



SPECIFICATION FOR APPROVAL

CN: 1306000657

CUSTOMER : _____

PRODUCT TYPE : HC-49/S SMD

NOMINAL FREQ. : 4.000000MHz

TXC P/N : AT04070007

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

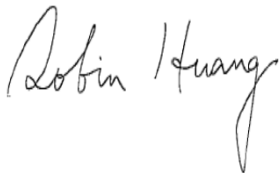
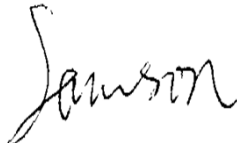

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PRODUCT TYPE : HC-49/S SMD

NOMINAL FREQ. : 4.000000MHz

TXC P/N : AT04070007

REVISION : A1

| PE/RD | QA | MFG |
|---|---|--|
|  |  |  |
| 2012/1/7 | 2012/1/7 | 2012/1/7 |

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> |
|------------|--------------------|---|-------------|----------------|----------------|
| S1 | N/A | Initial Released | 2011/5/13 | N/A | Xiaoyan Jiang |
| S2 | 3 | Load Capacitance, Drive Level Change | 2011/9/23 | ECR-11N093004 | Xiaoyan Jiang |
| A1 | N/A | S Turn A | 2012/1/7 | N/A | Xiaoyan Jiang |
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Spec Sheet Contents

| No. | Content | Page |
|-----|---|-------|
| 1 | ELECTRICAL SPECIFICATIONS | P.3 |
| 2 | FACTORY LOCATION | P.3 |
| 3 | DIMENSIONS | P.4 |
| 4 | SUGGESTED REFLOW PROFILE& MANUAL SOLDER CONDITION | P.4 |
| 5 | MARKING | P.5 |
| 6 | STRUCTURE ILLUSTRATION | P.6 |
| 7 | EMBOSS CARRIER TAPE & REEL | P.7 |
| 8 | PACKING | P.7 |
| 9 | RELIABILITY SPECIFICATIONS | P.8~9 |

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+/-1°C
 Relative humidity : 40%~70%

Measure equipment

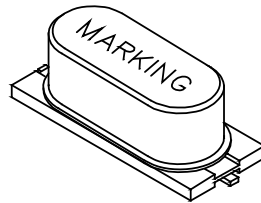
SAUNDERS 250A/250B CRYSTAL IMPEDANCE METER.

Crystal cutting type

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

Unit Weight:

