

## SPECIFICATION FOR APPROVAL

CUSTOMER : \_\_\_\_\_

PRODUCT TYPE : SMD SEAM SEALING X'TAL 3.2×2.5

NOMINAL FREQ. : 24.000000MHz

TXC P/N : 7M24000022

REVISION : A2

CUSTOMER P/N : \_\_\_\_\_

PM / SALES : \_\_\_\_\_

DATE : \_\_\_\_\_

CUSTOMER SIGNATURE & Date \_\_\_\_\_

\_\_\_\_\_

- (1) TXC requires one copy returned with signature and title of authorized individual that signifies acceptance of the attached specifications.
- (2) Orders received and accepted by TXC after return of signed copy of specification will be produced per these specifications.
- (3) Any changes to these specifications must be agreed upon by both parties and new revision of the Product Specification Sheet will be issued.
- (4) Any issuance of purchase order prior to consigning back the Approval page of "Specification Sheets" from customers will be regarded as the agreement on the contents of these specifications.

**MSL:Level 1**  
**RoHS Compliant**

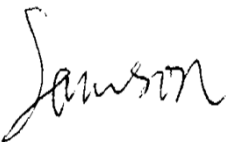
# PRODUCT SPECIFICATION SHEET

PRODUCT TYPE : SMD SEAM SEALING X'TAL 3.2×2.5

NOMINAL FREQ. : 24.000000MHz

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REVISION : A2

| PE/RD                                                                               | QA                                                                                  | MFG                                                                                  |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|  |  |  |
| 11-Oct-11                                                                           | 11-Oct-11                                                                           | 11-Oct-11                                                                            |

**NOTE:**

- (1)Lead Free Products are "Directive 2002/95/EC of The European Parliament of 27 January 2003 on the restriction of the use of certain hazardous substances (RoHS) in electrical and electronic equipment" Compliant (Attachment: SGS Test Report).
- (2)Revision "Sx" is for engineering samples only. PE/RD's approval required.
- (3)Revision "Ax" is production ready. PE, QA and MFG's approval required

**MSL:Level 1**  
**RoHS Compliant**

[illegible]

## Spec Sheet Contents

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## ■ ELECTRICAL SPECIFICATIONS

### Standard atmospheric conditions

Unless otherwise specified, the standard range of atmospheric conditions for making measurement and tests are as follow:

Ambient temperature : 25±5℃  
Relative humidity : 40%~70%

If there is any doubt about the results, measurement shall be made within the following limits:

Ambient temperature : 25±3℃  
Relative humidity : 40%~70%

### Measure equipment

Electrical characteristics measured by S&A250B or equivalent.

### Crystal cutting type

The crystal is using AT CUT (thickness shear mode).

