

# SPECIFICATION FOR APPROVAL

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

PRODUCT TYPE : SMD TCXO 7.0 \* 5.0

NOMINAL FREQ. : 20.000000MHz

TXC P/N : 7N20070004

REVISION : A1

CUSTOMER P/N : \_\_\_\_\_

PM / SALES : \_\_\_\_\_

DATE : \_\_\_\_\_

CUSTOMER CONFIRMATION : \_\_\_\_\_  
(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**

(for glass crystal only : Pb used in sealing glass material is exempt from EU directive)

# PRODUCT SPECIFICATION SHEET

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PE/RD	QA	MFG
<i>Eric Tsao</i>	<i>Mingjung Lin</i>	<i>Alex Huang</i>
<b>Eric Tsao</b>	<b>MingJung Lin</b>	<b>Alex Huang</b>
<i>26-Aug-22</i>	<i>26-Aug-22</i>	<i>26-Aug-22</i>

NOTE:

- (1) If customer's application involves ultrasonic 、molding 、PCBA dicing and manual soldering processes or customer's products are used in automotive system, the applicability should be confirmed with TXC R&D responsible person.
- (2) 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.
- (3) Revision "Sx" is for engineering samples only. PE/RD's approval required.
- (4) Revision "Ax" is production ready. PE, QA and MFG's approval required.

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## ■ ELECTRICAL SPECIFICATIONS

Item	Parameters		Condition	Electrical Specifications				Note
				MIN	TYP	MAX	UNITS	
1	Nominal Frequency			0.000000			MHz	
2	Operating Temperature Range			-40		+105	°C	
3	Storage Temperature			-40		+125	°C	
4	Supply Voltage			3.135	3.30	3.465	V	
5	Current Drain		With standard output load			10	mA	
6	Output Level			CMOS				
7	Duty Cycle			45		60	%	
8	Standard Output Load			15			pF	
9	Output Low					0.4	V	
10	Output High			2.8			V	
11	Rise Time		10% to 90% output swing			5	ns	
12	Fall Time		90% to 10% output swing			5	ns	
13	Initial Frequency Tolerance		25°C ± 2°C			±1.0	ppm	1
14	Frequency Tolerance After Reflow		2 times			±1.0	ppm	2
15	Start-up Time	Output Level	To 90% of Vp-p			10	ms	
16	Frequency Stability	vs. Temperature	-40°C to +105°C,			±0.25	ppm	3
17		vs. Load	Standard output load ± 10%			±0.1	ppm	4
18		vs. Supply Voltage	Standard Vcc ± 5%			±0.1	ppm	5
19	Slope of Frequency Drift over Temperature		Temp: -40 ~ +105 °C			±0.1	ppm/°C	6
20	Holdover stability, constant temperature		24 hr			±50	ppb	7
21	Aging		24 hr			±10	ppb	8
			1 year			±1.0	ppm	
			10 years			±3.0	ppm	
22	Free-run Accuracy		20years			±4.6	ppb	9
23	Phase Noise	@ 1 Hz offset			-65	-60	dBc/Hz	
24		@ 10 Hz offset			-90	-84	dBc/Hz	
25		@ 100 Hz offset			-120	-114	dBc/Hz	
26		@ 1 kHz offset			-140	-134	dBc/Hz	
27		@ 10 kHz offset			-145	-139	dBc/Hz	
28		@ 100 kHz offset			-150	-144	dBc/Hz	
29		@ 1 MHz offset			-155	-149	dBc/Hz	
30	RMS Jitter		10Hz - 1MHz		0.9	1.8	ps	
30	Short Term Frequency Stability(Tau=1sec)		After power on 30min @ constant Temperature			0.1	ppb/s	
31	G-sensitivity		Gamma vector of all three axes from 30 Hz to 1500 Hz			2.0	ppb/g	

Note 1 Refer to nominal frequency

Note 3 Reference (Fmax + Fmin)/2

Note 2 Operation after reflow 2hrs refer to Initial Frequency

Note 4 Reference to frequency at 3.3 V

Note 5 Reference to frequency at 15 pF

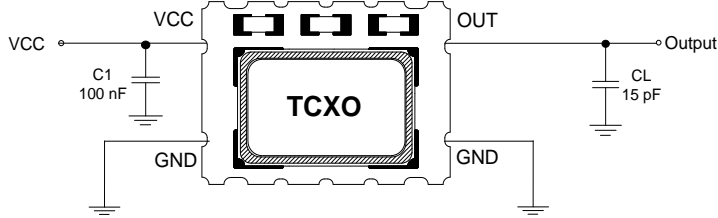
Note 6 Minimum of 1 frequency reading every 2°C over temperature, based on temperature varied at maximum of 2°C per minute.

