

深圳市维拓精电科技有限公司  
WTL International Limited

APPROVAL SHEET

DESCRIPTION :	HC-49/S Crystal			
NOMINAL FREQ.:	12.000MHz			
WTL P/N:	WTL9S95462PH			
VERSION:	1			
DATE:	2024.3.1			
Customer	Customer P/N			
	/			
Customer Signature	WTL			
	Approved by: <i>Kavin Liu</i>			
	Checked by: <i>Shu Ping</i>			
	Issued by: <i>colin zhan</i>			
<b>REVISION HISTORY</b>				
Revised Page	Revision Content	Date	Ref. No.	Reviser

## CONTENT CATALOG

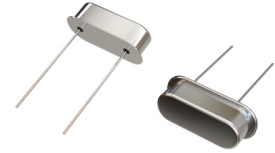
APPROVAL SHEET	P. 1
CONTENT CATALOG	P. 2
ELECTRICAL SPECIFICATIONS	P. 3
DIMENSIONS	P. 4
MARKING	P. 4
STRUCTURE ILLUSTRATION	P. 5
RELIABILITY SPECIFICATIONS	P. 6
SUGGESTED REFLOW PROFILE	P. 7
SUBSTANCES IN PRODUCT	P. 7
PACKING SPECIFICATIONS	P. 8
WTL PART NUMBER SYSTEM	P. 9

### Attachment(s):

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

## FEATURE

- Resistance welded type crystal units
- A great number of standard frequencies
- Higher frequency available and lower equivalent series resistance
- Lower cost and highly mass production capability
- RoHS Compliant / Pb Free

