

# H.ELE.

## Specifications for Approval



|                      |  |
|----------------------|--|
| PRODUCT TYPE         | Quartz Crystal HSX530G   |
| NOMINAL FREQUENCY    | 25.000000MHz   |
| H.ELE. SAMPLE O/N    | EOS-IB0115-11  |
| H.ELE. P/N           | X5H025000FK1H-X  |
| RELEASE DATE         | 2018/11/09   |
| VERSION              | 00   |
| MSL                  | Level 1  |
| GREEN PRODUCT        | <input type="checkbox"/> Pb free <input checked="" type="checkbox"/> RoHS Compliant<br><input checked="" type="checkbox"/> HF-Halogen free <input checked="" type="checkbox"/> REACH Compliant |
| CUSTOMER P/N         |  |
| APPLICATION & MODEL  |  |
| APPROVED BY CUSTOMER |  |

(DATE)

|                                  |                             |                                |  |
|----------------------------------|-----------------------------|--------------------------------|--|
| <b>Harmony Electronics Corp.</b> |                             |                                |  |
| <u>F. S. TSAI</u><br>(APPROVE)   | <u>C. C. HOU</u><br>(CHECK) | <u>U. F. CHEN</u><br>(PREPARE) | Country of Origin: Taiwan Factory<br>Thailand Factory<br>China Factory |

### HARMONY ELECTRONICS CORPRATION

KAOSIUNG

TAIPEI

THAILAND

SHENZHEN

TEL: 886-2-26588883

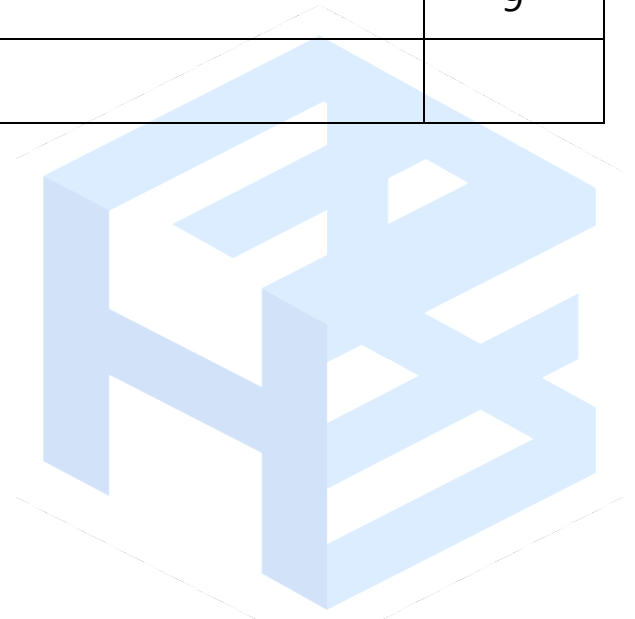
Email: contactus@hele.com.tw





## Contents

| ITEM                                 | PAGE |
|--------------------------------------|------|
| 1. QUARTZ CRYSTAL UNIT SPECIFICATION | 3    |
| 2. DIMENSIONS                        | 4    |
| 3. MARKING                           | 4    |
| 4. INSIDE STRUCTURE                  | 5    |
| 5. HANDLING SUGGESTIONS              | 5-6  |
| 6. EMBOSS CARRIER TAPE&REEL          | 6-7  |
| 7. PACKAGE                           | 7-8  |
| 8. MECHANICAL PERFORMANCE            | 8-9  |
| 9. ENVIRONMENTAL PERFORMANCE         | 9    |
| 10. APPENDIX                         |      |



**HARMONY ELECTRONICS CORPRATION**

KAOSIUNG

TAIPEI

THAILAND

SHENZHEN

TEL: 886-2-26588883

Email: [contactus@hele.com.tw](mailto:contactus@hele.com.tw)



