

# SPECIFICATION FOR APPROVAL

CUSTOMER : \_\_\_\_\_

PRODUCT TYPE : SMD TCXO 2.5 \* 2.0

NOMINAL FREQ. : 16.369 MHz

TXC P/N : 7L16303002

REVISION : S1

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.

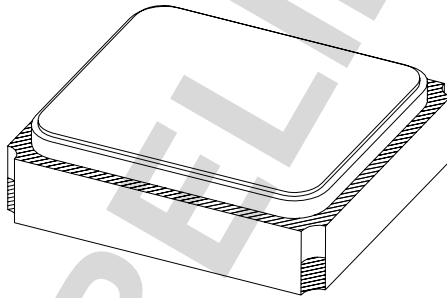
Attachment(s):

- 1. Product Specification Sheet
- 2. Testing Report(Electrical & Temperature)
- 3. Reliability Report

**RoHS Compliant**

# PRODUCT SPECIFICATION SHEET

CUSTOMER : \_\_\_\_\_  
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NOMINAL FREQ. : 16.369 MHz  
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PE/RD	QA	MFG
<i>Kenneth Kao</i>		
2010/6/18		

**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**

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P/N : 7L16303002

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<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	2010/6/18	N/A	Kenneth Kao

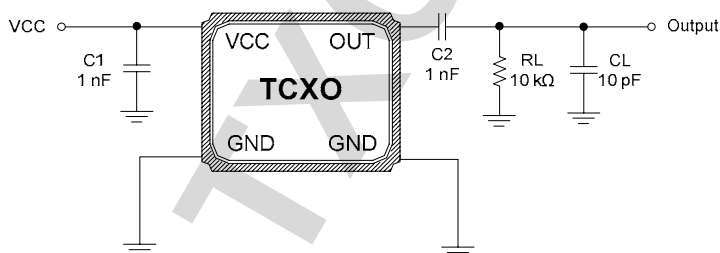
**ELECTRICAL SPECIFICATIONS**

Item	Parameters	Condition	Electrical Specifications				Note
			MIN	TYP	MAX	UNITS	
1	Nominal Frequency		16.369000			MHz	
2	Operating Temperature Range		-30		85	°C	
3	Supply Voltage		1.70	2.80	3.30	V	
4	Current Drain	With standard output load		1.5		mA	
5	Output Level(Vp-p)		0.8			V	1
6	Output Type		Clipped Sinewave				
7	Standard Output Load		10 KΩ // 10 pF				
8	Frequency Tolerance After Reflow	Two reflow soldering			±2.0	ppm	
9	Frequency Stability	vs. Temperature	Referenced to:25 ± 2°C		±0.5	ppm	
10		vs. Load	± 10% output load		±0.2	ppm	
11		vs. Supply Voltage	± 5% standard Vcc		±0.1	ppm	
12	Slope of Frequency Drift over Temperature				±0.1	ppm/°C	2
13	Storage Temperature		-40		85	°C	
14	Start-up Time	vs. Frequency	Within ± 1 ppm		2.5	ms	
15		vs. Output Level	To 90% of Vp-p		2.5	ms	
16	Duty Cycle		40	50	60	%	
17	Aging over 1st Year				±1.0	ppm	
18	Harmonics				-7	dBc	
19	Phase Noise	@ 10 Hz offset			-85	dBc/Hz	
20		@ 100 Hz offset			-112	dBc/Hz	
21		@ 1 kHz offset			-133	dBc/Hz	
22		@ 10 kHz offset			-148	dBc/Hz	

Note 1 Decoupling capacitor is required in external circuit.

Note 2 Minimum of 1 frequency reading every 2°C over temperature, based on temperature varied at maximum of 2°C per minute.

