

WTL International Limited

APPROVAL SHEET

DESCRIPTION :	2.0*1.2mm 2 Pads SMD Tuning Fork Crystal			
NOMINAL FREQ.:	32.768KHz			
WTL P/N:	WTL1W60389VH			
VERSION:	1			
DATE:	2020.04.22			
Customer	Customer P/N			
Spacecoast	/			
Customer Signature	WTL			
	Approved by: <i>Kavin Liu</i>			
	Checked by: <i>Shu Ping</i>			
	Issued by: <i>Shengbin</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

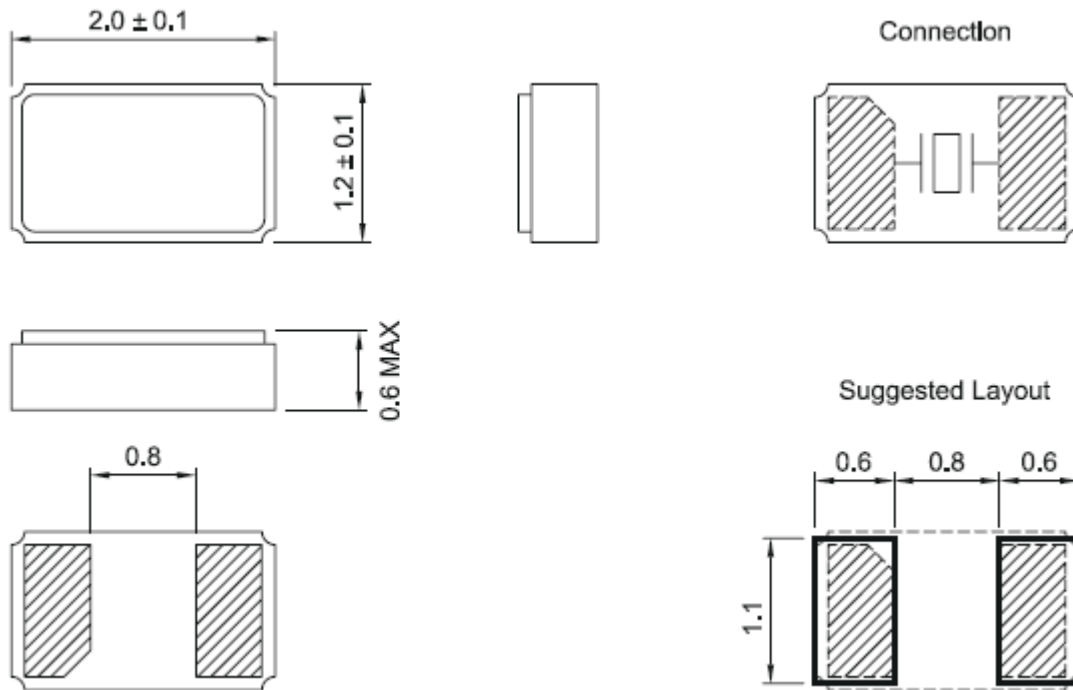
- Microprocessor Systems
- Consumer Electronics

1、 ELECTRICAL SPECIFICATIONS

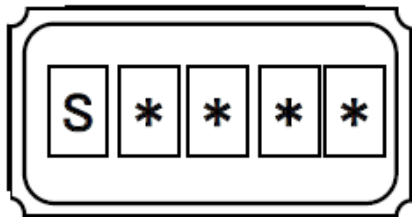
Hold Style	2.0X1.2MM SMD TUNING FORK CRYSTAL
Nominal Frequency	32.768 KHz
Frequency Tolerance (at 25°C)	±20 PPM
Load Capacitance(C _L)	12.5pF
ESR	70 kΩ Max
Turnover Temperature	25 ± 5°C
Frequency Temperature Curve	(-0.03±0.01) PPM/°C ²
Operating Temperature Range	-40 °C to + 85 °C
Storage Temperature Range	-55 °C to +125 °C
Shunt Capacitance (C ₀)	1.3pF Typ.
Dynamic Capacitance (C ₁)	6 fF Typ.
Driver Level (Typical)	0.1μW
Driver Level(Max)	1.0μW
Insulation Resistance	More than 500M Ω at DC100V
Aging @25°C 1 st year (Max)	±3 PPM/year

