TXC CORPORATION

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SPECIFICATION FOR APPROVAL

CUSTOMER	:	
PRODUCT TYPE	:	SMD TUNING FORK 2.0X1.2
NOMINAL FREQ.	:	32.768KHz
TXC P/N	:	9H03200012
REVISION	:	A2
CUSTOMER P/N	:	
PM / SALES	:	
DATE	:	
CUSTOMER CONFIRMATION	:	(Singnature)
		(Date)

MSL: Level 1

RoHS Compliant

Halogen Free

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PRODUCT SPECIFICATION SHEET

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NOMINAL FREQ.	:	32.768KHz
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PE/RD	QA	MFG
James Chung	Shipo Lin	Shu-Chen Ko
2018/11/14	2018/11/14	2018/11/14

MSL: Level 1

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Rev	Revise page	Revise contents	Date	Ref.No.	Reviser
A1	N/A	Initial released	2018/8/22	N/A	Shu-Chen Ko
A2	3 , 6 , 7	ESR & RELIABILITY SPECIFICATIONS & Wide Size Change	2018/11/14	EC-J01-181019-01	Shu-Chen Ko

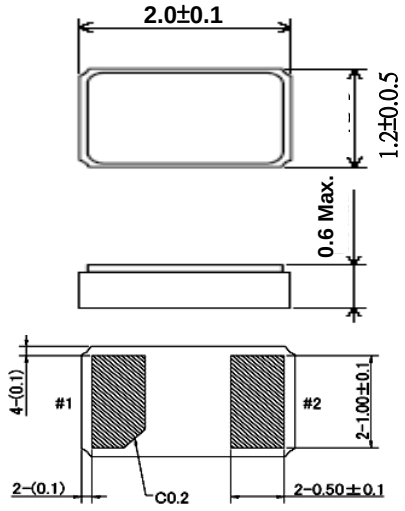
Spec Sheet Contents

■ ELECTRICAL SPECIFICATIONS

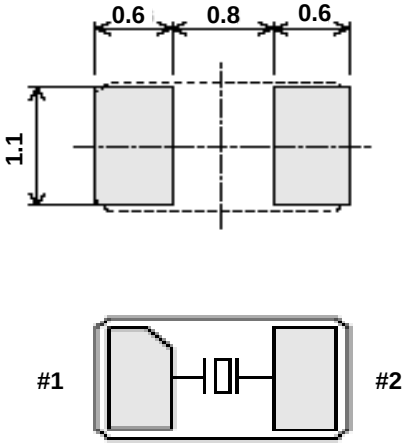
	Parameters	Sym.	Electrical Spec.				Notes
			Min	Typical	Max	Unit	
1	Nominal Frequency	F0		32.768		KHz	-
2	Frequency Tolerance	Δf/fo	-20		+20	ppm	at 25 °C +/-3 °C
3	Load Capacitance	CL		12.5		pF	-
4	Driver Level	DL	-	0.1	0.5	μW	-
5	Equivalent Series Resistance	ESR	-	-	80	KΩ	at 25 °C +/-3 °C
6	Turnover Temperature	Tp	20	25	30	°C	at 25 °C +/-3 °C
7	Parabolic Curvature Constant	K	-	-	-0.04	ppm/°C^2	-
8	Operating Temperature	-	-40	~	85	°C	-
9	Storage Temperature	-	-55	~	125	°C	-
10	Insulation Resistance	IR	500	-	-	MΩ	at DC 100V+/-15V
11	Shunt Capacitance	C0	-	1.3	-	pF	-
12	Motional Capacitance	C1	-	6.4	-	fF	-
13	Aging	Δf/f	-3		+3	ppm	1st Year

■ FACTORY LOCATION : CHINA

■ DIMENSIONS (UNIT:mm)



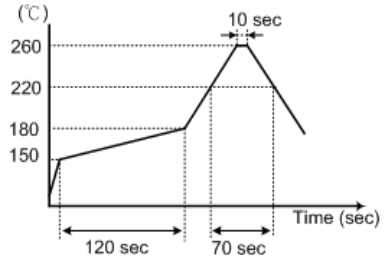
■ RECOMMENDED SOLDER PAD (UNIT:mm)



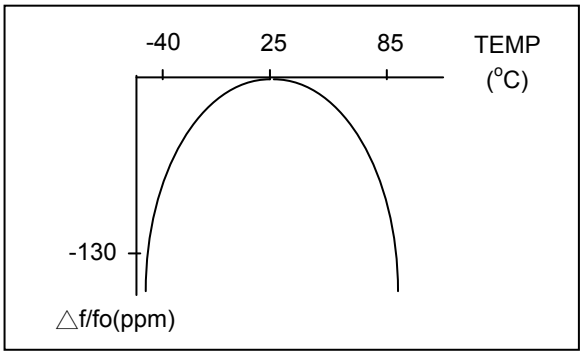
■ REFLOW PROFILE

Total time : 200 sec. Max.

