广东惠伦晶体科技股份有限公司
GUANGDONG FAILONG CRYSTAL TECHNOLOGY Co.,Ltd.
36 Donghuan Road,Jitigang Village,Huangjiang,Dongguan,Guangdong Province,P.R.China
TEL :+86(0)769-38879888 Fax :+86(0)769-38879889 E-mail : yl@dgylec.com

# PRODUCT SPECIFICATION SHEET

| | | |
|---|---|---|
| CUSTOMER | : | |
| PRODUCT TYPE | : | HC-49S |
| NOMINAL FREQ. | : | 28.800000 MHz |
| FL P/N | : | DS28800006 |
| REVISION | : | S0 |
| CUSTOMER P/N | : | |

CUSTOMER'S APPROVAL&DATE

FL CORPORATION

| APPROVED | CHECKED | DESIGNED |
|---|---|---|
| Antian KeShi | Luo Jinsong | Zhai XueLing |

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-Sep-19 | N/A | Chen XuanRu |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

## 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

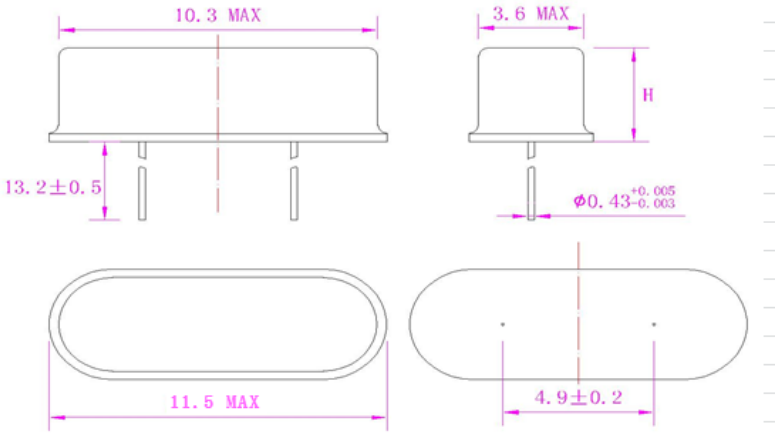
The crystal is using AT CUT (thickness shear mode)

## ELECTRICAL SPECIFICATIONS

| | Parameters | Symbol | Electrical Spec. | UNITS | Notes |
|---|---|---|---|---|---|
| 1 | Nominal Frequency | FL | 28.800000 | MHz | - |
| 2 | Oscillation Mode | - | Fund | - | - |
| 3 | Load Capacitance | CL | 20.0 | p F | - |
| 4 | Frequency Tolerance | - | +/-10 | ppm | at 25±2℃ |
| 5 | Operating Temperature | - | -20～+70℃ | ℃ | - |
| 6 | Frequency Stability (reference 25℃) | - | +/-15 | ppm | -20～+70℃ |
| 7 | Drive Level | DL | 100.0 | u W | - |
| 8 | Effective Resistance Rr | ESR | < 20.0 | ohm | - |
| 9 | Shunt Capaitance C0 | C0 | ＜5 | p F | - |
| 10 | Insulation Resistance | IR | >500 | M-ohm | at DC 100V |
| 11 | Aging | - | +/-5 | ppm | 1st Year |
| 12 | Reflow shift | - | +/-5 | ppm | at 265±2℃*10sec |
| 13 | Storage Temperature Range | - | -40～+85℃ | ℃ | - |
| 14 | ESD | - | HBM>2000V | ℃ | JESD22-A114-B |
| 15 | Others | - | - | - | - |
| | | | | | |
| | | | | | |
| | | | | | |

