

SPECIFICATION FOR APPROVAL

CUSTOMER : _____

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

NOMINAL FREQ. : 12.000000MHz

TXC P/N : 7M12000039

REVISION : A1

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

PRODUCT SPECIFICATION SHEET

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

NOMINAL FREQ. : 12.000000MHz

TXC P/N : 7M12000039

REVISION : A1

| PE/RD | QA | MFG |
|-------------------|--------------------|-------------------|
| <i>Scott Chen</i> | <i>Randy Cheng</i> | <i>Stan Chang</i> |
| 19-Sep-05 | 20-Sep-05 | 19-Sep-05 |

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



| <u>Rev</u> | <u>Revise page</u> | <u>Revise contents</u> | <u>Date</u> | <u>Ref.No.</u> | <u>Reviser</u> | <u>Page</u> | <u>Ver.</u> |
|------------|--------------------|------------------------|-------------|----------------|----------------|-------------|-------------|
| A1 | N/A | Initially revised | 15-Sep-05 | N/A | Sharon Miao | 1 | A1 |
| | | | | | | 2 | A1 |
| | | | | | | 3 | A1 |
| | | | | | | 4 | A1 |
| | | | | | | 5 | A1 |
| | | | | | | 6 | A1 |
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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 : 22±5°C
- Relative humidity : 40%~70%

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

- Ambient temperature : 22±1°C
- 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).

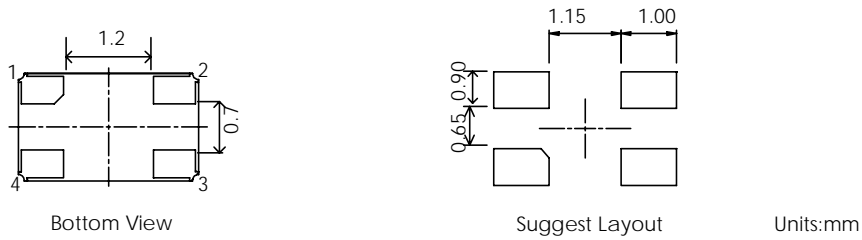
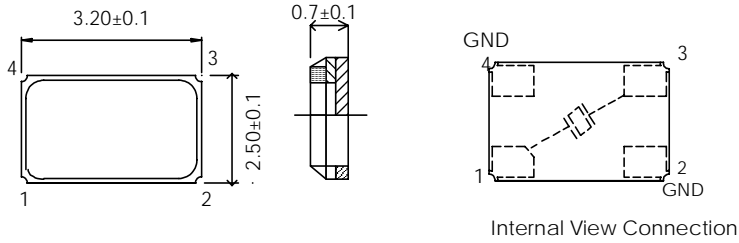
Unit Weight:

0.018±0.001 g/pcs

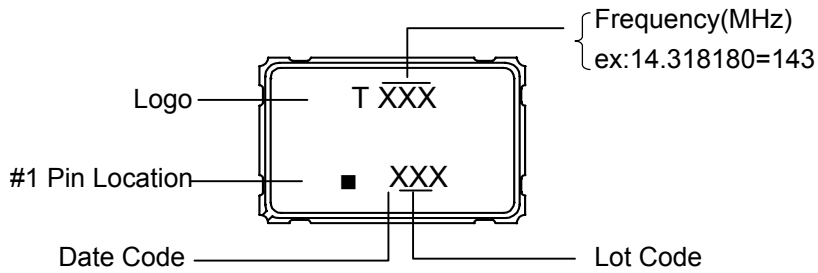
| | Parameters | SYM. | Electrical Spec. | | | | Notes |
|----|---------------------------|------|------------------|------|-----|-------|---|
| | | | MIN | TYPE | MAX | UNITS | |
| 1 | Nominal Frequency | FL | 12.000000 | | | MHz | - |
| 2 | Oscillation Mode | - | Fundamental | | | - | - |
| 3 | Load Capacitance | CL | 18 | | | pF | - |
| 4 | Frequency Tolerance | - | ±20 | | | ppm | at 25 °C ± 3 °C |
| 5 | Frequency Tolerance | - | ±20 | | | ppm | Over Operating Temp. Range (Reference 25°C) |
| 6 | Operating Temperature | - | -20 | ~ | 70 | °C | - |
| 7 | Aging | - | ±5 | | | ppm | 1st Year |
| 8 | Drive Level | DL | - | 10 | - | uW | - |
| 9 | Effective Resistance Rr | Rr | - | - | 200 | Ω | - |
| 10 | Shunt Capacitance C0 | C0 | - | - | 5 | pF | - |
| 11 | Motional Capacitance C1 | C1 | - | - | NA | fF | - |
| 12 | Insulation Resistance | - | 500 | - | - | MΩ | at DC 100V |
| 13 | Storage Temperature Range | - | -40 | ~ | 85 | °C | - |

