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 TCXO 2.5 * 2.0

NOMINAL FREQ. : 38.4 MHz

TXC P/N : 7L38402007

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

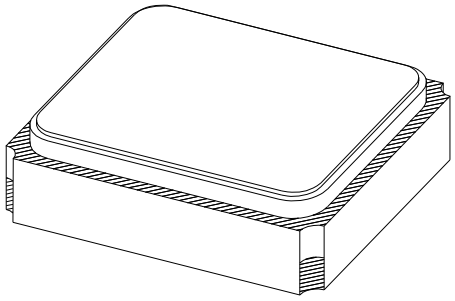
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**RoHS Compliant**

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# PRODUCT SPECIFICATION SHEET

| | | |
|---|---|---|
| PRODUCT TYPE | : | SMD TCXO 2.5 * 2.0 |
| NOMINAL FREQ. | : | 38.4 MHz |
| TXC P/N | : | 7L38402007 |
| REVISION | : | A1 |



| PE/RD | QA | MFG |
|---|---|---|
| Kenneth Kao | 陳建宇 | |
| 7/9 '12 | 4/9/12 | 3/26 |

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**

PRODUCT TYPE : SMD TCXO 2.5 * 2.0 P/N : 7L38402007 REVISION : A1

| Rev | Revise page | Revise contents | Date | Ref.No. | Reviser |
|---|---|---|---|---|---|
| A1 | N/A | Initial released | 2011/12/28 | N/A | Su-Chen Chiang |
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## ■ ELECTRICAL SPECIFICATIONS

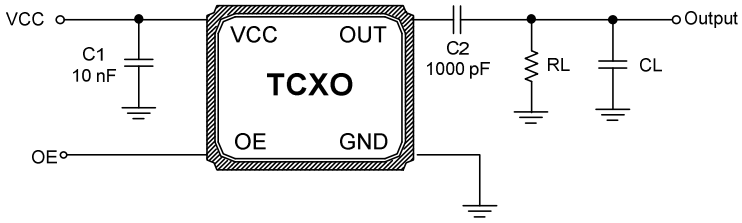
| Item | Parameters | | Condition | Electrical Specifications | | | | Note |
|---|---|---|---|---|---|---|---|---|
| | | | | MIN | TYP | MAX | UNITS | |
| 1 | Nominal Frequency | | | | 38.400000 | | MHz | |
| 2 | Operating Temperature Range | | | -30 | | +85 | ℃ | |
| 3 | Supply Voltage | | | 1.70 | 1.80 | 1.90 | V | |
| 4 | Current Drain | | | | | 2.0 | mA | |
| 5 | Output Level | | | 0.8 | | | V | 1 |
| 6 | Output Type | | | | Clipped Sinewave | | | |
| 7 | Output Load | | Resistance | 9 | 10 | 11 | kΩ | |
| 8 | | | Capacitance | 9 | 10 | 11 | pF | |
| 9 | Frequency Tolerance | | After 2 times reflow | | | ±2.0 | ppm | 2 |
| 10 | Frequency Stability | vs. Temperature | Temp: -30 ~ +85 ℃ | | | ±2.5 | ppm | 3 |
| 11 | | vs. Load | Load: 10 kΩ // 10 pF ±10% | | | ±0.2 | ppm | |
| 12 | | vs. Supply Voltage | Vcc: 1.8 V ±5% | | | ±0.3 | ppm | |
| 13 | Enable Voltage High | | Output enabled | 0.7*VCC | | VCC | V | |
| 14 | Enable Voltage Low | | Output disabled | 0 | | 0.3*VCC | V | |
| 15 | Storage Temperature | | | -40 | | +85 | ℃ | |
| 16 | Start-up Time | vs. Frequency | Within ±1.0 ppm | | | 3 | ms | |
| 17 | | vs. Output Level | To 90% of Vp-p | | | 3 | ms | |
| 18 | Duty Cycle | | | 40 | 50 | 60 | % | |
| 19 | Aging | | | | | ±1.0 | ppm/year | |
| 20 | Harmonics | | | | | -5 | dBc | |
| 21 | Phase Noise | @ 10 Hz offset | | | -82 | | dBc/Hz | |
| 22 | | @ 100 Hz offset | | | -110 | | dBc/Hz | |
| 23 | | @ 1 kHz offset | | | -130 | | dBc/Hz | |
| 24 | | @ 10 kHz offset | | | -140 | | dBc/Hz | |