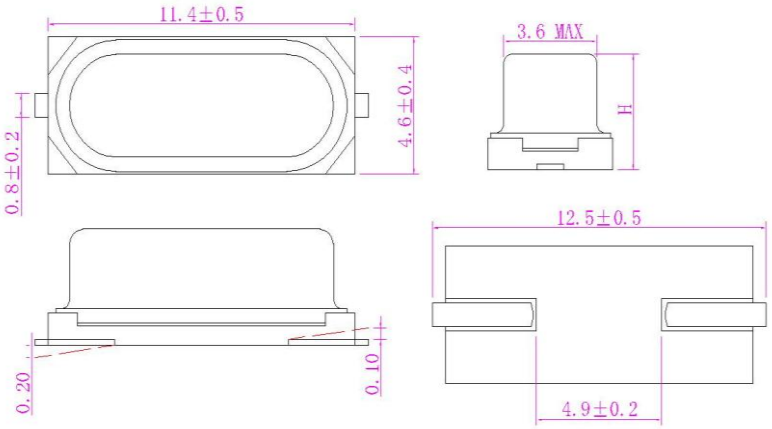
**DIMENSIONS** **UNITS: MM**

**49S MODE**




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

**49SMD MODE**




| OPTION | HOLDER | H |
|---|---|---|
| □ | SMD-49S | 4.1±0.3 mm |
| □ | SMD-49SS | 3.1±0.3 mm |

**MARKING**

YL
XXXX D G KK

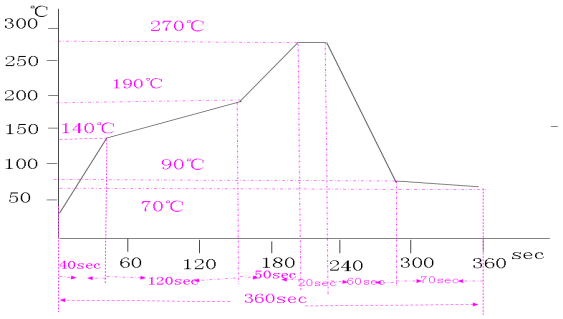
XXXX：Frequency
D：Company code（Y）
G：Year month code
KK：Lot No.

| month / year | | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2013 | 2017 | A | B | C | D | E | F | G | H | J | K | L | M |
| 2014 | 2018 | N | P | Q | R | S | T | U | V | W | X | Y | Z |
| 2015 | 2019 | a | b | c | d | e | f | g | h | j | k | l | m |
| 2016 | 2020 | n | p | q | r | s | t | u | v | w | x | y | z |

**SUGGESTED REFLOW PROFILE**

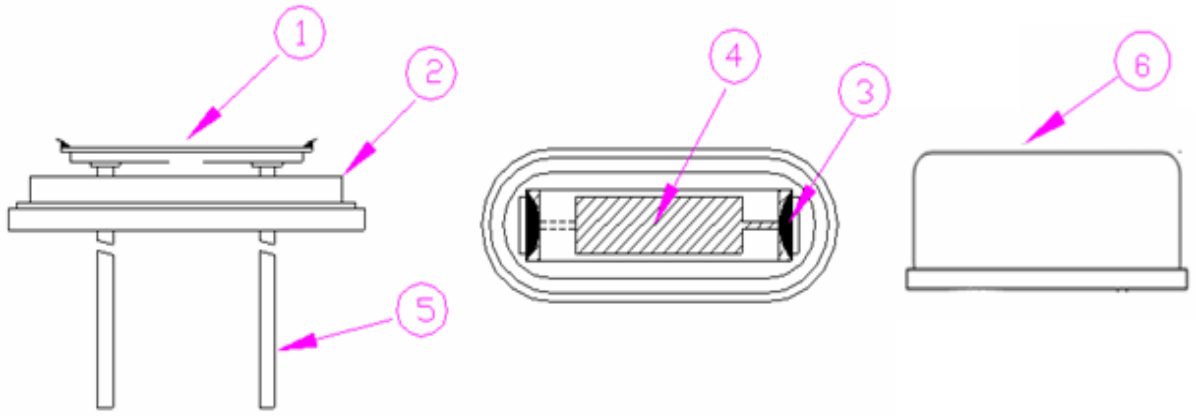
Total time : 200 sec. Max.

