



# TAI-SAW TECHNOLOGY CO., LTD.

No. 3, Industrial 2nd Rd., Ping-Chen Industrial District,  
Taoyuan, 324, Taiwan, R.O.C.

TEL: 886-3-4690038 FAX: 886-3-4697532

E-mail: [tstsales@mail.taisaw.com](mailto:tstsales@mail.taisaw.com) Web: [www.taisaw.com](http://www.taisaw.com)

## Product Specifications Approval Sheet

Product Description: Crystal Oscillator SMD 2.5x2.0 12.00MHz

TST Part No.: TW0451A

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

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

Checked by: \_\_\_\_\_ Naco Kuo *Naco*

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

Date: \_\_\_\_\_ 06/21/2013

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.**  
**SMD 2.5x2.0 12.00MHz Crystal Oscillator**

MODEL NO.: TW0451A

REV. NO.: 2

**Revise:**

| Rev. | Rev. Page | Rev. Account         | Date      | Ref. No.      | Reviser  |
|------|-----------|----------------------|-----------|---------------|----------|
| 1    | N/A       | Initial release      | 05/27/13' | N/A           | Naco Kuo |
| 2    | 5         | Correct Marking Rule | 06/21/13' | ECN-201300207 | Naco Kuo |



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## SMD 2.5x2.0 12.0000MHz Crystal Oscillator

MODEL NO.: TW0451A

REV. NO: 2

### Features:

- Surface Mount Seam Weld Package
- Excellent Reliability Performance
- Excellent Frequency Perturbation and Stability over temperature

RoHS Compliant  
Lead free  
Lead-free soldering

### Application:

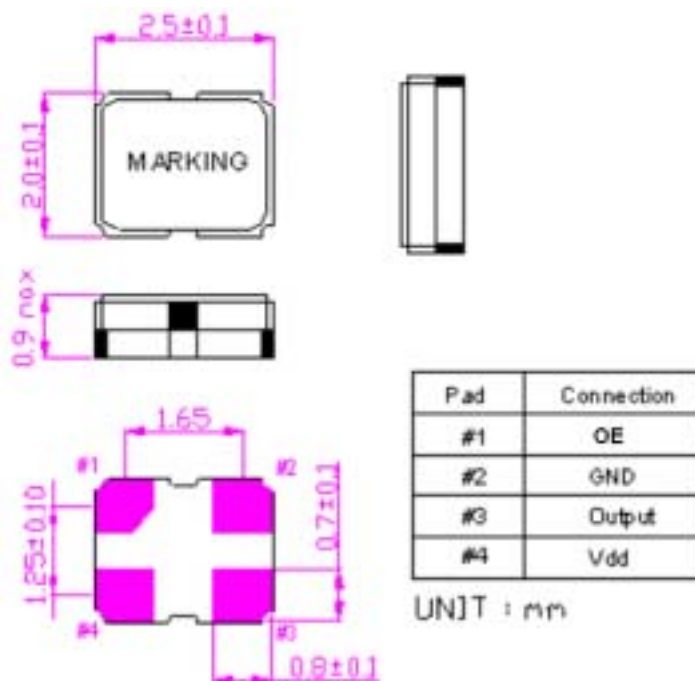
- 1.8V Supply Voltage CMOS Output
- Option-able stand-by function for output .

