

SPECIFICATION FOR APPROVAL

CUSTOMER : _____

PRODUCT TYPE : SMD SEAM SEALING X'TAL 3.2x2.5

NOMINAL FREQ. : 13.560000MHz

TXC P/N : 7M13500002

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**


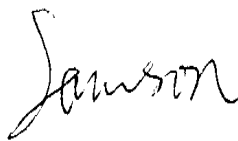

PRODUCT SPECIFICATION SHEET

PRODUCT TYPE : SMD SEAM SEALING X'TAL 3.2x2.5

NOMINAL FREQ. : 13.560000MHz

TXC P/N : 7M13500002

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**



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°C
Relative humidity : 40%~70%

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

Ambient temperature : 25±3°C
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:

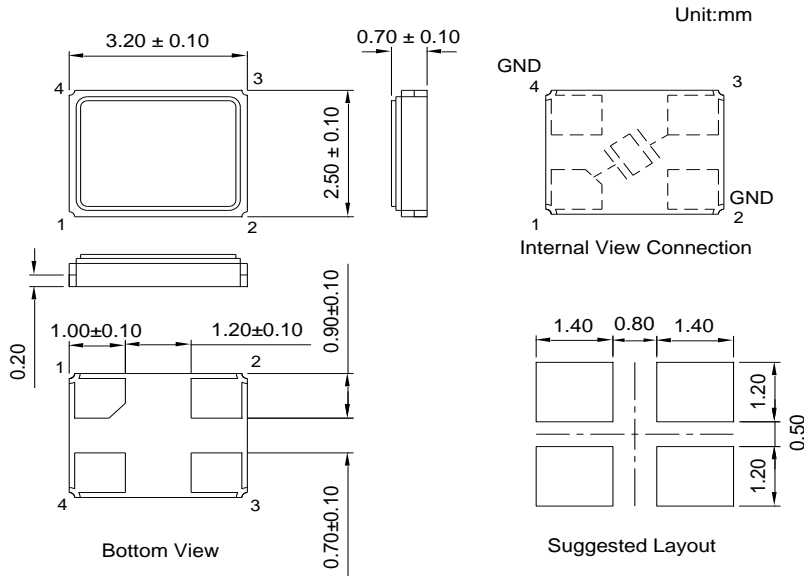
0.018±0.001 g/pcs

| | Parameters | SYM. | Electrical Spec. | | | | Notes |
|----|---------------------------|------|------------------|------|-----|-------|---|
| | | | MIN | TYPE | MAX | UNITS | |
| 1 | Nominal Frequency | FL | 13.560000 | | | MHz | - |
| 2 | Oscillation Mode | - | Fundamental | | | - | - |
| 3 | Load Capacitance | CL | 18 | | | pF | - |
| 4 | Frequency Tolerance | - | ±20 | | | ppm | at 25 °C ± 3 °C |
| 5 | Frequency Stability | - | ±20 | | | ppm | Over Operating Temp. Range (Reference 25°C) |
| 6 | Operating Temperature | - | -20 | ~ | 70 | °C | - |
| 7 | Aging | - | ±2 | | | ppm | 1st Year |
| 8 | Drive Level | DL | - | 100 | - | μW | - |
| 9 | Effective Resistance Rr | Rr | - | - | 80 | Ω | - |
| 10 | Shunt Capacitance C0 | C0 | - | - | 5 | pF | - |
| 11 | Insulation Resistance | - | 500 | - | - | MΩ | at DC 100V |
| 12 | Storage Temperature Range | - | -40 | ~ | 85 | °C | - |

FACTORY LOCATION

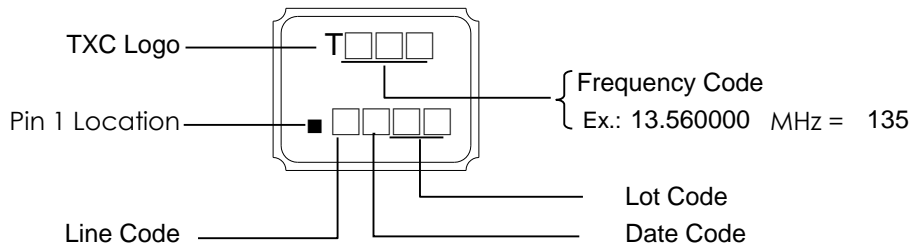
TXC (NINGBO) CORPORATION
NO.189 Huang Shan West Road, Beilun District,
Ningbo Zhejiang China

