广东惠伦晶体科技股份有限公司
GUANGDONG FAITH LONG CRYSTAL TECHNOLOGY Co.,Ltd.
NO.68 Huangjiang Donghuan Road，Huangjiang Town，Dongguan City，Guangdong Province，China
TEL :+86(0)769-38879888 Fax :+86(0)769-38879889 E-mail : yl@dgylec.com

# PRODUCT SPECIFICATION SHEET

| | | |
|---|---|---|
| CUSTOMER | : | |
| PRODUCT TYPE | : | HC-49SMD |
| NOMINAL FREQ. | : | 24.000000 MHz |
| FL P/N | : | DM24000083 |
| REVISION | : | S0 |
| CUSTOMER P/N | : | |

CUSTOMER'S APPROVAL&DATE

FL CORPORATION

| APPROVED | CHECKED | DESIGNED |
|---|---|---|
| Xing Yue | Jin Qi | Li Xiang |

MSL1

RoHS Compliant

**CONTENTS** **PAGE**


- SPECIFICATION REVISION RECORD SHEET 2
- ELECTRICAL SPECIFICATIONS 3
- DIMENSIONS & MARKING 4
- STRUCTURE ILLUSTRATION 5
- RELIABILITY TEST SPECIFICATIONS 6
- PACKAGING REQUIREMENT 7/8
- SPECIFICATION OF THE ENVIRONMENT-RELATED SUBSTANCES 9


**ATTACHMENT（optional）**

- ELECTRICAL CHARACTERISTICS TEST A ☐ YES ☑ NO
- TEMPERATURE CHARACTERISTICS TEST B ☐ YES ☑ NO

**SPECIFICATION REVISION RECORD SHEET**

| Rev. | Revise page | Revise Contents | Date | Ref. No. | Reviser |
|---|---|---|---|---|---|
| S0 | N/A | Initial released | 3-Jul-23 | N/A | Li Xiang |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

## PRODUCT DESCRIPION

**Standard atmospheric conditions**

Unless otherwise specified. The standard range of atmospheric conditions for making measurement and tests are as follow:

Ambient temperature 25±2℃
Relative humidity 40%~70%

If there is no doubt the results, measurement shall be made within the following limits:

Ambient temperature 25±2℃
Relative humidity : 40%~70%

**Measure equipment**

Electrical characteristics measured by S&A250B or equivalent.

**Crystal cutting type**

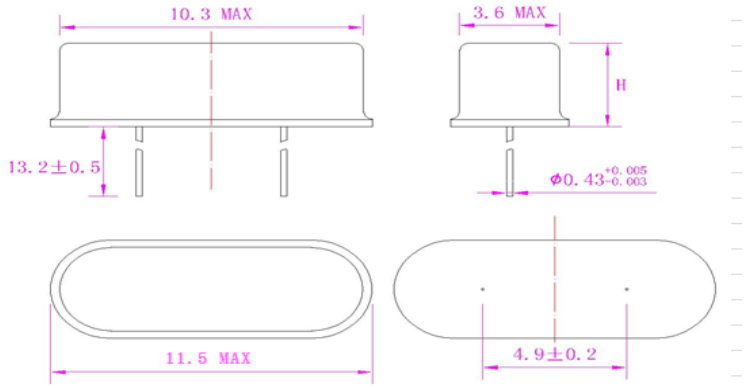
The crystal is using AT CUT (thickness shear mode)

