

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

APPROVAL SHEET

DESCRIPTION :	3.2*2.5mm 4 Pad SMD Crystal			
NOMINAL FREQ.:	24.000MHz			
WTL P/N:	WTL3M95447PH			
VERSION:	1			
DATE:	2024.03.03			
Customer	Customer P/N			
Customer Signature	WTL			
	Approved by:	<i>Kevin 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

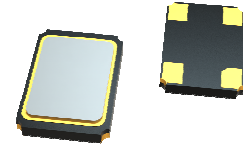
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Attachment(s):

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

## FEATURE

- Size 3.2×2.5 , Ultra thin, thickness 0.7mm
- High precision and high frequency stability
- Excellent heat resistance and environmental characteristics
- Designed for automatic mounting and reflow soldering
- RoHS Compliant / Pb Free

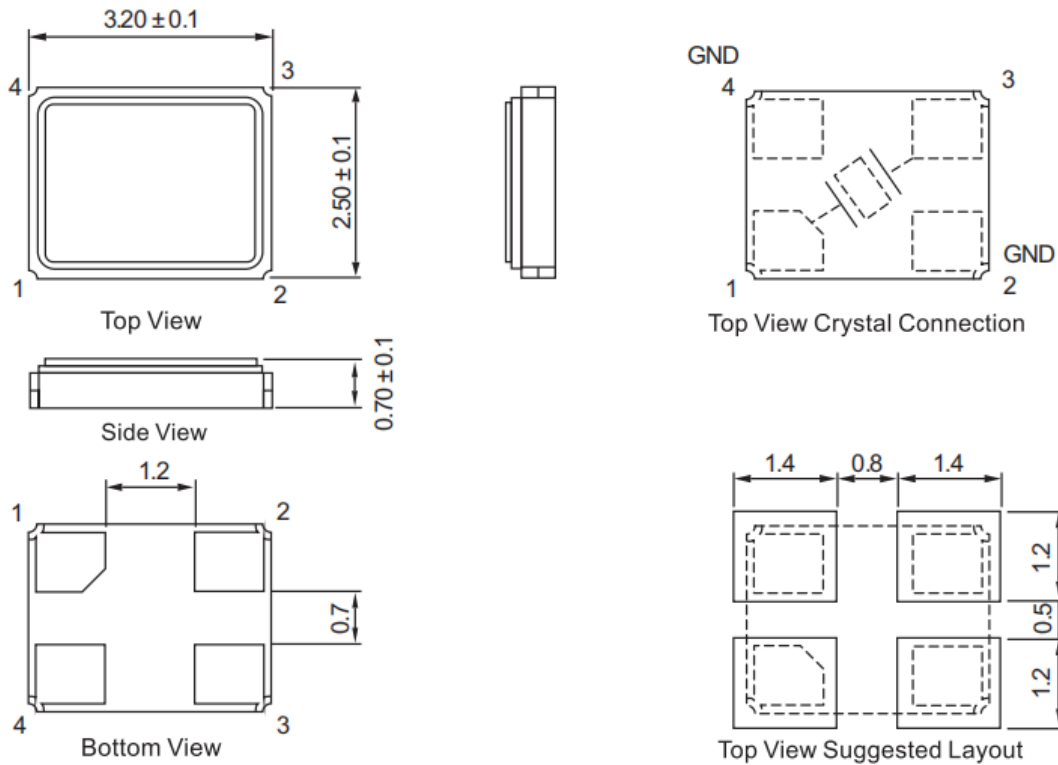


## 1、 ELECTRICAL SPECIFICATIONS

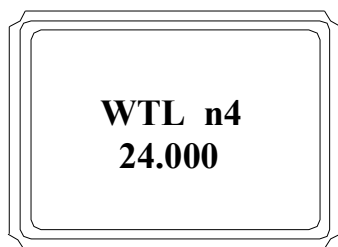
Hold Style	3225 Seam
Nominal Frequency	24.000MHz
Mode	Fundamental / AT
Frequency Tolerance (at 25°C)	±10ppm
Frequency Stability Over Operating Temperature Characteristics	±30ppm
Operating Temperature Range	-20°C ~ +70°C
Storage Temperature Range	-55°C ~ +125°C
Shunt Capacitance (C <sub>0</sub> )	5.0pF Max
Driver Level (Typical)	100μW
Load Capacitance(C <sub>L</sub> )	9pF
ESR	200Ω 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