## 1. QUARTZ CRYSTAL UNIT SPECIFICATION

| Items                         | Electrical Spec.               |      |     | Unit     | Notes         |
|-------------------------------|--------------------------------|------|-----|----------|---------------|
|                               | Min                            | Type | Max |          |               |
| 1. Frequency (FL)             | 25.000000                      |      |     | MHz      |               |
| 2. Mode of oscillation:       | Fundamental                    |      |     |          |               |
| 3. Frequency tolerance        | -30                            |      | +30 | ppm      | at 25°C±3°C   |
| 4. Equivalent resistance (RR) |                                |      | 50  | Ω        | SERIES        |
| 5. Storage temperature range  | -40                            |      | +85 | °C       |               |
| 6. Operable temperature range | -10                            |      | +70 | °C       |               |
| 7. Temperature stability      | -30                            |      | +30 | ppm      | -10°C ~ +70°C |
| 8. Loading capacitance (CL)   |                                | 20.0 |     | pF       |               |
| 9. Drive level (DL)           |                                | 10   | 300 | μW       |               |
| 10. Shunt Capacitance (C0)    |                                |      | 7.0 | pF       |               |
| 11. Insulation resistance     | 500                            |      |     | MΩ       | at DC 100V    |
| 12. Aging:                    | -5                             |      | +5  | ppm/Year |               |
| 13. Circuit:                  | Measured in HP/E5100A,S&A 250B |      |     |          |               |

Note: Storage Temperature is only for the product itself.



**HARMONY ELECTRONICS CORPRATION**

KAOSIUNG

TAIPEI

THAILAND

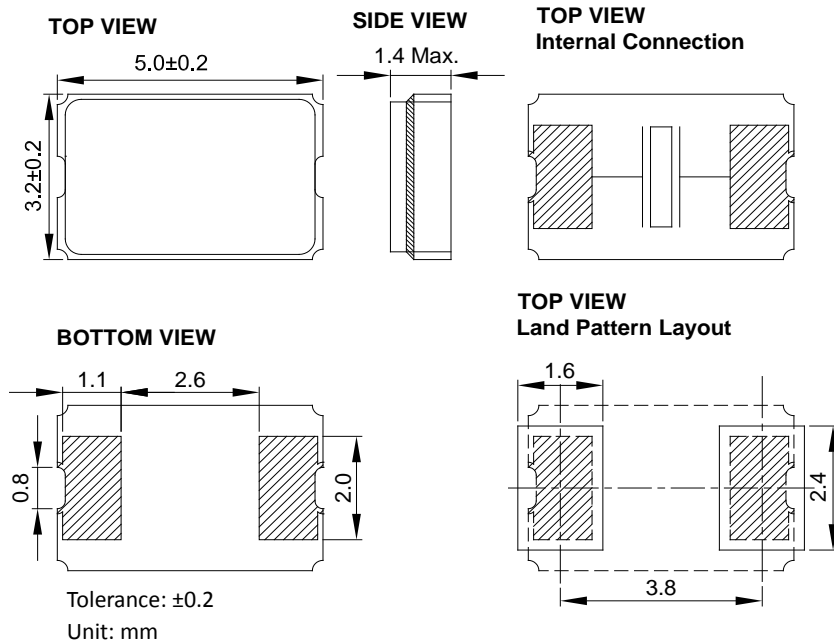
SHENZHEN

TEL: 886-2-26588883

Email: [contactus@hele.com.tw](mailto:contactus@hele.com.tw)

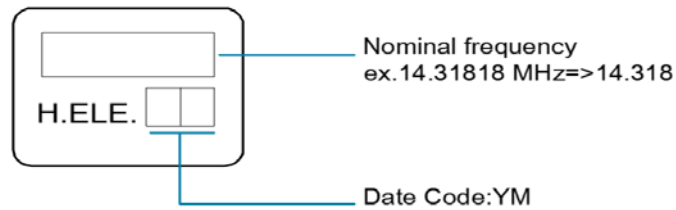


## 2. DIMENSION



\* Note: The Index mark was defined by the BASE suppliers.