■ 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 |

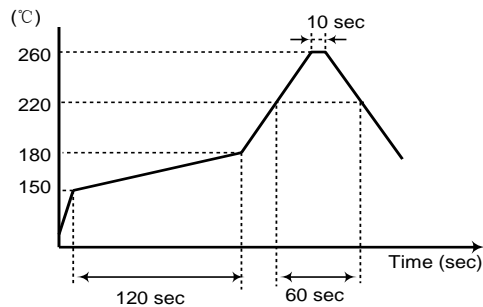
*This date code will be cycled every four years

■ SUGGESTED REFLOW PROFILE

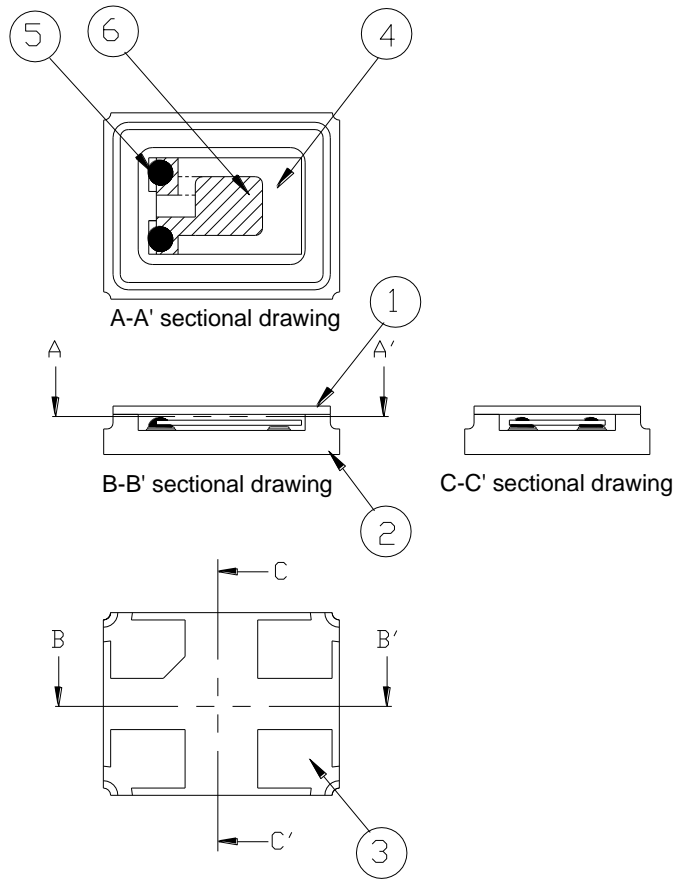
Solder melting point :220±10 °C, 60 sec. Min.
Peak Temperature: 260 ± 5 °C, 10 sec. Max.

