



# TAI-SAW TECHNOLOGY CO., LTD.

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## Product Specifications Approval Sheet

Product Description: Crystal Unit SMD 2.5x2.0 12.0MHz

TST Part No.: TZ2094A

Customer Part No.: \_\_\_\_\_

|                             |
|-----------------------------|
| Customer signature required |
| Company: _____              |
| Division: _____             |
| Approved by : _____         |
| Date: _____                 |

Checked by: \_\_\_\_\_ Yifan Chen *Yifan*

Approved by: \_\_\_\_\_ Kelly Huang *Kelly Huang*

Date: \_\_\_\_\_ 03/31/2014

1. Customer signed back is required before TST can proceed with sample build and receive orders.
2. Orders received without customer signed back will be regarded as agreement on the specifications.
3. Any specifications changes must be approved upon by both parties and a new revision of specifications shall be released to reflect the changes.



**TAI-SAW TECHNOLOGY CO., LTD.**  
Crystal Unit SMD 2.5x2.0 12.0MHz

MODEL NO.: TZ2094A

REV. NO.: 1

**Revise:**

| Rev. | Rev. Page | Rev. Account    | Date      | Ref. No. | Revised by |
|------|-----------|-----------------|-----------|----------|------------|
| 1    | N/A       | Initial release | 03/31/14' | N/A      | Yifan Chen |



# TAI-SAW TECHNOLOGY CO., LTD.

## Crystal Unit SMD 2.5x2.0 12.0MHz

MODEL NO.: TZ2094A

REV. NO.: 1

### Features:

- Surface Mount Hermetic Package
- Excellent Reliability Performance
- Good Frequency Perturbation and Stability over temperature
- Ultra Miniature Package

RoHS Compliant  
Lead free  
Lead-free soldering

### Description and Applications:

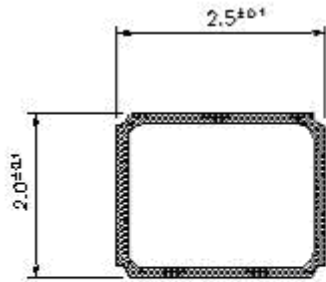
Surface mount 2.5mmx2.0mm crystal unit for use in wireless communications devices, especially for a need of ultra miniature package for mobility.

### Electrical Specifications:

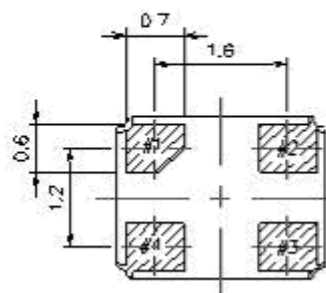
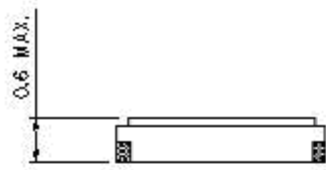
| TZ2094A  | Specification                             |
|--|---|
| Nominal Frequency                                    | 12.000000 MHz                             |
| Mode of Oscillation                                  | Fundamental                               |
| Storage Temperature Range                            | -40°C to +125°C                           |
| Operating Temperature Range                          | -30°C to +85°C                            |
| Frequency Stability over Operating Temperature Range | +/-15 ppm (referred to the value at 25°C) |
| Frequency Make Tolerance (FL)                        | +/-10 ppm @ 25°C +/- 3°C                  |
| Equivalent Series Resistance (ESR)                   | 180 Ω max                                 |
| Nominal Drive Level                                  | 10uW typical and 100uW max                |
| Shunt Capacitance (Co)                               | 3.0 pF max                                |
| Load Capacitance (CL)                                | 12 pF                                     |
| Insulation Resistance                                | 500 MΩ min./DC 100V                       |
| Aging  | +/-1ppm                                   |
| Marking  | Laser Marking                             |
| Unit Weight  | 9.5 +/-0.5mg                              |

