | Atype (Box 1~3K) | 200×200×165 |
| | Btype (Box 4~6K) | 205×205×290 |
| | CBtype (Box 7~10K) | 400×205×290 |
| | DBtype (Box 11~20K) | 420×320×250 |

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5.MECHANICAL ENDURANCE

Provided that measurement shall be carried out after letting it alone in the room temperature for 1 hour.

5-1.SHOCK

Electrical characteristics shall be satisfied after dropping three times from the height of 75cm onto the board of the 3cm thickness.

5-2.VIBRATION

Electrical characteristics shall be satisfied after supplying following vibration.

- | | |
|---------------------------|-----------------------|
| a).ENTIRE FREQUENCY RANGE | 10~55Hz |
| b).REPEATED PERIOD | 1~2min |
| c).AMPLITUDE | 1.5mm |
| d).DIRECTION | X.Y.Z |
| e).PERIOD | 2hours/Each Direction |

5-3.STRENGTH OF TERMINALS/LEAD-WIRES**①TENSILE**

- Body of specimen shall be fixed,and 900g of tension weight shall be supplied gradually to axial direction of terminals/lead-wires for 30 sec.
- After above test a),there is no distinct damage or damage to sealing.

②BENDING

- Body of specimen shall be fixed,and 90 degree bending shall be given,being supplied 225g tension weight.After that,terminals/lead-wires shall be straightened gradually. Then the same bending and straightening shall be supplied to the opposite direction in the same axial.
- After above test a),there is no observation of any visual damages on the specimen.

5-4.SEALING TIGHTNESS

Put the specimens in C_2H_5OH ,raise pressure it with 0.5Mpa for 10 min, test the insulation resistance at DC.100V,the result shall be over 500M Ω .
Electrical characteristics shall be satisfied and no sealing damage.

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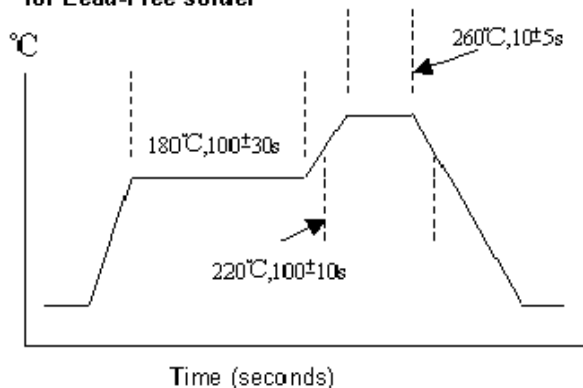
5-5.SOLDERING HEAT RESISTANCE

Electrical characteristics shall be satisfied .Without distinct looseness of terminals.

①.FLOW(WAVE)SOLDERING

Following profile of heat stress is applied to resonator,then being place in the natural condition for 1 hour,resonator shall be measured.

Recommendation of flow condition for Lead-Free solder



| | |
|--|----------|
| Peak temperature | 260°C |
| Dipping time | 10±5 sec |
| Soldering | 1 time |
| Dipping to the lead joint of component | |

②.SOLDERING DIP

Terminals/lead-wires of specimen shall be dipped into solder melter tank at +230°C±5°C for 3 sec.

Dipping depth shall be 2mm from the bottom of specimens body.(After applying ROSIN FLUX) soldering portion shall be covered in over 95% of Terminals/lead-wires dipped.

5-6.BEND STRENGTH PCB

①.Resonator is soldered into the ceater of PCB which is laid on the 2 small supporters spaced 90cm. PCB deflected to 1mm below from horizontal level by the pressing force with 20 x10.R10 stick.

The force is supplied for 1 second,5 times repeatedly.

②.After above test ①.there is no observation of any visual damages on specimen and the electical characteristic shall be satisfied.

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5-7.ENVIRONMENTAL ENDURANCE

Provided that measurement shall be carried out after letting it alone in the room temperature for 1 hour.

①HUMIDITY

Electrical characteristics shall be satisfied after letting it alone at $65\pm 2^{\circ}\text{C}$ in humidity of 90~95% for 250 hours.

②.STORAGE IN LOW TEMPRATURE

Electrical characteristics shall be satisfied after letting it alone at $-45\pm 2^{\circ}\text{C}$ for 250 hours.

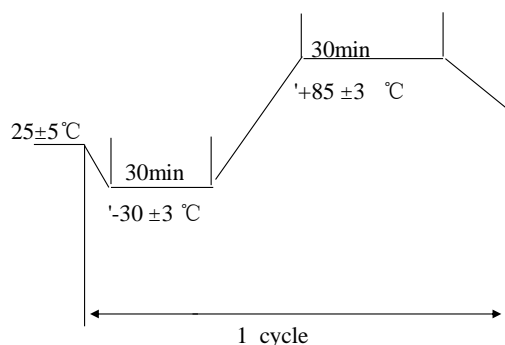
③.STORAGE IN HIGH TEMPRATURE

Electrical characteristics shall be satisfied after letting it alone at $85\pm 2^{\circ}\text{C}$ for 250 hours.