0.58±0.050 g/pcs



please refer to marking code page

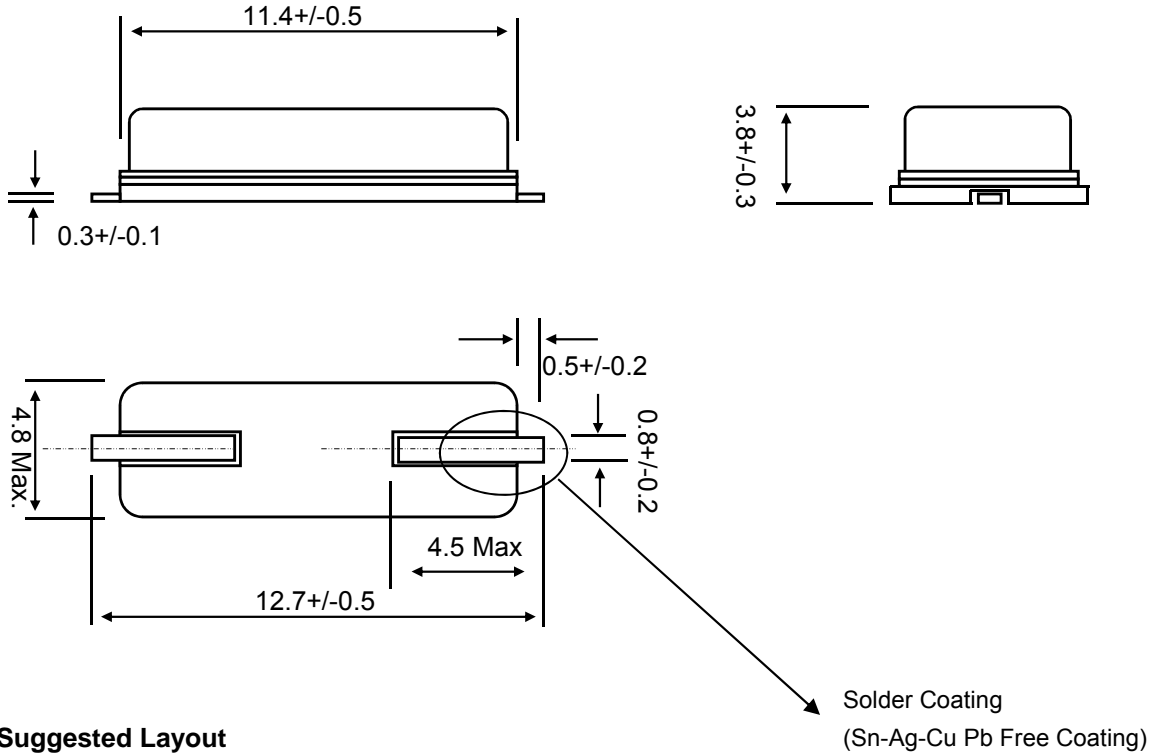
| | Parameters | SYM. | Electrical Spec. | | | | Notes |
|----|---------------------------|------|------------------|------|-----|-------|---|
| | | | MIN | TYPE | MAX | UNITS | |
| 1 | Nominal Frequency | FL | 4.000000 | | | MHz | - |
| 2 | Oscillation Mode | - | Fundamental | | | - | - |
| 3 | Load Capacitance | CL | 12 | | | pF | - |
| 4 | Frequency Tolerance | - | ±25 | | | ppm | at 25 °C ± 3 °C |
| 5 | Frequency Stability | - | ±50 | | | ppm | Over Operating Temp. Range (Reference 25°C) |
| 6 | Operating Temperature | - | -40 | ~ | 105 | °C | - |
| 7 | Aging | - | ±3 | | | ppm | 1st Year |
| 8 | Drive Level | DL | - | 100 | 400 | uW | - |
| 9 | Effective Resistance Rr | Rr | - | - | 120 | Ω | - |
| 10 | Shunt Capacitance C0 | C0 | - | - | 7 | pF | - |
| 11 | Insulation Resistance | - | 500 | - | - | MΩ | at DC 100V |
| 12 | Storage Temperature Range | - | -40 | ~ | 125 | °C | - |

■ FACTORY LOCATION

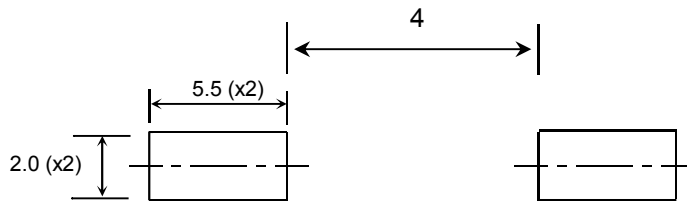
TXC (NINGBO) CORPORATION
 NO.189 Huang Shan West Road, Beilun District,
 Ningbo Zhejiang China