# Mechanical Dimensions (mm):

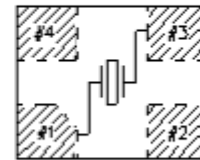
## Base 1



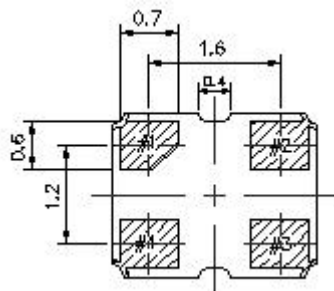
|        | Pin Connection |
|--------|----------------|
| #1 pin | IN/OUT         |
| #2 pin | GND            |
| #3 pin | IN/OUT         |
| #4 pin | GND            |



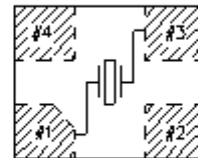
Internal Connections (Top View)



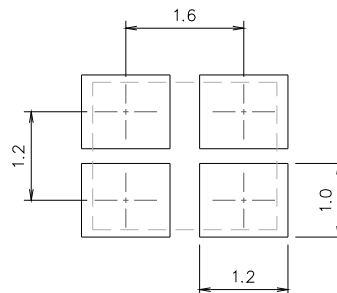
## Base 2



Internal Connections (Top View)



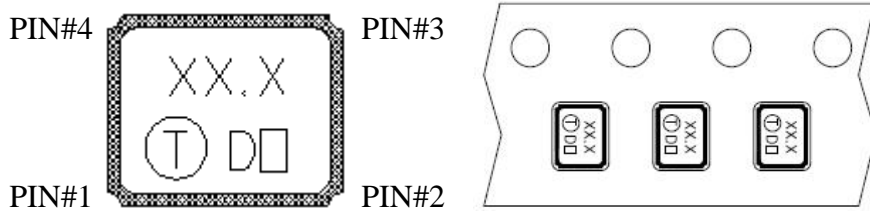
## Recommended Land Pattern: (unit: mm)



# Marking:

Line 1: Frequency (12.0)

Line 2: TST Logo + Date Code + Product Code (  is TST internal tracking code, could be a~z and A~Z)



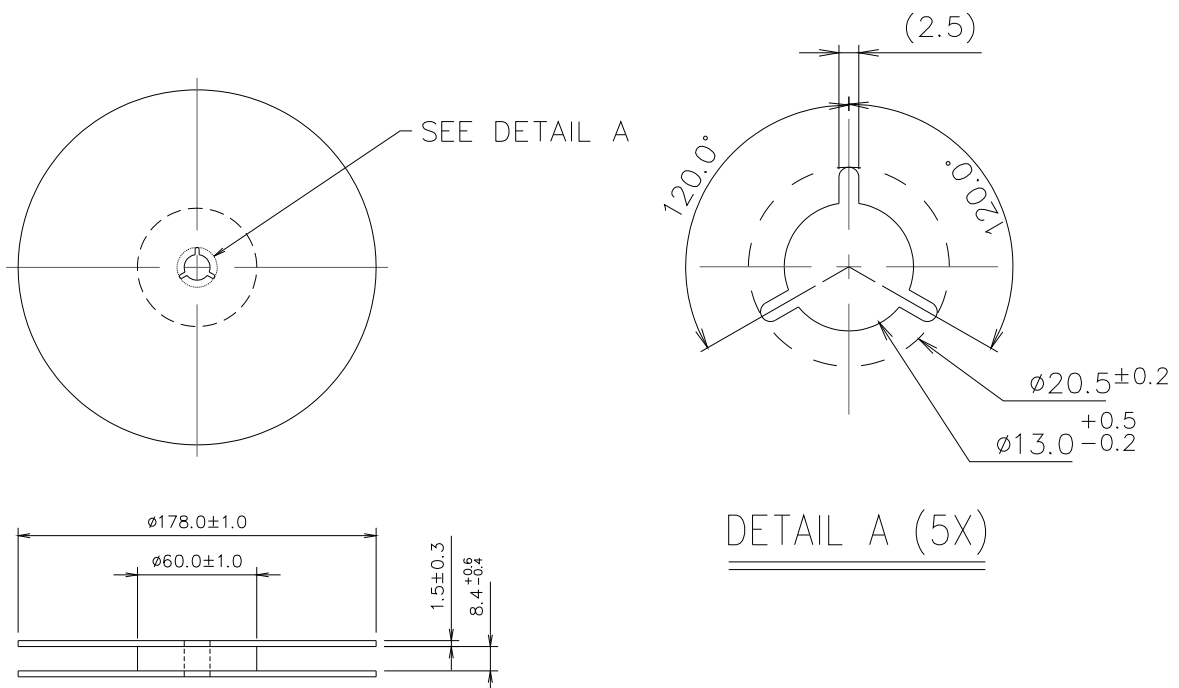
The inner vision of PIN#1, PIN#4 side is XTAL blank mounting pad.

