



# TAI-SAW TECHNOLOGY CO., LTD.

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## Product Specifications Approval Sheet

Product Description: Crystal Unit SMD 3.2x2.5 12.0MHz

TST Part No.: TZ1444D

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

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

Checked by: \_\_\_\_\_ Ann Liu

Approved by: \_\_\_\_\_ Robert Chang

Date: \_\_\_\_\_ 7/01/2009

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 3.2x2.5 12.0MHz

MODEL NO.: TZ1444D

REV. NO.: 2

**Revise:**

| Rev. | Rev. Page | Rev. Account        | Date     | Ref. No.      | Revised by |
|------|-----------|---------------------|----------|---------------|------------|
| 1    | N/A       | Initial release     | 04/17/09 | N/A           | Ann Liu    |
| 2    | 5         | Changed T/R drawing | 07/01/09 | ECN-200900240 | Ann Liu    |



MODEL NO.: TZ1444D

REV. NO.: 2

## 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

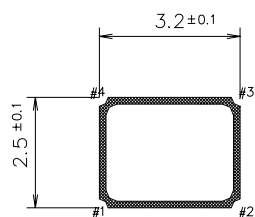
## Description and Applications:

Surface mount 3.2mmx2.5mm crystal unit for use in wireless communications devices, especially for a need of ultra miniature package for mobility.

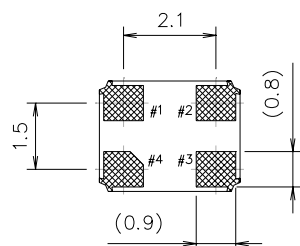
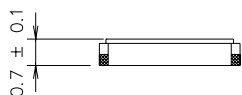
## Electrical Specifications:

| <b>TZ1444D</b>                                       | <b>Specification</b>                      |
|--|---|
| Nominal Frequency                                    | 12.000000 MHz                             |
| Mode of Oscillation                                  | Fundamental                               |
| Storage Temperature Range                            | -40°C to +85°C                            |
| Operating Temperature Range                          | -20°C to +70°C                            |
| Frequency Stability over Operating Temperature Range | +/-30 ppm (referred to the value at 25°C) |
| Frequency Make Tolerance (FL)                        | +/-30 ppm @ 25°C +/- 3°C                  |
| Equivalent Series Resistance (ESR)                   | 100 Ω max                                 |
| Nominal Drive Level                                  | 10 uW max.                                |
| Shunt Capacitance (Co)                               | 3 pF max                                  |
| Load Capacitance (CL)                                | 10pF                                      |
| Insulation Resistance                                | 500 MΩ min./DC 100V                       |
| Marking  | Laser Marking                             |
| Unit Weight  | 0.017+/-0.005 g                           |

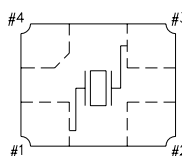
## Mechanical Dimensions (mm):



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



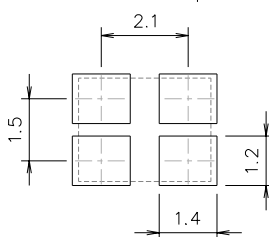
Internal Connections (Top View)



#2, #4 is connected with a cover

## Recommended Land Pattern: (unit: mm)

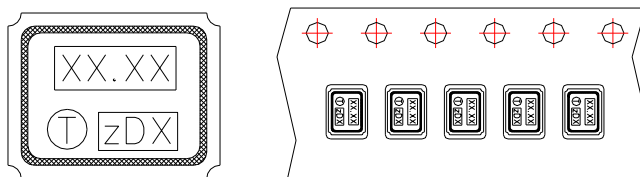
Reference Footpoint



## Marking:

Line 1: Frequency (12.00)