DIMENSIONS

UNIT:mm

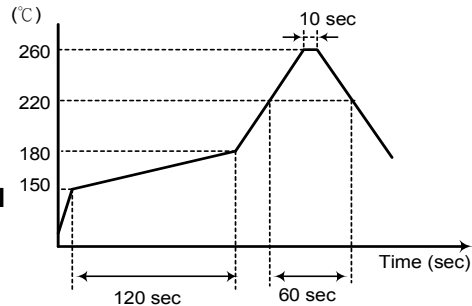


Suggested Layout



■ SUGGESTED REFLOW PROFILE

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

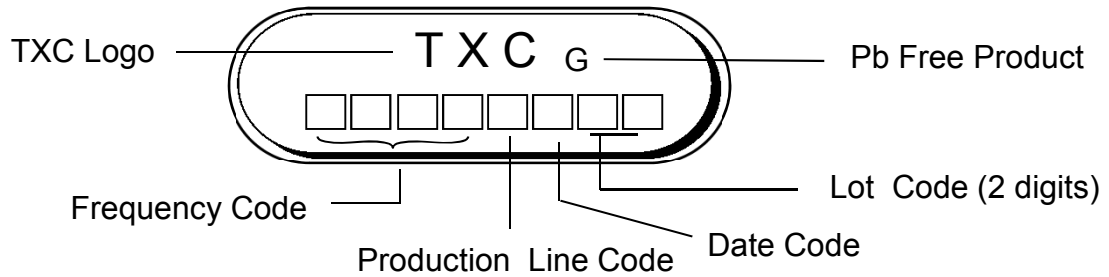


■ SUGGESTED MANUAL SOLDER CONDITION

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

MARKING

Marking For Pb Free Parts :

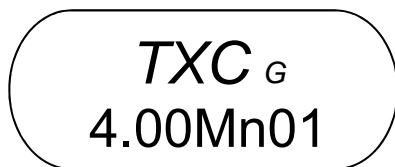


Date Code:

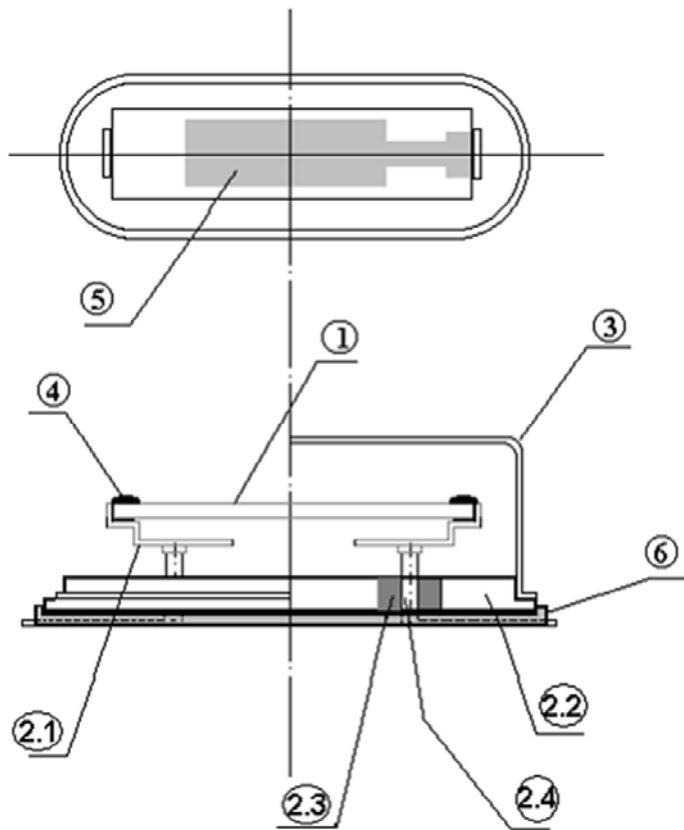
| YEAR | | | | | MONTH | | | | | | | | | | | |
|------|------|------|------|------|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | | | | | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
| 2001 | 2005 | 2009 | 2013 | 2017 | A | B | C | D | E | F | 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.

