

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

APPROVAL SHEET

DESCRIPTION :	$\phi 2 \times 6$ mm 2 Leads DIP Tuning Fork Crystal			
NOMINAL FREQ.:	32.768KHz			
WTL P/N:	WTL2T95466PH			
VERSION:	1			
DATE:	2024.03.3			
Customer	Customer P/N			
IBS Electronics, Inc.	/			
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

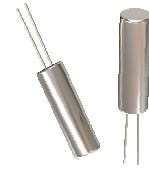
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Attachment(s):

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

## FEATURE

- Small size  $\phi 2 \times 6$ mm
- A great number of standard frequencies
- Higher frequency gullibility and lower equivalent series resistance
- The best choice of Clock
- RoHS Compliant / Pb Free

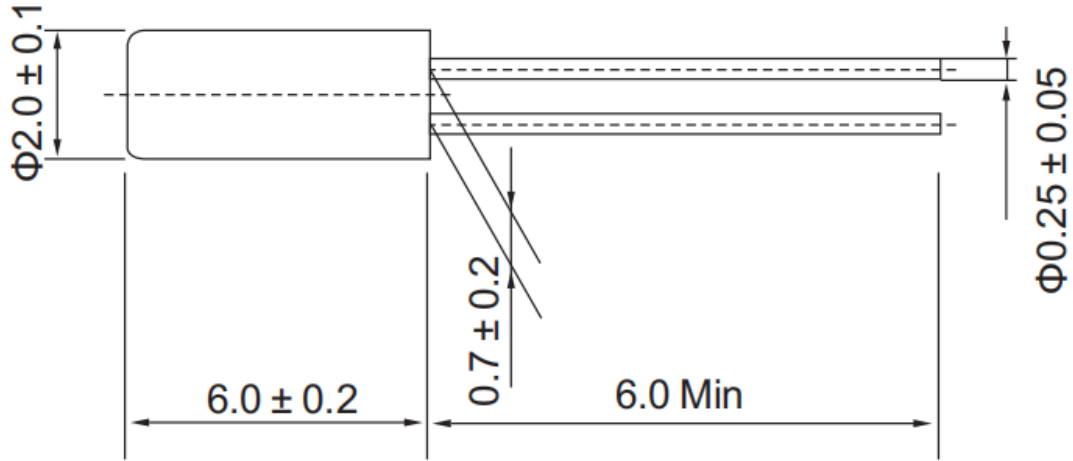


## 1、 ELECTRICAL SPECIFICATIONS

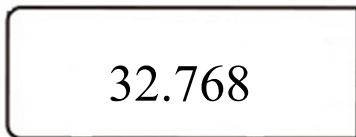
Hold Style	$\phi 2 \times 6$ MM DIP TUNING FORK CRYSTAL
Nominal Frequency	32.768KHz
Frequency Tolerance (at 25°C)	$\pm 20$ ppm
ESR	35Kohm Max
Turnover Temperature	$25 \pm 5$ °C
Frequency Temperature Curve	$-0.034(\pm 0.006)$ ppm/°C <sup>2</sup>
Operating Temperature Range	-20 °C to + 70 °C
Storage Temperature Range	-55 °C to +125 °C
Shunt Capacitance (C <sub>0</sub> )	1.5pF Typ.
Dynamic Capacitance (C <sub>1</sub> )	3.0fF Typ.
Driver Level (Typical)	0.1 $\mu$ W
Driver Level(Max)	1 $\mu$ W
Load Capacitance(C <sub>L</sub> )	12.5pF
Insulation Resistance	More than 500Mohms at DC100V
Aging @25°C 1 <sup>st</sup> year (Max)	$\pm 5$ ppm/year

