

SPECIFICATION FOR APPROVAL

CUSTOMER : _____

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

NOMINAL FREQ. : 48.000000MHz

TXC P/N : 7M48072009

REVISION : S3

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

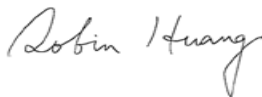
PRODUCT SPECIFICATION SHEET

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

NOMINAL FREQ. : 48.000000MHz

TXC P/N : 7M48072009

REVISION : S3

PE/RD	QA	MFG
 Robin Huang		
23-Sep-21		

NOTE:

- (1)The green product standard set by TXC is based upon the international standards. Related information is publicly described on the TXC's Website, and updated regularly. The document is compliant with the latest green product quality system directives at the time.
- (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

<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	8-Jul-21	N/A	Hong Li
S2	N/A	Aging: +/-10ppm Max (10Years@50C) Frequency Drift After Reflow: +/-2ppm Max ESR:25 ohm Max Q:30K Min Pullability:35ppm/Pf Max SPUR:20dB Min	22-Jul-21	PNR21071505	Hong Li
S3	N/A	SPUR:20dB Min Specifications to remove	23-Sep-21	PNR21091802	Hong Li

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).

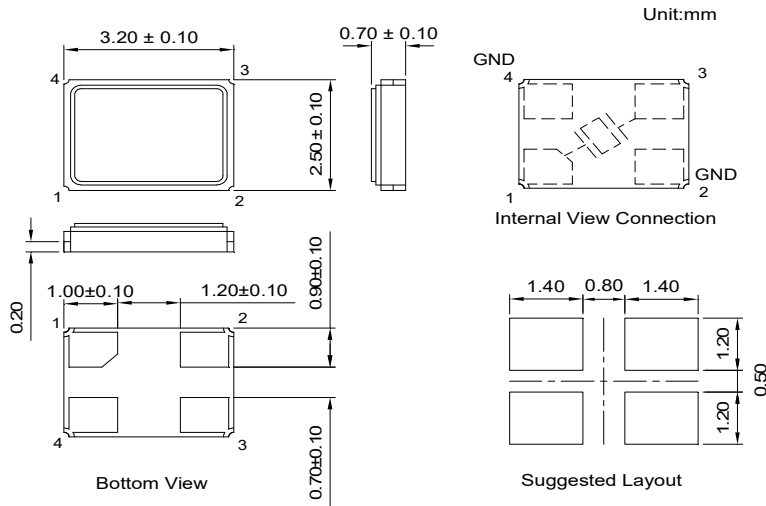
Unit Weight:

0.017 g/pcs Typ.

	Parameters	Symbol	Electrical Spec.				Notes
			Min.	Typ.	Max.	Units	
1	Nominal Frequency	FL	48.000000			MHz	-
2	Oscillation Mode	-	Fundamental			-	-
3	Load Capacitance	CL	8			pF	-
4	Frequency Tolerance	-	±10			ppm	at 25 °C ± 2 °C
5	Frequency Stability	-	±20			ppm	Over Operating Temp. Range (Reference 25°C)
6	Operating Temperature	-	-40	~	105	°C	100% TC Test
7	Aging	-	±1			ppm	1st Year@25 °C
		-	±10			ppm	10 Years@50 °C
8	Drive Level	DL	-	100	200	µW	-
9	Effective Series Resistance	Rr	-	-	25	Ω	-
10	Shunt Capacitance C0	C0	-	-	2	pF	-
11	Pulling Sensitivity TS	TS	-	-	35	ppm/pF	-
12	Q	Q	30	-	-	K	-
13	Activity Dip	-	-2	-	2	ppm	-
14	Frequency Drift After Reflow	-	-2	-	2	ppm	-
15	Insulation Resistance	IR	500	-	-	MΩ	at DC 100V
16	Storage Temperature Range	-	-40	~	105	°C	-