## ELECTRICAL SPECIFICATIONS

| | Parameters | Symbol | Electrical Spec. | UNITS | Notes |
|---|---|---|---|---|---|
| 1 | Nominal Frequency | FL | 24.000000 | MHz | - |
| 2 | Oscillation Mode | - | Fund | - | - |
| 3 | Load Capacitance | CL | 20.0 | p F | - |
| 4 | Frequency Tolerance | - | +/-20 | ppm | at 25±2℃ |
| 5 | Operating Temperature | - | -20～+85°C | ℃ | - |
| 6 | Frequency Stability (reference 25℃) | - | +/-30 | ppm | -20～+85℃ |
| 7 | Drive Level | DL | 500.0 | u W | 100 typ |
| 8 | Effective Resistance Rr | ESR | < 25.0 | ohm | - |
| 9 | Shunt Capaitance C0 | C0 | 5 | p F | - |
| 10 | Insulation Resistance | IR | >500 | M-ohm | at DC 100V |
| 11 | DLD2 | - | 8 | ohm | - |
| 12 | Aging | - | +/-5 | ppm | 1st Year |
| 13 | Storage Temperature Range | - | -55～+125°C | ℃ | - |
| 14 | ESD | - | HBM>2000V | ℃ | JESD22-A114-B |
| 15 | MSL | - | Level 1 | - | IPC/JEDEC J-STD-033C |
| 16 | Others | - | - | - | - |
| | | | | | |
| | | | | | |

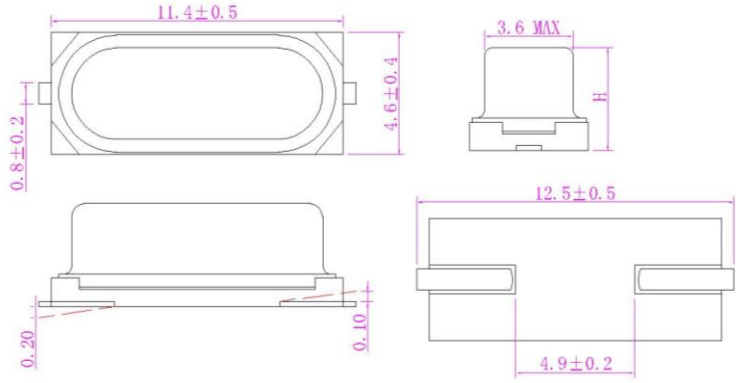
**DIMENSIONS UNITS: MM**

**49S MODE**




| OPTION | HOLDER | H |
|---|---|---|
| ☐ | 49S | 3.3±0.3 mm |
| ☐ | 49SS | 2.3±0.3 mm |

**49SMD MODE**




| OPTION | HOLDER | H |
|---|---|---|
| ■ | SMD-49S | 4.0±0.2mm |
| ☐ | SMD-49SS | 4.0 Max mm |

**MARKING**

YL
XXXX D G KK

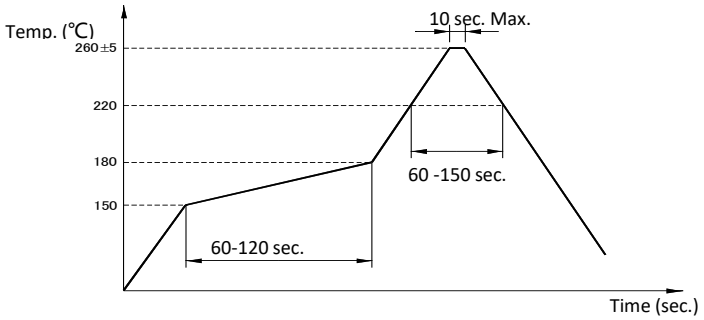
XXXX：Frequency
D：Administrative Symbol
G：Year month code
KK：Lot No.

| year \ month | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2021 | 2025 | A | B | C | D | E | F | G | H | J | K | L | M |
| 2022 | 2026 | N | P | Q | R | S | T | U | V | W | X | Y | Z |
| 2023 | 2027 | a | b | c | d | e | f | g | h | j | k | l | m |
| 2024 | 2028 | n | p | q | r | s | t | u | v | w | x | y | z |