Note 7 After 48hrs continuous operation and fix temperature

Note 8 After 30 days continuous operation and fix in 25 °C

Note 9 Inclusive of calibration tolerance @25 °C temperature, supply voltage 3.3 V±5%, load 15 pF±10%, reflow soldering and aging 20 years

**TESTING CIRCUIT**

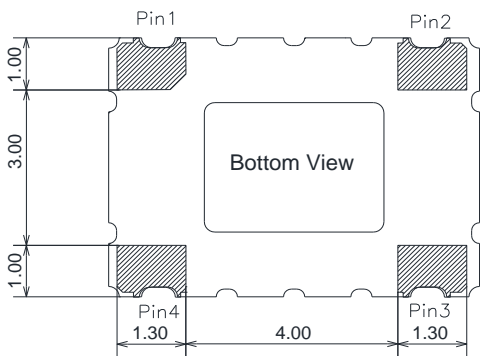
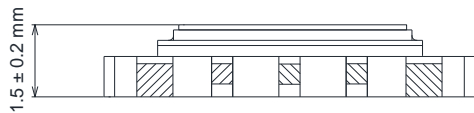
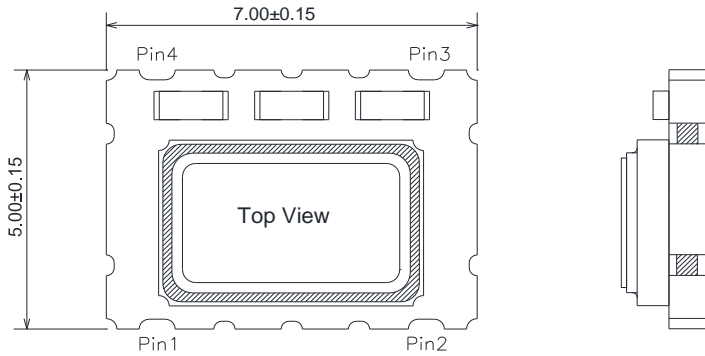


**External Components**

Name	Function
C1	AC Noise Bypass for VCC
CL	Load Capacitance

Note: Bypass capacitor (C1) should be placed.

**DIMENSIONS**

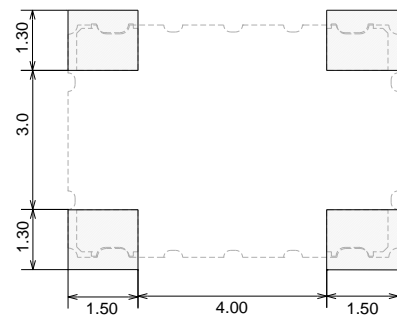


Unit : mm

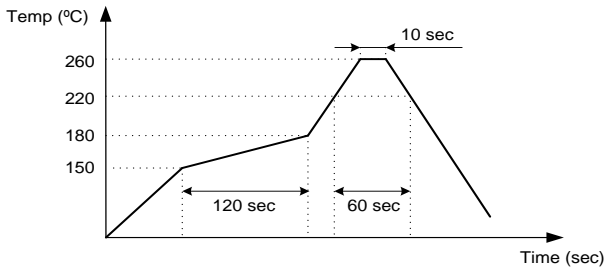
**Pin Connection**

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

**Recommended Land Pattern**



**■ SUGGESTED REFLOW PROFILE**

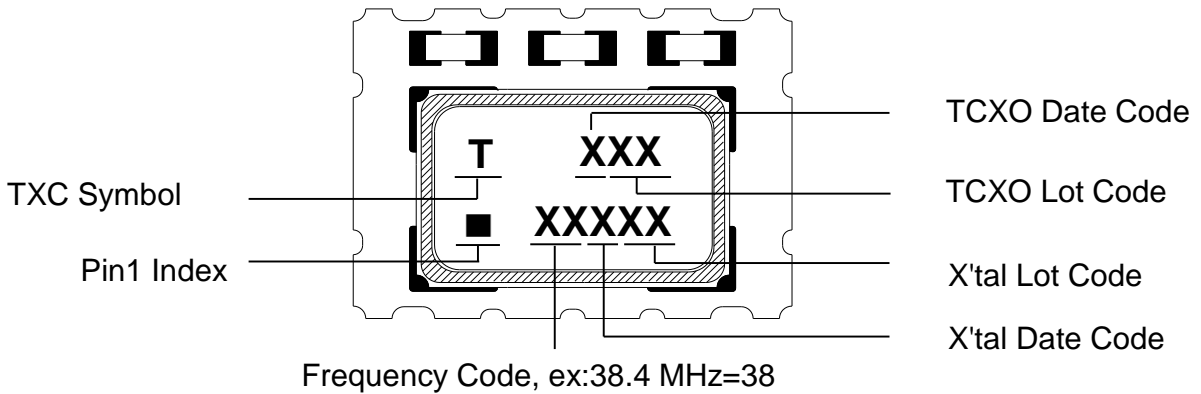


Note 1: Period while temperature exceeds the solder melting point : 220°C should be less than 200 sec.