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

## 2、DIMENSIONS (Unit: mm)



## 3、MARKING



#### 4、RELIABILITY SPECIFICATIONS

Item	Conditions	Result
Vibration	(1)Vibration Frequency 10 to 55Hz (2)Vibration Amplitude 1.5mm (3) Cycle Time 1-2min(10-55-10Hz) (4)Direction X.Y.Z (5)Duration 2h/each direction	Frequency Change:±5ppm Max. Resistance Change: 5kohm Max.
Shock	3 Times free drop from 75cm height to hard wooden board of thickness more than 30mm	Frequency Change:±5ppm Max. Resistance Change: 5kohm Max.
Hermetic seal	Helium leak detector Checked: before the molded crystal units	less than $1 \times 10^{-7}$ mbar.l/sec.
Solder ability	Dip the leads of crystal units into the solution (7-10%) of rosin $3 \pm 0.5s$ , then dip it into the tank 5-10s. Temperature of solder melted tank is $245^{\circ}C \pm 5^{\circ}C$	The dipped surface of the leads should be at least 95% covered with continuous new solder coating
High temperature	96 hours at $+100^{\circ}C \pm 2^{\circ}C$ After 1-2hours past at room temperature from following	Frequency Change:±5ppm Max. Resistance Change: 5kohm Max.
Low temperature	72 hours at $-40^{\circ}C \pm 2^{\circ}C$ After 1-2hours past at room temperature from following test.	Frequency Change:±5ppm Max. Resistance Change: 5kohm Max.
Humidity	96 hours at $+40^{\circ}C \pm 2^{\circ}C$ , relative humidity 90-95% After 1-2hours past at room temperature from following	Frequency Change:±5ppm Max. Resistance Change: 5kohm Max.
Temperature cycle	After supplying the following temperature cycle $-55^{\circ}C \leftrightarrow +125^{\circ}C$ for 30 minutes. (50cycles)	Frequency Change:±5ppm Max. Resistance Change: 5kohm Max.x.
salt spray test	On the basis of GB/T10125-1997	Frequency Change:±5ppm Max. Resistance Change: 5kohm Max.
Lead strength	In the lead 2.00 Kg tensile force was applied at the end to keep more than 5 seconds	Frequency Change:±5ppm Max. Resistance Change: 5kohm Max.

## 5、 HANDING NOTICE FOR STANDARD TUNING FORK CRYSTAL (Cylindrical Type)

### 5.1. Shock resistance

It may deteriorate the characteristics or cause of no oscillation if excess physical shock given. Please be careful not to drop. Please use under condition to minimize the shocks as much as possible. Please review the conditions if it is used by auto mounting or after the conditions are changed.

### 5.2. Heat and humidity resistance in storage

Storing the crystal products under higher or lower temperature or high humidity for a long period may deteriorate the characteristics of crystal units. Please store and use the crystal products at the normal temperature and humidity.

### 5.3. Solder heat resistance

Standard type crystal products use Material have a  $230^{\circ}\text{C}$  melting point. Heating up the package more than  $210^{\circ}\text{C}$  may deteriorate the characteristics or cause of no oscillation the products. If the crystal products need to be soldered at temperature of more than  $+210^{\circ}\text{C}$ , please study heat-resistance products or SMD products. Please review the condition or consult us about flow solder process. Our soldering condition is under  $280^{\circ}\text{C}$  within 3sec or  $320^{\circ}\text{C}$  within 2sec for lead parts use the soldering iron .

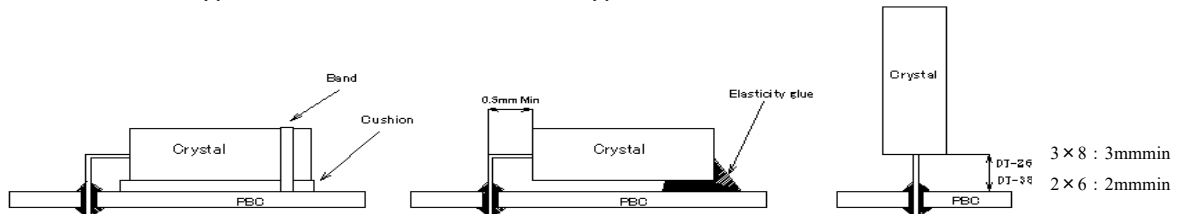
Please don't solder the crystal unit (case) directly. It may cause of deteriorate the characteristics.

### 5.4. Mounting method to PCB

When the crystal products need to be lay down please fix to PCB securely.

If the crystal is used with mechanical vibration location, please put cushion in between PCB or fix with elasticity glue (Silicon etc) as shown in below figure. Please don't gluing hermetic seal glass.

When the crystal products need to be mounted vertically, gap between crystal units and PCB more than 3mm for  $3 \times 8$  type , more than 2mm for  $2 \times 6$  type is recommended.



### 5.5. Lead process

When the lead needs to be cut please maintenance the cutter.

When the lead needs to be bent or repaired please be careful not to giving excess pressure at the root of the lead to avoid crack of the hermetic seal glass. Also please be careful not to giving excess pressure at sealing to avoid sealing tightness deteriorate. Leave more than 0.5 mm of lead from the case.