**SUGGESTED REFLOW PROFILE**

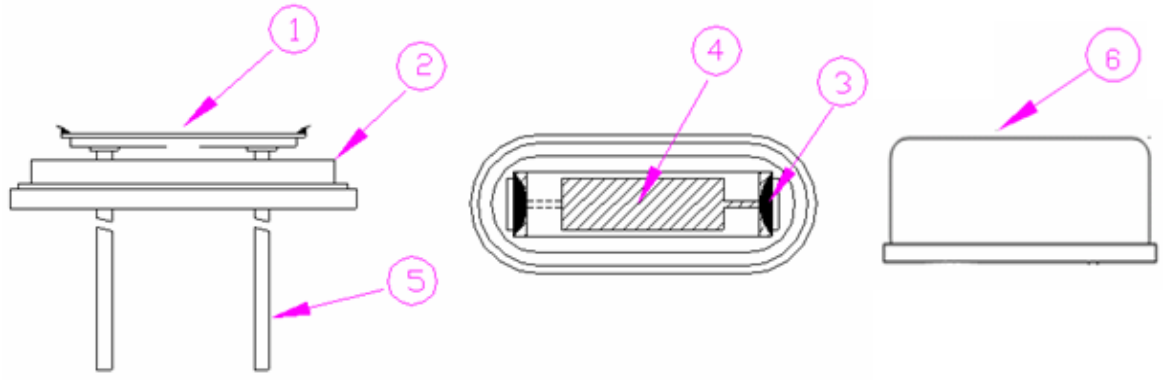
Total time : 360 sec. Max.

Solder melting point :225 °C

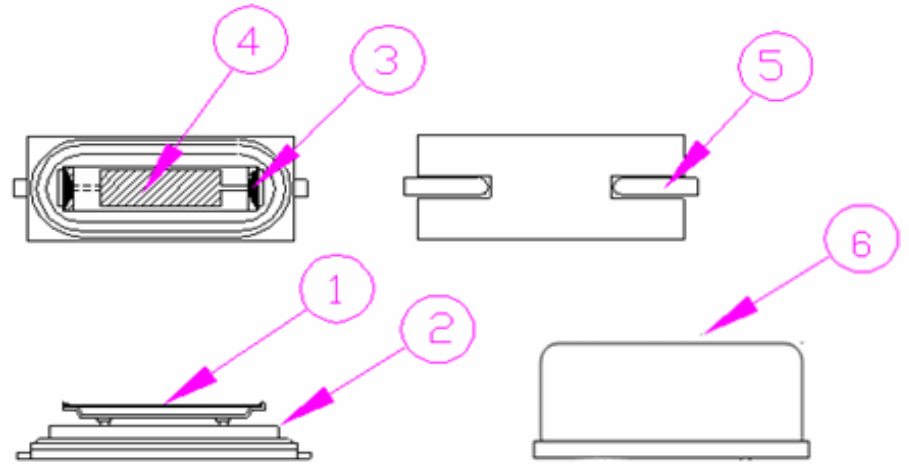


**STRUCTURE ILLUSTRATION**

49S/49SMD MODE




49M MODE




| NO | COMPONENTS | MATERIALS | QTY | FINISH/SPECIFICATIONS |
|---|---|---|---|---|
| 1 | CRYSTAL BLANK | SiO2 | 1 | - |
| 2 | BASE | SPCC-SD | 1 | - |
| 3 | ONDUCTIVE ADHESIV | Ag +Resin | 2 | - |
| 4 | ELECTRODE | Noble metal | 2 | - |
| 5 | LEAD | Kovar | 2 | - |
| 6 | COVER/CAN | Kovar | 1 | |