Solder melting point :185 °C

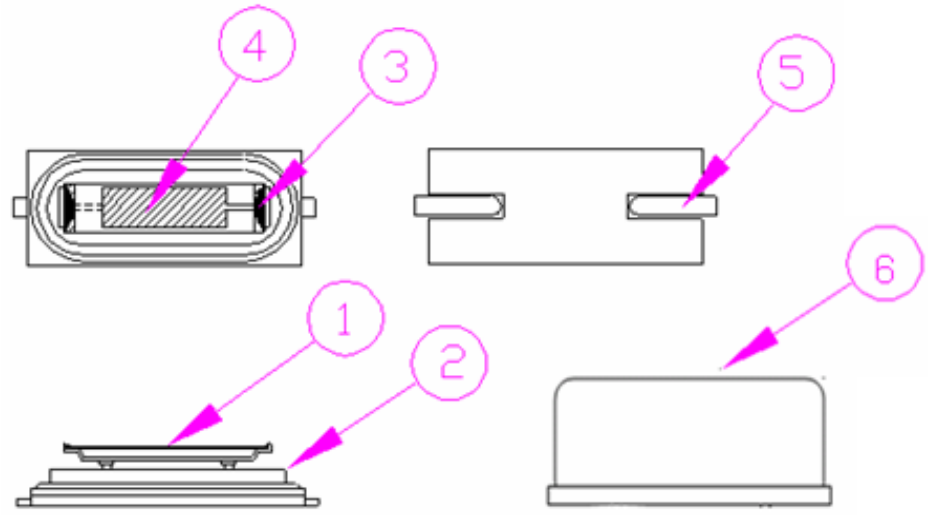


**STRUCTURE ILLUSTRATION**

49S/49SMD MODE




49M MODE



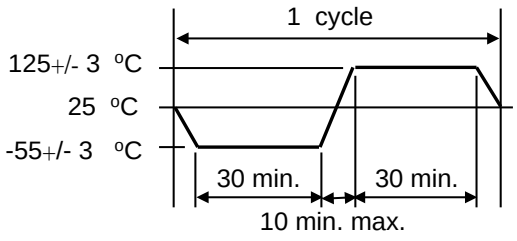

| NO | COMPONENTS | MATERIALS | QTY | FINISH/SPECIFICATIONS |
|---|---|---|---|---|
| 1 | CRYSTAL BLANK | SiO2 | 1 | - |
| 2 | BASE | SPCC-SD | 1 | - |
| 3 | ONDUCTIVE ADHESIV | Ag +Resin | 2 | - |
| 4 | ELECTRODE | Ag | 2 | - |
| 5 | LEAD | Kovar | 2 | - |
| 6 | COVER/CAN | Kovar | 1 | |

## RELIABILITY SPECIFICATIONS

1.MECHANICAL ENDURANCE

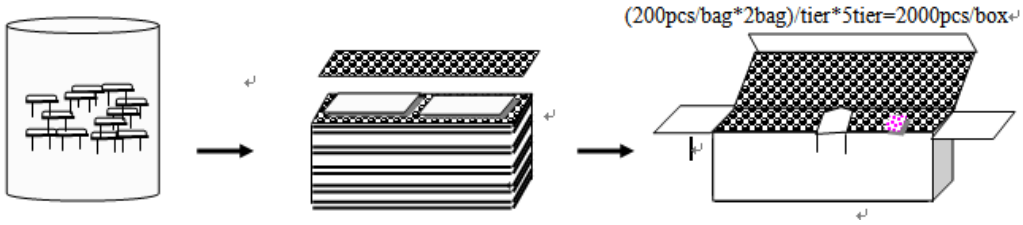
| No. | Test Item | Test Methods | | |
|---|---|---|---|---|
| 1 | Drop Test | 50 cm height, fall freely onto stainless plate 3 times. | | JIS C6701 |
| 2 | Vibration | Frequency range<br>Amplitude<br>Sweep time<br>Pendicular axes each test time | 10 ~ 2000 Hz<br>1.52 mm<br>20 minute<br>4 hours<br>(Total test time 12 hours) | MIL-STD-883E |
| 3 | Solderability | Temperature<br>Immersing depth<br>Immersion time<br>Flux | 255 °C +/- 5 °C<br>0.5 mm minimum<br>10 +/- 0.5 seconds<br>Rosin resin methyl alcohol solvent ( 1 : 4 ) | MIL-STD-883E |
| 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 |

