

WTL International Limited

APPROVAL SHEET

DESCRIPTION :	3.2*1.5mm 2 Pads SMD Tuning Fork Crystal			
NOMINAL FREQ.:	32.768KHz			
WTL P/N:	WTL1X60370VH			
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>			
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

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



APPLICATIONS

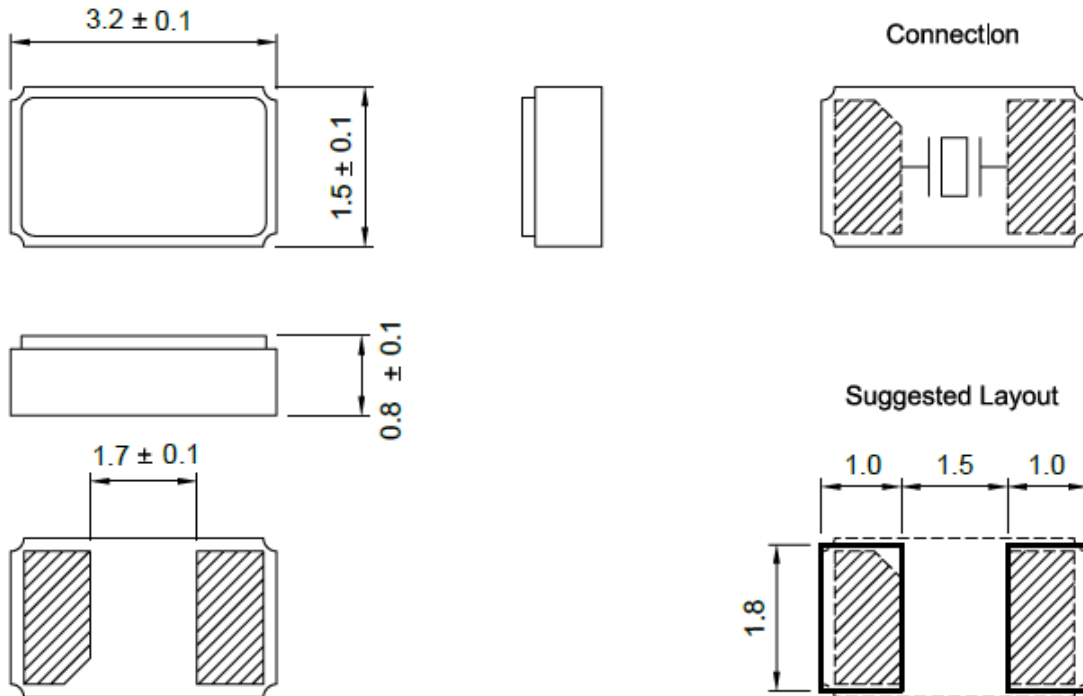
- Microprocessor Systems
- Consumer Electronics

1、 ELECTRICAL SPECIFICATIONS

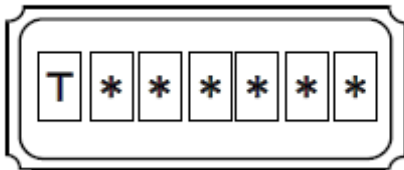
Hold Style	3.2X1.5mm SMD TUNING FORK CRYSTAL
Nominal Frequency	32.768KHz
Frequency Tolerance (at 25°C)	±20ppm
ESR	70Kohm Max
Turnover Temperature	25 ± 5°C
Frequency Temperature Curve	-0.034(±0.006)ppm/°C ²
Operating Temperature Range	-40 °C to + 85 °C
Storage Temperature Range	-55 °C to +125 °C
Shunt Capacitance (C ₀)	1pF Typ.
Dynamic Capacitance (C ₁)	3fF Typ.
Driver Level (Typical)	0.1μW
Driver Level(Max)	1μW
Load Capacitance(C _L)	7pF
Insulation Resistance	More than 500Mohms at DC100V
Aging @25°C 1 st year (Max)	±3ppm/year

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

2、DIMENSIONS (Unit: mm)



3、MARKING



T □ □ □ □ □ □
 *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 :

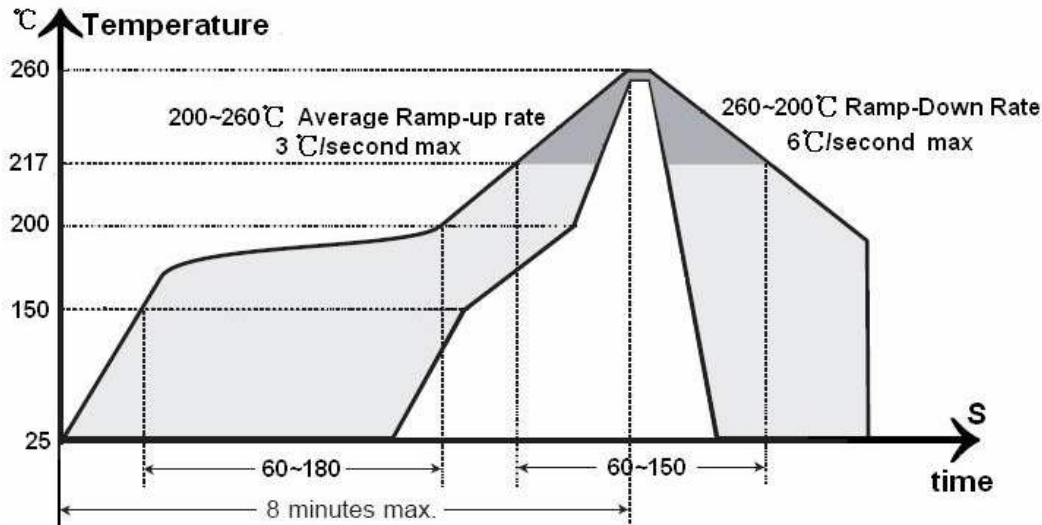
The date code was marked on the crystal body, which will be easily traced back in case of quality issue.