## 3. MARKING



Note:

1. Laser marking.
2. Date Code:

|        |      |      |      |      |      |      |      |      |      |      |
|--------|------|------|------|------|------|------|------|------|------|------|
| Y=Year | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|        | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 |
| Code   | 0    | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    |

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

**HARMONY ELECTRONICS CORPRATION**

KAOHSIUNG

TAIPEI

THAILAND

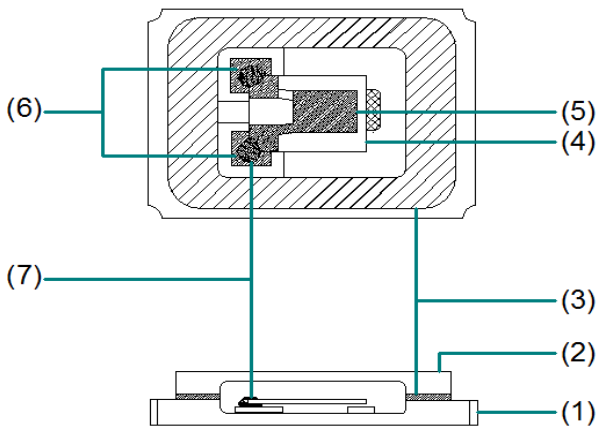
SHENZHEN

TEL: 886-2-26588883

Email: [contactus@hele.com.tw](mailto:contactus@hele.com.tw)



#### 4. INSIDE STRUCTURE



Reference drawing

| No. | Component           | Material      | Note                                   |
|-----|---------------------|---------------|--|
| (1) | Base-Ceramic        | Ceramic       | Al <sub>2</sub> O <sub>3</sub>         |
| (2) | Cap-Ceramic         | Ceramic       | Al <sub>2</sub> O <sub>3</sub>         |
| (3) | Crystal-Seal        | Glass         | -                                      |
| (4) | Crystal Blank       | Quartz        | SiO <sub>2</sub><br>Rectangular At-Cut |
| (5) | Electrode           | Metal         | -                                      |
| (6) | PAD                 | Metal         | W<br>Ni Plating<br>Au Plating          |
| (7) | Connective Adhesive | Silver Powder | Ag                                     |

※The use prohibition chemistry substance of Table 1 of DHE-0204-1 (HE-QA-24) is not included in this item.

#### 5. HANDLING SUGGESTION

##### ■ Reflow Condition

Please stay with our proposed reflow condition and do soldering within 2 times.

|     |              |              |              |
|-----|--------------|--------------|--------------|
| (1) | Preheat      | 160~180deg.C | 120 sec.     |
| (2) | Primary heat | >=220 deg.C  | 100±20 sec.  |
| (3) | Peak         | 260±5 deg.C  | 10 sec. Max. |

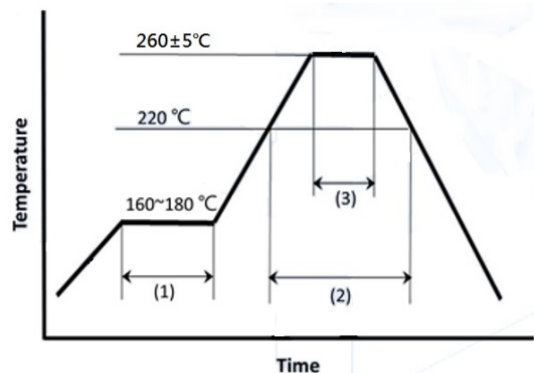
##### ■ Manual Solder iron (Example)

Bit temp.: 350°C max., Time: 3sec max. , Each terminal only should be soldered once.