2.ENVIRONMENTAL ENDURANCE

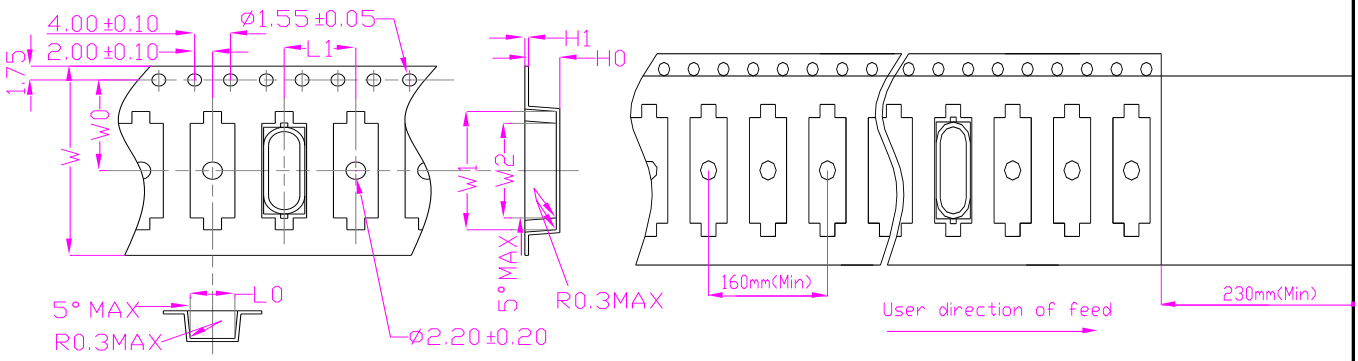
| No. | Test Item | Test Methods | |
|---|---|---|---|
| 5 | High Temp. Storage | + 125 °C +/- 2 °C for 500 +/- 12 hours | MIL-STD-883E |
| 6 | Low Temp. Storage | - 40 °C +/- 2 °C for 500 +/- 12 hours | |
| 7 | Thermal Shock | Total 10 cycles of the following temperature cycle   | MIL-STD-883E |

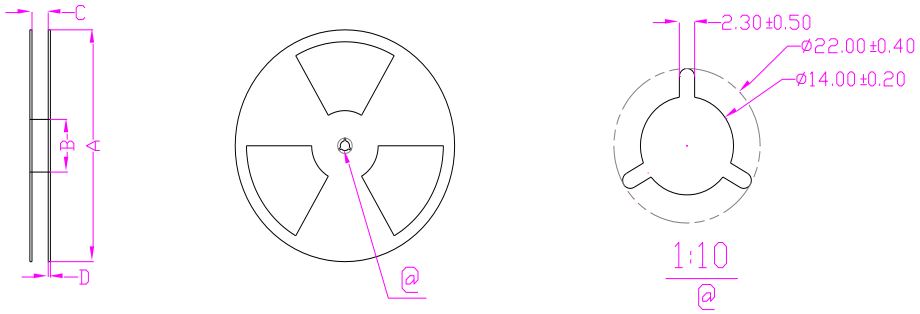
**PACKING :**

**49S/49SMD MODE**




**49M MODE**



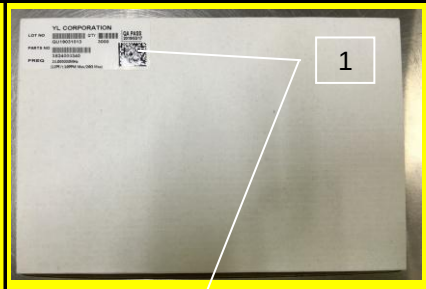
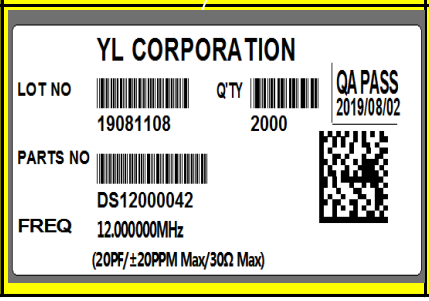

| Type \ Dimension | Unit : mm | | | | | | |
|---|---|---|---|---|---|---|---|
| | **W** | **W0** | **W1** | **W2** | **L0** | **L1** | **H0** |
| **SMD-49S** | 24±0.3 | 11.5±0.1 | 15±0.1 | 12±0.1 | 5±0.1 | 8/12±0.1 | 0.4±0.05 |
| | **H1** | **A** | **B** | **C** | **D** | | |
| | 4.25/3.5±0.2 | 330±2.0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

Standard Reel Quantity is 1,000 pcs per reel.