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

2、DIMENSIONS (Unit: mm)



3、MARKING



S □ □ □ □
 *1 *2 *3 *4 *5

- *1: Specification
- *2: CL (7pF: B、9pF: J、12.5pF: F)
- *3: Year of Production(Last digit of year)
- *4*5: Week of Production(01 ~ 52)

Marking Instruction :

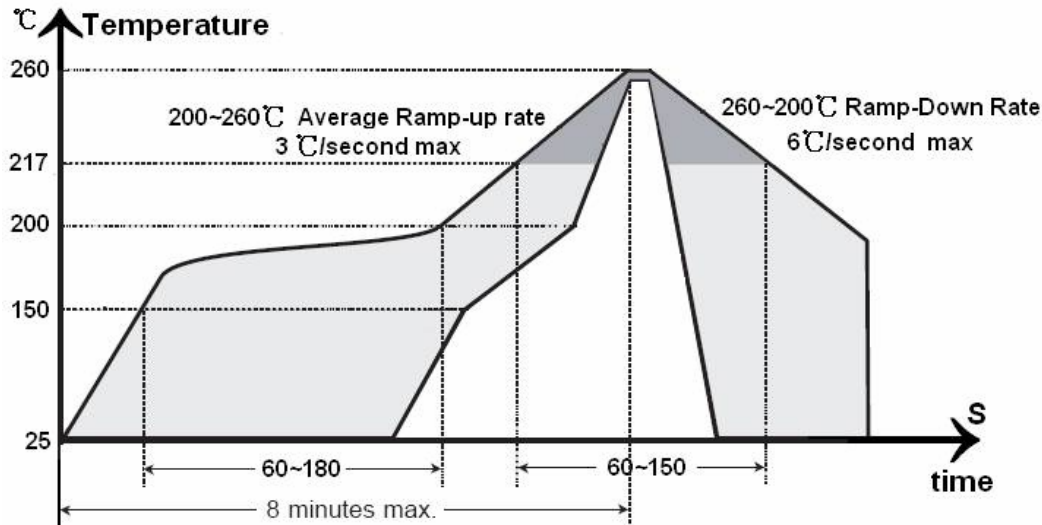
The date code was marked on the crystal body, which will be easily traced back in case of quality issue.

4、RELIABILITY SPECIFICATIONS

Item	Conditions	Result
Low Temp. Storage	After storage under -40 °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 °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±2 °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 °C ⇔ +125 °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 10N×10±1sec. according to IEC60068-2-21 (*2)	No peeling-off
Peel strength	Pressuring force 10N×10±1sec. according to IEC60068-2-21 (*2)	No peeling-off
Bending test	Bending: 3mm×5±1sec. 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 ±20% or less than ±15kΩ.
 In case of resistance to IR reflow, shift in series resistance after the above tests shall be less than ±30% or ±20kΩ.
 In case of resistance to high temperature storage(±125°C for 1000 hours), shift in series resistance after the above tests shall be less than ±40% or ±30kΩ.