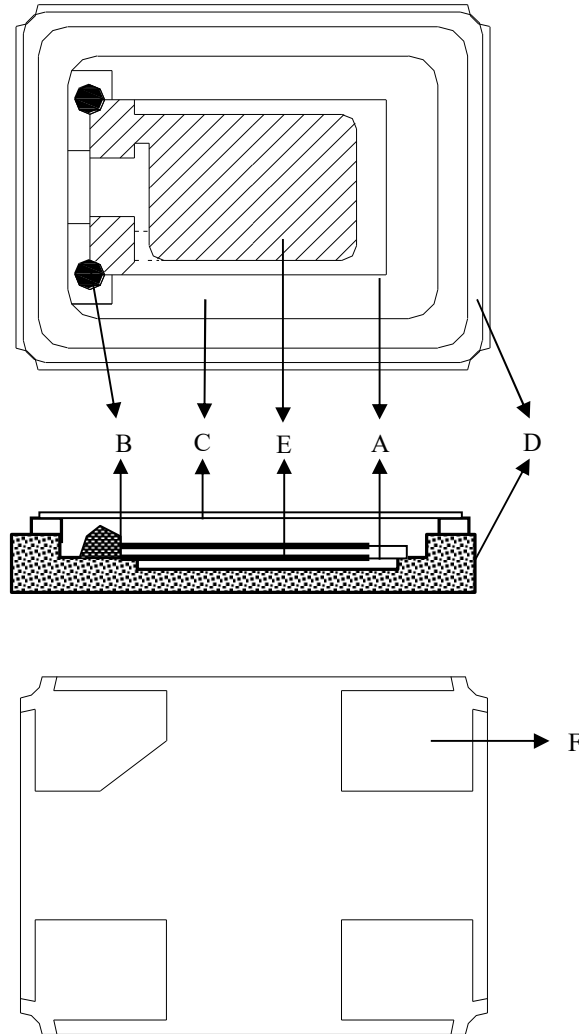


- WTL → Brand Logo
- 24.000 → Frequency ( MHz )
- n → Week ( a、 b、 c...z、 A、 B、 C...Y、 Z ,from 1 to 52week )
- 4 → YEAR ( 1=2021year, 2=2022year, 9=2029year....)

### 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

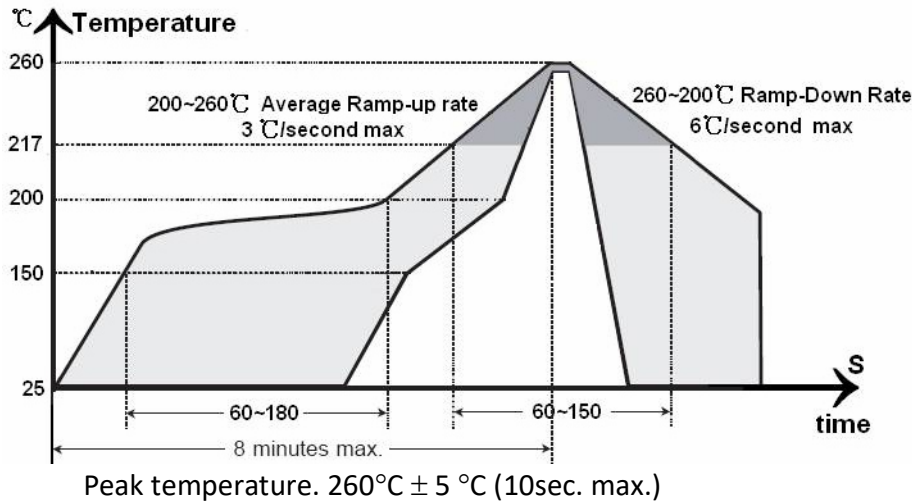


Parts		Material	QTY	COLOR
A	Blank	Mostly SiO <sub>2</sub>	1	White
B	Conductive paste	Ag:80%, silicone resin 10%	2	Greyish
C	Lid	Fe:52~56%,Ni:16~18%,Co:28~30%	1	Silvery
D	Package	Ceramic	1	Brown
E	Plating(blank)	Ag:99.99%	2	Silvery
F	Pad	Cu:6.6%,Au:0.2%,Fe:56%,Ni:18%	4	Golden

