

深圳市维拓精电科技有限公司

WTL International Limited

APPROVAL SHEET

| | | | | |
|-------------------------|-------------------------------|------|----------|---------|
| DESCRIPTION : | HC-49/SMD Crystal | | | |
| NOMINAL FREQ.: | 16.0000MHz | | | |
| WTL P/N: | WTL9M85521FO | | | |
| VERSION: | 1 | | | |
| DATE: | 2023.02.10 | | | |
| Customer | Customer P/N | | | |
| Promelectronica | / | | | |
| Customer Signature | WTL | | | |
| | Approved by: <i>Kevin Liu</i> | | | |
| | Checked by: <i>Shu Ping</i> | | | |
| | Issued by: <i>Shengbiao</i> | | | |
| REVISION HISTORY | | | | |
| Revised Page | Revision Content | Date | Ref. No. | Reviser |
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Attachment(s):

- 1.Product Specification Sheet
- 2.Electrical Testing Report
- 3.Reliability Report
- 4.ICP Test Report (SGS)

FEATURE

- Height 4.0mm, compact unit for surface mount
- Able to by means of a metal case and completely sealed high solution characteristics
- Copes with high density mounting and is the optimum for mass production

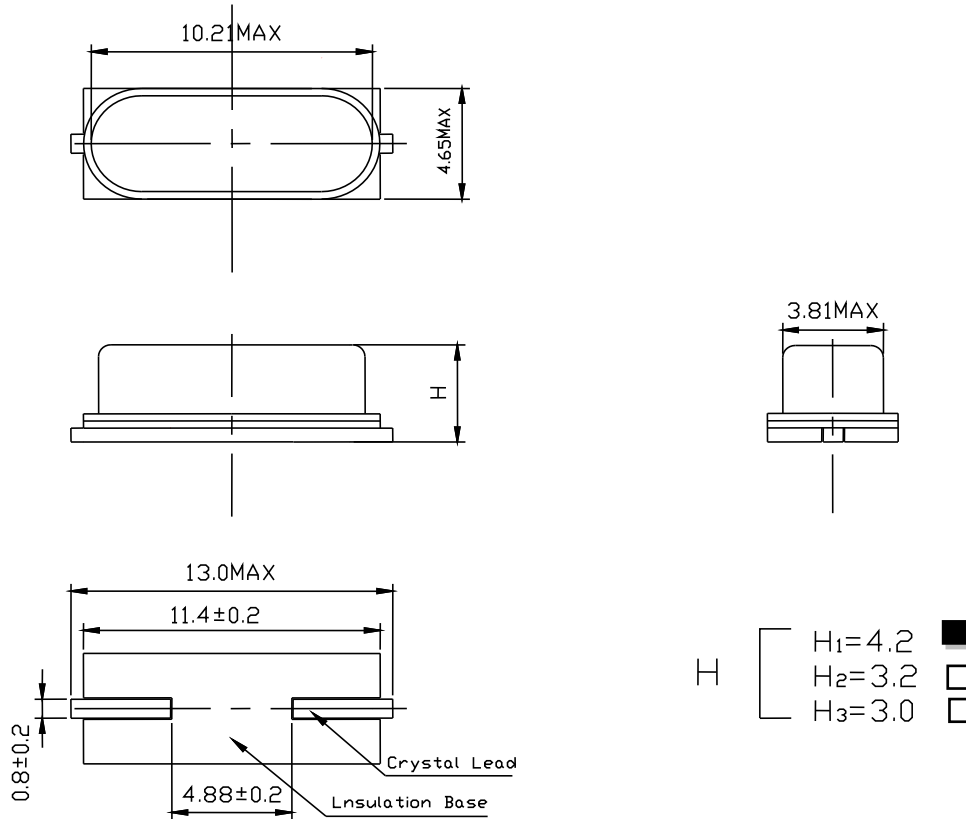


1、 ELECTRICAL SPECIFICATIONS