##### ■ Mounting Conditions

Our products are suitable for most automated SMT processes. However, we strongly advise all our customers to conduct SMT sampling prior to mass production in order to make sure production processes will not affect the properties and specifications of our product. Seal welding and mounting procedures involving the use of ultra-sonic processes are not recommended and will affect and/or damage the internal properties of our product. Excessive shock during the mounting process will also affect the product and we strongly recommend setting SMT conditions to minimize such conditions. If a possibility of the PCB being warped exists we strongly advise to ensure the degree of warping will not affect the product. Please also ensure the operating characteristics and or soldering conditions are all within the specifications of use for our product.

Ultimately the worst case scenario of all the above will lead to cases of non-oscillation but other negative effects are also likely should our products be used in an inappropriate way. Please note such cases of misuse and its related quality issues are not included in our product warranty.



### HARMONY ELECTRONICS CORPRATION

KAOHSIUNG

TAIPEI

THAILAND

SHENZHEN

TEL: 886-2-26588883

Email: [contactus@hele.com.tw](mailto:contactus@hele.com.tw)



■ **Cleansing Conditions**

General cleaning solutions may be used to clean our products but we always recommend testing to be performed prior to mass production processes. Ultrasonic cleaning procedures are not recommended and we strongly advise other forms of cleansing to be evaluated first. Unsuitable cleansing may lead to a number of negative effects such as damage to the product surface, discoloration of the product, corrosion of the package, package contamination, illegible marking, etc. Please note cases of unadvised treatment and its related quality issues are not included in our product warranty.

■ **Storage Conditions**

Please ensure our products are preserved appropriately in their original packaging. Irregular environmental instances of moisture will affect our product’s stability and may cause problems such as frequency instability, soldering ability and conditions, package defects, and other problems. It is essential to keep our products in a clean dust-free environment out of direct sunlight.

Our products’ storage conditions should at least meet the following condition:

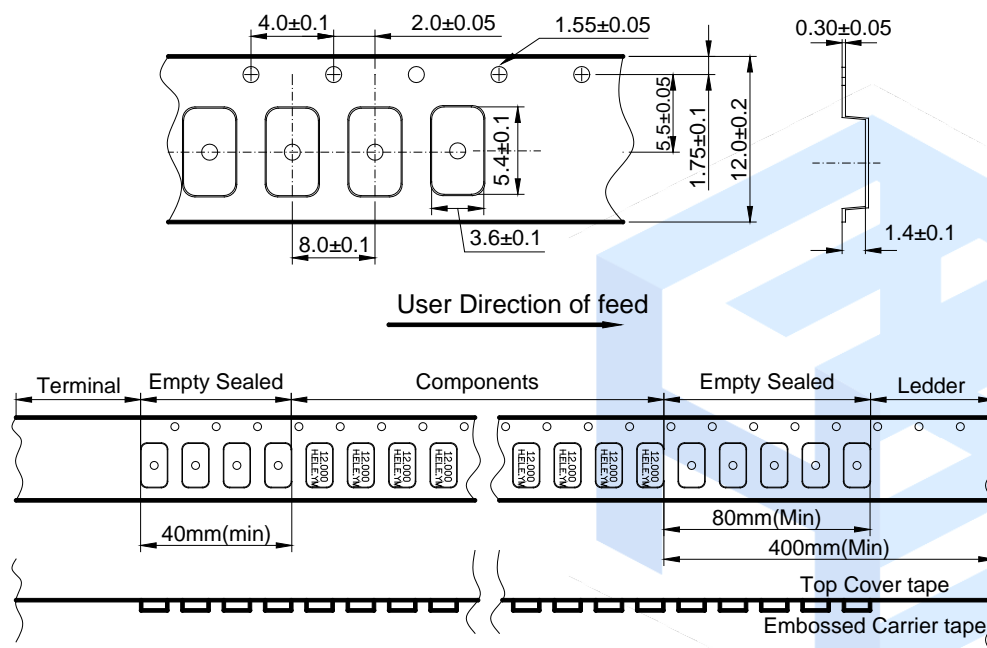
Environmental Temperature: + 40 degrees Celsius Maximum

