

SPECIFICATION FOR APPROVAL

CUSTOMER : _____

PRODUCT TYPE : SMD SEAM SEALING X'TAL 2.0 × 1.6

NOMINAL FREQ. : 39.000000MHz

TXC P/N : 8Y39072005

REVISION : A1

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





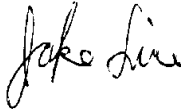
PRODUCT SPECIFICATION SHEET

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PE/RD	QA	MFG
 Robin Huang	 Samson Xiong	 Jake Liu
3-Nov-21	3-Nov-21	3-Nov-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

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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	20-Jan-21	N/A	Xiaoyan Jiang
S2	3	TC:-30~85°C±10ppm&- 40~95°C±20ppm&95~105°C/0~33ppm& 105~115°C/10~53ppm&115~125°C/30~ 82ppm Change To- 40~85°C±33ppm&85~105°C/- 33~5ppm&105~125°C/-10~35ppm	19-Feb-21	PNR21021104	Xiaoyan Jiang
S3	N/A	Specification change	23-Sep-21	PNR21091601	Xiaoyan Jiang
S4	3	Frequency Stability 105~125°C/- 10~35ppm Change To 105~125°C/- 30~35ppm	27-Oct-21	PNR21102606	Xiaoyan Jiang
A1	N/A	S Turn A	3-Nov-21	N/A	Xiaoyan Jiang

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 : $25 \pm 10^{\circ}\text{C}$
 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%

Measure equipment

Electrical characteristics measured by S&A250B or equivalent.

Crystal cutting type

The crystal is using AT CUT (thickness shear mode).

Unit Weight:

0.006 g/pcs Typ.

	Parameters	Symbol	Electrical Spec.				Notes
			Min.	Typ.	Max.	Units	
1	Nominal Frequency	FL	39.000000			MHz	-
2	Oscillation Mode	-	Fundamental			-	-
3	Load Capacitance	CL	10			pF	-
4	Frequency Tolerance	-	-5	~	7	ppm	at $25^{\circ}\text{C} \pm 3^{\circ}\text{C}$
5	Frequency Stability	-	-33	~	33	ppm	-40~+85 $^{\circ}\text{C}$ T0=30 $^{\circ}\text{C}$
		-	-33	~	5		85~+105 $^{\circ}\text{C}$ T0=30 $^{\circ}\text{C}$
		-	-30	~	35		105~+125 $^{\circ}\text{C}$ T0=30 $^{\circ}\text{C}$
6	Operating Temperature	-	-40	~	125	$^{\circ}\text{C}$	-
7	Aging	-	-2	~	2	ppm	5Years
			-4	~	2	ppm	10Years
8	Frequency Drift After Reflow		-1	~	1	ppm	After 4X Reflow
9	Drive Level	DL	0.01	100	200	uW	-
10	Equivalent Series Resistance	Rr	-	17	35	Ω	-
11	Shunt Capacitance C0	C0	0.5	0.75	1	pF	-
12	Motional Capacitance C1	C1	2	2.8	3.6	fF	-
13	Pulling Sensitivity	TS	10	12	14	ppm/pF	-
14	Motional Inductance L1	L1	4	6	8	mH	-
15	Spurious Mode Series Resistance	-	1100	-	-	Ω	$\pm 0.7\text{MHz}$
16	Quality Factor	-	60K	-	-	-	-
17	Insulation Resistance	-	500	-	-	M Ω	at DC 100V
18	Storage Temperature Range	-	-40	~	125	$^{\circ}\text{C}$	-

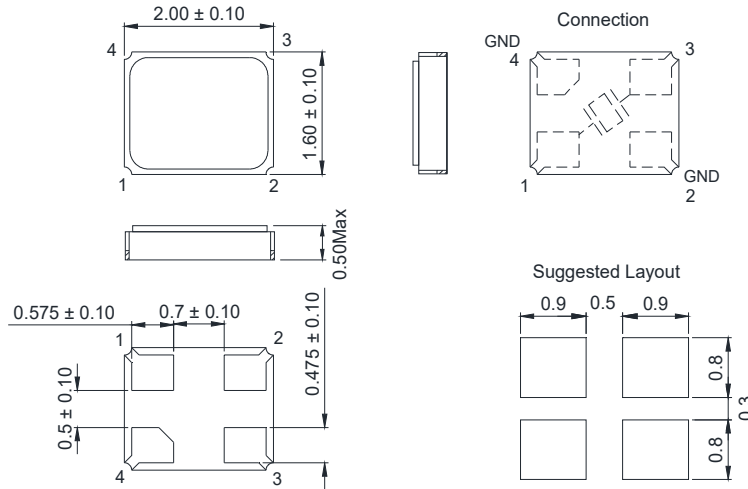
	Parameters	Symbol	Electrical Spec.				Notes
			Min.	Typ.	Max.	Units	
19	Frequency Error @85°C	-	-32	~	-14	ppm	Reference to 30°C
20	Inflection Point	-	28	30	32	°C	-
21	Frequency vs Temp at -40°C ~ +85°C	-	-8.5	f(T)	8.5	ppm	$f(T) = 1.05 \times 10^{-4}(T-T_0)^3 + 1.0 \times 10^{-4}(T-T_0)^2 - 0.74(T-T_0) - 0.35$, Reference to 30°C
22	Frequency vs Temp at 85°C ~ +105°C	-	-10	f(T)	12	ppm	
23	Frequency vs Temp at 105°C ~ +125°C	-	-12	f(T)	15	ppm	
24	Slope of Frequency Drift over Temperature	-	0.2	~	0.8	ppm/°C	at -35°C (-40~-30°C)
25	Slope of Frequency Drift over Temperature	-	0.3	~	0.9	ppm/°C	at 95°C (90~-100°C)
26	Slope of Frequency Drift over Temperature	-	0.7	~	1.4	ppm/°C	at 105°C (100~-110°C)
27	Slope of Frequency Drift over Temperature	-	1.1	~	2.1	ppm/°C	at 115°C (110~-120°C)
28	Slope of Frequency Drift over Temperature	-	1.5	~	2.5	ppm/°C	at 120°C (115~-125°C)