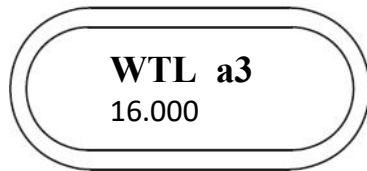
| | |
|--|------------------------------|
| Hold Style | HC-49/SMD |
| Nominal Frequency | 16.0000 MHz |
| Modew | Fundamental / AT |
| Frequency Tolerance (at 25°C) | ±30ppm |
| Frequency Stability Over Operating Temperature Characteristics | ±100ppm |
| Operating Temperature Range | -40°C ~ +85°C |
| Storage Temperature Range | -40°C ~ +85°C |
| Shunt Capacitance (C ₀) | 7.0pF Max |
| Driver Level (Typical) | 100μW |
| Load Capacitance(C _L) | 16 pF |
| ESR | 30 Ohm Max |
| Insulation Resistance | More than 500Mohms at DC100V |
| Aging @25°C 1 st year (Max) | ±5ppm/year |

REMARK: SPECIFICATIONS SUBJECT TO CHANGE WITHOUT PRIOR NOTICE. PLEASE CONFIRM WITH OUR SALES ENGINEER.

2、DIMENSIONS (Unit: mm)



3、MARKING

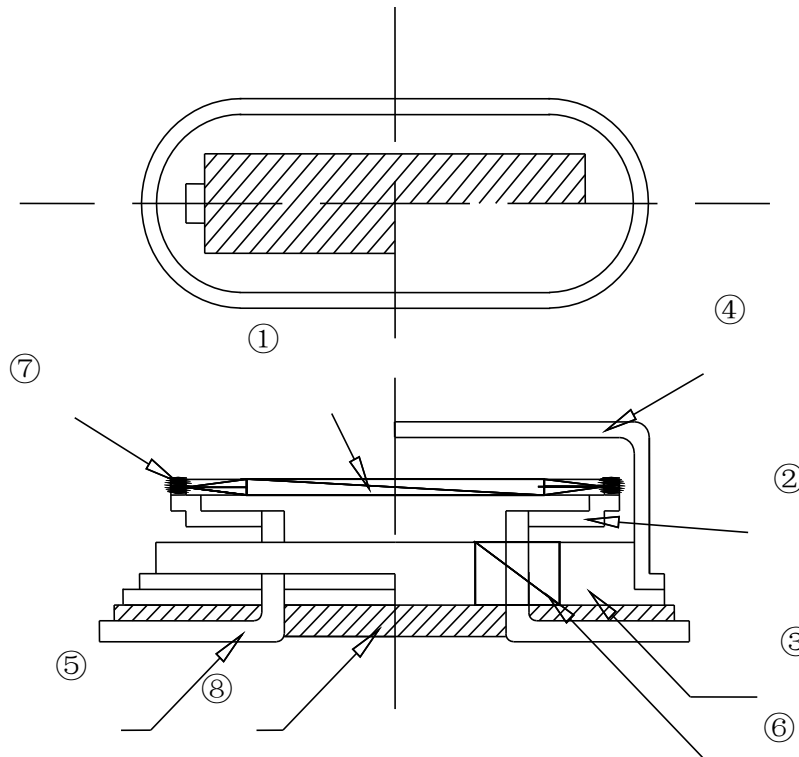


- WTL → Brand Logo
- 16.000 → Frequency (MHz)
- a → Week (a、b、c...z、A、B、C...Y、Z ,from 1 to 52week)
- 3 → YEAR (0=2020year, 1=2021year,2=2023year....)

Marking Instruction :

The date code was marked on the crystal body, which will be easily traced back in case of quality issue.