For example : Marking



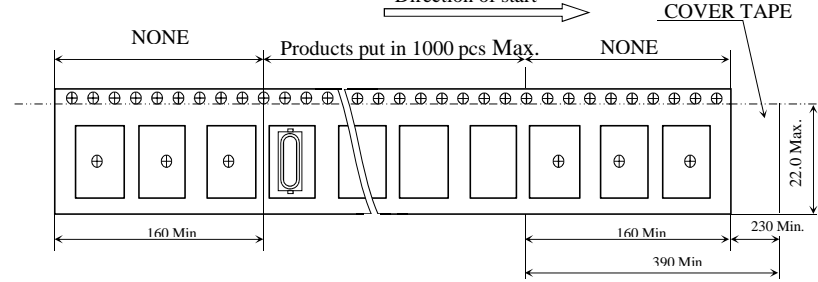
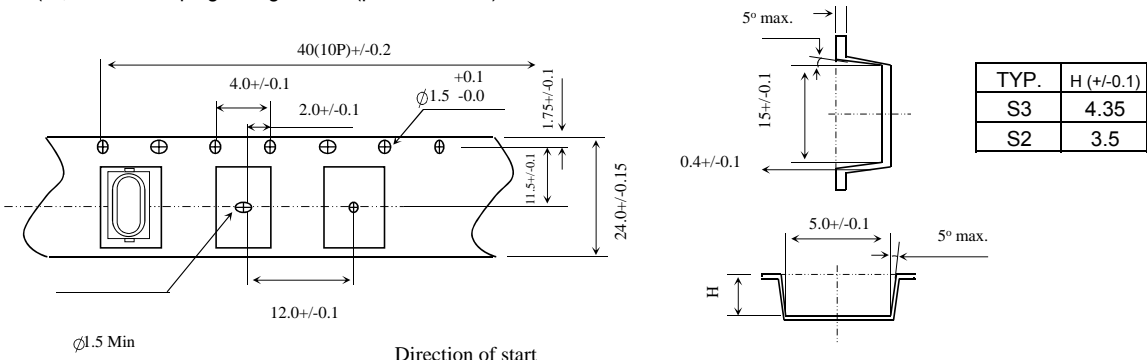
→
Introduction : Pb Free Product
49S/SMD 4.000 MHz
Made in NGB 2008/JAN 01Lot

■ STRUCTURE ILLUSTRATION


| NO | COMPONENTS | | MATERIALS | FINISH/SPECIFICATIONS |
|----|---------------------|--------------|---------------------------|-------------------------|
| 1 | CRYSTAL BLANK | | QUARTZ(SiO ₂) | - |
| 2 | 2.1 | CRYSTAL BASE | SUPPORTER | Nickel Silver(Cu/Zn/Ni) |
| | 2.2 | | HOLDER | SPCC(Fe) |
| | 2.3 | | GLASS | GLASS |
| | 2.4 | | LEAD | Kovar (Fe/Co/Ni) |
| 3 | CRYSTAL COVER | | Nickel Silver(Cu/Zn/Ni) | Ni Plated |
| 4 | CONDUCTIVE ADHESIVE | | Resin + Ag | - |
| 5 | ELECTRODE | | Noble Metal | - |
| 6 | INSULATION PAD | | PPS | - |

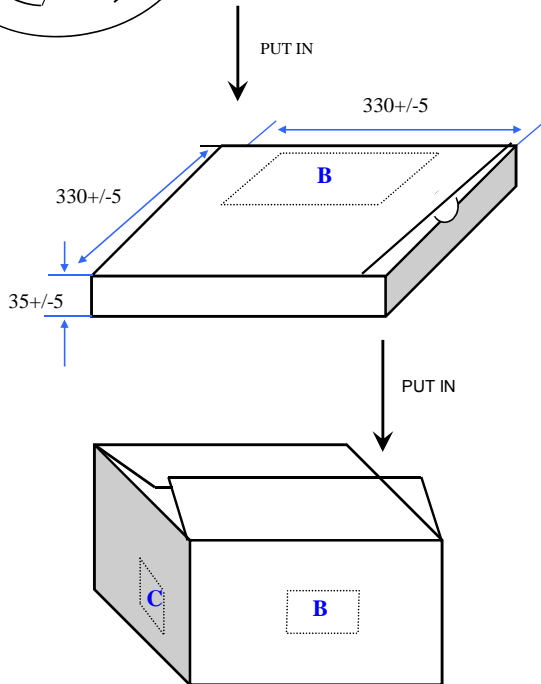
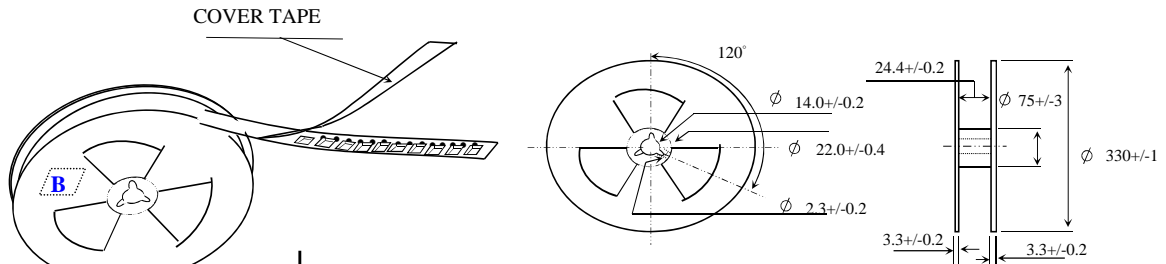
(A) Tape and reel configuration:(Unit : mm)