■ SUGGESTED MANUAL SOLDER CONDITION

Temperature: 350 ± 10 °C
Time: 3 sec.
Re-solder times: twice

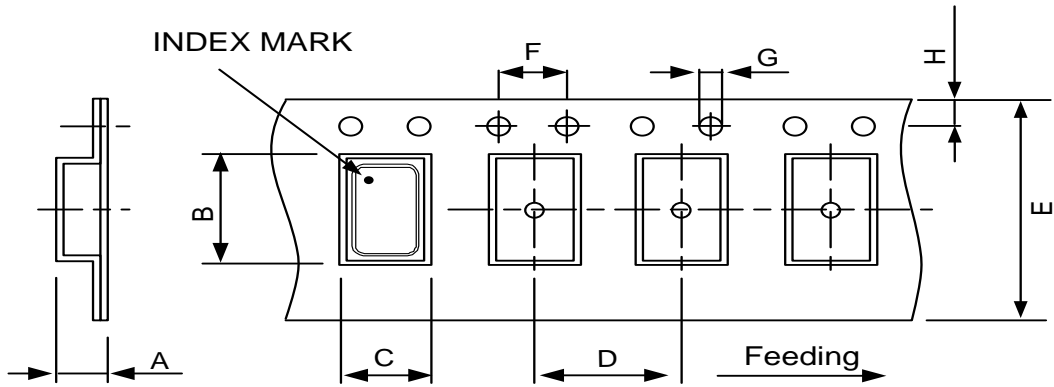


■ **STRUCTURE ILLUSTRATION**



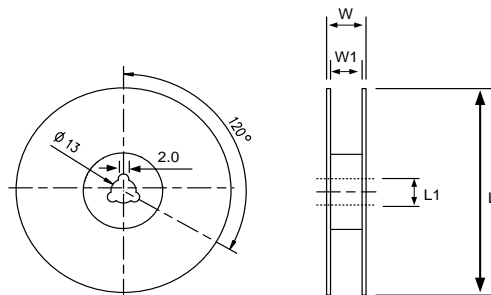
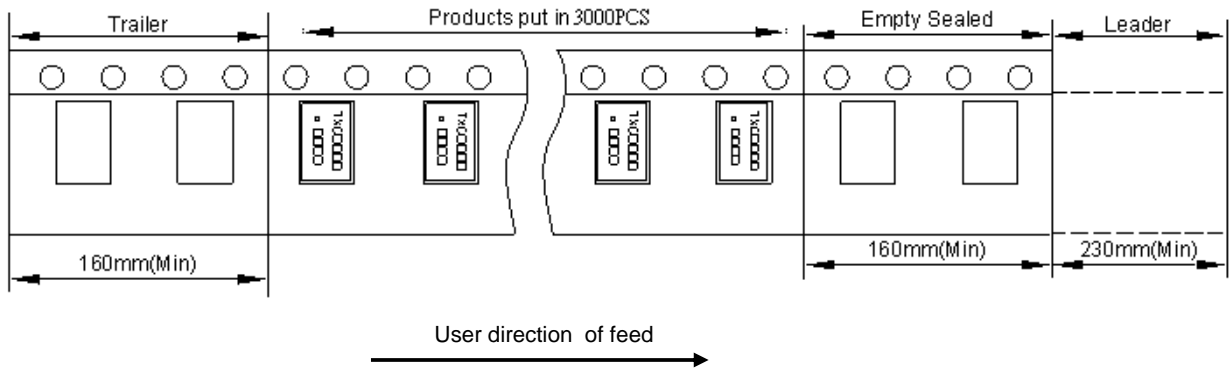
| NO | COMPONENTS | MATERIALS | FINISH/SPECIFICATIONS |
|----|---------------------|---|---|
| 1 | Lid | Kovar (Fe/Co/Ni) | - |
| 2 | Package | Ceramic (Al ₂ O ₃) + Kovar (Fe/Co/Ni)+ Ag/Cu | - |
| 3 | PAD | Au | Tungsten metalize + Ni plating + Au plating |
| 4 | Crystal blank | SiO ₂ | - |
| 5 | Conductive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

■ EMOSS CARRIER TAPE & REEL



| | | | | | | | | | |
|------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-------------|
| DIMENSIONS | A | B | C | D | E | F | G | H | (UNIT : mm) |
| | 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 | |

REMARK :



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

■ 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 Amplitude 1.52 mm/20G Sweep time 20 minutes Perpendicular axes each test time 4 Hrs (Total test time 12 Hrs) | A . C |
| 1.4 | Solderability | Temperature 245 °C ± 5°C Immersing depth 0.5 mm minimum Immersion time 5 ± 1 seconds 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 Pre-heat time 60 ~ 120 sec. Test temperature 260 ± 5 °C 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 | 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 ± 5 ppm or in customer's specification. |
| B | Frequency change: Within ± 10 ppm or in customer's specification. |
| C | Equivalent series resistance(E.S.R) change: Within $\pm 15\%$ or 10Ω (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.