## 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 $\Delta RR \cong \pm 15\%$
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 $\Delta RR \cong \pm 15\%$
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 $\Delta RR \cong \pm 15\%$
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 $\Delta RR \cong \pm 15\%$
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 120sec, 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 $\Delta RR \cong \pm 15\%$
Drop Test	The crystal fall off the cement floor with the height $100\text{cm}\pm 5\text{cm}$ for 3 times. Measurement taken after 2 hour.	$\Delta F \cong \pm 5$ PPM $\Delta RR \cong \pm 15\%$
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 $\Delta RR \cong \pm 15\%$
Shock	Peak $1000\text{m/s}^2$ , normal width 6ms half sine wave form, $3.7\text{m/s}$ , 3 perpendicular axis of samples, 3 cycles / direction, total 18 cycles. Measurement taken after 2 hour.	$\Delta F \cong \pm 5$ PPM $\Delta RR \cong \pm 15\%$
Fine Leak	Helium Bombing $4.5\text{kgf/cm}^2$ for 2 hr	Less than $1*10^{-8}\text{atm.c.c./sec}$ , Helium
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



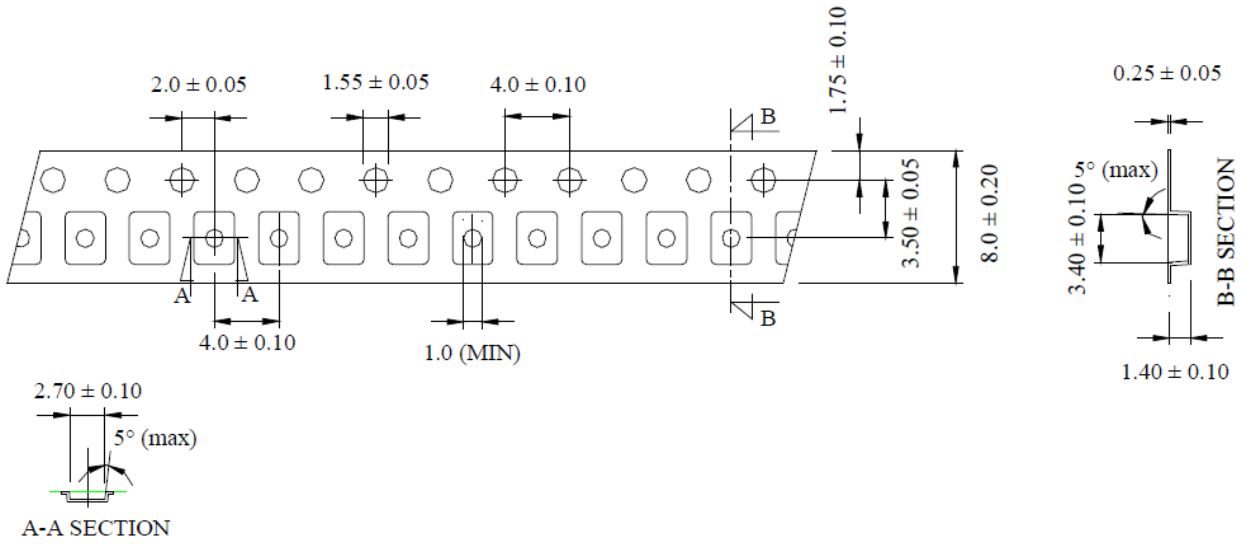
## 7、 SUBSTANCES IN PRODUCT

Drawing number	Disassembly Unit/component description	Homogeneous Material Name.	Substance Name	CAS No.	Substance Mass. (mg)	Content Rate(%)per
SMD3225	Crystal blank	Quartz	SiO <sub>2</sub>	14808-60-7	0.2543	100.00%
	Electrode	Electrode-Ag	Ag	7440-22-4	0.0585	100.00%