Relative Humidity: 80% Maximum

**Please note storage instances which do not conform to our guidelines and the related quality issues produced as an outcome are not included in our product warranty.**

**6. EMBOSS CARRIER TAPE AND REEL**

■ **Carrier Tape**



**HARMONY ELECTRONICS CORPRATION**

KAOHSIUNG

TAIPEI

THAILAND

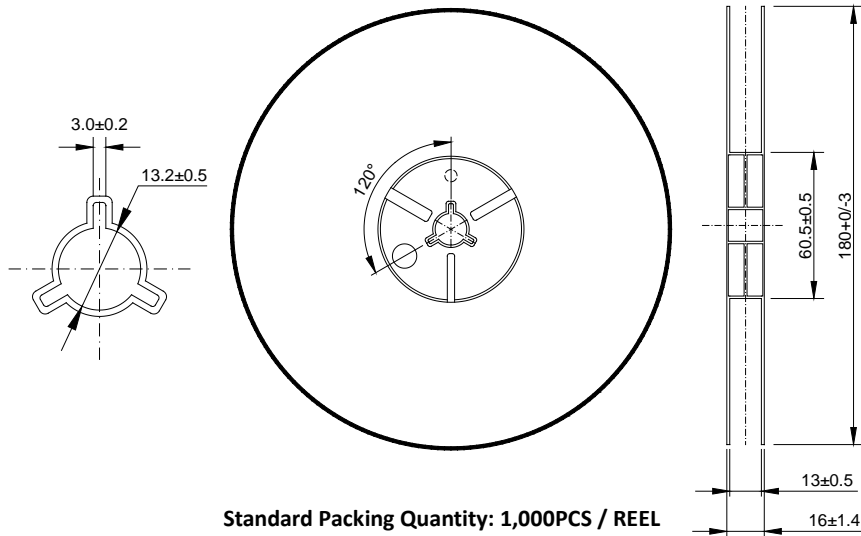
SHENZHEN

TEL: 886-2-26588883

Email: [contactus@hele.com.tw](mailto:contactus@hele.com.tw)



■ Reel



■ Material of The Tape

| Tape         | Material      |
|--------------|---------------|
| Carrier tape | PS Conductive |
| Top tape     | PET           |

■ Joint of tape

The carrier-tape and top cover-tape should not be jointed.

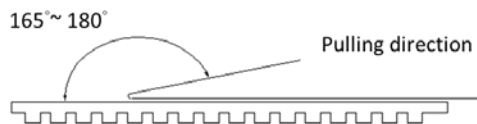
■ Release strength of cover tape

The force should be controlled between 0.1N to 0.7N under following condition.

Pulling direction: 165° to 180°

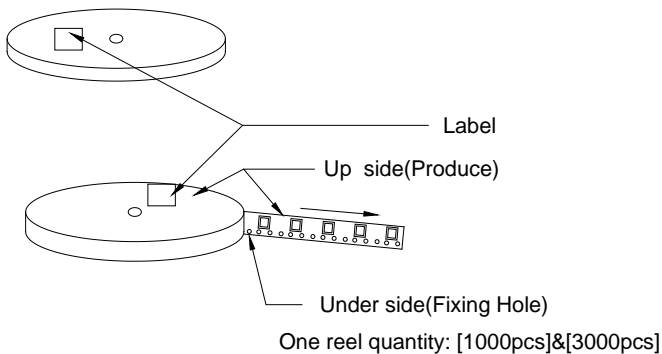
Speed: 300mm/min.

Otherwise unless specified.



Other standards shall be based on JIS C 0806-1990.

