

# SPECIFICATION FOR APPROVAL

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

PRODUCT TYPE : SMD TUNING FORK 2.0X1.2

NOMINAL FREQ. : 32.768KHz

TXC P/N : 9H03200010

REVISION : A1

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

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

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

CUSTOMER CONFIRMATION : \_\_\_\_\_  
(Singnature)

\_\_\_\_\_ (Date)

**MSL: Level 1**  
**RoHS Compliant**  
**Halogen Free**

# PRODUCT SPECIFICATION SHEET

PRODUCT TYPE : SMD TUNING FORK 2.0X1.2

NOMINAL FREQ. : 32.768KHz

TXC P/N : 9H03200010

REVISION : A1

PE/RD	QA	MFG
<i>James Chung</i>	<i>Shipo Lin</i>	<i>Shu-Chen ko</i>
James Chung	Shipo Lin	Shu-Chen Ko
2018/11/23	2018/11/23	2018/11/23

**MSL: Level 1**

**RoHS Compliant**

**Halogen Free**



<u>Rev</u>	<u>Revise page</u>	<u>Revise contents</u>	Date	Ref.No.	Reviser
A1	N/A	Initial released	2018/11/23	N/A	Shu-Chen Ko

## Spec Sheet Contents

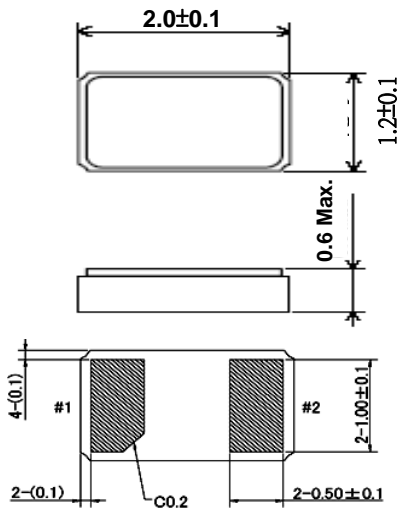
1	ELECTRICAL SPECIFICATIONS DIMENSIONS SUGGESTED REFLOW PROFILE& MANUAL SOLDER CONDITION	P.3
2	MARKING PACKING	P.4
3	STRUCTURE ILLUSTRATION UNIT WEIGHT	P.5
4	RELIABILITY SPECIFICATIONS	P.6
5	Standard atmospheric conditions Measurement condition NOTE	P.7

### ELECTRICAL SPECIFICATIONS

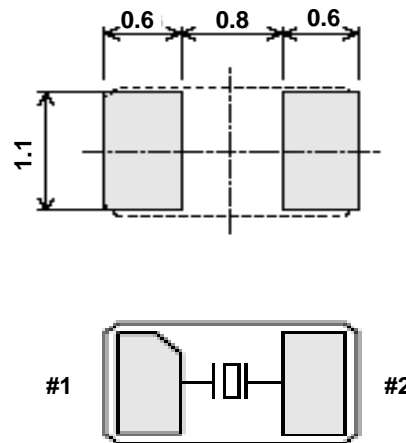
	Parameters	Sym.	Electrical Spec.				Notes
			Min	Typical	Max	Unit	
1	Nominal Frequency	F0	32.768			KHz	-
2	Frequency Tolerance	$\Delta f/fo$	-20		+20	ppm	at 25 °C +/-3 °C
3	Load Capacitance	CL	9.0			pF	-
4	Driver Level	DL	-	0.1	0.5	$\mu$ W	-
5	Equivalent Series Resistance	ESR	-	-	90	K $\Omega$	at 25 °C +/-3 °C
6	Turnover Temperature	Tp	20	25	30	°C	at 25 °C +/-3 °C
7	Parabolic Curvature Constant	K	-	-	-0.04	ppm/°C <sup>2</sup>	-
8	Operating Temperature	-	-40	~	85	°C	-
9	Storage Temperature	-	-55	~	125	°C	-
10	Insulation Resistance	IR	500	-	-	M $\Omega$	at DC 100V+/-15V
11	Shunt Capacitance	C0	-	1.3	-	pF	-
12	Motional Capacitance	C1	-	6.5	-	fF	-
13	Aging	$\Delta f/f$	-3		+3	ppm	1st Year