### 5.6. Ultrasonic cleaning and ultrasonic soldering

Soldered by ultrasonic cannot be guaranteed, because crystal may be sympathetic vibrated and may damage. Please study at your side about ultrasonic cleaning.

### 5.7. Drive level

Applying excessive drive level to the crystal units may cause deterioration of characteristics or damage. Less than  $1.0\mu\text{W}$  is recommended to this products. More than  $2.0\mu\text{W}$  cannot be guaranteed.

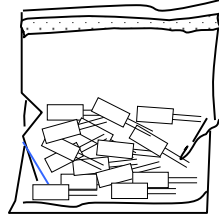
## 6、SUBSTANCES IN PRODUCT (weight: 60.98/pcs)

Drawing number	Disassembly Unit	Homogeneous Material Name.	Substance Name	CAS No.	Substance Mass. (mg)	Content Rate(%)per
$\phi 2 * 6$	CAP	Kovar	Cu	7440-50-8	24.622	59.84%
			Ni	7440-02-0	9.489	23.06%
			Zn	7440-66-6	6.480	15.75%
			Mn	7439-96-5	0.233	0.57%
			Fe	7439-89-6	0.324	0.79%
	Lead	Kovar ring	Fe	7439-89-6	3.409	57.46%
			Ni	7440-02-0	2.492	42.01%
			Co	13981-50-5	0.001	0.02%
			Mn	7439-96-5	0.028	0.48%
			Sn	7440-31-5	0.001	0.02%
			Cu	7440-50-8	0.001	0.02%
	Glass	Glass	SiO2	7631-46-1	2.750	100.00%
	Base	Fe-Ni	Fe	7439-89-6	3.850	68.75%
			Ni	7440-02-0	1.560	27.86%
			Co	13981-50-5	0.001	0.02%
			Mn	7439-96-5	0.008	0.14%
			Sn	7440-31-5	0.098	1.75%
			Cu	7440-50-8	0.083	1.48%
	Blank	Quartz	SiO2	14808-60-7	3.600	100.00%
	Electrode	CrAg	Cr	7440-47-3	0.002	6.43%
			Ag	7440-22-4	0.029	93.57%
SOLDER	SnAgCu	Sn	7440-31-5	1.850	96.56%	
		Ag	7440-22-4	0.057	2.97%	
		Cu	7440-50-8	0.009	0.47%	

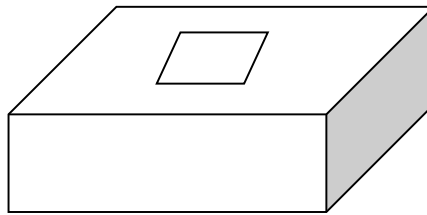
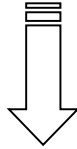
All the products we provide meet the requirements of RoHS and Reach regulations, and we send SGS for ICP test every year.

## 7、PACKING SPECIFICATIONS (Unit: mm)

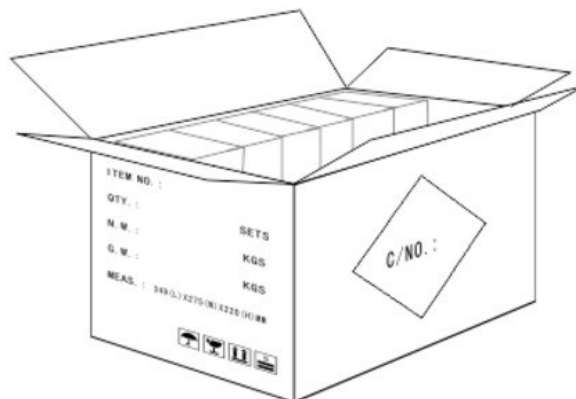
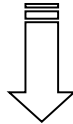
Bag packaging  
Size: 150\*120 mm  
Quantity: 1000pcs



Packing inner box  
Size: 170\*120\*75 mm  
Quantity: 10,000pcs



Packing box  
Size: 360\*320\*170 mm  
10 boxes in each outer carton, QTY: 100,000pcs





Series WX2, P/N: WTL2T95466PH  
DIP TUNING FORK CRYSTAL  $\phi 2 \times 6$  MM

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## 8、WTL PART NUMBER SYSTEM :

For example: WTL2T66645AZ

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

WTL - 2T - 66645 - AZ

WTL: Brand

2T : Package Code

66645: Serial number , flow code , without any rules

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