### Electrical Characteristics:

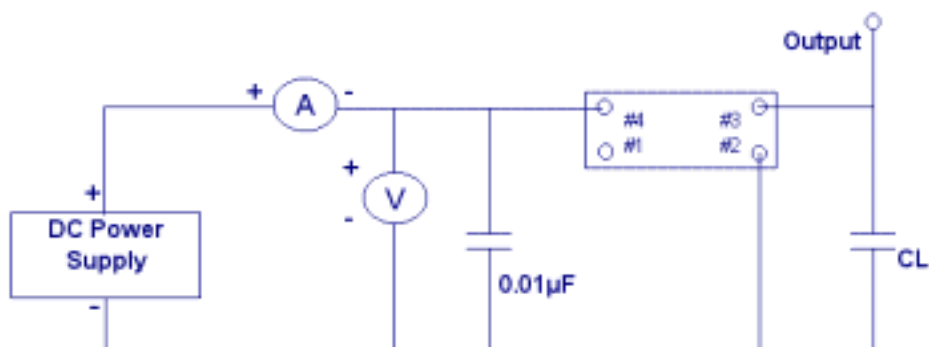
| TW0451A  | Specifications   |
|--|--|
| Nominal Frequency, Fo  | 12.000000 MHz  |
| Storage Temperature Range  | -40°C to +85°C   |
| Operating Temperature Range  | -20°C to +70°C   |
| Power Supply Voltage, Vcc  | 1.8V +/- 10%   |
| Load   | 15pF   |
| “0” Level<br>“1” Level   | 0.18 V max<br>1.62 V min   |
| Frequency Stability <sup>1</sup>   | +/-20ppm max   |
| Duty Cycle   | 40% ~ 60%  |
| Current Consumption  | 5mA max  |
| Start-up Time  | 10 ms max  |
| Rise Time ( 10% -> 90% of final RF level in Vp-p )<br>Fall Time ( 90% -> 10% of final RF level in Vp-p ) | 10nsec max.  |
| Unit Weight  | 14 +/-0.5mg  |
| Aging  | +/-2ppm/Year   |
| Enable/Disable Function  | PIN 1: High or Open, PIN 3:Output Enable<br>PIN 1: Low, PIN 3:Output Disable |

#Note 1: Frequency accuracy includes 25C tolerance, operating temperature range -20 to 70 deg C, first year of aging and voltage or load change

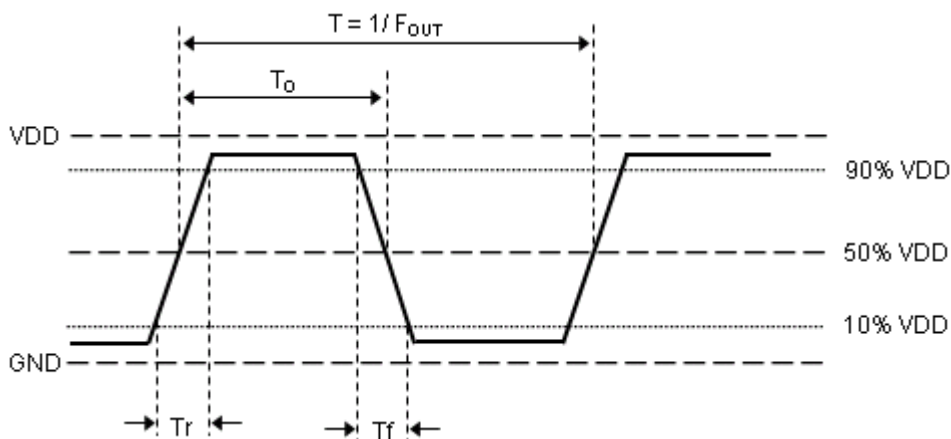
## Mechanical Dimensions: (Unit: mm)



## Test Circuit:



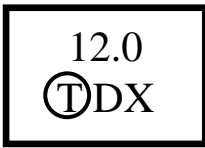
## Output Waveform :



# Marking:

Line 1: 12.0(Frequency)

Line 2:  $\text{\textcircled{T}}$ DX (TST logo + Data Code + Product Code)