|      |      |      |      |      |      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| WK01 | WK02 | WK03 | WK04 | WK05 | WK06 | WK07 | WK08 | WK09 | WK10 | WK11 | WK12 | WK13 |
| A    | B    | C    | D    | E    | F    | G    | H    | I    | J    | K    | L    | M    |
| WK14 | WK15 | WK16 | WK17 | WK18 | WK19 | WK20 | WK21 | WK22 | WK23 | WK24 | WK25 | WK26 |
| N    | O    | P    | Q    | R    | S    | T    | U    | V    | W    | X    | Y    | Z    |
| WK27 | WK28 | WK29 | WK30 | WK31 | WK32 | WK33 | WK34 | WK35 | WK36 | WK37 | WK38 | WK39 |
| a    | b    | c    | d    | e    | f    | g    | h    | i    | j    | k    | l    | m    |
| WK40 | WK41 | WK42 | WK43 | WK44 | WK45 | WK46 | WK47 | WK48 | WK49 | WK50 | WK51 | WK52 |
| n    | o    | p    | q    | r    | s    | t    | u    | v    | w    | x    | y    | z    |

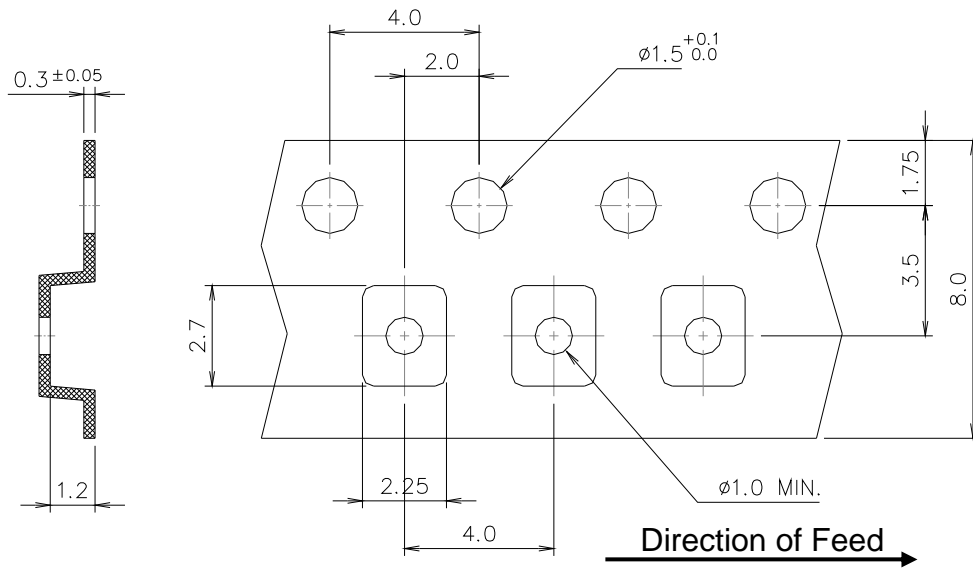
Product Code Table: (Under line With Even Year and Odd Year for Nothing)

| Year |      |      |      |      |      | Product Code             |
|------|------|------|------|------|------|--------------------------|
| 2013 | 2015 | 2017 | 2019 | 2021 | 2023 | <input type="checkbox"/> |
| 2014 | 2016 | 2018 | 2020 | 2022 | 2024 | <input type="checkbox"/> |

