

# WTL International Limited

## APPROVAL SHEET

DESCRIPTION :	3.2*1.5mm 2 Pads SMD Tuning Fork Crystal			
NOMINAL FREQ.:	32.768KHz			
WTL P/N:	WTL1X60369VH			
VERSION:	1			
DATE:	2020.04.22			
Customer	Customer P/N			
Spacecoast				
Customer Signature	WTL			
	Approved by: <i>Xo Xo Lee</i>			
	Checked by: <i>Susan He</i>			
	Issued by: <i>Shengbiao</i>			
<b>REVISION HISTORY</b>				
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**

- Wide Frequency range
- Small size
- Tape & Reel
- Reflow available



**APPLICATIONS**

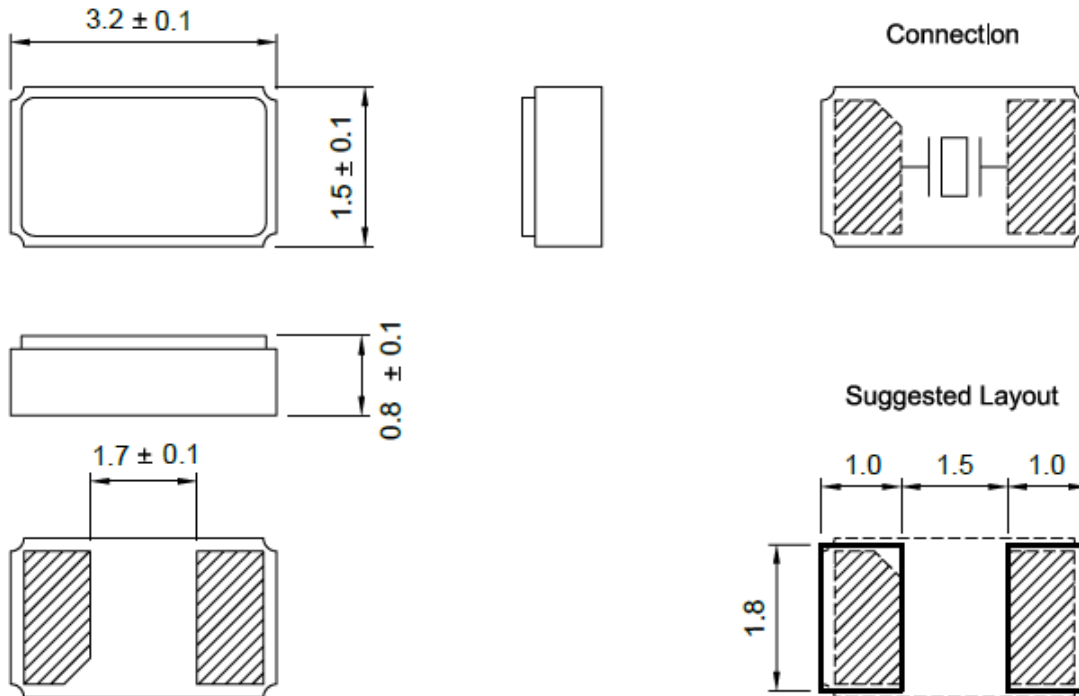
- Microprocessor Systems
- Consumer Electronics

**1、 ELECTRICAL SPECIFICATIONS**

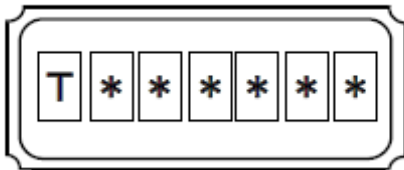
Hold Style	3.2X1.5mm SMD TUNING FORK CRYSTAL
Nominal Frequency	32.768KHz
Frequency Tolerance (at 25°C)	±20ppm
ESR	70Kohm Max
Turnover Temperature	25 ± 5°C
Frequency Temperature Curve	-0.034(±0.006)ppm/°C <sup>2</sup>
Operating Temperature Range	-40 °C to + 85 °C
Storage Temperature Range	-55 °C to +125 °C
Shunt Capacitance (C <sub>0</sub> )	1pF Typ.
Dynamic Capacitance (C <sub>1</sub> )	3fF Typ.
Driver Level (Typical)	0.1μW
Driver Level(Max)	1μW
Load Capacitance(C <sub>L</sub> )	12.5pF
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



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 \*1 \*2 \*3 \*4 \*5 \*6 \*7