**TESTING CIRCUIT**

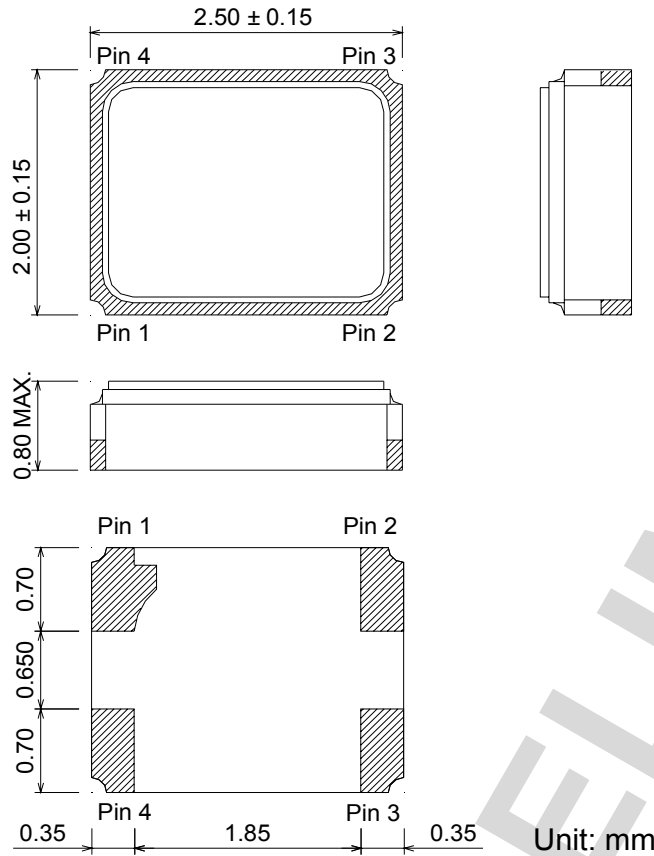


**External Components**

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.