# Reel Dimensions (mm):



### Tape Dimensions (mm):

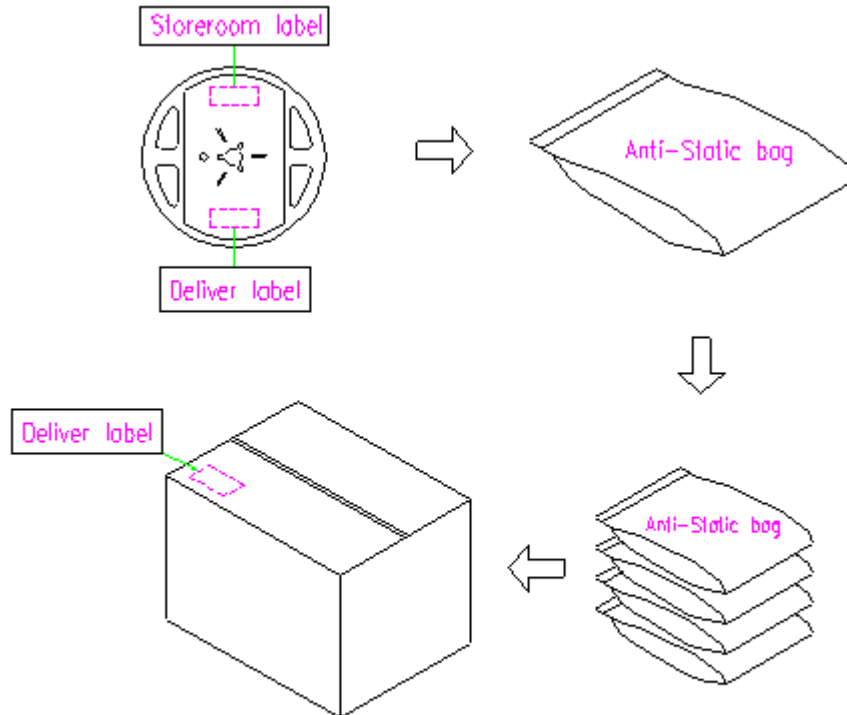


[NOTE]:

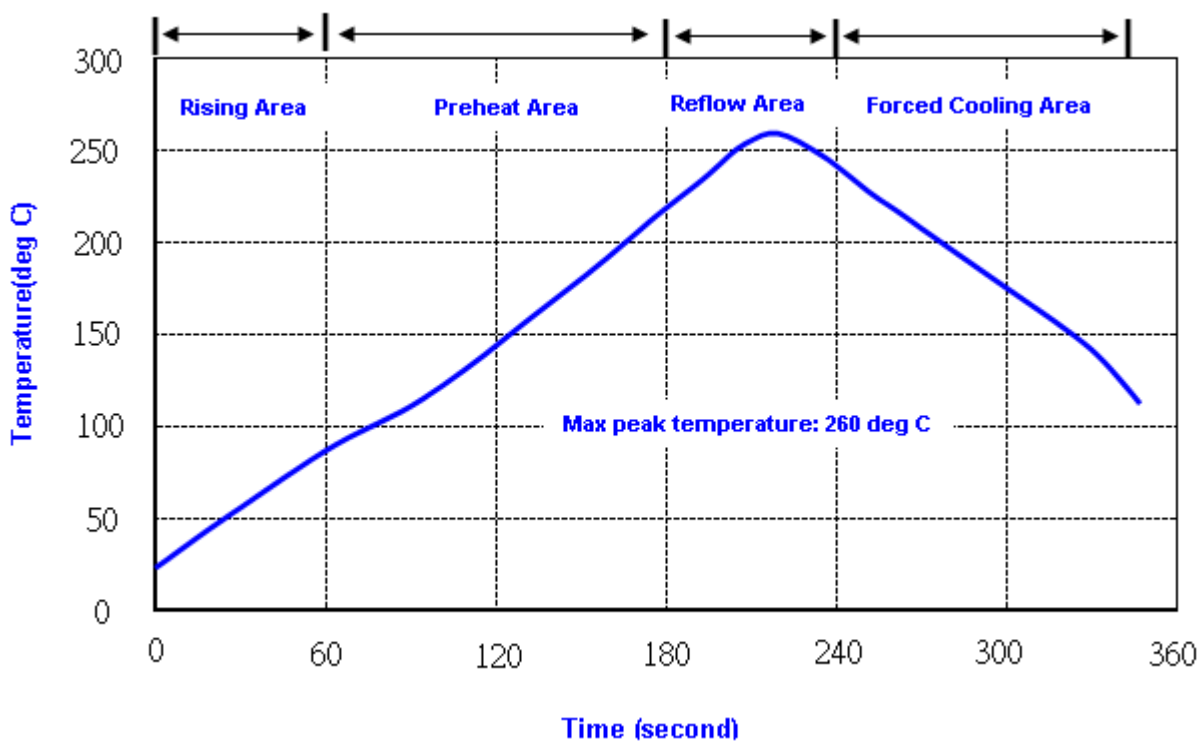
1. Unless otherwise specified tolerance on dimension +/-0.1 mm.
2. Material: conductive polystyrene with color black.
3. 10 pitch cumulative tolerance +/-0.2 mm.

### Packing Quantity/Packing:

3K pcs maximum per reel



## Reflow Profile:



- Note: 1. Max peak temperature: 260 $\pm$ 5 deg C; Time: 10 $\pm$ 2 sec  
2. Temperature: 217 $\pm$ 5 deg C; Time: 90~100 sec

## Reliability Specifications

| Test name                                | Test process / method   | Reference standard                           |
|--|---|--|
| <b>Mechanical characteristics</b>        |   |  |
| resistance to Soldering heat (IR reflow) | Temp./ Duration : 260°C /10sec x2 times<br>Total time : 4min.(IR-reflow)  | EIAJED-4701<br>-300(301)M(II)                |
| Vibration                                | Total peak amplitude : 1.5mm<br>Vibration frequency : 10 to 55 Hz<br>Sweep period : 1.0 minute<br>Vibration directions : 3 mutually perpendicular<br>Duration : 2 hr / direc. | MIL-STD 202F<br>method 201A                  |
| Mechanical Shock                         | directions : 3 impacts per axis<br>Acceleration : 3000g's, +20/-0 %<br>Duration : 0.3 ms (total 18 shocks)<br>Waveform : Half-sine  | MIL-STD 202F<br>method 213C                  |
| Solderability                            | Solder Temperature:265±5°C<br>Duration time: 5±0.5 seconds.   | MIL-STD 883G<br>method 2003                  |
| <b>Environmental characteristics</b>     |   |  |
| Thermal Shock                            | Heat cycle conditions<br>-55 °C (30min) ↔ 125 °C (30min)<br>* cycle time : 10 times   | MIL-STD 883G<br>method 1010.7                |
| Humidity test                            | Temperature : 70 ± 2 °C<br>Relative humidity : 90~95%<br>Duration : 96 hours  | MIL-STD 202F<br>method 103B                  |
| Dry heat ( Aging test )                  | Temperature : 125 ± 2 °C<br>Duration : 168 hours  | MIL-STD 883G<br>method 1008.2<br>condition C |
| PCT test                                 | Pressure: 2.06kg/cm <sup>2</sup> (2.03*10 <sup>5</sup> pa)<br>Temperature : 121 ± 2 °C<br>Relative humidity : 100%<br>Duration : 24 hours                                     | EIAJED-4701-3<br>B-123A                      |



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