- \*1 Product name
- \*2 Type of product
- \*3 Specification
- \*4 CL
- \*5 Year of Production( Last digit of year )
- \*6,7 Week of Production(01 ~ 52)

### Marking Instruction :

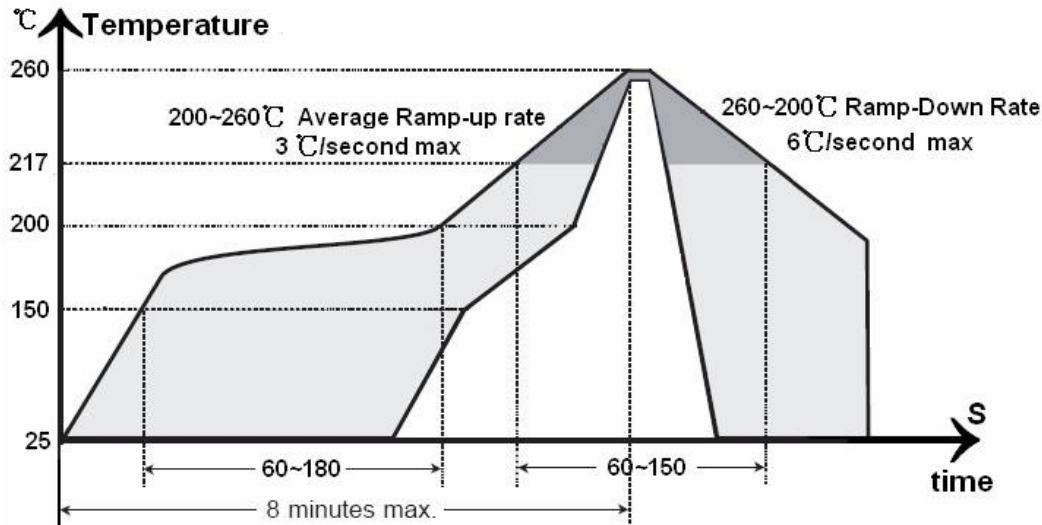
The date code was marked on the crystal body, which will be easily traced back in case of quality issue.

#### 4、RELIABILITY SPECIFICATIONS

Item	Conditions	Result
Low Temp. Storage	After storage under $-40\text{ }^{\circ}\text{C}$ for 1000 hours, measure at room temperature. (*1 *3)	$\Delta f/f_0 = \pm 10\text{ppm}$
High Temp. Storage	After storage under $125\text{ }^{\circ}\text{C}$ for 1000 hours, measure at room temperature. (*1 *3)	$\Delta f/f_0 = \pm 15\text{ppm}$
High Temp & Humidity	After storage under $+85\pm 2\text{ }^{\circ}\text{C}$ , 85 % RH for 1000h, measure at room temperature. (*1 *3)	$\Delta f/f_0 = \pm 10\text{ppm}$
Thermal Shock	Measure at room temperature after 100 cycles. $-55\text{ }^{\circ}\text{C} \Leftrightarrow +125\text{ }^{\circ}\text{C}$ for 30 minutes. (*1 *3)	$\Delta f/f_0 = \pm 10\text{ppm}$
IR Reflow	Measure after 2 time reflow under reflow profile specified (*1)	$\Delta f/f_0 = \pm 10\text{ppm}$
Mechanical shock	Measure after 100g-dummy (SII Standard) drop from 1500mm height on the concrete 3 directions 10times. (*2)	$\Delta f/f_0 = \pm 10\text{ppm}$
Vibration Test	Amplitude 1.5mm and 10 ~ 60Hz with cycle time 2 ~ 3 minutes in 3 direction (X,Y,and Z axis) each for 2 h. (*2)	$\Delta f/f_0 = \pm 10\text{ppm}$
Shear strength	Pressuring force $10\text{N}\times 10\pm 1\text{sec.}$ according to IEC60068-2-21 (*2)	No peeling-off
Peel strength	Pressuring force $10\text{N}\times 10\pm 1\text{sec.}$ according to IEC60068-2-21 (*2)	No peeling-off
Bending test	Bending: $3\text{mm}\times 5\pm 1\text{sec.}$ Thickness of the testing board: 1mm (*2)	No peeling-off

1. Each test shall be done independently. (not in series tests)
2. \*1: Measure after 24 hours left at room temperature.
3. \*2: Measure after 2 hours left at room temperature.
4. \*3: Pre conditions
  - (1) IR Reflow : 2 times
  - (2) Initial values shall be measured after 24 hours at room temperature.
5. Shift in series resistance after the above tests shall be less than  $\pm 20\%$  or less than  $\pm 15\text{k}\Omega$ . In case of resistance to IR reflow and high temperature storage ( $\pm 125\text{ }^{\circ}\text{C}$  for 1000 hours), shift in series resistance after the above tests shall be less than  $\pm 30\%$  or  $\pm 20\text{k}\Omega$ .