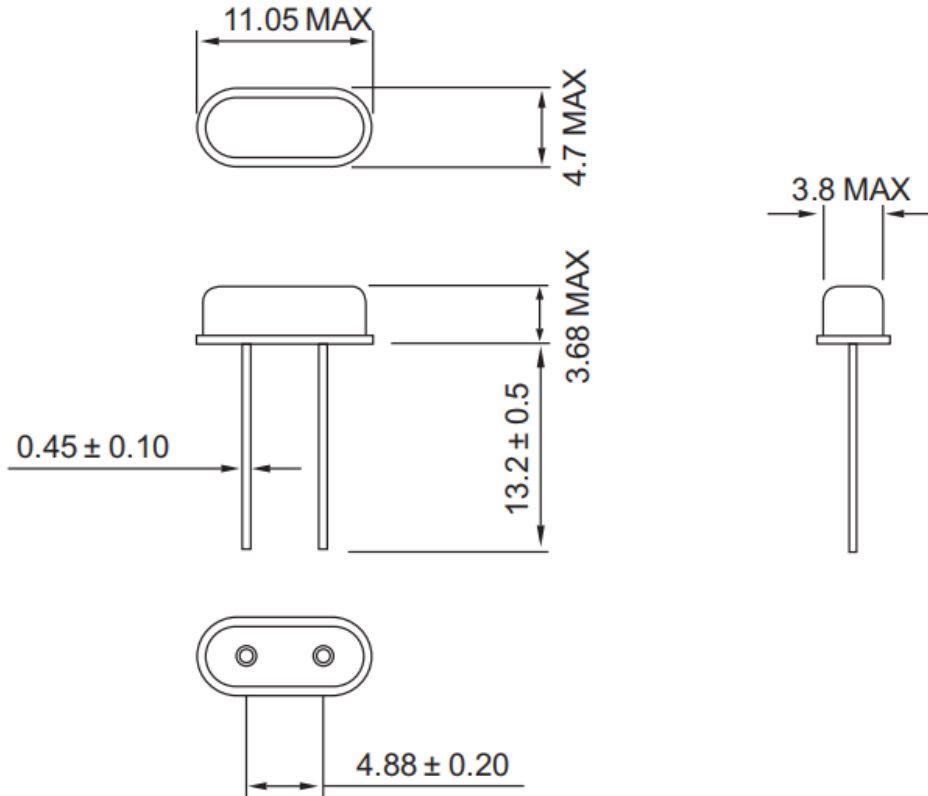


## 1、ELECTRICAL SPECIFICATIONS

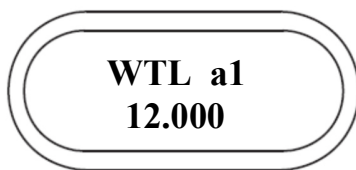
Hold Style	HC-49/S
Nominal Frequency	12.000MHz
Mode	Fundamental / AT
Frequency Tolerance (at 25°C)	±20ppm
Frequency Stability Over Operating Temperature Characteristics	±30ppm
Operating Temperature Range	-20°C ~ +70°C
Storage Temperature Range	-40°C ~ +85°C
Shunt Capacitance (C <sub>0</sub> )	7.0pF Max
Driver Level (Typical)	100μW
Load Capacitance(C <sub>L</sub> )	20pF
ESR	60Ω Max
Insulation Resistance	More than 500Mohms at DC100V
Aging @25°C 1 <sup>st</sup> year (Max)	±3ppm/year

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

## 2、DIMENSIONS (Unit: mm)



## 3、MARKING

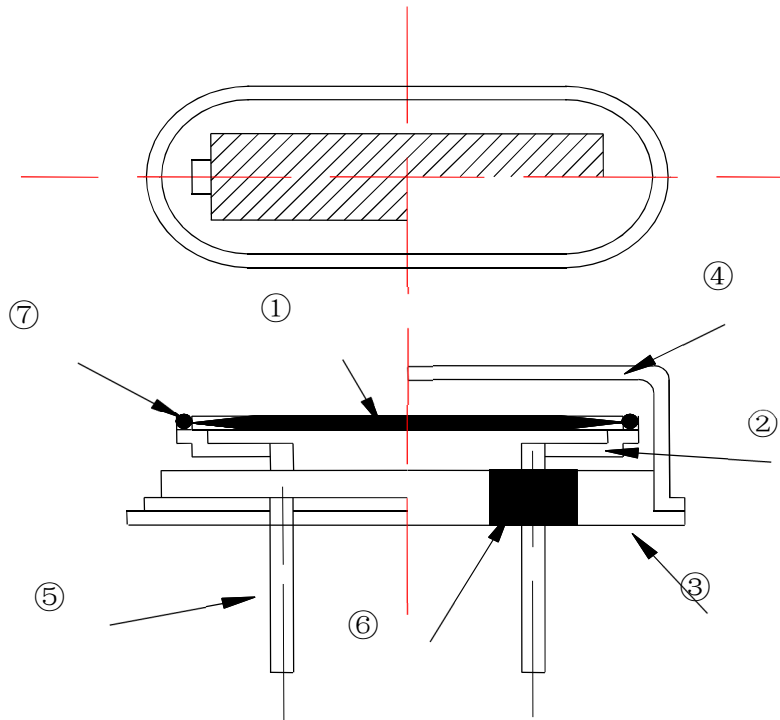


- WTL → Brand Logo
- 12.000 → Frequency (MHz)
- a → Week (a, b, c...z, A, B, C...Y, Z, from 1 to 52week)
- 1 → YEAR (1=2021year, 2=2022year, 9=2029year....)