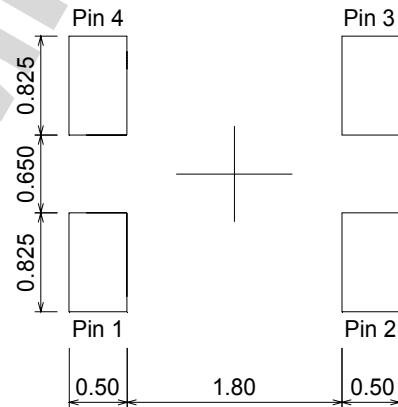
**DIMENSIONS**



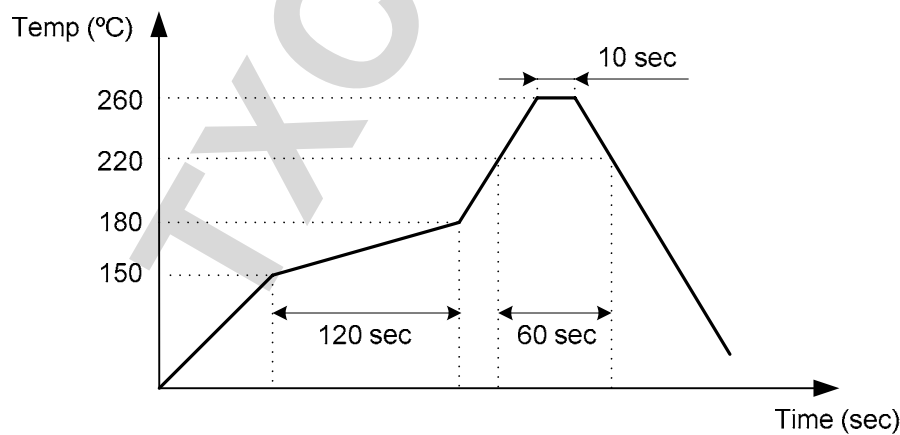
**Pin Function**

Name	Function
Pin 1	GND
Pin 2	GND
Pin 3	OUTPUT
Pin 4	VCC

**Land Pattern**

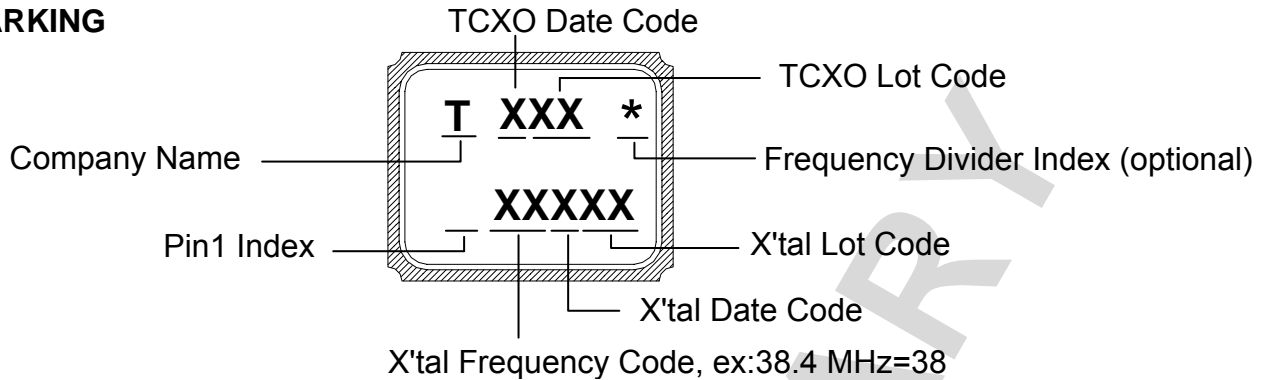


**SUGGESTED REFLOW PROFILE**



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

**MARKING**



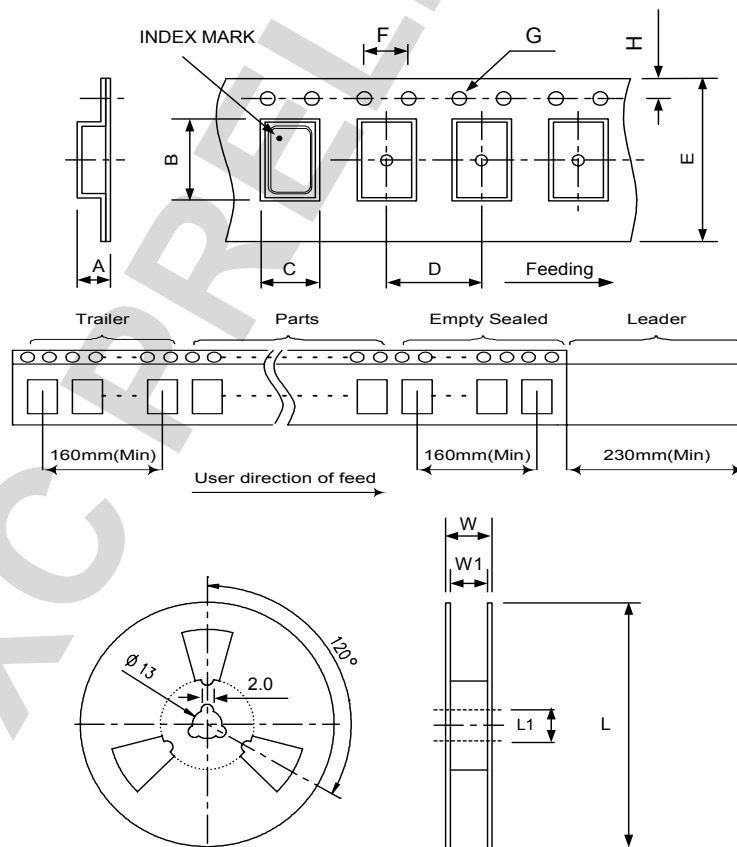
**DATE CODE**

				MONTH											
YEAR				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

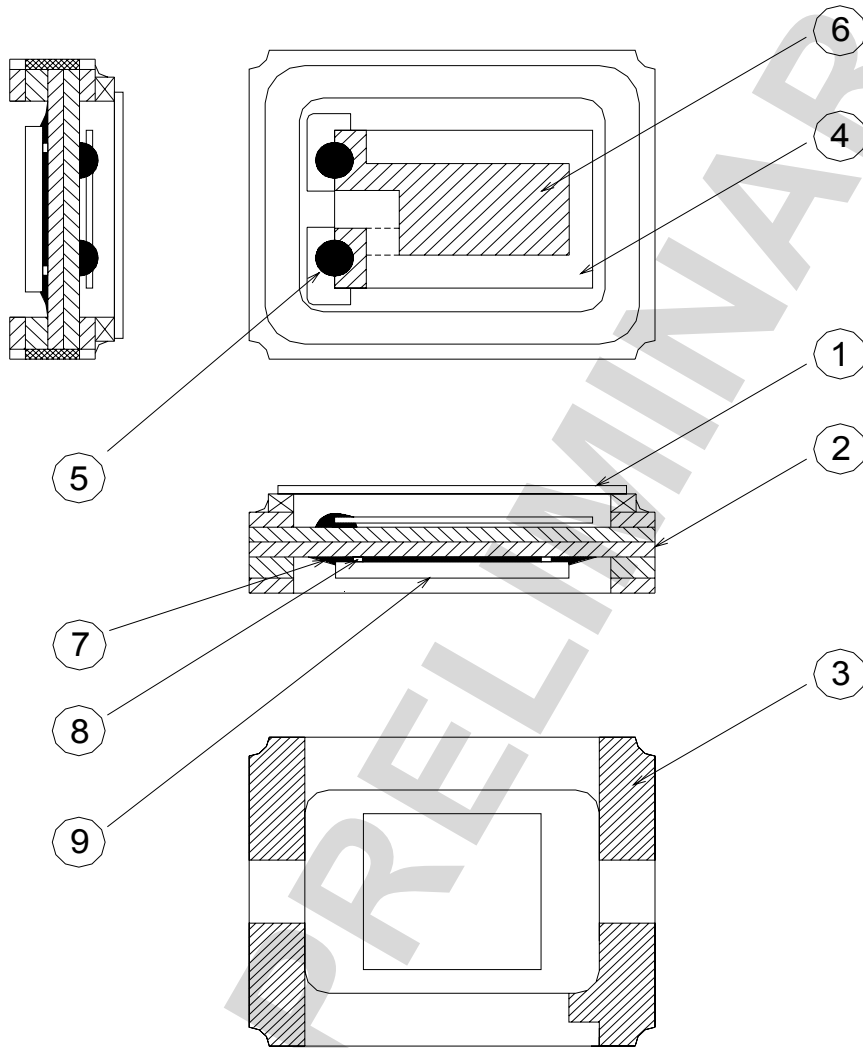
DIMENSIONS (mm)	A	B	C	D	E	F	G	H	L	L1	W	W1	Standard Reel Quantity is 3,000 pcs per reel
	1.15	2.70	2.25	4.00	8.00	4.00	1.55	1.75	178	13.0	11.6	8.4	

**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 + Ni Plating + Au Plating
4	Crystal Blank	SiO <sub>2</sub>	-
5	Conductive Adhesive	Ag	Silicone Resin
6	Electrode	Noble Metal	-
7	Underfill	Organic	Color Black
8	Bump	Au	
9	IC	Si	

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**RELIABILITY SPECIFICATIONS**

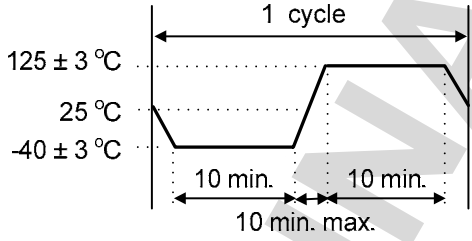
## 1. Mechanical Endurance

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

[Note] Criteria mean the maximum frequency change after reliability test, frequency shall be measured at 25°C.



2. Environmental Endurance

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

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

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**NOTICE**

1. Product storage (Before dry bag opened) and usage(After dry bag opened) condition :

	Before dry bag opened	After dry bag opened
Temperature	-10 ~ 50°C	-10 ~ 30°C
Humidity	10% ~ 65%	10% ~ 60%
Period	6 months	2 days

2. Please keep product used within 2 days after dry bag opened, and pack the rest product into dry bag by heat sealing the bag neck.

**PROHIBITED ITEMS**

Be sure to use the product under the following conditions. Otherwise, the product may lose function due to improper usage.

1. Reflow soldering heat resistance

- 1.1 Peak temperature and period : 265°C, 10 sec.
- 1.2 Preheating temperature and period : 170 ± 10°C, 120 sec.
- 1.3 Reflow passage times : twice

2. Manual soldering heat resistance

- 2.1 Soldering iron :

Pressing a soldering iron of 350°C on the terminal electrode below 3 sec.

- 2.2 Hot air gun soldering :

Keep the hot air export head above the product with a minimum gap distance : 1.5 cm

Maximum hot air blowing temperature : 300°C

Maximum hot air blowing period : 2 sec