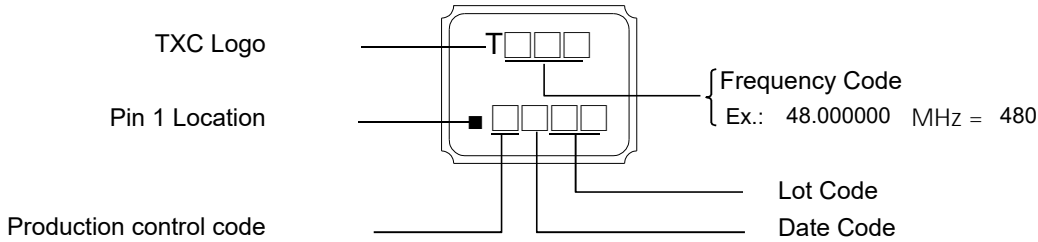
■ DIMENSION^①

(Unit:mm)



*Coplanarity of solderable areas Camber 0.10 mm Max

■ MARKING



Date Code:

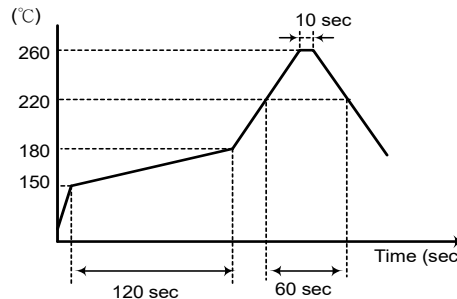
YEAR					MONTH											
					JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2021	2025	2029	2033	2037	A	B	C	D	E	F	G	H	J	K	L	M
2022	2026	2030	2034	2038	N	P	Q	R	S	T	U	V	W	X	Y	Z
2023	2027	2031	2035	2039	a	b	c	d	e	f	g	h	j	k	l	m
2024	2028	2032	2036	2040	n	p	q	r	s	t	u	v	w	x	y	z

*This date code will be cycled every four years

Production Location: Taiwan, China(Ningbo), China(Chungking).

■ SUGGESTED REFLOW PROFILE

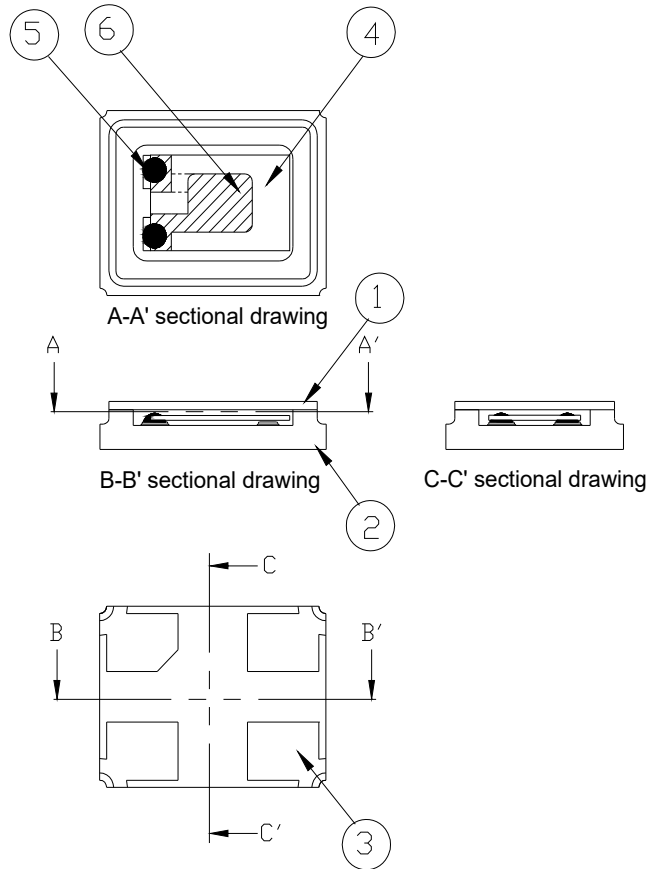
Solder melting point :220±10 °C, 60 sec. Min.
 Peak Temperature: 260 ± 5 °C, 10 sec. Max.
 Reflow Times: 3 times reflow is allowed