■ DIMENSIONS

- 1. Crystal enclosure seal : Seam Weld
- 2. Crystal enclosure medium : Vacuum



■ MARKING



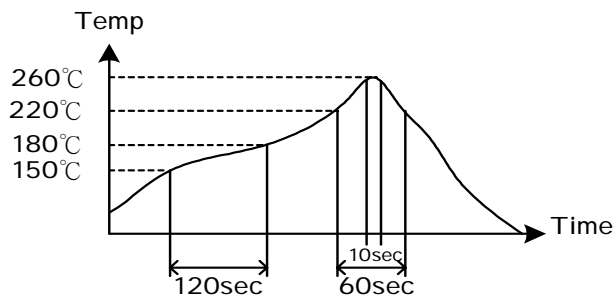
Date Code

| YEAR \ MONTH | | | | | MONTH | | | | | | | | | | | |
|--------------|------|------|------|------|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | | | | | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
| 2001 | 2005 | 2009 | 2013 | 2017 | A | B | C | D | E | F | G | H | J | K | L | M |
| 2002 | 2006 | 2010 | 2014 | 2018 | N | P | Q | R | S | T | U | V | W | X | Y | Z |
| 2003 | 2007 | 2011 | 2015 | 2019 | a | b | c | d | e | f | g | h | j | k | l | m |
| 2004 | 2008 | 2012 | 2016 | 2020 | n | p | q | r | s | t | u | v | w | x | y | z |

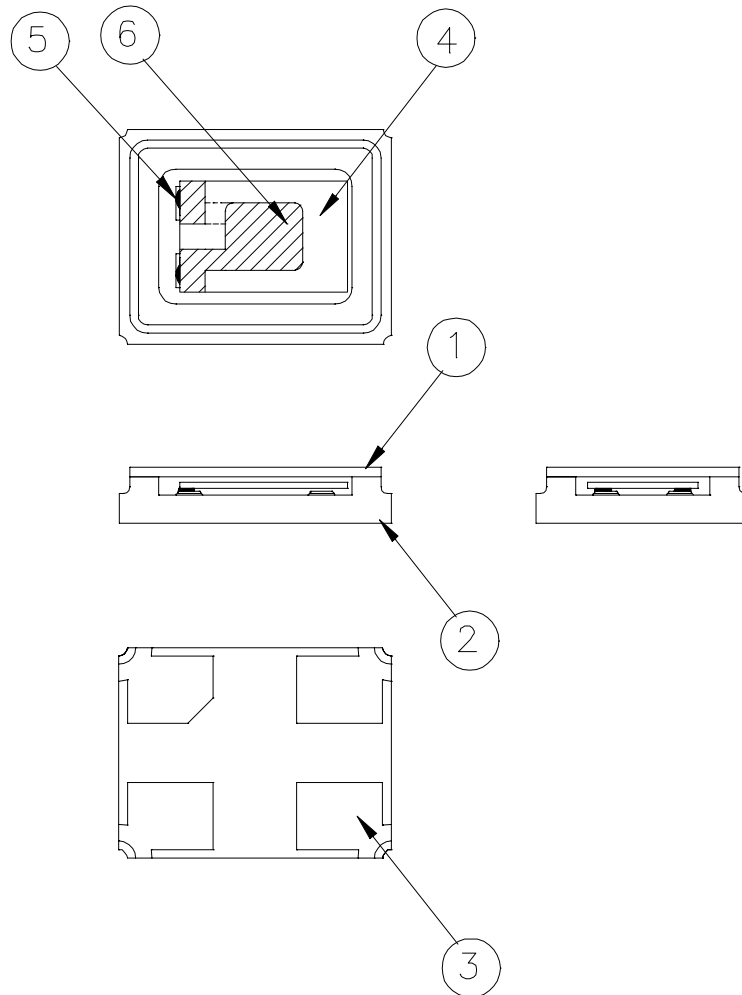
This date code will be cycled every four years

