**TXC CORPORATION**

4F, NO. 16, Sec. 2 Chung Yang S Rd., Peitou, Taipei, Taiwan.

TEL : 886-2-2894-1202 , 886-2-2895-2201 FAX : 886-2-2894-1206 , 886-2-2895-6207 www.txccorp.com

# SPECIFICATION FOR APPROVAL

| | | |
|---|---|---|
| CUSTOMER | : | |
| PRODUCT TYPE | : | SMD SEAM SEALING X'TAL 3.2×2.5 |
| NOMINAL FREQ. | : | 12.000000MHz |
| TXC P/N | : | 7M12010001 |
| REVISION | : | A5 |
| 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.

Attachment: Product Specification Sheet

1
2
3
4
5

**RoHS Compliant**

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# PRODUCT SPECIFICATION SHEET

| | | |
|---|---|---|
| PRODUCT TYPE | : | SMD SEAM SEALING X'TAL 3.2×2.5 |
| NOMINAL FREQ. | : | 12.000000MHz |
| TXC P/N | : | 7M12010001 |
| REVISION | : | A5 |

| PE/RD | QA | MFG |
|---|---|---|
| Shih-YungPao | Samson Xiong | Min-ChiangChao |
| *11-Jan-13* | *11-Jan-13* | *11-Jan-13* |

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

**RoHS Compliant**

| Rev | Revise page | Revise contents | Date | Ref.No. | Reviser |
|---|---|---|---|---|---|
| A1 | N/A | Initial released | 13-Nov-07 | N/A | Yachuan Miao |
| A2 | N/A | Add Apple's special requirements Operating Temperature Change | 29-Mar-12 | N/A | Xiaoyan Jiang |
| A3 | N/A | Add Apple's special requirements Operating Temperature Change | 14-May-12 | ECR-12N060501 | Xiaoyan Jiang |
| A4 | 6 | RELIABILITY SPECIFICATIONS Change | 13-Jul-12 | ECR-12N060501 | Xiaoyan Jiang |
| A5 | 3 | Equivalent Series Resistance, Drive Level Change | 11-Jan-13 | ECR-13N020500 | Xiaoyan Jiang |
| | | | | | |
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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 HP E5100A or equivalent.

**Crystal cutting type**

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

**Unit Weight:**

0.018±0.001 g/pcs

| | Parameters | Symbol | Electrical Spec. | | | | Notes |
|---|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | Units | |
| 1 | Nominal Frequency | FL | | 12.000000 | | MHz | - |
| 2 | Oscillation Mode | - | | Fundamental | | - | - |
| 3 | Load Capacitance | CL | | 10 | | pF | - |
| 4 | Frequency Tolerance | - | | ±10 | | ppm | at 25 ℃ ± 3 ℃ |
| 5 | Frequency Tolerance | - | | ±20 | | ppm | Over Operating Temp. Range (Reference 25℃) |
| 6 | Operating Temperature | - | -10 | ~ | 90 | ℃ | - |
| 7 | Aging | - | | ±3 | | ppm | 1st Year |
| 8 | Drive Level | DL | - | 100 | 200 | uW | - |
| 9 | Equivalent Series Resistance | ESR | - | - | 60 | Ω | - |
| 10 | Shunt Capacitance C0 | C0 | - | - | 3 | pF | - |
| 11 | Spurious Response | - | - | - | -6 | dB | ±1000 ppm of nominal Freq. |
| 12 | DLD2 | - | - | - | 20 | Ohms | test drive level: 0.2uW to 200uW /5Point |
| 13 | SPRR | - | 2 | - | - | - | - |
| 14 | Insulation Resistance | - | 500 | - | - | MΩ | at DC 100V |
| 15 | Storage Temperature Range | - | -40 | ~ | 85 | ℃ | - |