■ SUGGESTED MANUAL SOLDER CONDITION

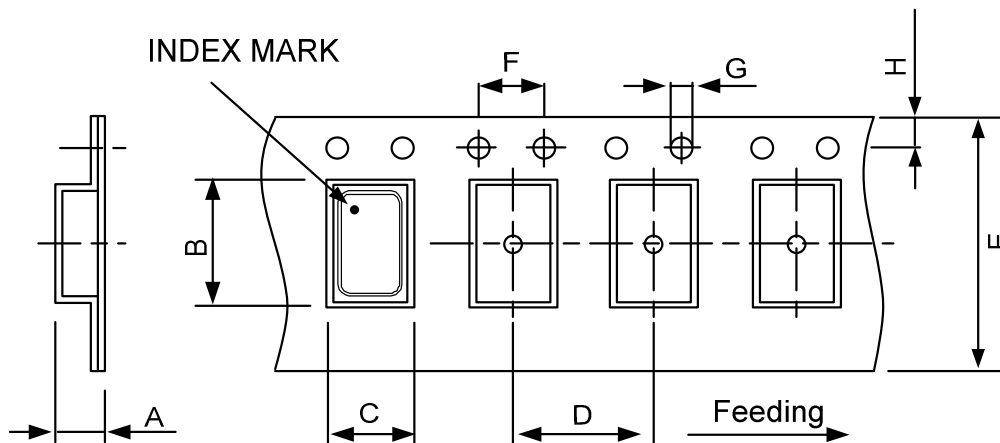
Temperature: 350 ± 10 °C
 Time: 3 sec.
 Re-solder times: twice

■ STRUCTURE ILLUSTRATION



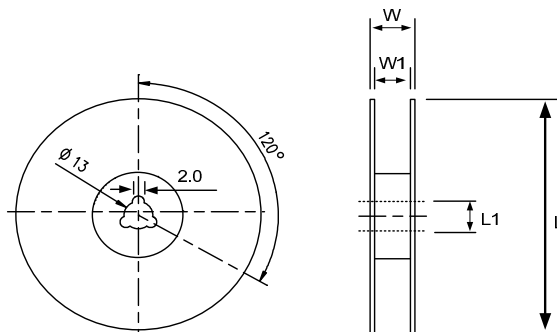
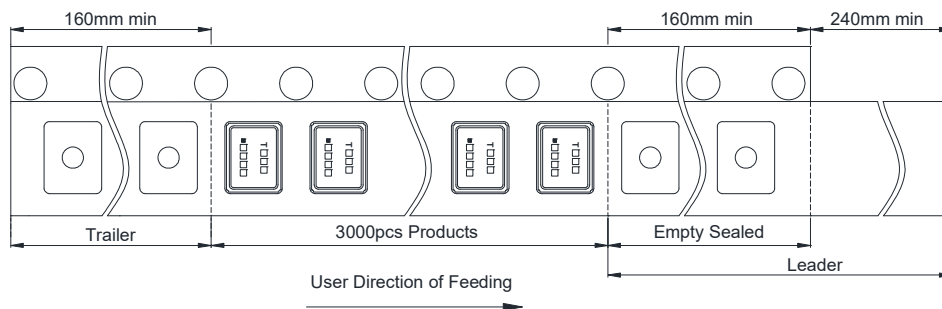
NO	COMPONENTS	MATERIALS	FINISH/SPECIFICATIONS
1	Lid	Kovar (Fe/Co/Ni)	-
2	Package	Ceramic (Al ₂ O ₃) + Kovar (Fe/Co/Ni)+ Ag/Cu-	-
3	PAD	Au	Tungsten metalize + Ni plating + Au plating
4	Crystal blank	SiO ₂	-
5	Conductive adhesive	Resin+Ag	-
6	Electrode	Noble Metal.	-

EMBOSS CARRIER TAPE & REEL



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

REMARK :