Note 1 Decoupling capacitor (1000 pF) is required in external circuit

Note 2 Refer to nominal frequency

Note 3 Refer to frequency at 25±2℃

## TESTING CIRCUIT

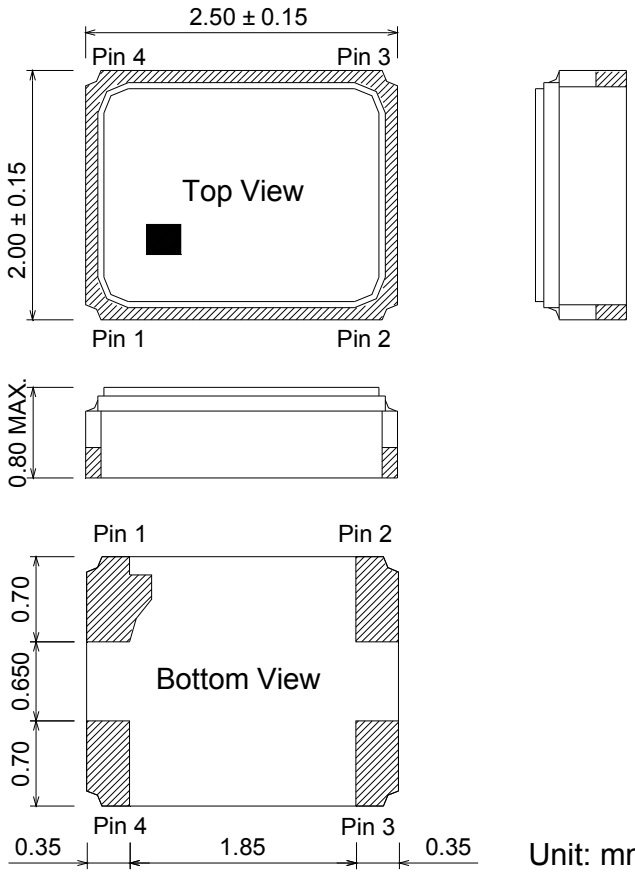



### External Components

| Name | Function |
|---|---|
| C1 | AC Noise Bypass for VCC |
| C2 | DC Block for Output |
| RL | Load Resistance |
| CL | Load Capacitance |

Note: Bypass capacitor (C1) and DC blocking capacitor (C2) should be placed.