Line 2: TST Logo + Crystal Product Code + Date Code



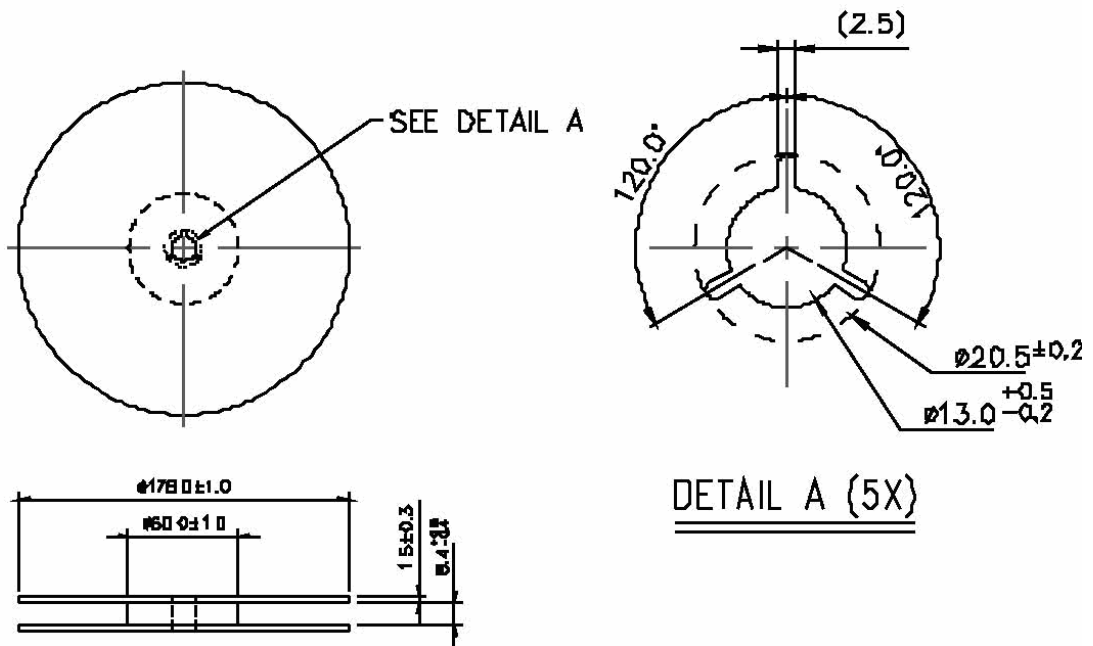
## Product Code Table

| Year         | 2009 | 2010 | 2011 | 2012 |
|--------------|------|------|------|------|
|              | 2013 | 2014 | 2015 | 2016 |
|              | 2017 | 2018 | 2019 | 2020 |
| product code | Z    | z    | Z    | z    |

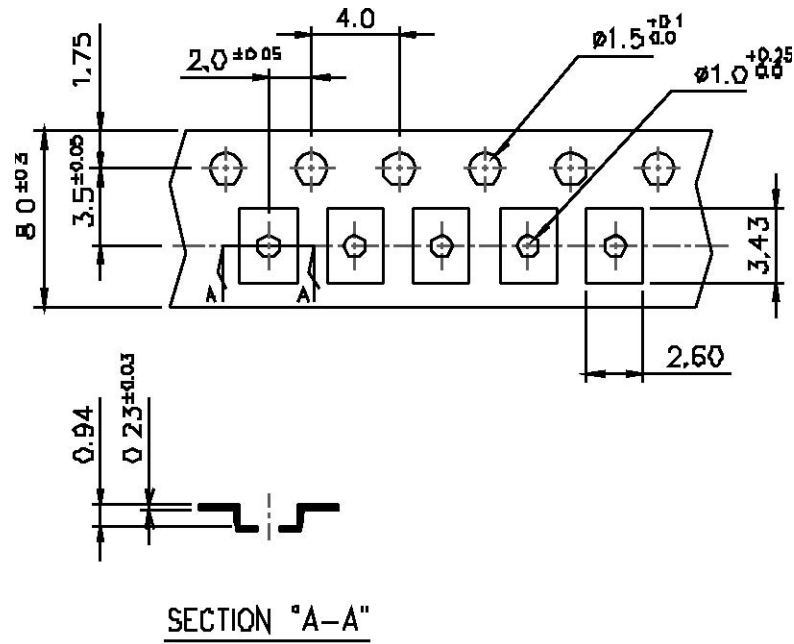
## Date Code Table

|      |      |      |      |      |      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 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    |