### Unit Weight:

0.018±0.001 g/pcs

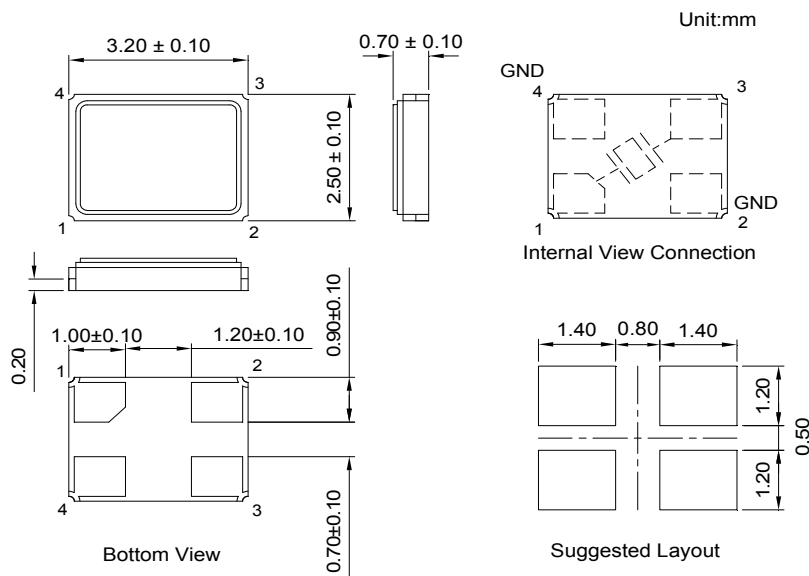
|    | Parameters                          | SYM.           | Electrical Spec. |      |     |       | Notes                                       |
|----|-------------------------------------|----------------|------------------|------|-----|-------|---------------------------------------------|
|    |                                     |                | MIN              | TYPE | MAX | UNITS |                                             |
| 1  | Nominal Frequency                   | FL             | 24.000000        |      |     | MHz   | -                                           |
| 2  | Oscillation Mode                    | -              | Fundamental      |      |     | -     | -                                           |
| 3  | Load Capacitance                    | CL             | 10               |      |     | pF    | -                                           |
| 4  | Frequency Tolerance                 | -              | ±10              |      |     | ppm   | at 25 °C ± 3 °C                             |
| 5  | Frequency Stability                 | -              | ±15              |      |     | ppm   | Over Operating Temp. Range (Reference 25°C) |
| 6  | Operating Temperature               | -              | -30              | ~    | 80  | °C    | -                                           |
| 7  | Aging                               | -              | ±1               |      |     | ppm   | 1st Year                                    |
| 8  | Drive Level                         | DL             | -                | 100  | -   | μW    | -                                           |
| 9  | Effective Resistance R <sub>r</sub> | R <sub>r</sub> | -                | -    | 60  | Ω     | -                                           |
| 10 | Shunt Capacitance C <sub>0</sub>    | C <sub>0</sub> | -                | 0.85 | -   | pF    | -                                           |
| 11 | Motional Capacitance C <sub>1</sub> | C <sub>1</sub> | -                | 2.9  | -   | fF    | -                                           |
| 12 | Insulation Resistance               | -              | 500              | -    | -   | MΩ    | at DC 100V                                  |
| 13 | Storage Temperature Range           | -              | -40              | ~    | 85  | °C    | -                                           |

## ■ FACTORY LOCATION

TXC (NINGBO) CORPORATION  
NO.189 Huang Shan West Road, Beilun District,  
Ningbo Zhejiang China

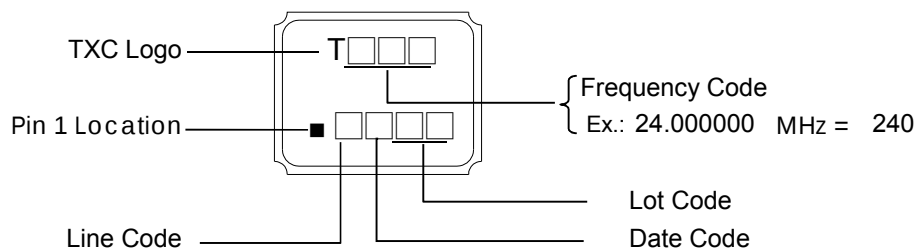
## DIMENSIONS

(Unit:mm)



\*Coplanarity of solderable areas Camber 0.10 mm Max

## MARKING



### Date Code:

| YEAR |      |      |      | MONTH |     |     |     |     |     |     |     |     |     |     |     |
|------|------|------|------|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|      |      |      |      | JAN   | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
| 2005 | 2009 | 2013 | 2017 | A     | B   | C   | D   | E   | F   | G   | H   | J   | K   | L   | M   |
| 2006 | 2010 | 2014 | 2018 | N     | P   | Q   | R   | S   | T   | U   | V   | W   | X   | Y   | Z   |
| 2007 | 2011 | 2015 | 2019 | a     | b   | c   | d   | e   | f   | g   | h   | j   | k   | l   | m   |
| 2008 | 2012 | 2016 | 2020 | n     | p   | q   | r   | s   | t   | u   | v   | w   | x   | y   | z   |

\*This date code will be cycled every four years

## SUGGESTED REFLOW PROFILE

Solder melting point :220±10 °C, 60 sec. Min.