4、STRUCTURE ILLUSTRATION

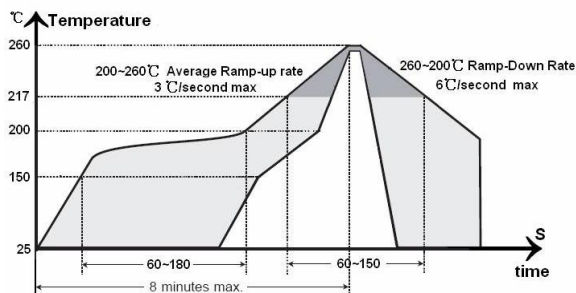


| NO | COMPONENT | MATERIALS | QTY | SURFACE |
|----|---------------|------------------|-----|----------------------------|
| ① | CRYSTAL BLANK | SiO ₂ | 1 | POLISH/ETCHED |
| ② | SUPPORTER | COPPER | 2 | |
| ③ | BASE | Fe-NI | 1 | NI PLATED |
| ④ | CAN | NICKEL-COPPER | 1 | |
| ⑤ | LEAD | KOVAR | 2 | NI PLATED+SOLDER DIPPED |
| ⑥ | GLASS | KOVER-GLASS | 2 | |
| ⑦ | ADHESIVE GENT | Ag-URETHANE | 2 | |
| ⑧ | INSULATOR | PPS | 1 | |

5、RELIABILITY SPECIFICATIONS

| Item | Conditions | Result |
|------------------------------|---|--|
| Low Temp. Storage | Put the crystal into the $-40^{\circ}\text{C} \pm 2^{\circ}\text{C}$ constant temperature box for 500 ± 2 H , Measurement taken after 2 hour. | $\Delta F \cong \pm 5$ PPM $\Delta RR \cong \pm 15\%$ or 5 ohms |
| High Temp. Storage | Put the crystal into the $+100^{\circ}\text{C} \pm 2^{\circ}\text{C}$ constant temperature box for 500 ± 2 H, Measurement taken after 2 hour. | $\Delta F \cong \pm 5$ PPM $\Delta RR \cong \pm 15\%$ or 5 ohms |
| High Temp & Humidity | Put the crystal into the constant temperature & humid with the temperatures $85^{\circ}\text{C} \pm 3^{\circ}\text{C}$ and the humidity 98% for 500 ± 2 H. Measurement taken after 2 hour. | $\Delta F \cong \pm 5$ PPM $\Delta RR \cong \pm 15\%$ or 5 ohms |
| Thermal Shock | Put the crystal into the constant temperature $-55^{\circ}\text{C} \pm 2^{\circ}\text{C}$ for 30 ± 1 M, then change the temperature to $+85^{\circ}\text{C} \pm 2^{\circ}\text{C}$ for 30 ± 1 M, the total is 100times. Measurement taken after 2 hour. | $\Delta F \cong \pm 5$ PPM $\Delta RR \cong \pm 15\%$ or 5 ohms |
| Resistance To Soldering Heat | Passed through the re-flow oven under the following condition. Preheat to $150^{\circ}\text{C} \pm 5^{\circ}\text{C}$ for 60 to 120 sec, and peak $265^{\circ}\text{C} \pm 5^{\circ}\text{C}$ for $10 \text{s} \pm 3 \text{sec}$. Measurement taken after DUT being left at room temperature for at 24 ± 2 hours | $\Delta F \cong \pm 5$ PPM $\Delta RR \cong \pm 15\%$ or 5 ohms |
| Drop Test | The crystal fall off the cement floor with the height $75 \text{cm} \pm 5 \text{cm}$ for 3 times . Measurement taken after 2 hour. | $\Delta F \cong \pm 5$ PPM $\Delta RR \cong \pm 15\%$ or 5 ohms |
| Vibration Test | Apply 0.75mm vibration at sweep frequency $10 \sim 500$ Hz, for 2h. 10 cycles in each direction of 3 axis. Measurement taken after 2 hour. | $\Delta F \cong \pm 5$ PPM $\Delta RR \cong \pm 15\%$ or 5 ohms |
| Fine Leak | Take measurements with a helium leakage detector, or measure insulation resistance under pressure. | $1 \times 10^{-2} \mu\text{Pa} \cdot \text{m}^3 / \text{s}$ Max or $IR \geq 500 \text{M}\Omega$ |
| Solder ability | In $245 \pm 5^{\circ}\text{C}$ solder bath for 2 ± 0.5 seconds. 8-12X magnifier. | Terminals shall be covered more then 95% with solder. |