### FACTORY LOCATION : CHINA

### DIMENSIONS (UNIT:mm)



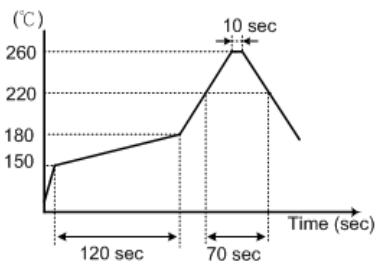
### RECOMMENDED SOLDER PAD (UNIT:mm)



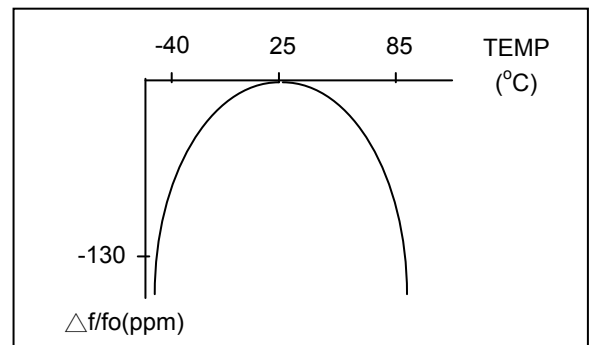
### REFLOW PROFILE

Total time : 200 sec. Max.