## DIMENSIONS

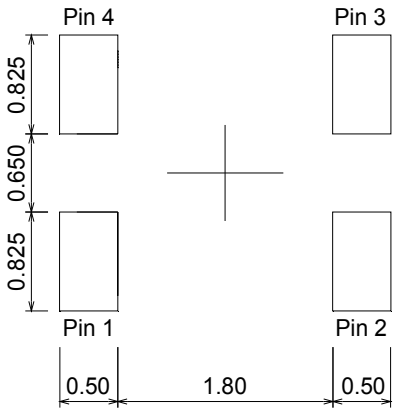



Unit: mm

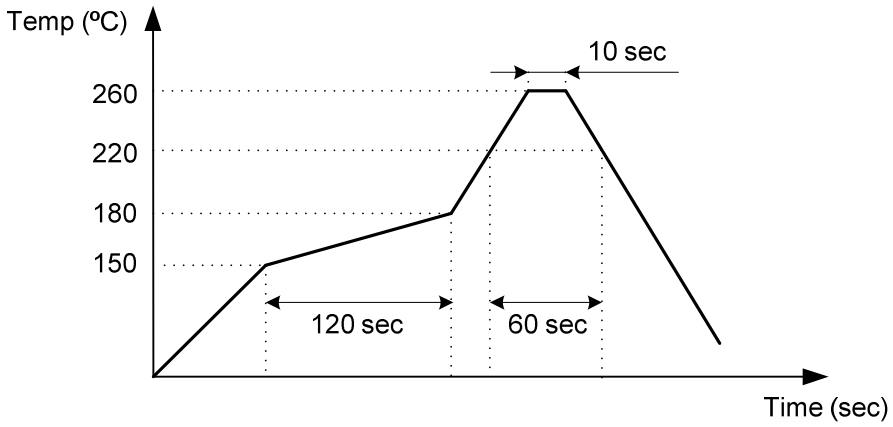
### Pin Connection

| Name | Function |
|---|---|
| Pin 1 | OE |
| Pin 2 | GND |
| Pin 3 | OUTPUT |
| Pin 4 | VCC |

### Recommended Land Pattern

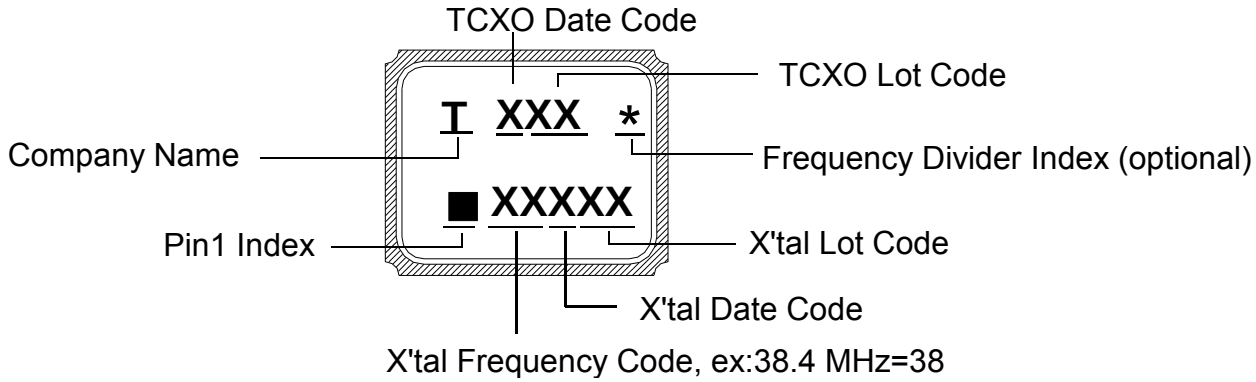


## ■ SUGGESTED REFLOW PROFILE




Note : Total Time: 200 sec. Max., Solder Melting Point: 220°C

## ■ MARKING



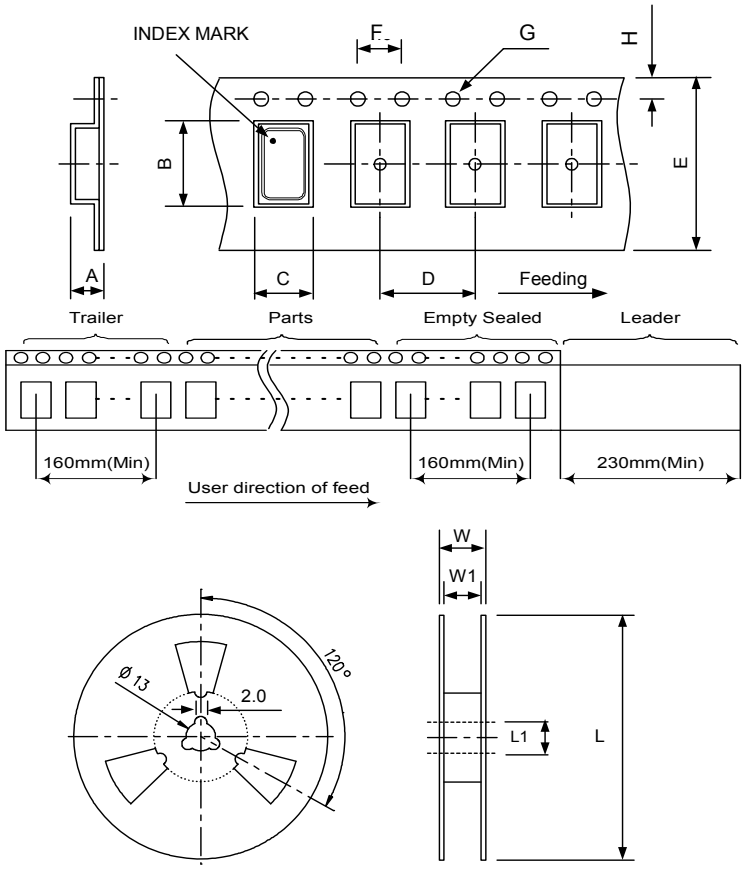

**DATE CODE**

| 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.