### 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

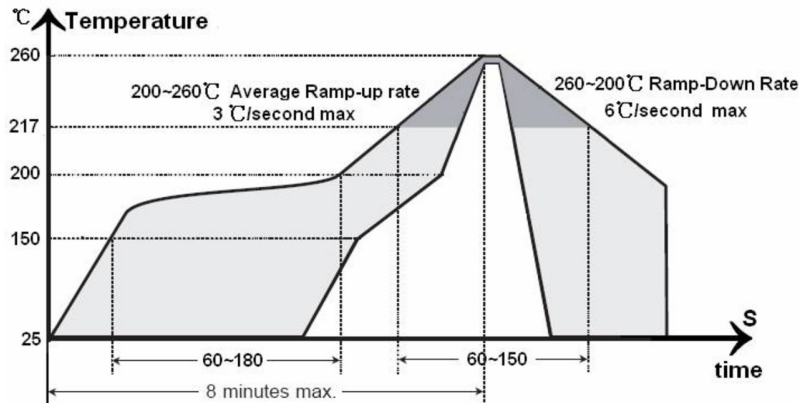


NO	COMPONENT	MATERIALS	QTY	SURFACE
①	CRYSTAL BLANK	SiO <sub>2</sub>	1	POLISH/ETCHED
②	SUPPORTER	COPPER	2	
③	BASE	Fe-NI	1	NI PLATED
④	CAN	NICKEL-COPPER	1	
⑤	LEAD	KOVAR	2	NI PLATED+SOLDER DIPPED
⑥	GLASS	KOVER-GLASS	2	
⑦	ADHESIVE GENT	Ag-URETHANE	2	

## 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 $500\pm 2$ 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 $500\pm 2$ 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 $500\pm 2$ 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 $30\pm 1$ M, then change the temperature to $+85^{\circ}\text{C}\pm 2^{\circ}\text{C}$ for $30\pm 1$ 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 $24\pm 2$ 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 time . 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
Tensile strength of terminal	Apply a 1.5Kg tensile load to each terminal and sustain it for $30\pm 5$ seconds.	No visible damage, Leak OK
Bending strength of terminal	Apply a 0.5 Kg load to one of the terminals, and after tilting the main unit for $90^{\circ}$ , restore to its original attitude. Then, tilt it in an opposite direction for $90^{\circ}$ , and restore to its original attitude.	No visible damage, Leak OK
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 $2 \pm 0.5$ seconds. 8-12X magnifier.	Terminals shall be covered more then 95% with solder.

## 6、SUGGESTED REFLOW PROFILE



Peak temperature. 260°C ± 5 °C (10sec. max.)

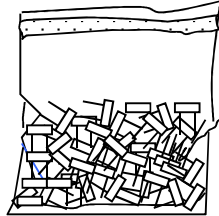
## 7、SUBSTANCES IN PRODUCT

Drawing number	component description	Homogeneous Material Name.	Substance Name	CAS No.	Substance Mass. (mg)	Content Rate(%)/per	
HC-49/S	BASE	Fe and its compounds	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	Sliver	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%	

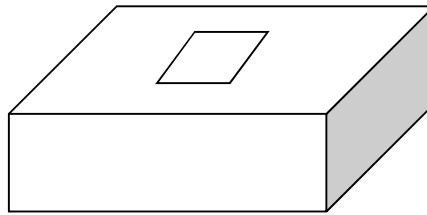
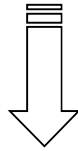
All the products we provide meet the requirements of RoHS and Reach regulations, and we send SGS for ICP test every year.

## 8、PACKING SPECIFICATIONS (Unit: mm)

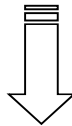
Bag packaging  
Size: 150\*120 mm  
Quantity:200pcs



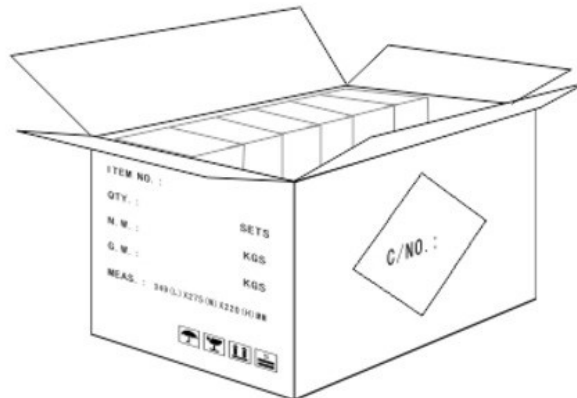
Packing inner box  
Size: 170\*120\*75 mm  
Quantity: 2,000pcs



Packing box  
Size: 360\*320\*170 mm  
10 boxes in each outer carton, QTY: 20,000pcs







## 9、WTL PART NUMBER SYSTEM :

For example: WTL9S23226CH

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

WTL - 9S - 23226 - CH

WTL: Brand

9S : Package Code

23226: Serial number, flow code, without any rules

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