7. PACKAGE



HARMONY ELECTRONICS CORPRATION

KAOHSIUNG

TAIPEI

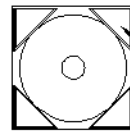
THAILAND

SHENZHEN

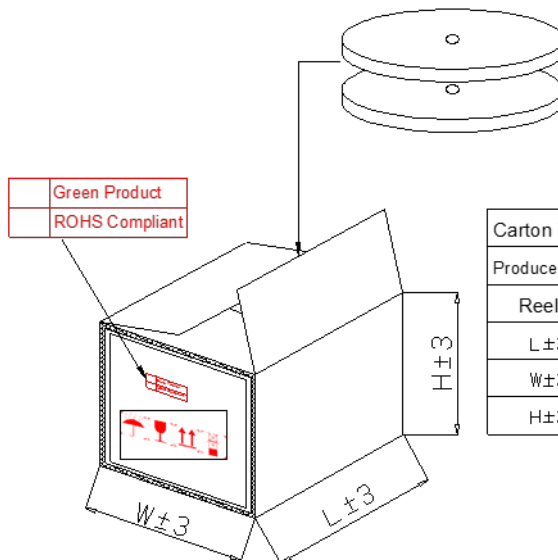
TEL: 886-2-26588883

Email: contactus@hele.com.tw





use 4 trigon pilla

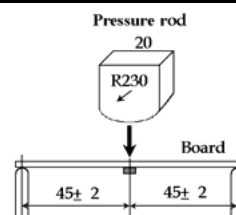


| Carton Type  | A       | B               | C                  | D     |
|--------------|---------|-----------------|--------------------|-------|
| Produce Type | 840/751 | 630/531/<br>421 | 321/221<br>211/111 | OTHER |
| Reel         | 15      | 15              | 15                 | 1~7   |
| L±3          | 200     | 200             | 200                | 195   |
| W±3          | 200     | 200             | 200                | 195   |
| H±3          | 230/260 | 230             | 230                | 150   |

- ① Top and bottom with 2.3cm thickness foam-rubber cushion for protection.
- ② Carton's Q'TY: 1~15 pcs.
- ③ Carton Type=A,B,C use 4 trigon pillar to fasten the Reel.
- ④ Need to add 3 pages dry agent in each outer box.

## 8. MECHANICAL PERFORMANCE

| Item |                  | Test Methods   | Specifications Code |
|------|------------------|--|---------------------|
| 1    | Shock            | Dropping from 100 cm height 3 times on 30 mm Concrete floor.<br>Refer to: JIS C 60068-2-32   | A                   |
| 2    | Vibration        | Frequency 10-55Hz, Sine Wave full amplitude of 0.8mm to X, Y and Z 3 axes, 2 cycles and duration of 2 hours to each direction.<br>Refer to: JIS C 60068-2-6/ MIL-HDBK-781A 6.5.2                     | A                   |
| 3    | Leakage Test     | Leak Rate $1.0 \times 10^{-9}$ Pa·m <sup>3</sup> /sec. Max. Measured by Helium leak detector. Refer to: JIS C 60068-2-17   | ---                 |
| 4    | Solder ability   | After applying ROSIN Flux, dipping in solder bath at 245deg.C $\pm 5$ deg.C for 3 $\pm 0.5$ sec.<br>Refer to: JIS C 60068-2-20/ JIS C 60068-2-58   | B                   |
| 5    | Bending Strength | Mount a sample on board.<br>Apply Pressure to the center of board until it is bent to 3 mm and hold for 5 $\pm 1$ sec.<br>Pressure speed: 0.5 mm/sec.<br>Refer to: EIAJ ET-7403/<br>JIS C 60068-2-21 | A                   |



## HARMONY ELECTRONICS CORPRATION

KAOHSIUNG

TAIPEI

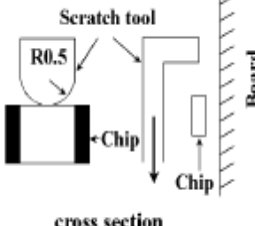
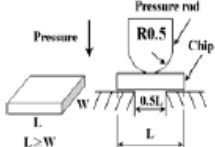
THAILAND