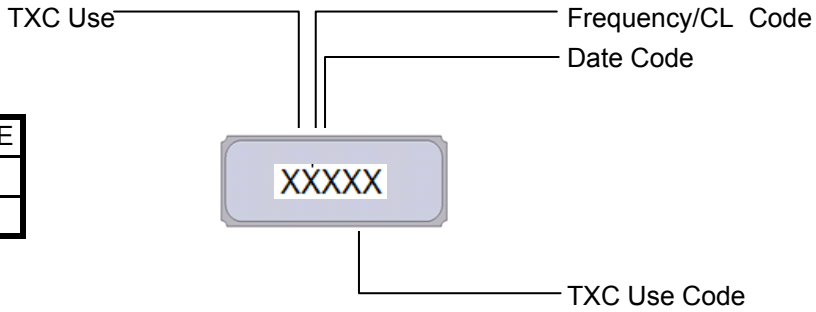
Solder melting point :220℃



■ TEMPERATURE V.S FREQENCY CURVE



■ MARKING



Frequency /CL Code

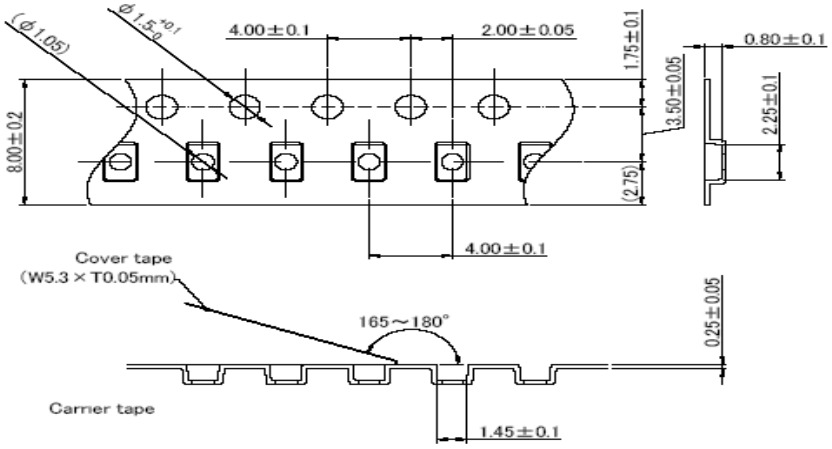
KHz	PF	CODE
32.768	12.5	**A**

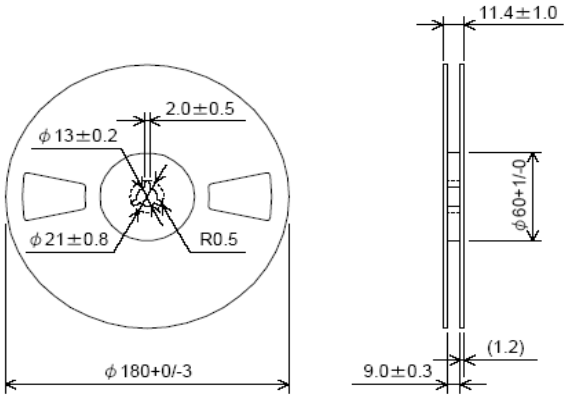
Date Code

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

■ PACKIN((UNIT:mm)