■ SUGGESTED REFLOW PROFILE

- Total time : 200 sec. Max.
- Solder melting point :220 °C

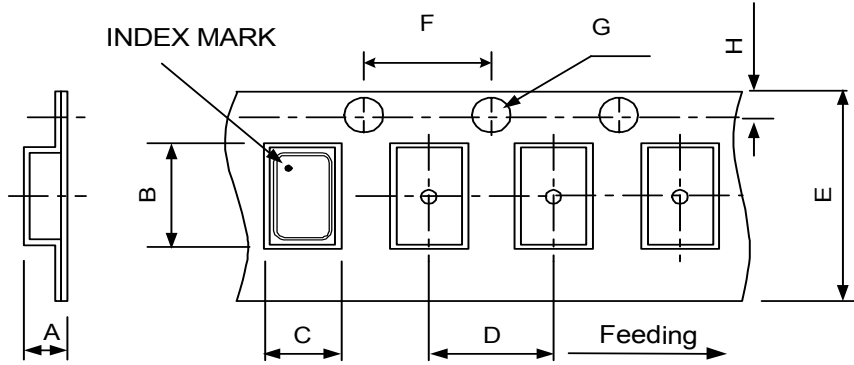


■ STRUCTURE ILLUSTRATION



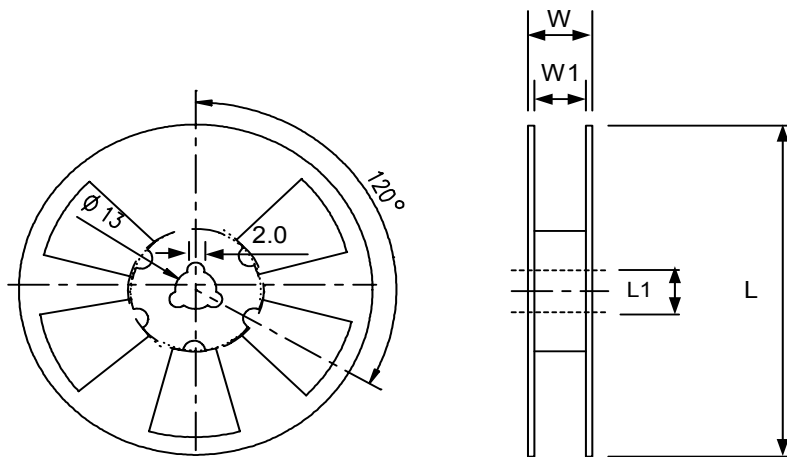
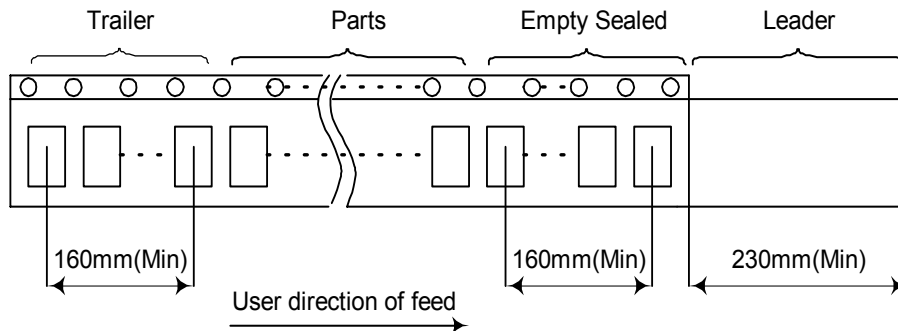
| NO | COMPONENTS | MATERIALS | QTY | FINISH/SPECIFICATIONS |
|----|---------------------|------------------|-----|---|
| 1 | Lid | Metal (Fe) | 1 | - |
| 2 | Base(Package) | Ceramic | 1 | Color black |
| 3 | PAD | Au | 4 | Tungsten metalize + Ni plating + Au plating |
| 4 | Crystal blank | SiO ₂ | 1 | - |
| 5 | Conductive adhesive | Ag | 4 | Epoxy resin |
| 6 | Electrode | Au + Cr | 2 | - |