5、SUGGESTED REFLOW PROFILE



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

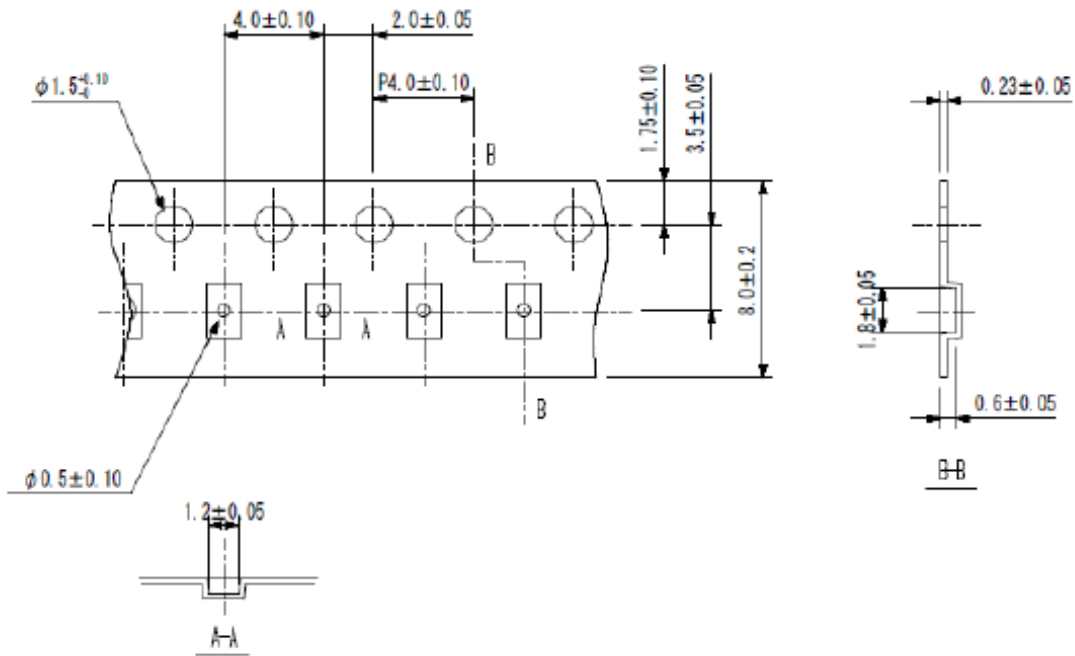
6、SUBSTANCES IN PRODUCT

Breakdown of component	Material Name	Substance Name	CAS No.	Substance Mass					Note		
				(mg)	(g)	(w%) / Part	(ppm) / Total Weight	(w%) / Total Weight			
Crystal Element	Crystal	Silicon Dioxide	SiO ₂	14808-60-7	0.189660	0.00018966	100.00	41230.43	4.12		
	Electrode	Chromium	Cr	7440-47-3	0.001560	0.00000156	100.00	339.13	0.03		
	Electrode	Gold	Au	7440-57-5	0.006540	0.00000654	100.00	1421.74	0.14		
Lid	Kovar	Iron	Fe	7439-89-6	0.476800	0.00047680	53.33	103652.17	10.37		
		Cobalt	Co	7440-48-4	0.151800	0.00015180	16.98	33000.00	3.30		
		Nickel	Ni	7440-02-0	0.260400	0.00026040	29.13	56608.70	5.66		
		Manganese	Mn	7439-96-5	0.003800	0.00000380	0.43	826.09	0.08		
		Silicon	Si	7440-21-3	0.000600	0.00000060	0.07	130.43	0.01		
		Chromium	Cr	7440-47-3	0.000400	0.00000040	0.05	86.96	0.01		
		Carbon	C	7440-44-0	0.000100	0.00000010	0.01	21.74	0.00		
		Nickel	Ni	7440-02-0	0.096000	0.00009600	100.00	20869.57	2.09		
	Plating										
Conductive adhesive		Silver	Ag	7440-22-4	0.088130	0.00008813	78.50	19158.70	1.92		
		Silicone resin	Si	Trade Secret	0.008100	0.00000810	7.20	1760.87	0.18		
		Silsesquioxanes, Me	C12H32O8Si8	68554-70-1	0.008100	0.00000810	7.20	1760.87	0.18		
		n-Dodecane	C12H26	112-40-3	0.007900	0.00000790	7.00	1717.39	0.17		
		Alkoxysilane	C11H22O4Si	3388-04-3	0.000100	0.00000010	0.10	21.74	0.00		
Ceramic package	Ceramic	Aluminum oxide	Al ₂ O ₃	1344-28-1	1.660000	0.00166000	50.99	360869.57	36.09		
		Manganese oxide	Mn ₂ O ₃	1317-34-6	0.064000	0.00006400	1.88	13913.04	1.39		
		Silicon dioxide	SiO ₂	7631-86-9	0.064000	0.00006400	1.78	13913.04	1.39		
		Molybdenum oxide	MoO ₃	1313-27-5	0.014000	0.00001400	0.27	3043.48	0.30		
		Magnesium oxide	MgO	1309-48-4	0.014000	0.00001400	0.16	3043.48	0.30		
	Metalize	Molybdenum	Mo	7439-98-7	0.484000	0.00048400	14.64	105217.39	10.52		
	Seal ring	Iron	Fe	7439-89-6	0.324000	0.00032400	9.74	70434.78	7.04		
		Nickel	Ni	7440-02-0	0.170000	0.00017000	5.23	36956.52	3.70		
		Cobalt	Co	7440-48-4	0.100000	0.00010000	3.07	21739.13	2.17		
	Silver solder	Silver	Ag	7440-22-4	0.194000	0.00019400	5.71	42173.91	4.22		
		Copper	Cu	7440-50-8	0.032000	0.00003200	1.01	6956.52	0.70		
	Electrode	Nickel	Ni	7440-02-0	0.110000	0.00011000	3.46	23913.04	2.39		
		Cobalt	Co	7440-48-4	0.030000	0.00003000	0.87	6521.74	0.65		
		Gold	Au	7440-57-5	0.040000	0.00004000	1.20	8695.65	0.87		
		Thallium	Tl	7440-28-0	0.000010	0.00000001	<1	2.17	0.00		
	Total					4.600000	0.00460000		1000000	100.00	