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

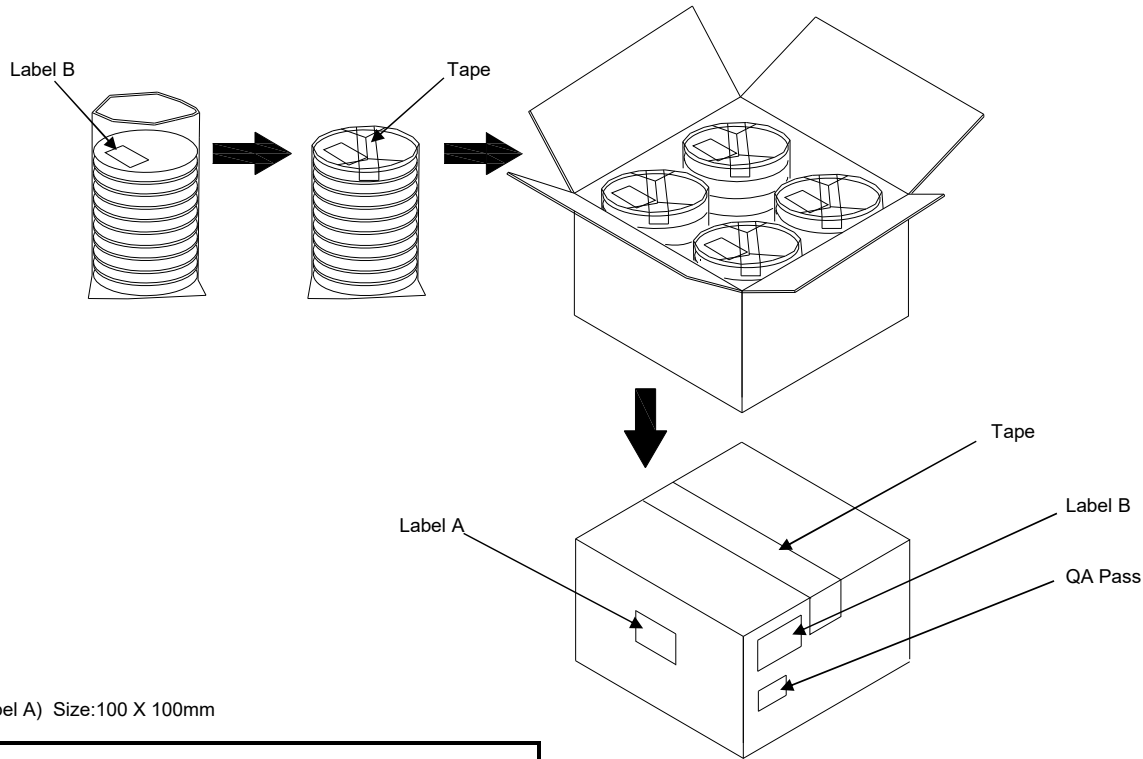
PACKING

Reel Quantity :

- 1. Reel X 6 (6 Reels)
- 2. Reel X 12 (12 Reels)
- 3. Reel X 25 (12 Reels + 13 Reels)
- 4. Reel X 50 (12 Reelsx2 + 13 Reelsx2)

Box Size:

- 1. L200 X W200 X H140mm
- 2. L200 X W200 X H250mm
- 3. L400 X W200 X H250mm
- 4. L400 X W400 X H280mm



(Label A) Size:100 X 100mm

<h1 style="margin: 0;">TXC</h1>	
Inv No: 00096815	
Po No: 21106326- 24- 1	
Part No: □□□□□□□□	
Qty: 40000 PCS	
C/No: 157- 44	

(Label B) Size:80 X 40mm

TXC CORPORATION		QA PASS
DATE CODE:	QTY:	2011/09/02
□□□□□□□□		□□□□
LOT NO:	RoHS	
□□□□□□□□		
PART NO:	HF	
□□□□□□□□		
FREQ: □□□□□□□□□□		

* If customers have special requirements, we can paste labels according to it.

RELIABILITY SPECIFICATIONS

1.Mechanical Endurance

No.	Test Item	Test Methods	Test Criteria
1	Drop Test	150 cm height,3 times on concrete floor .	A . C
1	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	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	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	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	High Temp. Storage	+ 125 °C ± 3 °C for 500 ± 12 Hrs	B . C . D
2	Low Temp. Storage	- 40 °C ± 3 °C for 500 ± 12 Hrs	B . C . D
2	Temperature cycle	Total 100 cycles of the following temperature cycle 	B . C . D
3	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.

APPLICATIOON NOTE

1. Don't be caught in the rain.
2. The storage environment shall be $5^{\circ}\text{C} \sim 40^{\circ}\text{C}$ temperature and 30% ~ 75%RH humidity and free from the sun shine.
3. It is recommended to use product within 1 year after arrival because characteristics will deteriorate with time.
4. The product shall not be used for military uses, aerospace equipment, medical instruments to sustain life, automotive application, and others equivalen.
5. The product is intended for general use in electronic equipment, please contact us when using this product for industrial equipment.
6. Since the ultrasonic welding process may damage crystal resonator interior, we strongly recommend to verify the product by ultrasonic welding before using it if utrasonic welding process has to be used.