■ PACKING : (EIA-481-2)



| DIMENSIONS | A | B | C | D | E | F | G | H | (UNIT : mm) |
|------------|------|------|------|------|------|------|------|------|-------------|
| | 1.40 | 3.40 | 2.70 | 4.00 | 8.00 | 4.00 | 1.50 | 1.75 | |

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

| No. | Test Item | Test Methods | REF.DOC |
|-----|------------------------------|--|--------------|
| 1 | Drop Test | 150 cm height, fall freely onto stainless plate 3 times. | |
| 2 | Mechanical Shock | Device are shocked to half sine wave (1000 G) three mutually perpendicular axes each 3 times. 0.5m sec. duration time | |
| 3 | Vibration | Frequency range 10 ~ 2000 Hz Amplitude 1.52 mm Sweep time 20 minute Perpendicular axes each test time 4 hours (Total test time 12 hours) | MIL-STD-883E |
| 4 | Solderability | Temperature 240 °C ± 5°C Immersing depth 0.5 mm minimum Immersion time 5 ± 0.5 seconds Flux Rosin resin methyl alcohol solvent (1 : 4) | MIL-STD-883E |
| 5 | 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. | MIL-STD-202F |
| 6 | High Temp. Storage | + 125 °C ± 3 °C for 1000 ± 12 hours | JIS C 0021 |
| 7 | Low Temp. Storage | - 40 °C ± 3 °C for 1000 ± 12 hours | JIS C 0020 |
| 8 | Thermal Cycles | Total 100 cycles of the following temperature cycle | |



Test Report

TXC CORPORATION
NO. 4, KUNG YEH 6TH ROAD, PING CHENG
INDUSTRIAL DISTRICT, PING CHENG CITY, TAO
YUAN HSIEN, TAIWAN, R. O. C.

Report No. : CE/2004/B4941
Date : 2004/12/03
Page : 1 of 3

The following merchandise was (were) submitted and identified by the client as :

Type of Product : QUARTZ CRYSTAL UNIT
Style/Item No : SMD X TAL
Sample Received : 2004/11/26
Testing Date : 2004/11/26 TO 2004/12/03

=====
Test Result : - Please see the next page -


Daniel Yeh, M.R. / Operation Manager
Signed for and on behalf of
SGS TAIWAN LTD.

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Page : 2 of 3

Test Result

PART NAME NO.1 : PLEASE REFER TO THE PHOTO(S) ATTACHED.(MIXED ALL PARTS)

| Test Item (s): | Unit | Method | MDL | Result | | | |
|--|------|---|--------|--------|--|--|--|
| | | | | No.1 | | | |
| PBBs(Polybrominated biphenyls)(CAS NO:059536-65-1) | % | With reference to USEPA3540 or USEPA3550. Analysis was performed by HPLC/DAD, LC/MS or GC/MS. (prohibited by 2002/95/EC (RoHS), 83/264/EEC, and 76/769/EEC) | 0.0005 | N.D. | | | |
| PBBEs(PBDEs)(Polybrominated biphenyl ethers) | % | With reference to USEPA3540 or USEPA3550. Analysis was performed by HPLC/DAD, LC/MS or GC/MS. (prohibited by 2002/95/EC (RoHS), 83/264/EEC, and 76/769/EEC) | 0.0005 | N.D. | | | |

| Test Item (s): | Unit | Method | MDL | Result | | | |
|--------------------|------|--|-----|--------|--|--|--|
| | | | | No.1 | | | |
| Chromium VI (Cr+6) | ppm | As per US EPA 7196A and US EPA 3060A. | 2 | N.D. | | | |
| Cadmium (Cd) | ppm | ICP-AES after as per EN 1122, method B:2001 or other acid digestion. | 2 | N.D. | | | |
| Mercury (Hg) | ppm | ICP-AES after as per US EPA 3052 or other acid digestion. | 2 | N.D. | | | |
| Lead (Pb) | ppm | ICP-AES after as per US EPA 3050B or other acid digestion. | 2 | N.D. | | | |

NOTE: (1) N.D. = Not detected (<MDL)
(2) ppm = mg/kg
(3) MDL = Method Detection Limit

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