	Package	Ceramics	Al <sub>2</sub> O <sub>3</sub>	1344-28-1	8.1990	90.00%
			Mn <sub>2</sub> O <sub>3</sub>	1317-34-6	0.3644	4.00%
			SiO <sub>2</sub>	7631-86-9	0.3644	4.00%
			MoO <sub>3</sub>	1313-27-5	0.0911	1.00%
			MgO	1309-48-4	0.0911	1.00%
			Kovar ring	Fe	7439-89-6	0.1061
		Ni		7440-02-0	0.0581	29.00%
		Co		7440-48-4	0.0360	18.00%
		Plate		Au	7440-57-5	0.0571
			Ni	7440-02-0	0.2433	81.00%
	Metallizing	Mo	7439-98-7	0.1001	100.00%	
		Solder	Ag	7440-22-4	0.2132	71.00%
			Cu	7440-50-8	0.0871	29.00%
	Lid	Kovar	Fe	7439-89-6	3.4096	48.50%
			Ni	7440-02-0	2.4605	35.00%
			Co	7440-48-4	1.1248	16.00%
			Mn	7439-96-5	0.0352	0.50%
	Conduct Adhesive	siliver adhesive	Ag	7440-22-4	0.1540	70.00%
Pd			7440-05-3	0.0110	5.00%	
C <sub>11</sub> H <sub>24</sub>			1120-21-4	0.0220	10.00%	
C <sub>12</sub> H <sub>26</sub>			112-40-3	0.0110	5.00%	
SiO <sub>2</sub>			7631-86-9	0.0220	10.00%	

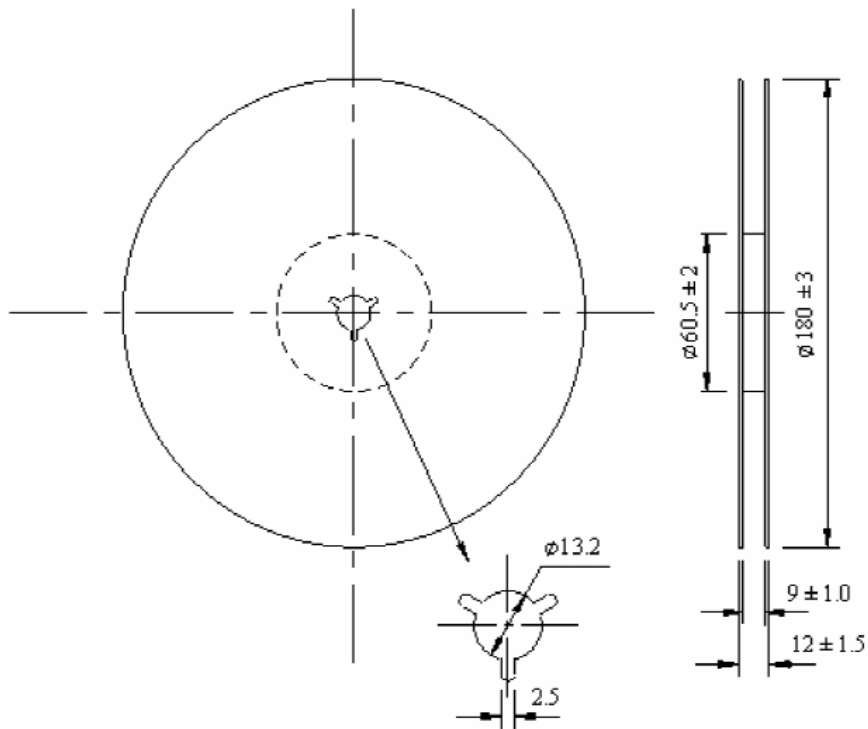
All the products we provide meet the requirements of RoHS and Reach regulations, and we send SGS for ICP test every year.

### 8、PACKING SPECIFICATIONS (Unit: mm)

#### TAPE SPECIFICATION



#### OUTLINE DIMENSION



Q'ty: 3000pcs/Reel



Series TX3, P/N: WTL3M95447PH  
SMD Seam Sealed Crystals 3.2×2.5 mm

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## 9、WTL PART NUMBER SYSTEM :

For example: WTL3M25625CH

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

WTL - 3M - 25625 - CH

WTL: Brand

3M : Package Code

25625: Serial number, flow code, without any rules

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