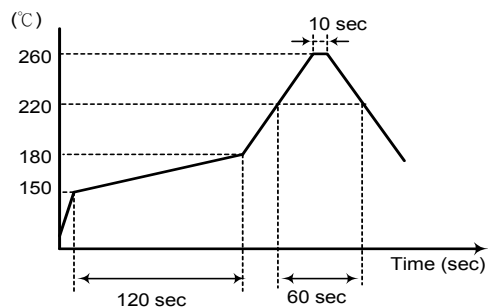
Peak Temperature: 260 ± 5 °C, 10 sec. Max.

## SUGGESTED MANUAL SOLDER CONDITION

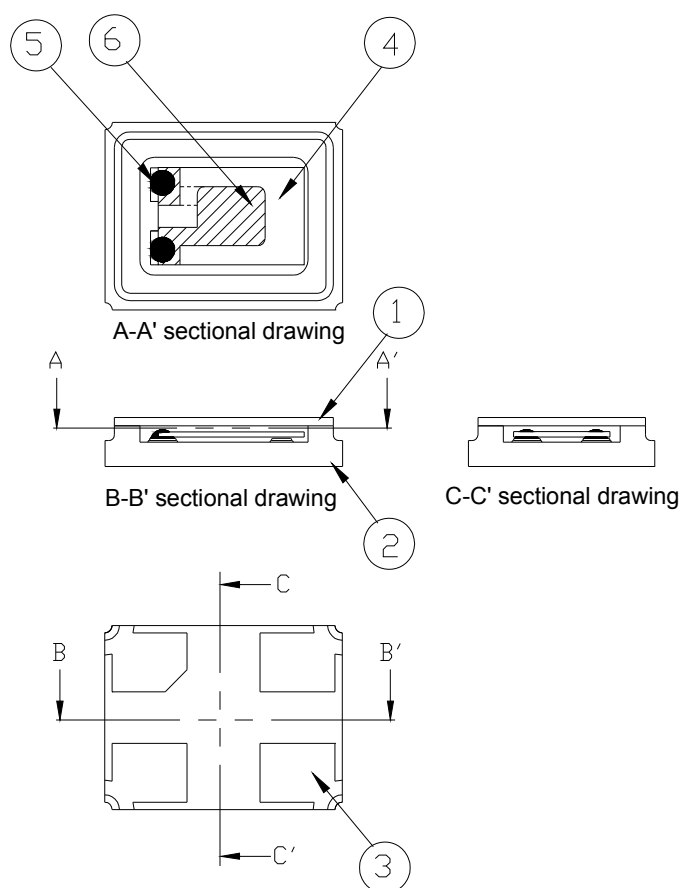
Temperature: 350 ± 10 °C

Time: 3 sec.