## ■ FACTORY LOCATION

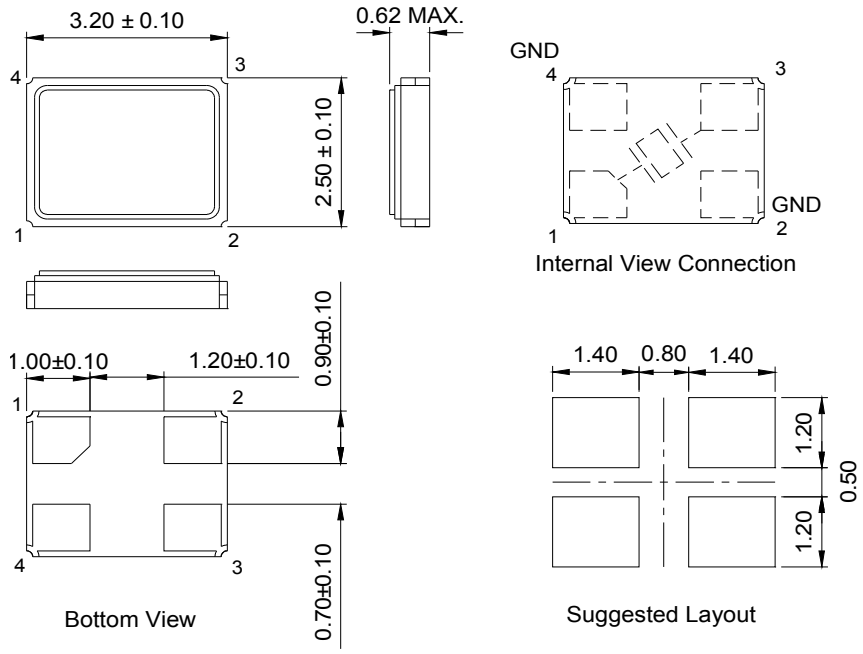
TXC (NINGBO) CORPORATION

NO.189 Huang Shan West Road, Beilun District,

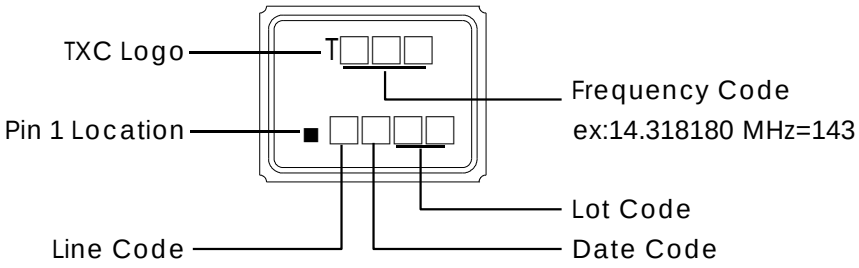
Ningbo Zhejiang China

## ■ DIMENSIONS

Unit:mm




## ■ MARKING




**Date Code:**

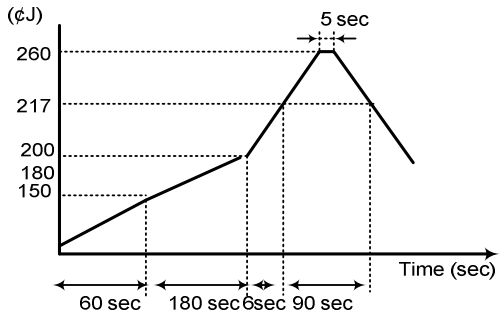
| YEAR \ MONTH | | | | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2005 | 2009 | 2013 | 2017 | A | B | C | D | E | F | G | H | J | K | L | M |
| 2006 | 2010 | 2014 | 2018 | N | P | Q | R | S | T | U | V | 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 ℃, 70 sec. Min.

Peak Temperature: 260 ± 3 ℃, 10 sec. Max.