④.TEMPERATURE CYCLE

Electrical characteristics shall be satisfied after supplying the following temperature cycle(3cycle).Temperature shift from low to high, high to low shall be done in $1^{\circ}\text{C}/\text{sec}$.

(refer to Fig-3)



(Fig-3)

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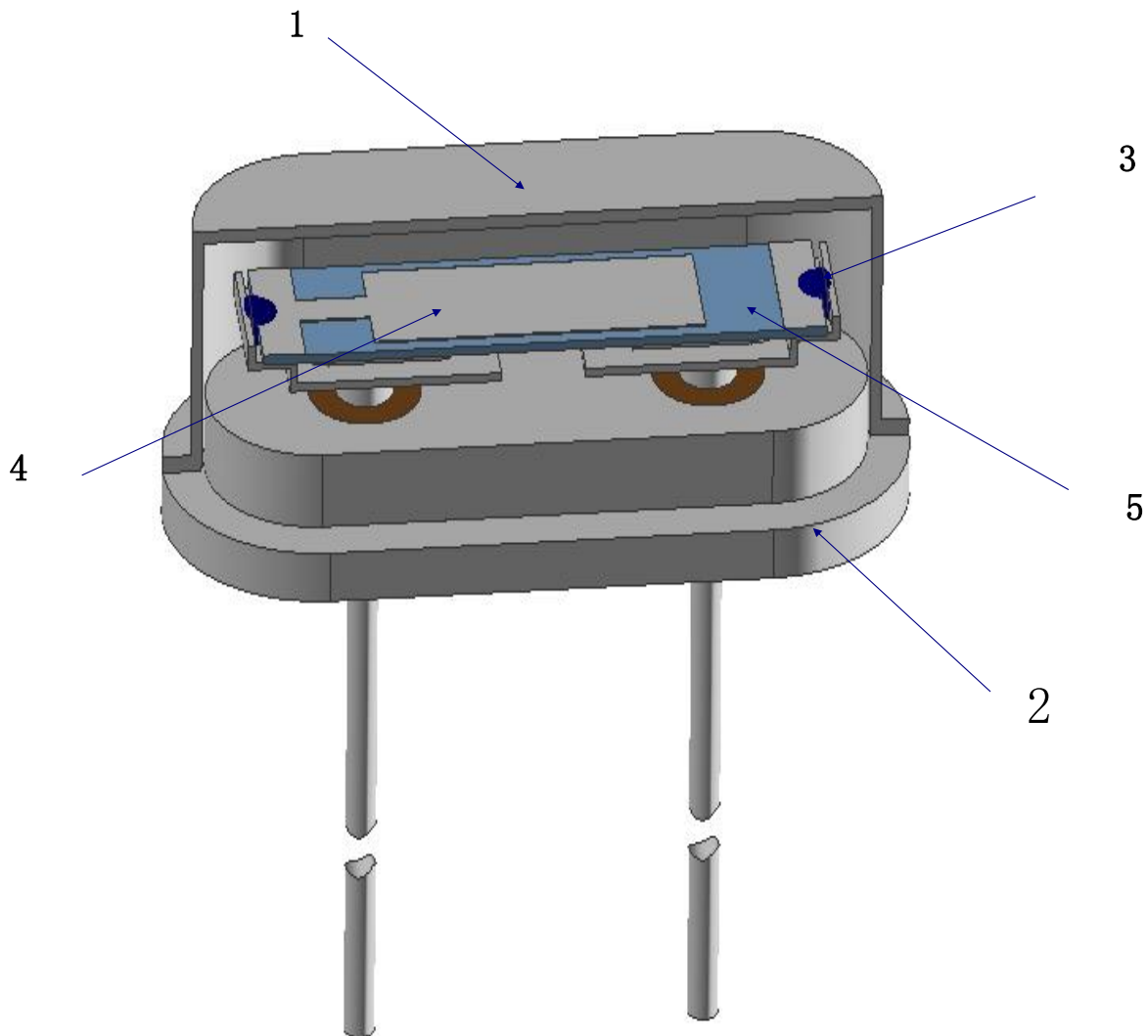
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6. Structure Illustration



(BOTTOM VIEW)

| No. | Items | Materials | Manufacture's name |
|-----|---------------------|------------------|--------------------|
| 1 | Metal Can(Cap) | Ni Alloy | TOGAWA SEIKO CHINA |
| 2 | Substrate(Base) | Kovar (Pb free) | XURI ELEC. CHINA |
| 3 | Conductive Adhesive | Ag+Epoxy Resin | Three Bond JAPAN |
| 4 | Internal Electrode | Ag | SOLAR CHINA |
| 5 | Element(Blank) | SiO ₂ | ECEC CHINA |

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