Note: If TCXO frequency is X'tal frequency divided by 2, then frequency divider index appears.
If TCXO frequency is the same as X'tal frequency, then no frequency divider index appears.

## ■ PACKING : (EIA-481-2)




Unit: mm

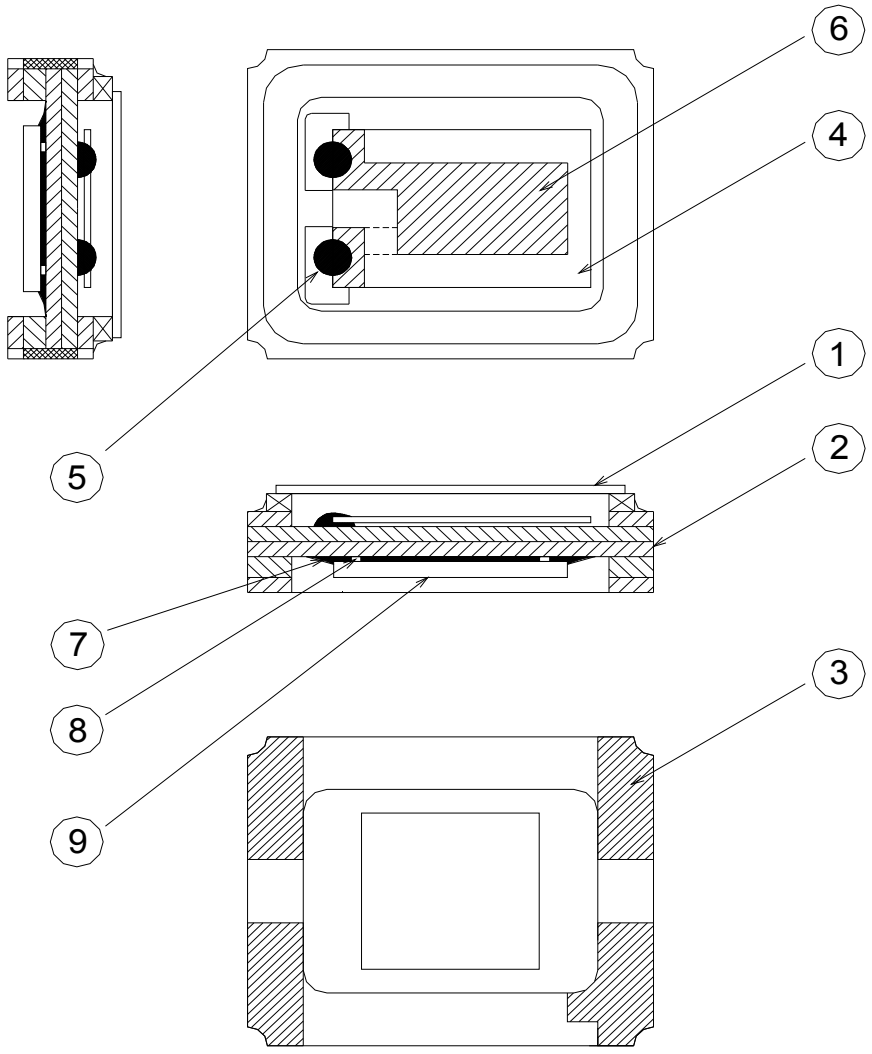
| DIMENSIONS (mm) | A | B | C | D | E | F | G | H | L | L1 | W | W1 | Standard Reel Quantity is 3,000 pcs per reel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1.15 | 2.70 | 2.25 | 4.00 | 8.00 | 4.00 | 1.55 | 1.75 | 178 | 13.0 | 11.6 | 8.4 | |