## RELIABILITY SPECIFICATIONS

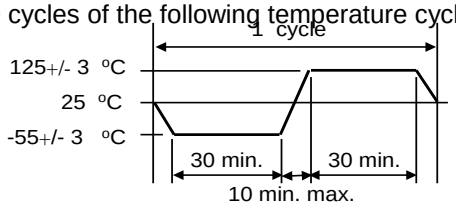
1.MECHANICAL ENDURANCE

| No. | Test Item | Test Methods | | |
|---|---|---|---|---|
| 1 | Drop Test | 50 cm height, fall freely onto stainless plate 3 times. | | JIS C6701 |
| 2 | Vibration | Frequency range<br>Amplitude<br>Sweep time<br>Pendicular axes each test time | 10 ~ 2000 Hz<br>1.52 mm<br>20 minute<br>4 hours<br>(Total test time 12 hours) | MIL-STD-883E |
| 3 | Solderability | Temperature<br>Immersing depth<br>Immersion time<br>Flux | 260 °C ±5 °C<br>0.5 mm minimum<br>5 ± 1 seconds<br>Rosin resin methyl alcohol solvent ( 1 : 4 ) | GB/T 2424.17-2008 / IEC 60068-2-44:1995; GB/T 2423.28-2005 / IEC 60068-2-20:1979 |
| 4 | Resistance To Soldering Heat | Pre-heat temperature<br>Pre-heat time<br>Test temperature<br>Test time | 125 °C<br>60 ~ 120 sec.<br>260 +/- 5 °C<br>5 +/- 1 sec. | MIL-STD-202F |

*Storage conditions ： 18 months

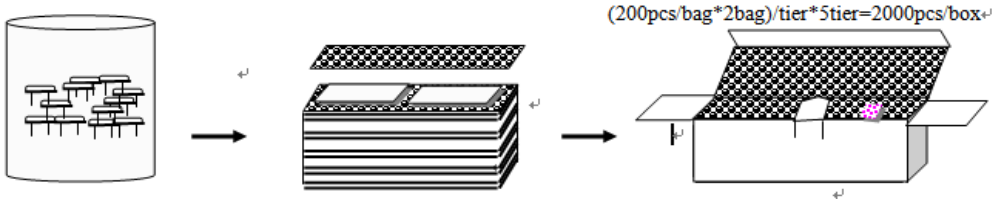
*Constant humidity ： 40~70%

2.ENVIRONMENTAL ENDURANCE

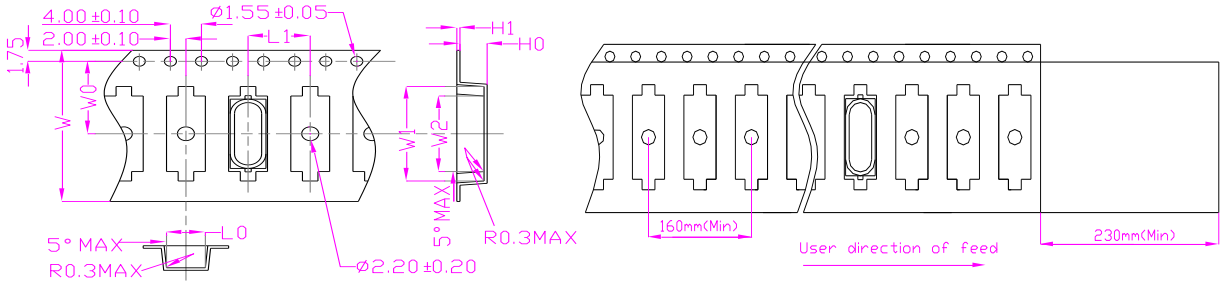
| No. | Test Item | Test Methods | |
|---|---|---|---|
| 5 | High Temp. Storage | + 125 °C +/- 2 °C for 500 +/- 12 hours | MIL-STD-883E |
| 6 | Low Temp. Storage | - 40 °C +/- 2 °C for 500 +/- 12 hours | |
| 7 | Thermal Shock | Total 10 cycles of the following temperature cycle   | MIL-STD-883E |