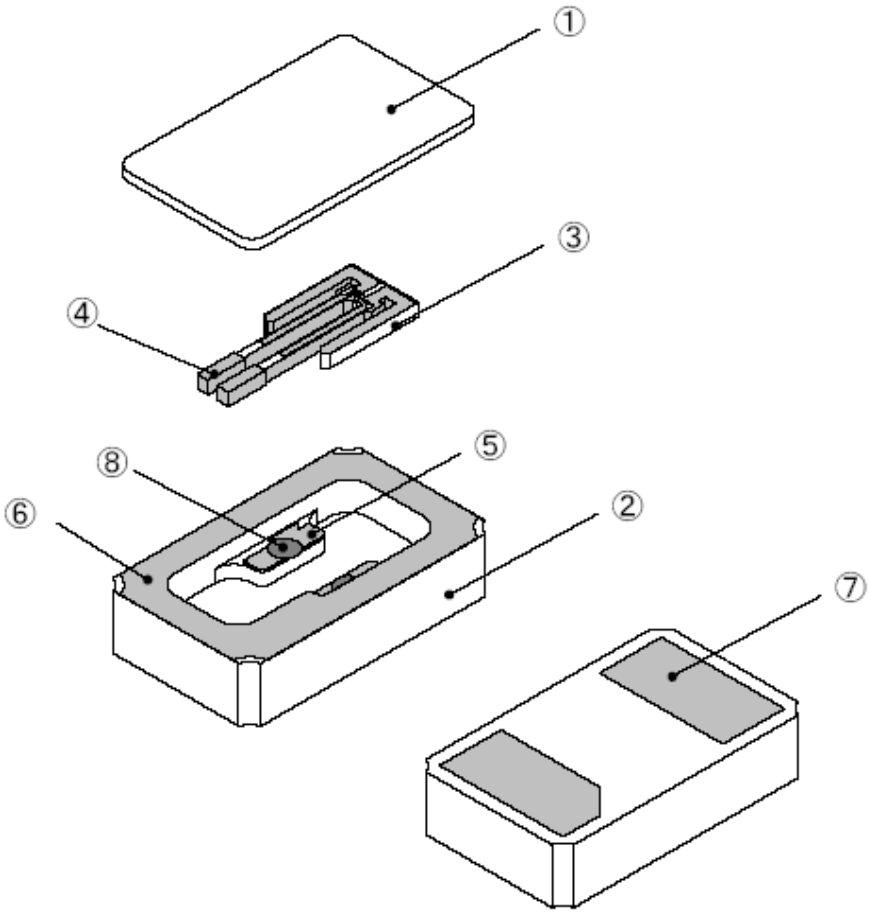
Amount	PCS/REEL
	3K

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

REMARK : 1. 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.

2. 160 mm (6.3) minimum trailer of empty carrier tape sealed with cover tape.

■ STRUCTURE ILLUSTRATION

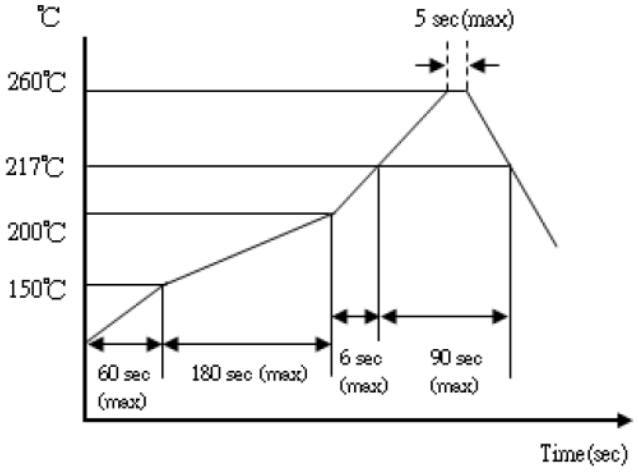


NO	COMPONENTS	MATERIALS	QTY	FINISH/SPECIFICATIONS
1	Lid	Clad Metal	1	Ni+Kovar+Cu-Ni+Silver Solder (Ag-Cu-Sn)
2	Base(Package)	Ceramic(Al_2O_3)	1	Color Black
3	Crystal blank	SiO_2	1	-
4	Electrode	Noble Metal	2	Cr+Au
5	Internal terminals	Au	2	Tungsten metallize + Ni plating + Au plating
6	Metallize for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

No.	Test Item	Test Methods	REF.DOC
1	Resistance To Soldering Heat	a.Hand Soldering:With no preheat, the component leads shall be totally immersed in molten solder, 260℃±3℃ for 10±1 second b.Reflow Solder:Preheat at 3℃/sec to 150℃,and using lead-free solder,heat at 260℃ for 5 seconds (Per Figure 1) c.Reflow Solder Cycles:Component must withstand two reflow solder cycles with a cool-down in between d.Hand Soldering Cycles:Component must withstand one reflow solder cycle followed,after a cool-down,by a hand soldering cycle After resistance to soldering heat test,there shall be no evidence of deformation or cracking.The parts shall meet all electrical and mechanical specifications  Figure 1	MIL-STD-202
2	Operational Test	1000 Hours@ 85±2℃.using an inverter with 10MΩ resistor in parallel and load capacitors	MIL-STD-202
3	Temperature Cycling (AIR TO AIR)	-40±3℃ for 30 minutes,to 125±3℃ for 30 minutes, 100 cycles	EIA-JESD22
4	Vibration	10Hz to 2000Hz at 5g's for 20 minutes,12 cycles each of 3 orientations	MIL-STD-202
5	Mechanical Shock	100g's, 3ms, 3 shocks each axis	MIL-STD-202
6	Temperature and Humidity	240 hours at 40±2℃, 90% to 95% relative humidity	MIL-STD-202
7	Drop Test	Part is mounted to 100g fixture and dropped from a height of 150cm to a cement floor. The drop must be conducted on all 6 sides	

■ RELIABILITY SPECIFICATIONS

8	Solderability	Temperature Immersing depth Immersion time Flux	255 ℃ ± 5℃ 0.5 mm minimum 3.5 ± 0.5 seconds Rosin resin methyl alcohol solvent (1 : 4)	MIL-STD-883
9	High Temp. Storage	+ 100 ℃ ± 3 ℃ for 100 ± 12 hours		MIL-STD-883
10	Low Temp. Storage	- 40 ℃ ± 3 ℃ for 1000 ± 12 hours		MIL-STD-883
11	Pressure Cooker Storage	121℃ ± 3℃, RH100%, 2 bar, for 240 hours		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±5℃

Relative humidity : 40%~70%

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

Ambient temperature : 25±3℃

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 .