Re-solder times: twice

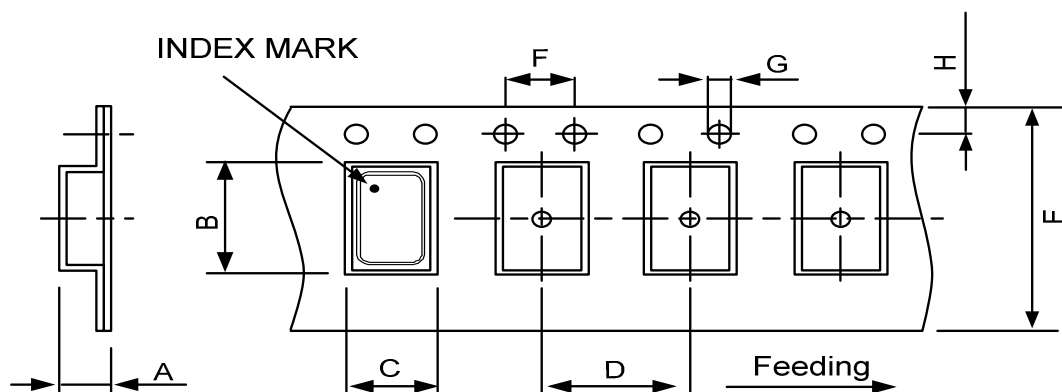


■ STRUCTURE ILLUSTRATION



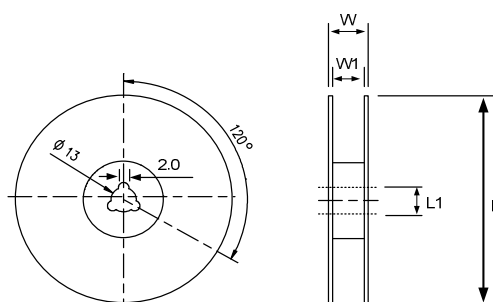
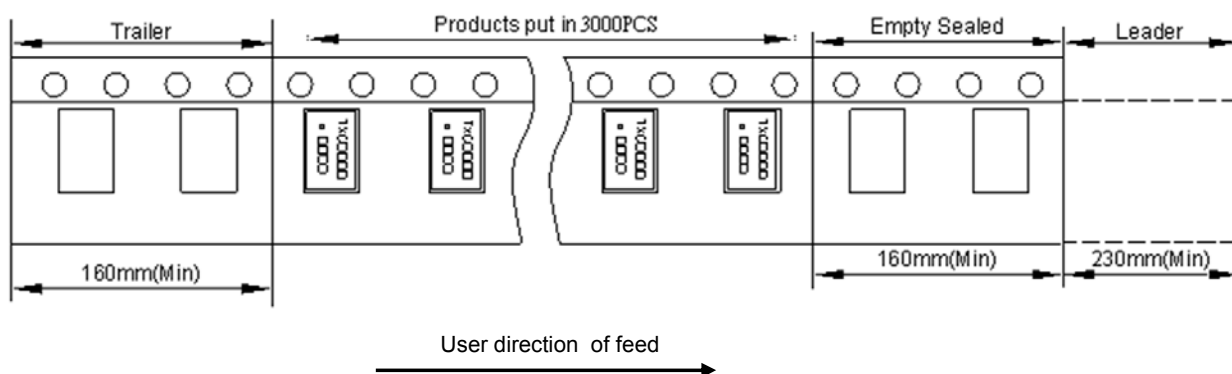
| NO | COMPONENTS          | MATERIALS                                                           | FINISH/SPECIFICATIONS                             |
|----|---------------------|---------------------------------------------------------------------|---------------------------------------------------|
| 1  | Lid                 | Kovar (Fe/Co/Ni)                                                    | -                                                 |
| 2  | Package             | Ceramic (Al <sub>2</sub> O <sub>3</sub> ) + Kovar (Fe/Co/Ni)+ Ag/Cu | -                                                 |
| 3  | PAD                 | Au                                                                  | Tungsten metalize<br>+ Ni plating<br>+ Au plating |
| 4  | Crystal blank       | SiO <sub>2</sub>                                                    | -                                                 |
| 5  | Conductive adhesive | Resin+Ag                                                            | -                                                 |
| 6  | Electrode           | Noble Metal                                                         | -                                                 |

# EMBOSS CARRIER TAPE & REEL



| DIMENSIONS | A         | B         | C         | D         | E         | F         | G         | H         |             |
|------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-------------|
|            | 1.65±0.10 | 3.40±0.10 | 2.70±0.10 | 4.00±0.10 | 8.00±0.20 | 4.00±0.10 | 1.55±0.10 | 1.75±0.10 | (UNIT : mm) |

## REMARK :



| DIMENSIONS | L        | L1      | W         | W1     |             |
|------------|----------|---------|-----------|--------|-------------|
|            | 178±1.00 | 13±0.50 | 11.5±0.20 | 8±0.10 | (UNIT : mm) |