## 5、 SUGGESTED REFLOW PROFILE



Peak temperature. 260°C ± 5 °C (10sec. max.) Reflow is permitted 2 times

## 6、 SUBSTANCES IN PRODUCT

Breakdown of component	Material Name	Substance Name	CAS No.	Substance Mass		Note
				(mg)	(w%)	
Crystal Element	Crystal	Silica cristobalite (SiO <sub>2</sub> )	14808-60-7	0.145	1.22	
	Electrode	Chromium (Cr)	7440-47-3	0.005	0.04	
		Gold (Au)	7440-57-5	0.001	0.01	
	Protection membrane	Silica amorphous (SiO <sub>2</sub> )	7631-86-9	0.0002	0.00	
Lid	Kovar	Iron (Fe)	7439-89-6	0.920	7.73	
		Nickel (Ni)	7440-48-4	0.293	2.46	
		Cobalt (Co)	7440-02-0	0.503	4.23	
		Manganese (Mn)	7439-96-5	0.007	0.06	
		Others	-	0.002	0.02	
	Plating	Nickel (Ni)	7440-02-0	0.127	1.07	
Conductive adhesive		Silver(Ag)	7440-22-4	0.012	0.10	
		Silica amorphous (SiO <sub>2</sub> )	7631-86-9	0.0006	0.01	
		Silicone resin(C <sub>2</sub> H <sub>6</sub> OSi) <sub>n</sub>	7440-66-6	0.0012	0.01	
Ceramic package	Ceramic	Aluminum oxide(Al <sub>2</sub> O <sub>3</sub> )	1344-28-1	5.376	45.18	
		Silica amorphous (SiO <sub>2</sub> )	7631-86-9	0.267	2.24	
		Calcium oxide(CaO)	1305-78-8	0.040	0.34	
		Magnesium oxide(MgO)	1309-48-4	0.040	0.34	
		Chromium oxide(Cr <sub>2</sub> O <sub>3</sub> )	1308-38-9	0.049	0.41	
	Metalize	Tungsten(W)	7440-33-7	1.551	13.03	
		Molybdenum(Mo)	7439-98-7	0.109	0.92	
	Sealing	Iron (Fe)	7439-89-6	0.860	7.23	
		Nickel (Ni)	7440-48-4	0.326	2.74	
		Cobalt (Co)	7440-02-0	0.556	4.67	
	Silver solder	Silver(Ag)	7440-22-4	0.455	3.82	
		Copper(Cu)	7440-50-8	0.079	0.66	
	Electrode	Nickel (Ni)	7440-02-0	0.106	0.89	
		Gold (Au)	7440-57-5	0.069	0.58	
	Total				11.9	100.00

All the products we provide meet the requirements of RoHS and Reach regulations,

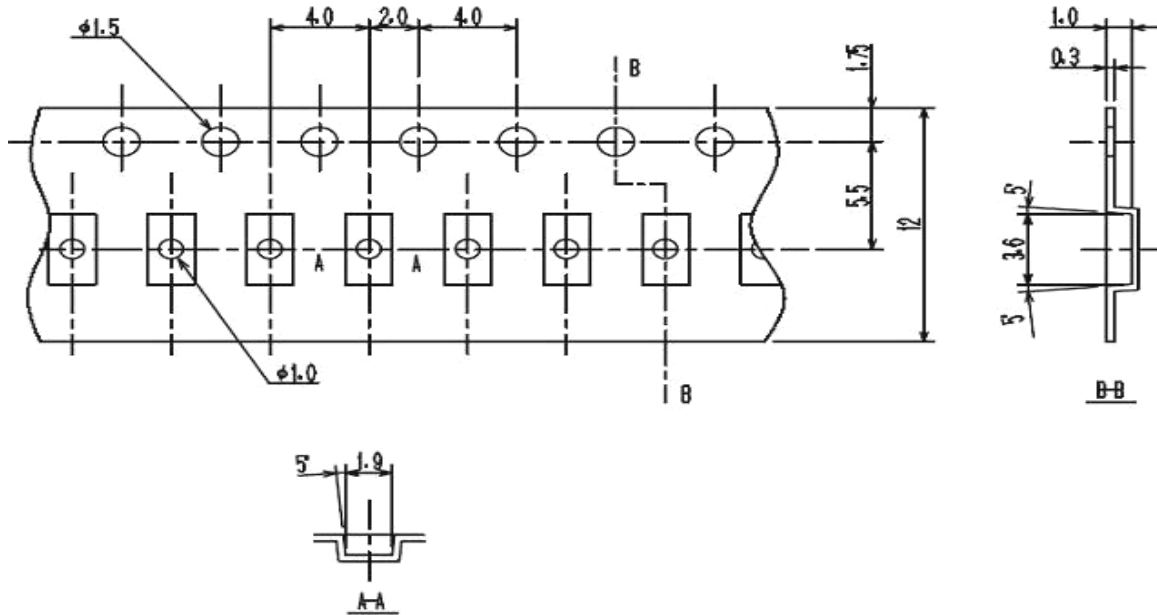
**P/N: WTL1X60369VH**  
**SMD TUNING FORK CRYSTAL 3.2X1.5MM**