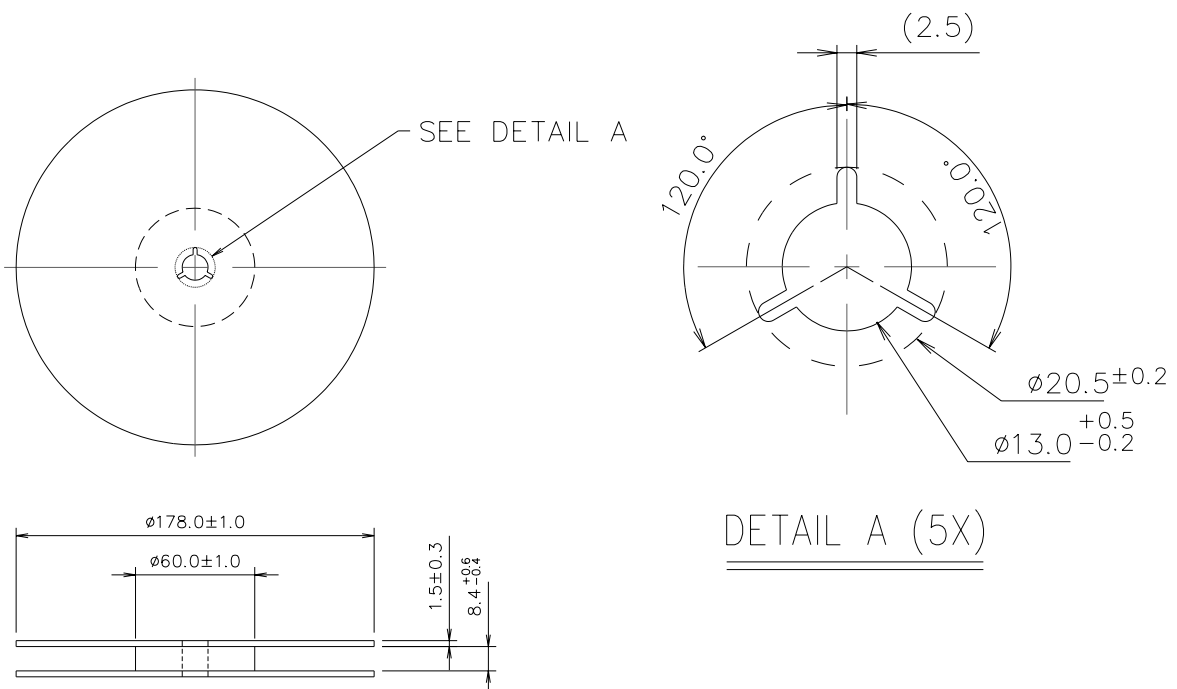
## Date Code Table

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

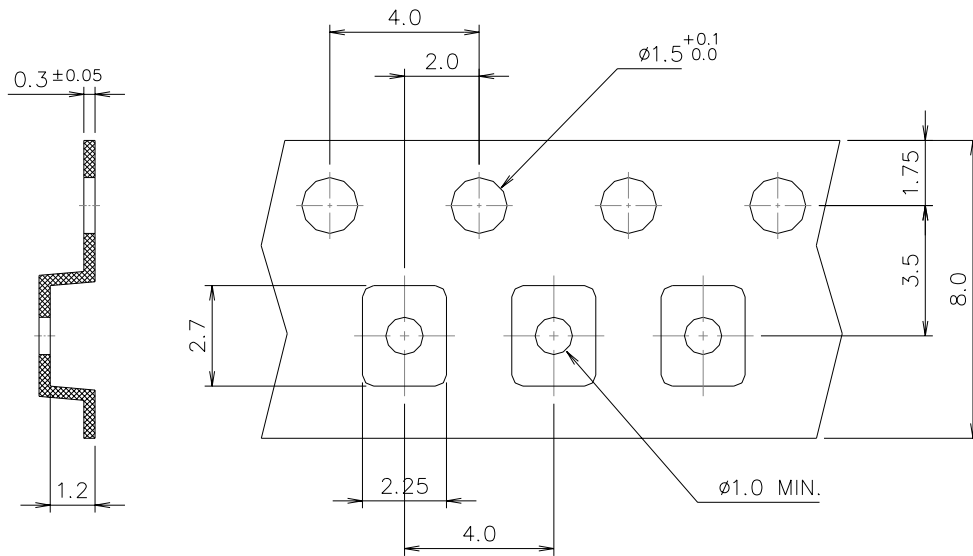
## Product Code Table:

|              |          |                 |
|--------------|----------|-----------------|
| Year         | 2007     | 2008            |
|              | 2009     | 2010            |
|              | 2011     | 2012            |
|              | 2013     | 2014            |
| Product code | <b>W</b> | <b><u>W</u></b> |