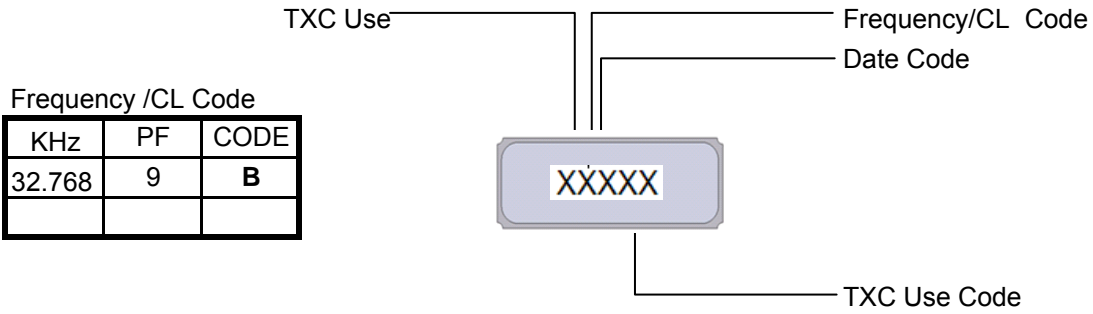
Solder melting point :220 °C



### TEMPERATURE V.S FREQUENCY CURVE



**MARKING**

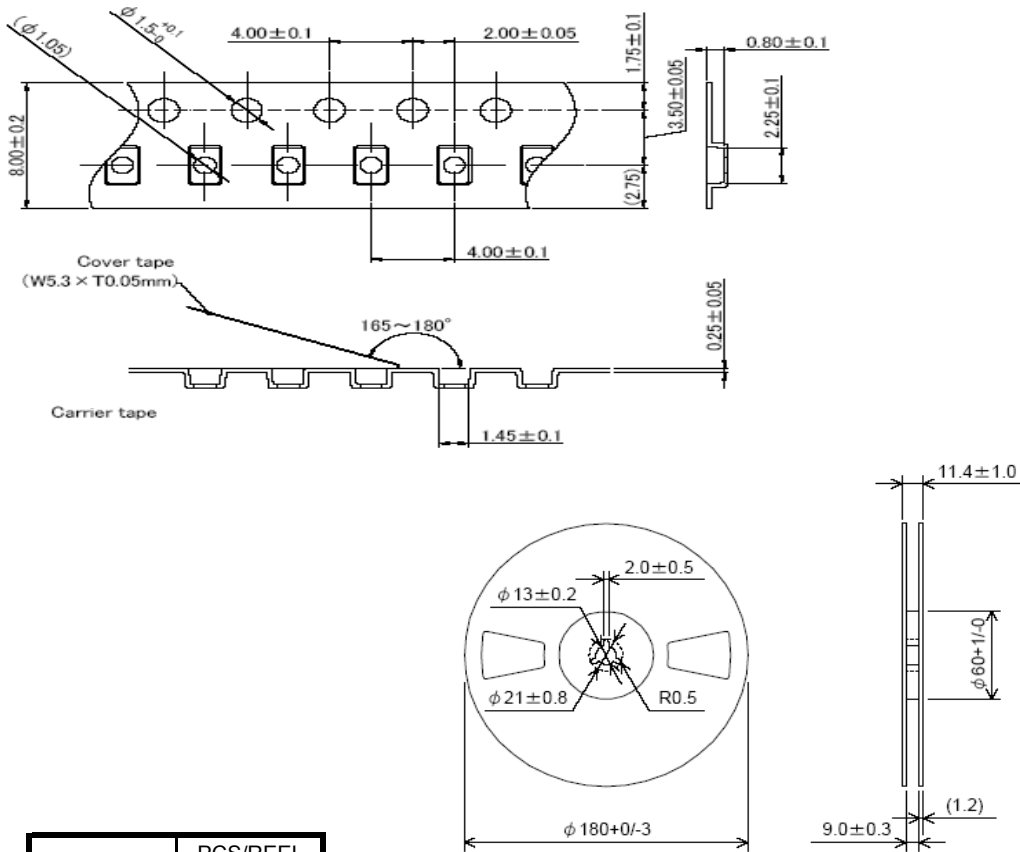


Date Code

YEAR					MONTH											
					JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2013	2017	2021	2025	2029	A	B	C	D	E	F	G	H	J	K	L	M
2014	2018	2022	2026	2030	N	P	Q	R	S	T	U	V	W	X	Y	Z
2015	2019	2023	2027	2031	a	b	c	d	e	f	g	h	j	k	l	m
2016	2020	2024	2028	2032	n	p	q	r	s	t	u	v	w	x	y	z

This date code will be cycled every four years

**PACKING (UNIT:mm)**

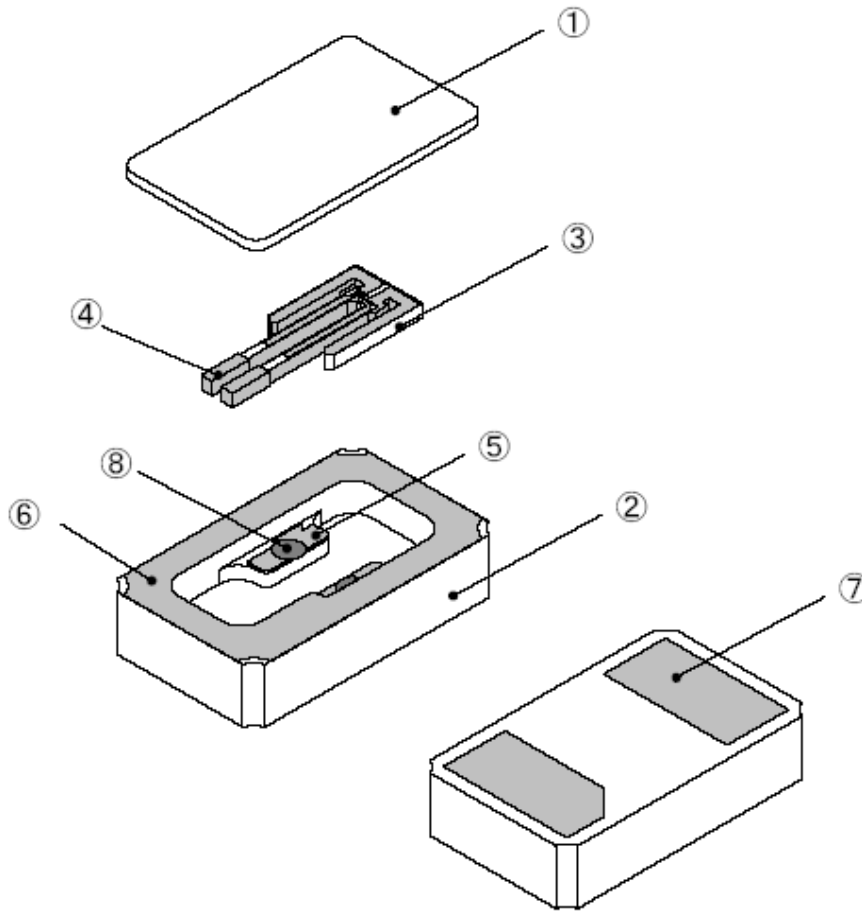


Amount	PCS/REEL
	3K

3000 pieces of taped crystal units are put into a packing reels

- REMARK :
- 230 mm (9.05) minimum leader which consist of carrier and/or tape followed by a minimum of 160 mm (6.3) of empty carrier tape sealed with cover tape.
  - 160 mm (6.3) minimum trailer of empty carrier tape sealed with cover tape.