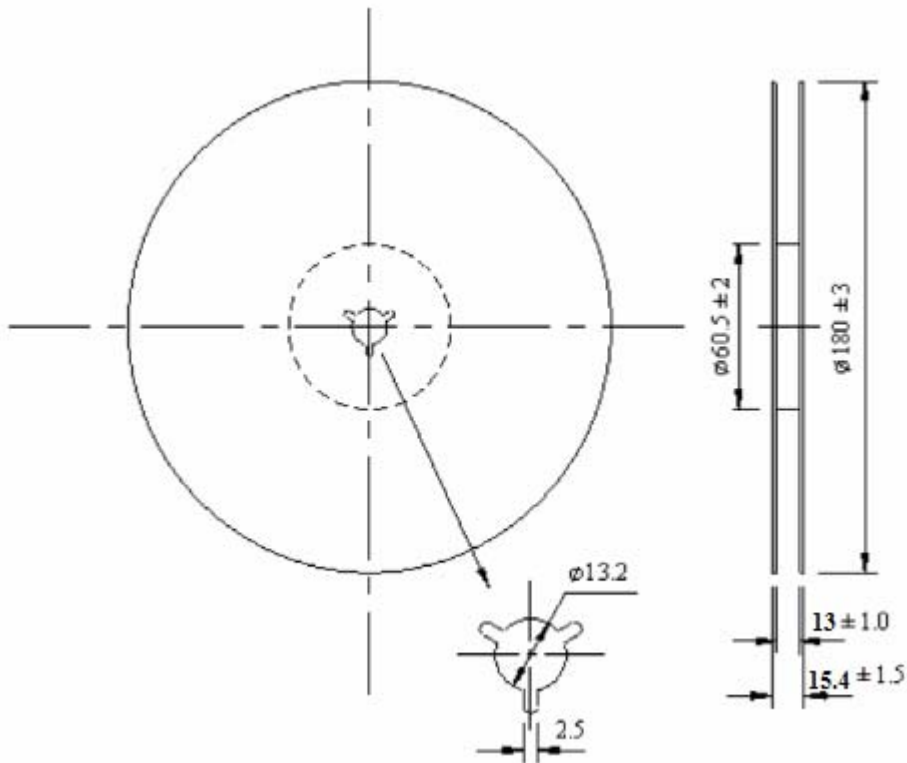
and we send SGS for ICP test every year.

**7、PACKING SPECIFICATIONS (Unit: mm)**

TAPE SPECIFICATION :



OUTLINE DIMENSION:



Q'ty: 3000pcs/Reel

## 8、WTL PART NUMBER SYSTEM :

For example: WTL1X25212CH

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

WTL - 1X - 25212 - CH

WTL: Brand

1X : Package Code , please see Table 1

25212: Serial number , flow code , without any rules

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

Table1

Type	Tuning Fork Crystal								
Series	WX1	WX2	WX3	WX4	WT8	WA8	WA9	TS9	TS6
Package Code	1X	2T	3X	4X	3T	8A	9A	1W	6W
Size(mm)	3.2*1.5	2*6	3.8*8.0	6.9*1.4	3*8	2*6SMD	3*8SMD	2.0*1.2	1.6*1.0
	2PAD	2PIN	2PIN	4PAD	2PIN	2PIN	2PIN	2PAD	2PAD