6、SUGGESTED REFLOW PROFILE



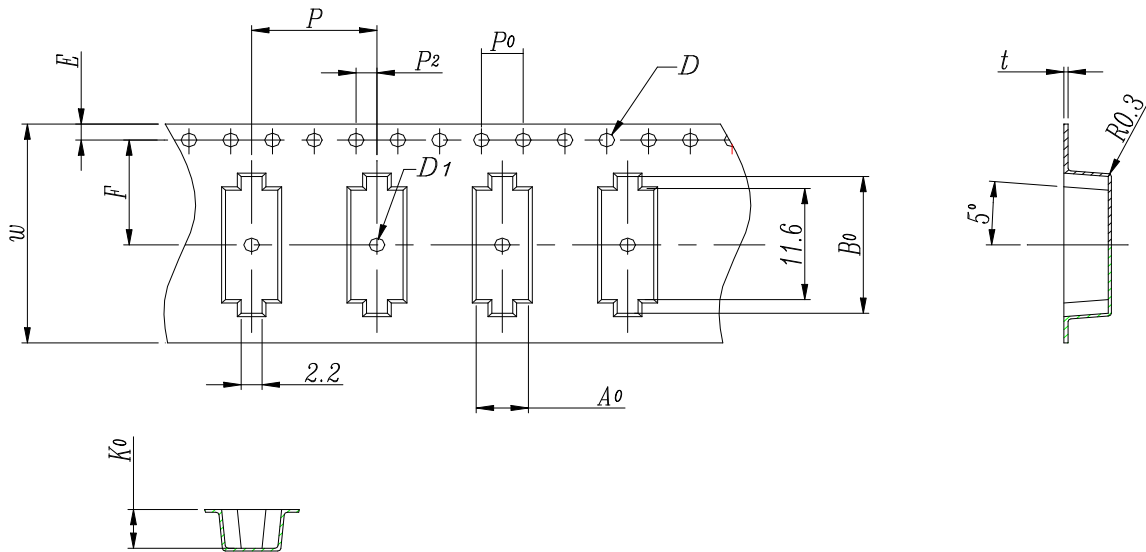
Peak temperature $260^{\circ}\text{C} \pm 5^{\circ}\text{C}$ (10sec. max)