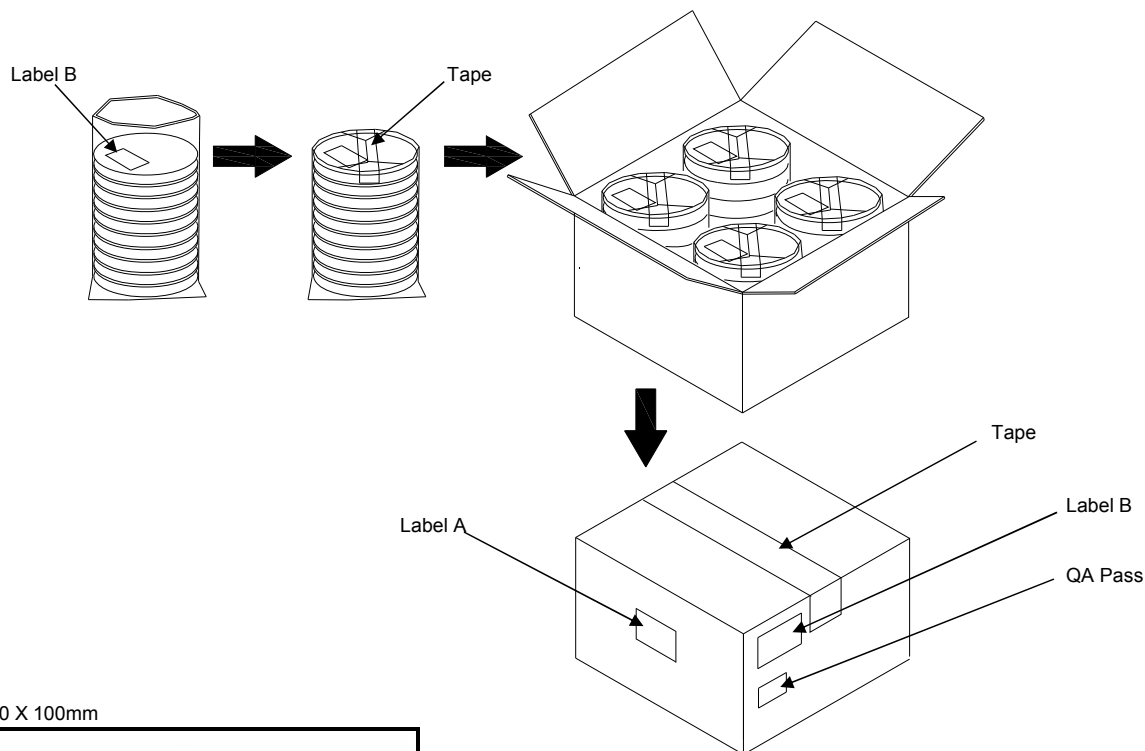
## ■ PACKING

### Reel Quantity :

1. Reel X 6 (6 Reels)
2. Reel X 12 (12 Reels)
3. Reel X 25 (12 Reels + 13 Reels)
4. Reel X 50 (12 Reelsx2 + 13 Reelsx2)

### Box Size:

1. L200 X W200 X H140mm
2. L200 X W200 X H250mm
3. L400 X W200 X H250mm
4. L400 X W400 X H280mm



(Label A) Size:100 X 100mm

|                                                                               |  |
|-------------------------------------------------------------------------------|--|
| <b>TXC</b>                                                                    |  |
| Inv No: 00096815                                                              |  |
| Po No: 21106326- 24- 1                                                        |  |
| Part No: <span style="border: 1px solid black; padding: 2px;">00000000</span> |  |
| Qty: 40000 PCS                                                                |  |
| C/No: 157- 44                                                                 |  |