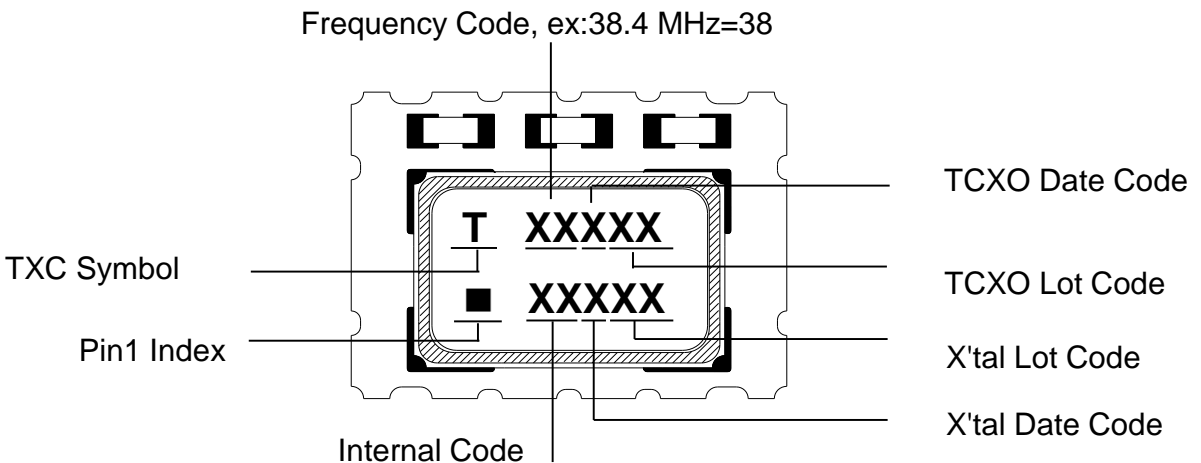
Note 2: Period while temperature stays at the top melting point : 260°C should be less than 30 sec.

**■ MARKING**

**No Divide Mode :**



**Divide Mode :**

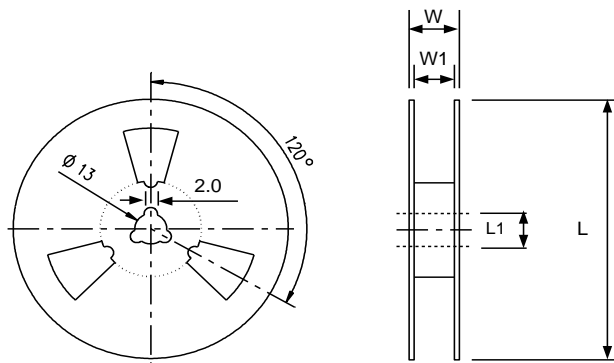
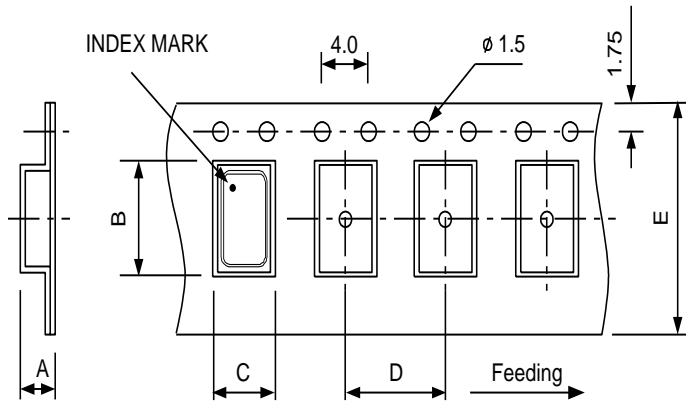


**DATE CODE**

					MONTH											
YEAR					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.