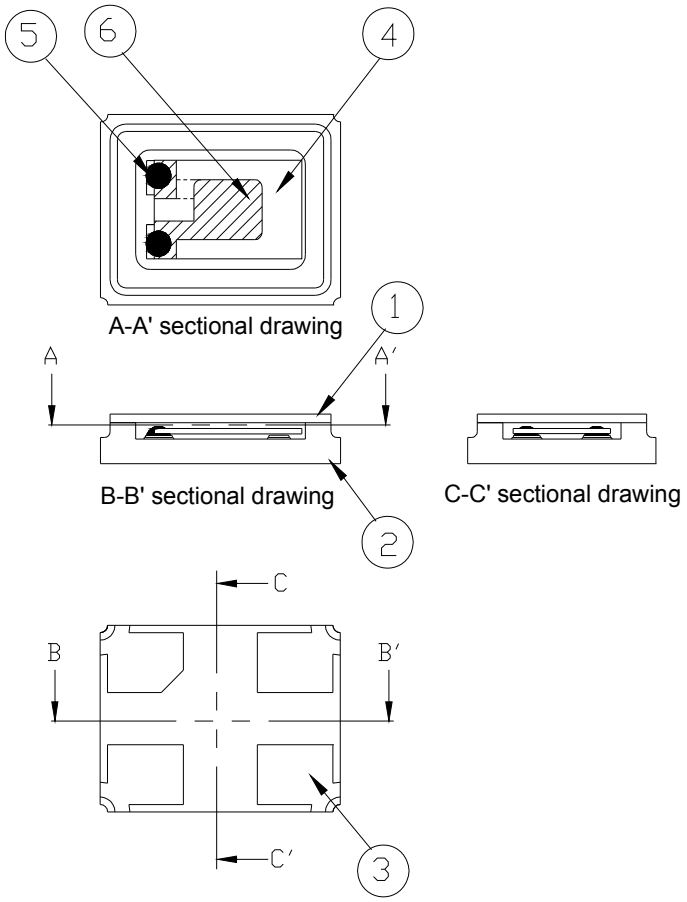

## ■ SUGGESTED MANUAL SOLDER CONDITION

Temperature: 350 ± 10 ℃

Time: 3 sec.

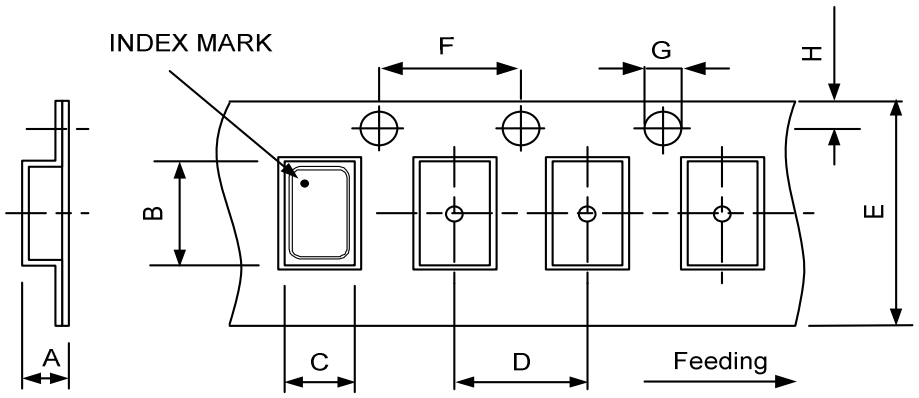
Re-solder times: twice

## ■ STRUCTURE ILLUSTRATION



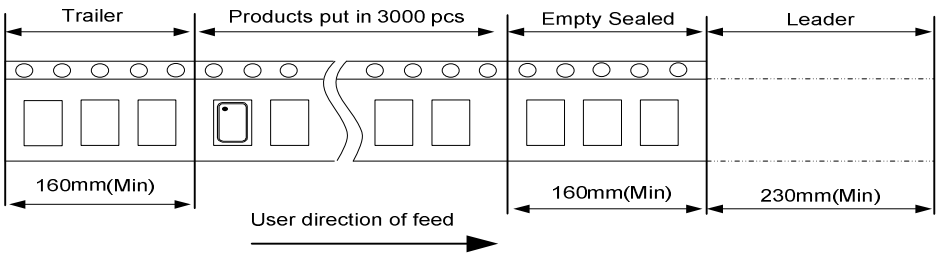

| NO | COMPONENTS | MATERIALS | FINISH/SPECIFICATIONS |
|---|---|---|---|
| 1 | Lid | Kovar (Fe/Co/Ni) | - |
| 2 | Base(Package) | Ceramic ($Al_2O_3$) + Kovar (Fe/Co/Ni)+ Ag/Cu | Color black |
| 3 | PAD | Au | Tungsten metalize<br>+ Ni plating<br>+ Au plating |
| 4 | Crystal blank | $SiO_2$ | - |
| 5 | Conductive adhesive | Ag | Silicon resin |
| 6 | Electrode | Noble Metal | - |