SHENZHEN

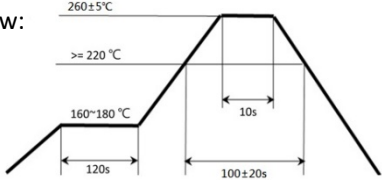
TEL: 886-2-26588883

Email: contactus@hele.com.tw



|   |               |   |  |   |
|---|---------------|---|--|---|
| 6 | Adhesion      | Mount a sample on the circuit board. Apply pressure vertically to the side of specimen attached to the circuit board with the pressure jig.<br>Pressure: 5N for 10±1 sec.<br>Refer to: EIAJ ET-7403<br>JIS C 60068-2-21 |  | C |
| 7 | Body strength | Apply pressure to the center of body with the R0.5 pressure jig.<br>pressure :10N for 10±1sec<br>Refer to: EIAJ ET-7403<br>JIS C 60068-2-21   |  | C |

## 9. ENVIRONMENT PERFORMANCE

| Item | Test Methods   | Specifications Code |
|------|--|---------------------|
| 1    | Resistance of Soldering Heat<br>Performing as the following reflow: Refer to: JIS C 60068-2-58<br>  | A                   |
| 2    | Humidity<br>Temperature 60°C±2°C, RH 90~95%, duration of 240 hours.<br>Back to room temperature first, then check the component after 1~2 hours.<br>Refer to: JIS C 60068-2-3  | A                   |
| 3    | Storage in Low Temperature<br>-40deg.C ±2deg.C, duration of 240 hours.<br>Back to the room temperature first, then check the component after 1~2 hours.<br>Refer to: JIS C 60068-2-1   | A                   |
| 4    | Storage in High Temperature<br>+85deg.C ±2deg.C, duration of 240 hours.<br>Back to the room temperature first, then check the component after 1~2 hours.<br>Refer to: JIS C 60068-2-2  | A                   |
| 5    | Thermal shock<br>-55deg.C ±2deg.C (30min) ↔ +125deg.C ±2deg.C (30min) 25 cycles.<br>And Temperature Increasing/reducing time ≤ 3mins.<br>Back to the room temperature first, then check the component after 1~2 hours.<br>Refer to: JIS C 0025 | A                   |

| Specifications code | Specifications  |
|---------------------|---|
| A                   | FREQ. DRIFT: ±5 ppm Max, RESISTANCE DRIFT: ±15% or 2Ω   |
| B                   | More than 90% of lead shall be covered by new solder.   |
| C                   | FREQ. DRIFT: ±15 ppm Max, RESISTANCE DRIFT: ±25% or 10Ω |

## HARMONY ELECTRONICS CORPRATION

KAOHSIUNG

TAIPEI

THAILAND

SHENZHEN

TEL: 886-2-26588883

Email: [contactus@hele.com.tw](mailto:contactus@hele.com.tw)

## **FACTORY LOCATION**

### **HEAD OFFICE/TAIWAN FACTORY**

NO.39, HUADONG RD., DALIAO DIST., DAFA INDUSTRIAL PARK, KAOHSIUNG CITY 831, TAIWAN.

### **CHINA FACTORY**

JU YUAN INDUSTRIAL PARK, QIAO TANG ROAD, TANG WEI COMMUNITY, FUYONG, BAOAN DISTRICT, SHEN ZHEN CITY, CHINA (Post Code:518103).

### **THAILAND FACTORY**

66MOO 5, KAONGU-BEOKPRAI RD., T.BEOKPRAI, A. BANPONG, RATCHABURI PROVINCE 70110, THAILAND.

## **SERVICE CENTER**

### **TAIPEI OFFICE**

2F., NO.409, SEC.2, TIDING BLVD., NEIHU DISTRICT, TAIPEI CITY 114, TAIWAN  
TEL: 886-2-26588883  
FAX: 886-2-26588683

## **CONTACT INFORMATION**

E-MAIL: [contactus@hele.com.tw](mailto:contactus@hele.com.tw)



**加高電子股份有限公司**  
**HARMONY ELECTRONICS CORP.**