**PACKING : (EIA-481-2)**



Unit: mm

DIMENSIONS (mm)	A	B	C	D	E	L	L1	W	W1	Standard Reel Quantity is
	2.00	7.90	5.45	8.00	16.00	180	13.0	20.5	16.0	1,000 pcs per reel

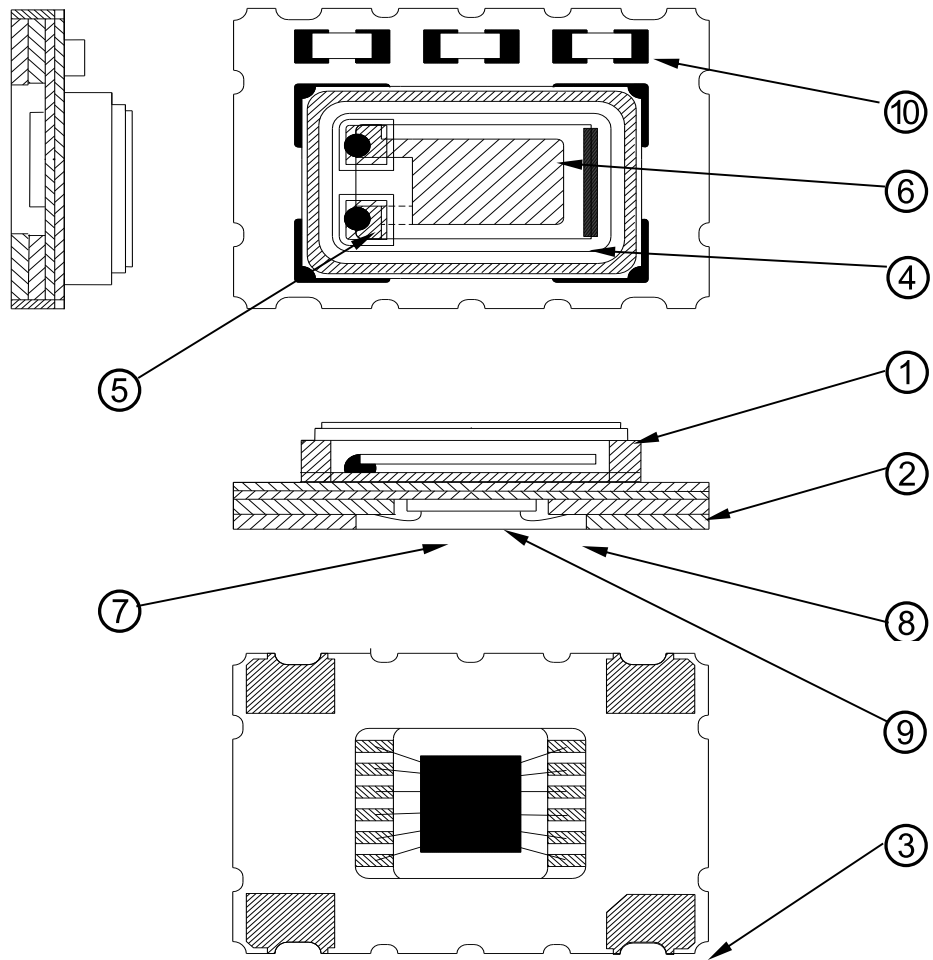
**WEIGHT**

0.137 g / piece(TYP) , 137±5 g / 1 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	Bonding Wire	Au	
9	IC	Si	
10	Capacitor	Ceramic	



## ■ RELIABILITY SPECIFICATIONS

### 1. Mechanical Endurance

No.	Test Item	Test Methods	Standard
1.1	Drop Test	Hegiht : 75 cm height Test cycles : 3 cycles Fall freely on to wood floor	IEC-68-02-27
1.2	Mechanical Shock	Acceleration : 1000 g Duration : 0.5 ms Test cycles : 3 times for all 3 directions	MIL-STD-202 Method 213B
1.3	Vibration	Acceleration : 20 g Duration : 4 hours/each direction Frequency range : 10 ~ 2000 Hz Amplitude : 1.52 mm Direction : X,Y,Z 3 directions Sweep speed : 20 minutes/cycle	MIL-STD-883 Method 2007.3
1.4	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 Criterion : >90% Coated	J-STD-002

### 2. Environmental Endurance

No.	Test Item	Test Methods	Standard
2.1	High Temp. Storage	Temperture : +125°C ± 3°C Duration : 1000 hours	MIL-STD-883 Method 1005.8
2.2	Low Temp. Storage	Temperture : -40°C ± 3°C Duration : 1000 hours	MIL-STD-883 Method 1013
2.3	Thermal Shock (Air to Air)	-55°C ~ 125°C, Dwell: 15min, Maximum transfer time 20sec, 500 cycles	MIL-STD-202
2.4	High Temp&Humidity	Temperture : 85°C ± 3°C Humidity: RH 85% Duration : 1000 hours	EIA-JESD22-A101-B
2.5	Aging	Temperture : 85°C ± 3°C Duration : 1000 hours Voltage input by specification	JIS C6701
2.6	ESD	HBM : 2000 V	JESD22-A114-B
		CDM : 500 V	JESD22-C101-B
		MM : 200 V	JESD22-A115-B

[Note] This product is Level 1 for JEDEC J-STD-020D moisture sensitivity level.