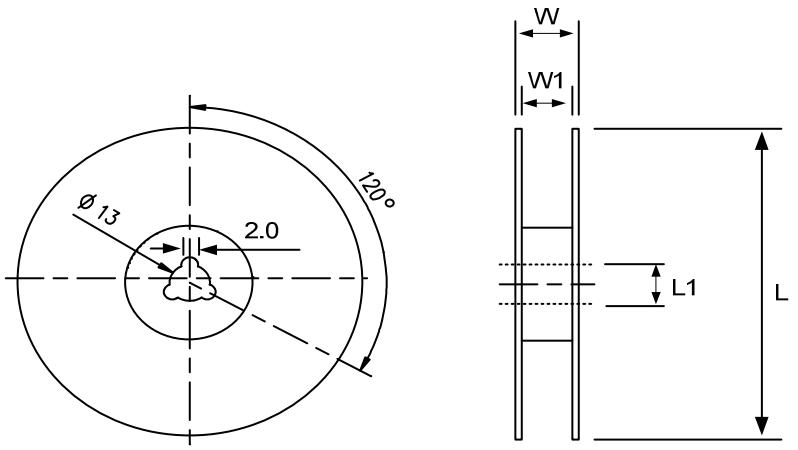
## ■ PACKING




| DIMENSIONS | A | B | C | D | E | F | G | H | |
|---|---|---|---|---|---|---|---|---|---|
| | 1.65 | 3.4 | 2.7 | 4 | 8 | 4 | 1.55 | 1.75 | (UNIT : mm) |

REMARK :

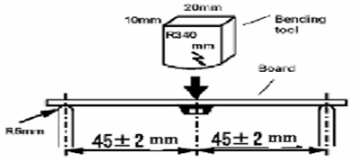
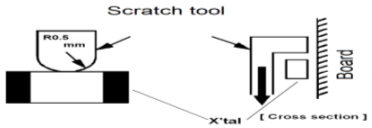


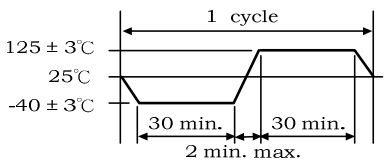

| DIMENSIONS | L | L1 | W | W1 | pcs / Reel (UNIT : mm) |
|---|---|---|---|---|---|
| | 178 | 13 | 11.5 | 8 | Standard Reel Quantity is 3,000 pcs per reel |

## ■ RELIABILITY SPECIFICATIONS

1.Mechanical Endurance

| No. | Test Item | Test Methods | Test Criteria |
|---|---|---|---|
| 1.1 | Drop Test | Part is mounted to 100g fixture and dropped form a heighe of 150cm to a cement floor.The drop must be conducted on all 6 sides | A.D.E |
| 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.D.E |
| 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.D.E |
| 1.4 | Bending Test | Apply pressure in the direction of the arrow at a rate of about 0.5 mm/s until bent width reaches 3 mm, then hold for 30 seconds.<br>  | A.D.E |
| 1.5 | Shear test | A static load of 20N(2.04kgf) using a R0.5 scratch tool, shall be applied on the core of the component and in the direction of the arrow and held for 5 seconds.<br>  | A.D.E |
| 1.6 | Solderability | Temperature 245 ℃ ± 5℃<br>Immersing depth 0.5 mm minimum<br>Immersion time 5 ± 1 seconds<br>Flux Rosin resin methyl alcohol solvent ( 1 : 4 ) | C.D.E |

2.Environmental Endurance

| No. | Test Item | Test Methods | Test Criteria |
|---|---|---|---|
| 2.1 | Resistance To Soldering Heat | Pre-heat temperature 125 ℃<br>Pre-heat time 60 ~ 120 sec.<br>Test temperature 260 ± 5 ℃<br>Test time 10 ± 1 sec. | A.B.D.E |
| 2.2 | High Temp. Storage | + 125 ℃ ± 3 ℃ for 500 ± 12 Hrs | A.B.D.E |
| 2.3 | Low Temp. Storage | - 40 ℃ ± 3 ℃ for 500 ± 12 Hrs | A.B.D.E |
| 2.4 | Thermal Shock | Total 100 cycles of the following temperature cycle<br>  | A.B.D.E |
| 2.5 | High Temp.&Humidity | 40℃ ± 2℃ , RH 90%~ 95%, 240 Hrs | A.B.D.E |
| 2.6 | Operational Life | 1,000 hours @ 85 ± 2°C. using an inverter with 1MΩ resistor in parallel and load capacitors | A.B.D.E |

**RELIABILITY SPECIFICATIONS**

| | Specifications |
|---|---|
| A | All specifications can meet customer's requests listed on the Page 3 |
| B | After conditioning , quartz crystal units shall be subjected to standard atmospheric conditions for 2 hour, and measured. |
| C | Minimum 95% of immersed terminal shall be covered with new uniform solder. |
| D | Fine leak test: Parts shall have a mass spectrometer leak rate of less,than 1X 10-8 atmosphere cc/sec of helium. |
| E | Gross Leak test: Standard Sample For Automatic Gross Leak Detector, Test Pressure: 2kg / cm2 |

**Measurement condition**

Electrical characteristics measured by S&A250B or equivalent.