■ **STRUCTURE ILLUSTRATION**



NO	COMPONENTS	MATERIALS	QTY	FINISH/SPECIFICATIONS
1	Lid	Clad Metal	1	Ni+Kovar+Cu-Ni+Silver Solder (Ag-Cu-Sn)
2	Base(Package)	Ceramic( $Al_2O_3$ )	1	Color Black
3	Crystal blank	$SiO_2$	1	-
4	Electrode	Noble Metal	2	Cr+Au
5	Internal terminals	Au	2	Tungsten metallize + Ni plating + Au plating
6	Metallize for sealing	Au	1	Tungsten metallize + Ni plating + Au plating
7	PAD	Au	2	Tungsten metallize + Ni plating + Au plating
8	Conductive adhesive	Ag	2	Silicon resin

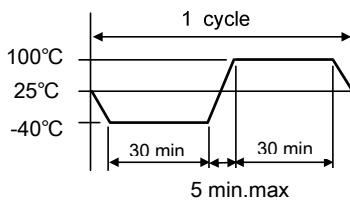
■ **UNIT WEIGHT:**  
0.00459 g/pcs

**RELIABILITY SPECIFICATIONS**

1.Mechanical Endurance

No.	Test Item	Test Methods	REF. DOC
1.1	Drop Test	150 cm height, fall freely onto concrete floor 3 times.	MIL-STD-202
1.2	Mechanical Shock	Device are shocked to half sine wave ( 1000 G ) three mutually perpendicular axes each 3 times. 1m sec. duration time	MIL-STD-202
1.3	Vibration	Frequency range 10 ~ 55 Hz Amplitude 1.5 mm Sweep time 1 minute Perpendicular axes each test time 2 hours (Total test time 6 hours)	MIL-STD-883
1.4	Solderability	Temperature 255 °C ± 5°C Immersing depth 0.5 mm minimum Immersion time 3.5 ± 0.5 seconds Flux Rosin resin methyl alcohol solvent ( 1 : 4 )	MIL-STD-883

2.Environmental Endurance

No.	Test Item	Test Methods	REF. DOC
2.1	Resistance To Soldering Heat	Pre-heat temperature 160 °C Pre-heat time 90 ± 10 sec. Test temperature 260 ± 5 °C Test time 5 ± 1 sec.	MIL-STD-202
2.2	High Temp. Storage	+ 125 °C ± 3 °C for 168 ± 12 hours	MIL-STD-883
2.3	Low Temp. Storage	- 40 °C ± 3 °C for 1000 ± 12 hours	MIL-STD-883
2.4	Thermal Shock	Total 100 cycles of the following temperature cycle 	MIL-STD-883
2.5	Pressure Cooker Storage	121 ± 3°C, RH100%, 2 bar, for 240 hours	EIA-JESD22
2.6	High Temp & Humidity	85°C ± 3°C, RH 85% , 1000Hrs	EIA-JESD22



**Standard atmospheric conditions**

Unless otherwise specified, the standard range of atmospheric conditions for making measurement and tests are as follow:

Ambient temperature :  $25\pm 5^{\circ}\text{C}$   
Relative humidity : 40%~70%

If there is any doubt about the results, measurement shall be made within the following limits:

Ambient temperature :  $25\pm 3^{\circ}\text{C}$   
Relative humidity : 40%~70%

**Measurement condition**

Electrical characteristics measured by S&A250B or equivalent.

**NOTE:**

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.
5. 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.
6. Revision "Sx" is for engineering samples only. PE/RD's approval required.
7. Revision "Ax" is production ready. PE, QA and MFG's approval required.
8. Inform TXC in advance if you use ultrasonic welding in assembling process .