## ■ WEIGHT

0.0135 g / piece(TYP), 40 ± 2 g /3 kpcs( regardless of tape weight )

## STRUCTURE ILLUSTRATION

Crystal Enclosure Seal: Seam Welding




| No. | COMPONENTS | MATERIALS | FINISH/SPECIFICATIONS |
|---|---|---|---|
| 1 | Cap | Metal(Fe + Co + Ni) | - |
| 2 | Base | Ceramic | Color Black |
| 3 | Pad | Au | Tungsten Metalize<br>+ Ni Plating<br>+ Au Plating |
| 4 | Crystal Blank | $SiO_2$ | - |
| 5 | Conductive Adhesive | Ag | Silicone Resin |
| 6 | Electrode | Noble Metal | - |
| 7 | Underfill | Organic | Color Black |
| 8 | Bump | Au | |
| 9 | IC | Si | |

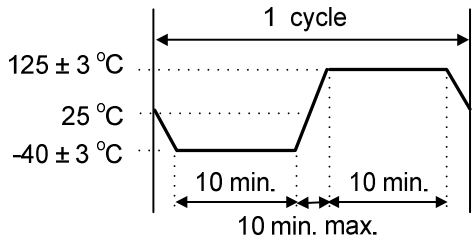
## ■ RELIABILITY SPECIFICATIONS

### 1. Mechanical Endurance

| No. | Test Item | Test Methods | Criteria |
|---|---|---|---|
| 1.1 | Drop Test | Hegiht : 100 cm height<br>Direction : X,Y,Z 6 directions<br>Test cycles : 3 cycles<br>Fall freely on to concrete floor<br>Mounting on test fixture (total weight=100 g) | +/- 2.0 ppm |
| 1.2 | Mechanical Shock | Acceleration : 1000 g<br>Duration : 0.5 ms<br>Test cycles : 3 times for all 3 directions | +/- 2.0 ppm |
| 1.3 | Vibration | Frequency range : 10 ~ 2000 Hz<br>Amplitude : 1.52 mm (10 ~ 80 Hz)<br>Acceleration : 20 g (80 ~ 2000 Hz)<br>Sweep speed : 20 minutes/cycle<br>Direction : X,Y,Z 3 directions<br>Duration : 4 hours/each direction | +/- 2.0 ppm |
| 1.4 | Gross Leak | Standard sample for automatic gross leak detector.<br>Test Pressure : 2 $kg/cm^2$ | < $1.5 \times 10^{-5}$ Pa $m^3$ / sec |
| 1.5 | Fine Leak | Helium bomging 4.5 $kgf/cm^2$ for 2 hours | < $1.0 \times 10^{-9}$ Pa $m^3$ / sec |
| 1.6 | Solderability | Preheate temperature : 125℃ ± 5℃<br>Preheate time : 120 sec<br>Solding temperature : 245℃ ± 5 ℃<br>Duration : 5 ± 1 sec<br>Method : Solder bath method | 90% Coated |

[Note] Criteria mean the maximum frequency change after reliability test, frequency shell be measured at 25℃.

## 2. Environmental Endurance

| No. | Test Item | Test Methods | Criteria |
|---|---|---|---|
| 2.1 | High Temp. Storage | Temperature : +125℃ ± 3℃<br>Duration : 168 hours | +/- 2.0 ppm |
| 2.2 | Low Temp. Storage | Temperature : -40℃ ± 3℃<br>Duration : 500 hours | +/- 2.0 ppm |
| 2.3 | Thermal Shock<br>(Air to Air) | Total 100 cycles of the following temperature cycle :<br> | +/- 2.0 ppm |
| 2.4 | High Temp & Humidity | Temperature : 85℃ ± 3℃<br>Humidity: RH 85%<br>Duration : 168 hours | +/- 2.0 ppm |
| 2.5 | Aging | Temperature : 85℃ ± 3℃<br>Duration : 500 hours<br>Voltage input by specification | +/- 2.0 ppm |

[Note] Criteria mean the maximum frequency change after reliability test, frequency shell be measured after 2 hours at 25℃ leaving.