(a) Emboss taping configuration. (per EIA-481-2)



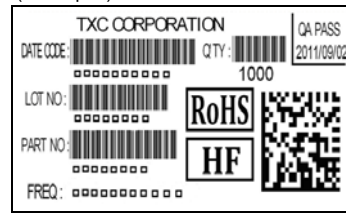
(b) Reel configuration.

(B) Packing & Label :(Unit : mm)



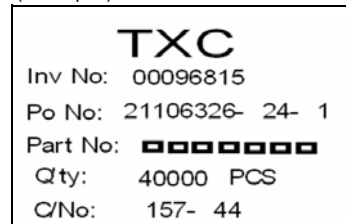
Label B

(Example)



Label C

(Example)



- # (1) Put in stuff between space.
- (2) Tie Up the Carton with 4 Packthreads.

[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°C ~40°C 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 (AEC-Q200 Compliant)
1.Mechanical Endurance

| No. | Test Item | Test Methods | Test Criteria |
|-----|-------------------|---|---------------|
| 1.1 | Mechanical Shock | 1000 G , 0.5 m Sec. , 3 times for all 3 directions. | B C |
| 1.2 | Vibration | Frequency range 10 ~ 2000 Hz Acceleration 20G Sweep time 20 minute Pencil axes each test time 4 hours (Total test time 12 hours) | B C |
| 1.3 | Terminal Strength | 17.7N force for 60sec +/-1sec. | F |
| 1.4 | Board Flex | Duration time:60 Sec Minimum,Deviation:3mm | B C |
| 1.5 | Solderability | Temperature 245 °C +/- 5°C Immersing depth 0.5 mm minimum Immersion time 5 +/- 0.5 seconds Flux Rosin resin methyl alcohol solvent (1 : 4) | E |

2.Environmental Endurance

| No. | Test Item | Test Methods | SPEC |
|-----|------------------------------|--|------|
| 2.1 | Resistance To Soldering Heat | Test temperature 260 +/- 5 °C Test time 10 +/- 1 sec. | ACD |
| 2.2 | High Temp. Storage | + 105°C ± 3 °C for 1000 ± 12 Hrs | ACD |
| 2.3 | Low Temp. Storage | - 40 °C ± 3 °C for 1000 ± 12 Hrs | ACD |
| 2.4 | Temperature cycle | -40°C~105°C,for 1000 cycles. | ACD |
| 2.5 | Operational Life | 1000 hrs @ 105± 3°C. Rated VDD applied with 1 MΩ. | ACD |
| 2.6 | High Temp&Humidity | 85°C ± 3°C , RH 85% , 1000 Hrs | ACD |

HANDLING CAUTIONS

Prohibit the use of ultrasonic welding in Assembling

RELIABILITY SPECIFICATIONS

| Specifications | |
|----------------|--|
| A | Frequency change: Within ± 20 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 24 hour, and measured. |
| E | Minimum 95% of immersed terminal shall be covered with new uniform solder. |
| F | No damage on specimen |

Measurement condition

Measurements are carried out with Network-analyzer(S&A 250B or equivalent).