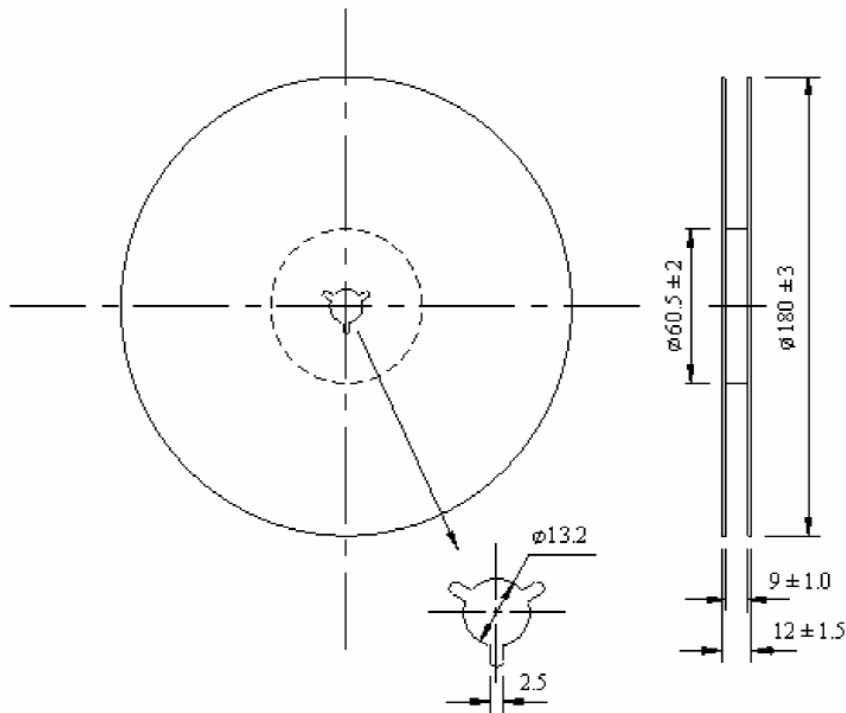
All the products we provide meet the requirements of RoHS and Reach regulations, and we send SGS for ICP test every year.

7、PACKING SPECIFICATIONS (Unit: mm)

TAPE SPECIFICATION:



OUTLINE DIMENSION:



Q'ty: 3000pcs/Reel

8、WTL PART NUMBER SYSTEM :

For example: WTL1W23222CH

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

WTL - 1W - 23222 - CH

WTL: Brand

1W : Package Code , please see Table 1

23222: 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