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 ₂)	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 ₂)	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 ₂)	7631-86-9	0.0006	0.01	
		Silicone resin(C ₂ H ₆ O ₂ Si) _n	7440-66-6	0.0012	0.01	
Ceramic package	Ceramic	Aluminum oxide(Al ₂ O ₃)	1344-28-1	5.376	45.18	
		Silica amorphous (SiO ₂)	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 ₂ O ₃)	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,

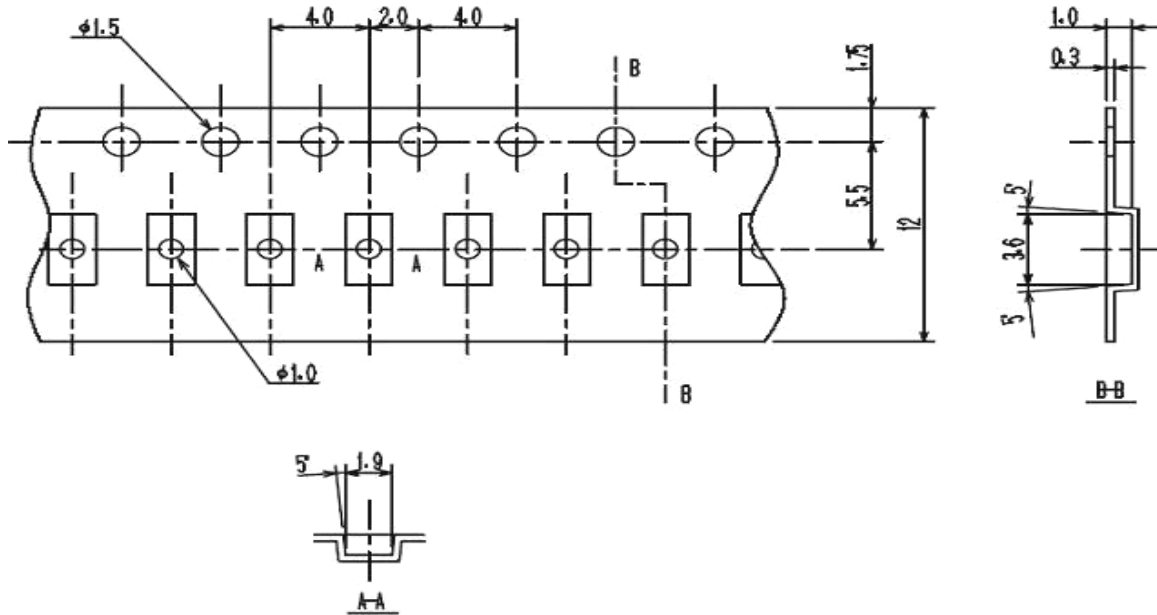
P/N: WTL1X60370VH
SMD TUNING FORK CRYSTAL 3.2X1.5MM



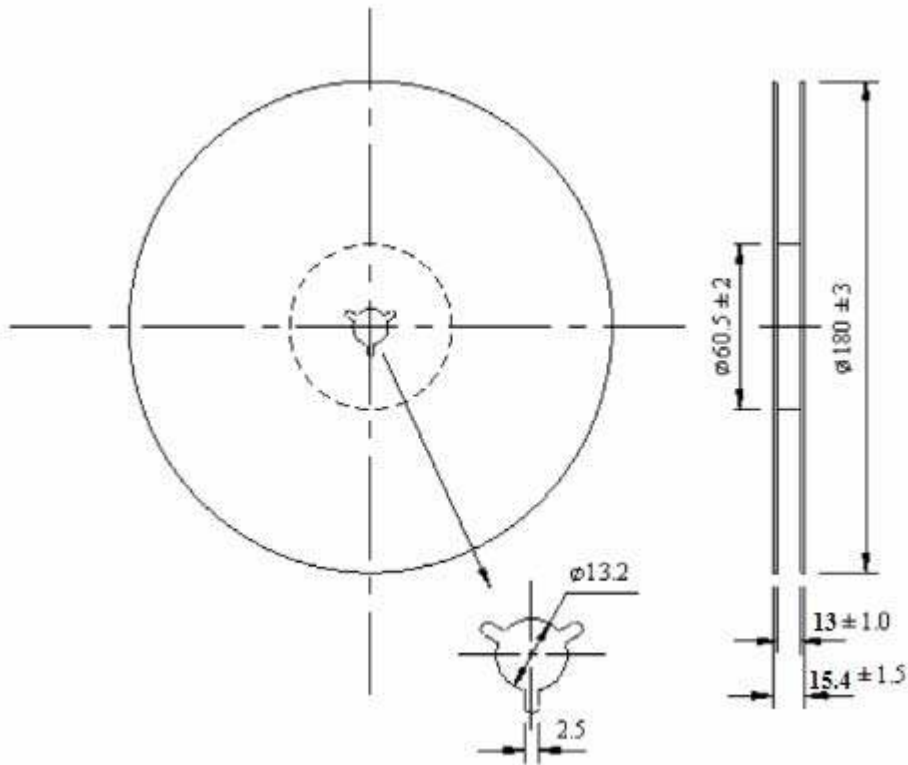
and we send SGS for ICP test every year.

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