**Reel Dimensions (mm):**



**Tape Dimensions (mm):**

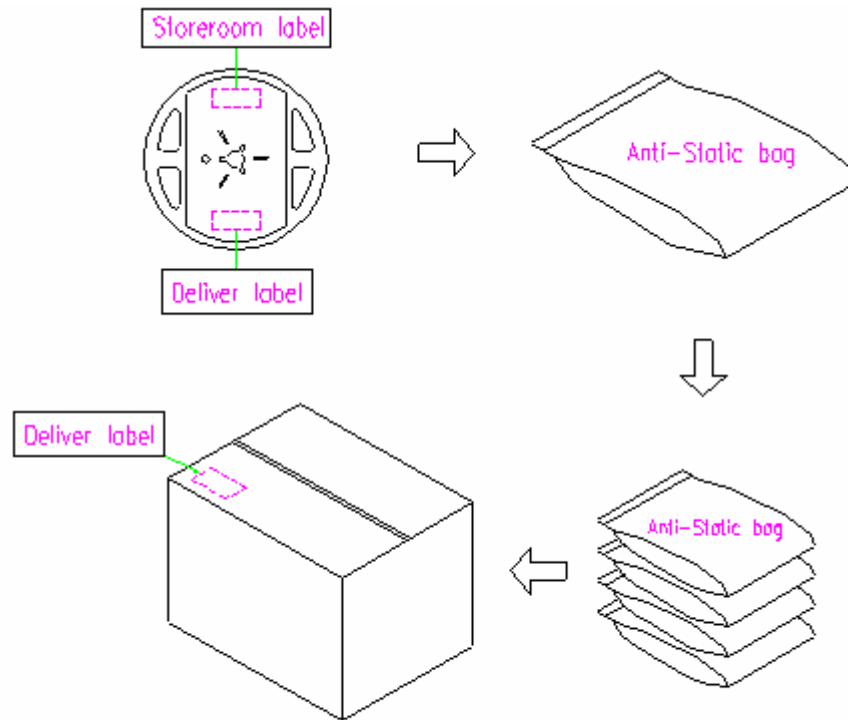


[NOTE]

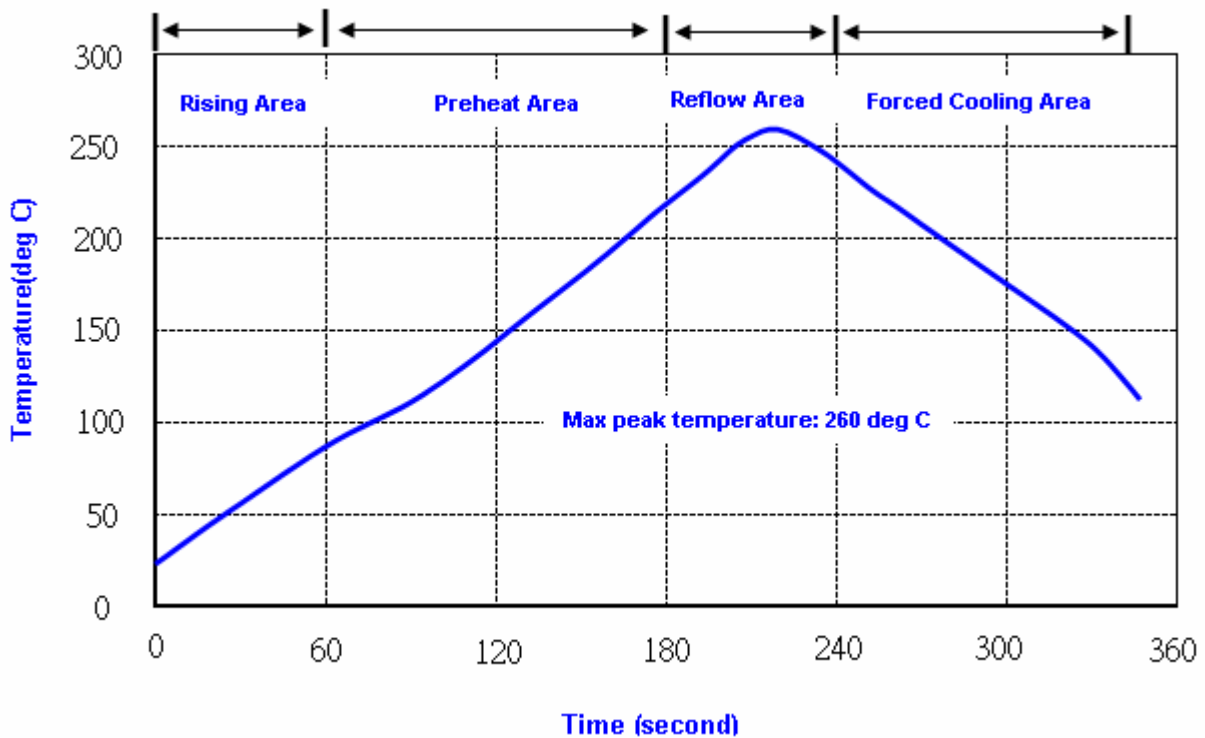
- 1 UNIT : mm.
- 2 UNLESS OTHERWISE SPECIFIED TOLERANCE ON DIM. +/-0.1mm.
- 3 MATERIAL : CONDUCTIVE POLYSTYRENE.
- 4 COLOR : BLACK.
- 5 10 PITCHES CUMULATIVE TOLERANCE +/-0.2mm.

## 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 ×2 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                      |