## Reel Dimensions (mm):



## Tape Dimensions (mm):

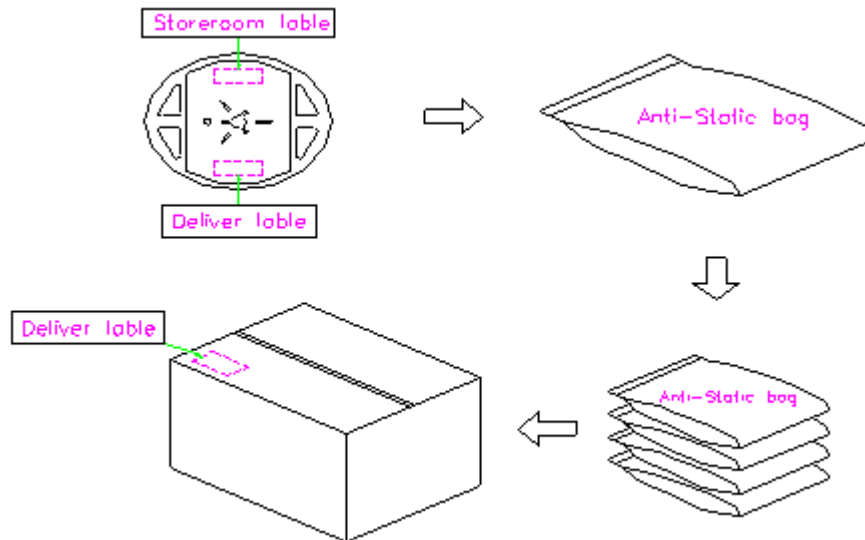


### [NOTE]:

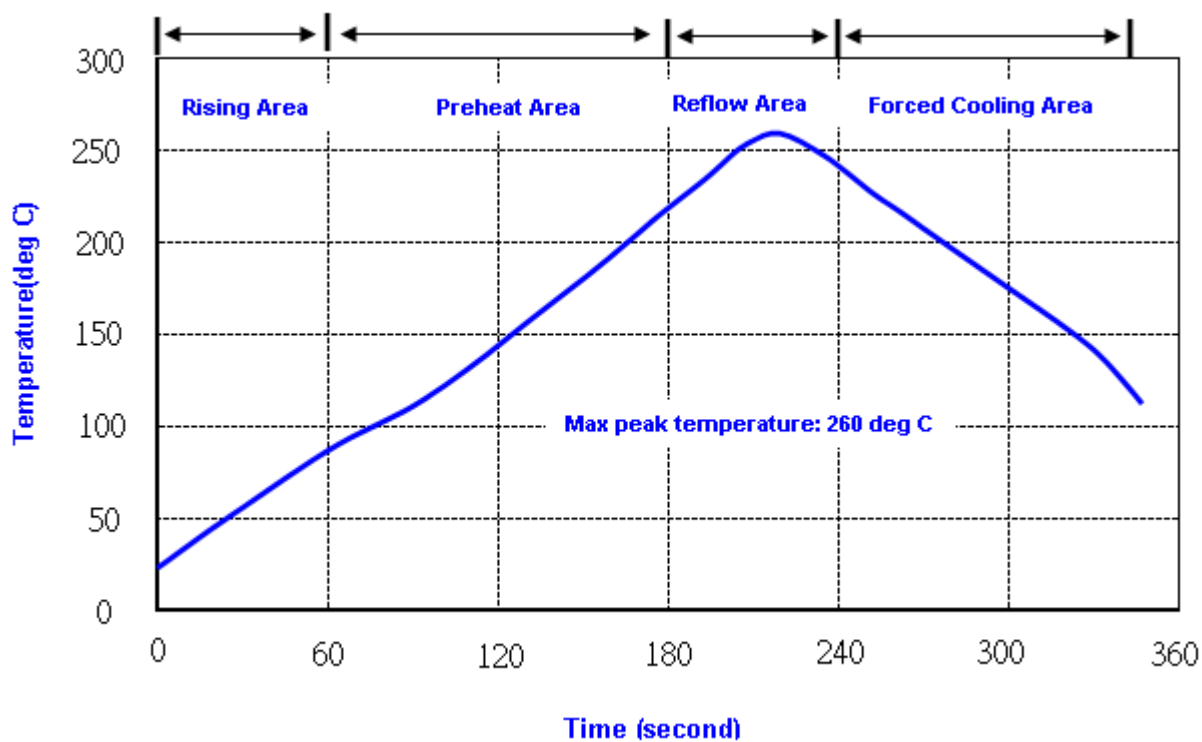
1. Unless otherwise specified tolerance on dimension  $\pm 0.1$  mm.
2. Material: conductive polystyrene with color black.
3. 10 pitch cumulative tolerance  $\pm 0.2$  mm.

## Packing Quantity/Packing:

1Kpcs 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 (30min)                      125 (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                      |