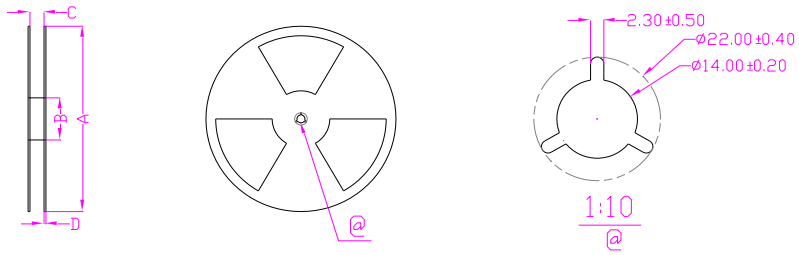
**PACKING :**

**49S/49SMD MODE**




**49M MODE**




| Dimension / Type | Unit : mm | | | | | | |
|---|---|---|---|---|---|---|---|
| | **W** | **W0** | **W1** | **W2** | **L0** | **L1** | **H0** |
| **SMD-49S** | 24±0.3 | 11.5±0.1 | 15±0.1 | 12±0.1 | 5±0.1 | 8/12±0.1 | 0.4±0.05 |
| | **H1** | **A** | **B** | **C** | **D** | | |
| | 4.25/3.5±0.2 | 330±2.0 | 100±1.0 | 24.5±1.0 | 2.4±0.2 | | |

Standard Reel Quantity is 1,000 pcs per reel.

**REMARK : NA**

## SMD PRODUCT PACKING STANDARD

### Out-going packing instruction

| Reel Packing | Carton |
|---|---|
| name：reel<br>standard：diameter 33cm<br>material：plastics | name：carton<br>standard：340×340×350mm<br>material：AB corrugated paper(10 reels enter) |
|  |  |
| |  |

### The label instruction

| Label Drawing | Mark | Name of Article | Spec. | Size | Printing |
|---|---|---|---|---|---|
|  | L1 | 条码标签<br>Bar Code Label<br>(Chintz Paper) | 1.Part No.<br>2.Lot No.<br>3.Q'ty<br>4.Freq | 70x50mm | White |
|  | L2 | 条码标签<br>Bar Code Label<br>(Chintz Paper) | 1.Part No.<br>2.Date Code<br>3.Q'ty<br>4.Freq | 70x50mm | White |

**Remark**

Specifications on the label is for the use of templates with different product specifications may vary.
If customer specified requirements for labels packaging. please provide the operation procedure.

| Range | Products | Packing Material |
|---|---|---|
| **Banned Substances** | **Maximum concentration ppm(mg/kg)** | **Maximum concentration ppm(mg/kg)** |
| 1.镉及镉化合物<br>Cadmium and cadmium compounds | 100 | 100 |
| 2.铅及铅化合物<br>Lead and lead compounds | 1000 | 100 |
| 3.汞及汞化合物<br>Mercury and mercury compounds | 1000 | 100 |
| 4.六价铬化合物<br>Hexavalent-Chromium VI (Cr+6) | 1000 | 100 |
| 5.聚溴联苯 PBB<br>Polybrominated biphenyls | 1000 | N/A |
| 6.聚溴二苯醚 PBDE<br>Polybrominated diphenyl ethers | 1000 | N/A |
| 7.邻苯二甲酸二(2-乙基己基)酯 DEHP<br>Di (2-ethylhexyl) phthalate | 1000 | N/A |
| 8.邻苯二甲酸丁苄酯 BBP<br>Butyl Benzyl Phthalate | 1000 | N/A |
| 9.邻苯二甲酸二丁酯 DBP<br>Dibutyl Phthalate | 1000 | N/A |
| 10 邻苯二甲酸二异丁酯 DIBP<br>Diisobutyl Phthalate | 1000 | N/A |
| 11. 氟（F）、氯（Cl）、溴（Br）、碘（I）<br>Fluorine、Chlorine、 Bromine、Iodine | 900、900、900、900<br>注：Br+Cl＜1000 | N/A |
| 12.包装材料中重金属(汞、镉、六价铬、铅、PBB、PBDE)之总量<br>Heavy metals (mercury, cadmium, lead, Cr+6,PBB and PBDE) in packing materials | N/A | 100<br>铅(Pb) + 镉(Cd) + 汞(Hg) + 六价铬(Cr+6) <100ppm |
| 13.高度关注物质<br>SVHC-Substances of Very High Concern | 1000 | N/A |


惠伦晶体
FAITH LONG CRYSTAL