(Label B) Size:80 X 40mm

|                                                                                 |                                                                       |            |
|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|------------|
| TXC CORPORATION                                                                 |                                                                       | QA PASS    |
| DATE CODE: <span style="border: 1px solid black; padding: 2px;">00000000</span> | QTY: <span style="border: 1px solid black; padding: 2px;">0000</span> | 2011/09/02 |
| LOT NO: <span style="border: 1px solid black; padding: 2px;">00000000</span>    | <b>RoHS</b>                                                           |            |
| PART NO: <span style="border: 1px solid black; padding: 2px;">00000000</span>   | <b>HF</b>                                                             |            |
| FREQ: <span style="border: 1px solid black; padding: 2px;">0000000000</span>    |                                                                       |            |

## [STORAGE]

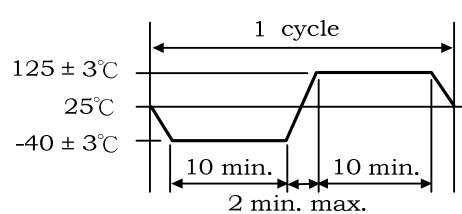
- 1.The storage time to be 1 year maximum.
- 2.Don't be caught in the rain.
- 3.The storage environment shall be 5℃ ~40℃ temperature and 30% ~ 75%RH humidity and free from the sun shine.
- 4.If customers have special requirements, we can paste labels according to it.

## ■ RELIABILITY SPECIFICATIONS

### 1.Mechanical Endurance

| No. | Test Item        | Test Methods                                                                                                                                          | Test Criteria |
|-----|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| 1.1 | Drop Test        | 150 cm height,3 times on concrete floor .                                                                                                             | A . C         |
| 1.2 | Mechanical Shock | Device are shocked to half sine wave ( 1000 G ) three mutually perpendicular axes each 3 times. 0.5 ms duration time                                  | A . C         |
| 1.3 | Vibration        | Frequency range 10 ~ 2000 Hz<br>Amplitude 1.52 mm/20G<br>Sweep time 20 minutes<br>Perpendicular axes each test time 4 Hrs<br>(Total test time 12 Hrs) | A . C         |
| 1.4 | Solderability    | Temperature 245 °C ± 5°C<br>Immersing depth 0.5 mm minimum<br>Immersion time 5 ± 1 seconds<br>Flux Rosin resin methyl alcohol solvent ( 1 : 4 )       | E             |

### 2.Environmental Endurance

| No. | Test Item                    | Test Methods                                                                                                                               | Test Criteria |
|-----|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| 2.1 | Resistance To Soldering Heat | Pre-heat temperature 125 °C<br>Pre-heat time 60 ~ 120 sec.<br>Test temperature 260 ± 5 °C<br>Test time 10 ± 1 sec.                         | B . C . D     |
| 2.2 | High Temp. Storage           | + 125 °C ± 3 °C for 500 ± 12 Hrs                                                                                                           | B . C . D     |
| 2.3 | Low Temp. Storage            | - 40 °C ± 3 °C for 500 ± 12 Hrs                                                                                                            | B . C . D     |
| 2.4 | Temperature cycle            | Total 100 cycles of the following temperature cycle<br> | B . C . D     |
| 2.5 | High Temp&Humidity           | 85°C ± 3°C , RH 85% , 500 Hrs                                                                                                              | B . C . D     |

## RELIABILITY SPECIFICATIONS

| Specifications |                                                                                                                           |
|----------------|---------------------------------------------------------------------------------------------------------------------------|
| A              | Frequency change: Within $\pm 5\text{ppm}$ or in customer's specification.                                                |
| B              | Frequency change: Within $\pm 10\text{ppm}$ or in customer's specification.                                               |
| C              | Equivalent series resistance(E.S.R) change: Within $\pm 15\%$ or $10\Omega$ (larger value).                               |
| D              | After conditioning , quartz crystal units shall be subjected to standard atmospheric conditions for 2 hour, and measured. |
| E              | Minimum 95% of immersed terminal shall be covered with new uniform solder.                                                |

### Measurement condition

Electrical characteristics measured by S&A250B or equivalent.