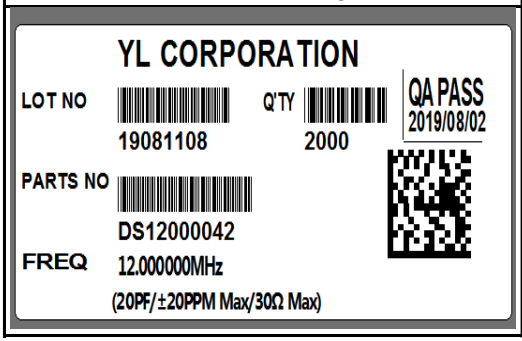
**REMARK : NA**

## SMD PRODUCT PACKING STANDARD

### Out-going packing instruction

| Reel Packing | Inner Packing | Carton |
|---|---|---|
| name：reel<br>standard：diameter 18cm<br>material：plastics | name：inner box<br>standard：L19.0xW19.0xH2.5cm<br>material：B corrugated paper | name：carton<br>standard：L34.0xW22.0xH22.0cm<br>material：AB corrugated paper(10 boxes enter) |
|  |  |  |
| |  |  |

### The label instruction

| Label Drawing | Mark | Name of Article | Spec. | Size | Printing |
|---|---|---|---|---|---|
|  | L1 | 条码标签<br>Bar Code<br>Label<br>(Chintz Paper) | 1.Date Code<br>2.Lot No.<br>3.Part No.<br>4.Freq<br>5.Q'ty | 75x35mm | 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 | Test Method |
|---|---|---|---|
| **Banned Substances** | **Maximum concentration ppm(mg/kg)** | **Maximum concentration ppm(mg/kg)** | |
| 1.镉及镉化合物<br>Cadmium and cadmium compounds | 5 | 5 | ICP-AES as per EN1122, method B2001 or other acid digestion. |
| 2.铅及铅化合物<br>Lead and lead compounds | 40 | 100 | ICP-AES after as per EPA 3050B or other acid digestion. |
| 3.汞及汞化合物<br>Mercury and mercury compounds | 5 | 5 | ICP-AES after as per EPA 3052 or other acid digestion. |
| 4.六价铬化合物<br>Hexavalent-Chromium VI (Cr+6) | 10 | 10 | As per US EPA 7196A and US EPA 3060A. |
| 5.聚溴联苯 PBB<br>Polybrominated biphenyls | 5 | 5 | With reference to USEPA 3540 or USEPA3550.<br>Analysis was performed by LPLC/DAD, LC/MS or GC/MS. (prohibited by 2002/95/EC (RoHS),83/261/EEC, and76/769/EEC) |
| 6.聚溴二苯醚 PBDE<br>Polybrominated diphenyl ethers | 5 | 5 | With reference to USEPA3540or USEPA3550.<br>Analysis was performed by HPLC/DAD<br>LC/MS or GC/MS.(prohibited by 2002/95/EC(RoHS), 83/264/EEC, and 76/769/EEC) |
| 7.多氯联苯 (PCB)<br>Polychlorinated biphenyl | 5 | 5 | |
| 8.多氯化萘 (PCN)<br>Polychlorinated naphthalene | 5 | 5 | |
| 9.氯代烷烃 (CP)<br>Chiorinated paraffin | 5 | 5 | |
| 10.其他有机氯化合物<br>Other chlorinated organic compounds | 5 | 5 | |
| 11.其他有机溴化合物<br>Other brominated organic compounds | 5 | 5 | |
| 12.有机锡化合物 (三丁基锡化合物,三苯基锡化合物)<br>Organic tin compounds (Tributyl tin category & Triphenyl tin category ) | 5 | 5 | |
| 13.石棉<br>Asbestos | 5 | 5 | |
| 14.偶氮化合物<br>Azo compounds | 5 | 5 | |
| 15.甲醛<br>Formaldehyde | 5 | 5 | |
| 16.聚氯乙烯(PVC)以及聚氯乙烯混合物<br>Polyvinyl chloride (PVC) and PVC blends | No detect | No detect | |
| 17.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 | N/A | <100 | |

Lead Free Products are “Directive 2002/95/EC of The European Parliament of 27 January 2003 on the restriction of certain hazardous substances (RoHS) in electrical and electronic equipment” and Sony SS-00259 Compliant.


惠伦晶体
FAILONG CRYSTAL