7、SUBSTANCES IN PRODUCT

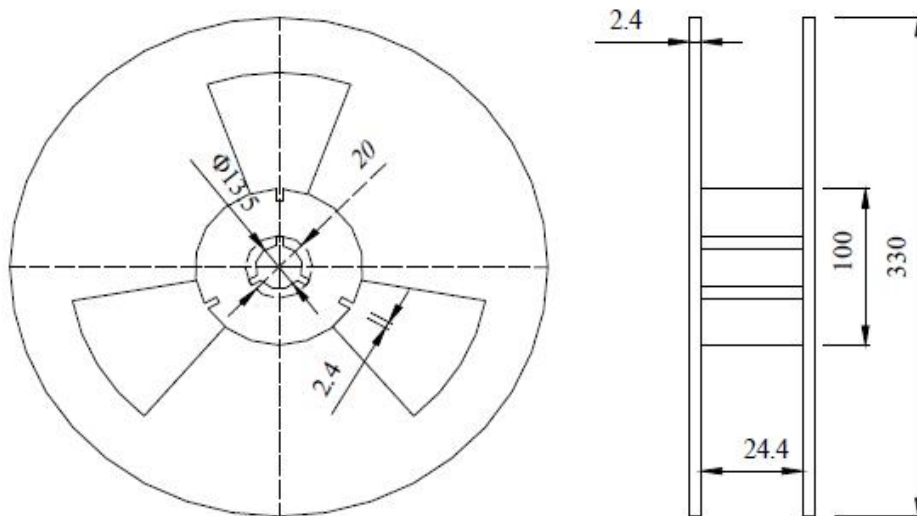
| Drawing number | Disassembly Unit/component description | Homogeneous Material Name. | Substance Name | CAS No. | Substance Mass. (mg) | Content Rate(%)per |
|----------------|--|----------------------------|----------------|------------|----------------------|--------------------|
| HC-49/SMD | BASE | Fe-NI | Fe | 7439-89-6 | 290.9292 | 99.76% |
| | | | C | 7440-44-0 | 0.1458 | 0.05% |
| | | | Mn | 7439-96-5 | 0.4958 | 0.17% |
| | | | P | 7723-14-0 | 0.035 | 0.01% |
| | | | Si | 7440-21-3 | 0.0292 | 0.01% |
| | WIRE | Kovar ring | Fe | 7439-89-6 | 12.9626 | 37.38% |
| | | | Cobal | 7440-48-4 | 5.5091 | 15.89% |
| | | | Nickel | 7440-02-0 | 4.5369 | 13.08% |
| | | | Copper | 7440-50-8 | 10.3701 | 29.91% |
| | | | Sn | 7440-31-5 | 0.6481 | 1.87% |
| | | | Ag | 7440-22-4 | 0.6481 | 1.87% |
| | GLASS | GLASS | SiO2 | 15468-32-3 | 27.083 | 70.00% |
| | | | Al2O3 | 1344-28-1 | 3.4821 | 9.00% |
| | | | B2O3 | 1303-86-2 | 3.0952 | 8.00% |
| | | | Li2O | 12057-24-8 | 0.4643 | 1.20% |
| | | | Na2O | 1313-59-3 | 3.869 | 10.00% |
| | | | K2O | 12136-45-7 | 0.5804 | 1.50% |
| | CAN | Kovar | Copper | 7440-50-8 | 97.8194 | 64.26% |
| | | | Zn | 7440-66-6 | 28.3137 | 18.60% |
| | | | Nickel | 7440-02-0 | 25.9543 | 17.05% |
| | | | Fe | 7439-89-6 | 0.137 | 0.09% |
| | Crystal Blank | Quartz | SiO2 | 14464-46-1 | 4.3658 | 100.00% |
| | Electrode | Ag | Ag | 7440-22-4 | 0.3122 | 100.00% |
| | Sliver adhesive | Sliver adhesive | Ag | 7440-22-4 | 3 | 75.00% |
| | | | Xylene | 1330-20-7 | 0.4 | 10.00% |
| | | | C6H12O3 | 111-15-9 | 0.152 | 3.80% |
| | | | Isophorone | 78-59-1 | 0.448 | 11.20% |
| | INSULATOR | INSULATOR | Poly | 25212-74-2 | 10.40 | 40.00% |
| | | | Glass Fiber | 65997-17-3 | 10.40 | 40.00% |
| | | | Filler | 11097-59-9 | 4.42 | 17.00% |
| | | | Carbon Black | 1333-86-4 | 0.78 | 3.00% |

All the products we provide meet the requirements of RoHS and Reach regulations, and we send SGS for ICP test every year.

8、PACKING SPECIFICATIONS (Unit: mm)



| Item | W | A0 | B0 | K0 | E | F | P | P0 | P2 | D | D1 | t |
|------|--------|---------|----------|----------|----------|----------|----------|---------|---------|------|------|---------|
| DIM | 24±0.3 | 4.6±0.1 | 14.3±0.1 | 4.25±0.1 | 1.75±0.1 | 11.5±0.1 | 12.0±0.1 | 4.0±0.1 | 2.0±0.1 | ±1.5 | ±1.5 | 5.0±0.1 |



*1000pcs/Reel

9、WTL PART NUMBER SYSTEM :

For example: WTL9M85521FO

[Instructions: for project management, WTL will trace back the part number to developer wherever it goes]

WTL - 9M - 85521 - FO

WTL: Brand

9M : Package Code

85521: Serial number , flow code , without any rules

FO: WTL Developer Code, for example: VH,CH,PZ,RZ,ML