Temperature vs Frequency Specification

Test Condition			Proposed Specification Ranges																	
Measured Freq w.r.t 30 Deg C																				
30 Deg C	85 Deg C		-40 Deg C			-30 Deg C			95 Deg C			105 Deg C			115 Deg C			125 Deg C		
ppm	Min ppm	Max ppm	Min ppm	Typ ppm	Max ppm	Min ppm	Typ ppm	Max ppm	Min ppm	Typ ppm	Max ppm	Min ppm	Typ ppm	Max ppm	Min ppm	Typ ppm	Max ppm	Min ppm	Typ ppm	Max ppm
0	-19	-18	8.80	11.80	14.80	15.26	17.26	19.26	-15.62	-13.62	-11.62	-6.50	-4.50	-2.50	7.66	9.66	11.66	27.03	30.03	33.03
0	-20	-19	9.56	12.56	15.56	16.05	18.05	20.05	-16.82	-14.82	-12.82	-7.74	-5.74	-3.74	6.21	8.21	10.21	26.50	28.46	31.00
0	-21	-20	10.59	13.59	16.59	17.50	18.91	20.50	-18.13	-16.13	-14.13	-9.29	-7.29	-5.29	4.44	6.44	8.44	23.54	26.54	29.54
0	-22	-21	12.06	15.06	18.06	18.50	20.13	22.00	-19.23	-17.23	-15.23	-10.60	-8.60	-6.60	3.50	5.16	7.00	22.50	24.98	27.50
0	-23	-22	11.00	15.77	18.00	16.00	20.73	22.70	-20.44	-18.44	-16.44	-12.03	-10.03	-8.03	1.00	3.27	5.50	19.00	22.44	25.50
0	-24	-23	13.00	17.02	19.00	17.00	21.85	23.50	-21.66	-19.66	-17.66	-14.00	-11.40	-9.50	-2.00	1.76	4.00	16.00	20.99	24.50
0	-25	-24	13.00	17.28	20.50	17.80	21.92	25.00	-23.03	-21.03	-19.03	-15.20	-13.12	-10.00	-3.50	-0.30	3.50	14.00	18.47	24.00
0	-26	-25	14.50	18.71	21.00	18.50	23.20	25.50	-24.00	-22.00	-20.00	-17.00	-14.29	-12.00	-6.00	-1.59	1.00	10.50	17.01	20.50
0	-27	-26	15.50	19.28	22.20	19.50	23.55	26.00	-24.74	-23.24	-21.74	-18.00	-15.77	-14.00	-6.50	-3.38	-1.00	10.00	14.98	18.50
0	-28	-27	16.00	19.54	23.00	20.00	23.69	27.00	-26.00	-24.34	-22.50	-19.00	-17.18	-15.00	-8.00	-5.13	-2.00	9.00	12.86	16.50
0	-29	-28	15.81	18.81	21.81	20.55	22.55	24.55	-27.87	-25.87	-23.87	-21.45	-19.45	-17.45	-10.25	-8.25	-6.25	5.84	8.84	11.84
0	-30	-29	17.57	20.57	23.57	22.14	24.14	26.14	-29.86	-27.86	-25.86	-23.69	-21.69	-19.69	-13.04	-11.04	-9.04	2.83	5.83	8.83
0	-31	-30	18.54	21.54	24.54	23.17	25.17	27.17	-30.90	-28.90	-26.90	-24.94	-22.94	-20.94	-14.19	-12.19	-10.19	1.16	4.16	7.16
0	-32	-31	20.01	23.01	26.01	24.33	26.33	28.33	-32.00	-30.00	-28.00	-26.26	-24.26	-22.26	-15.75	-13.75	-11.75	-0.52	2.48	5.48

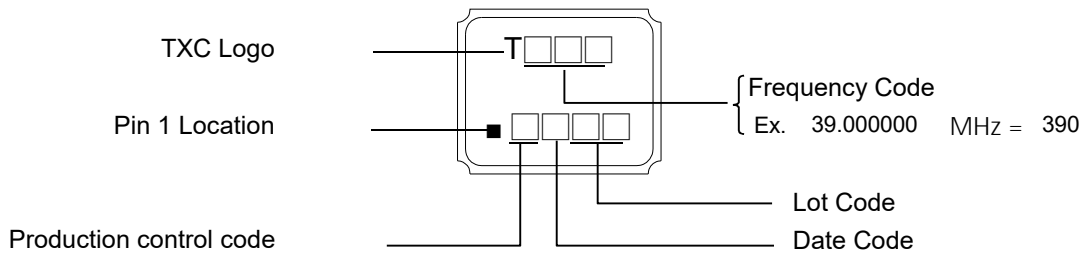
■ DIMENSIONS

(Unit:mm)



*Coplanarity of solderable areas Camber 0.05 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

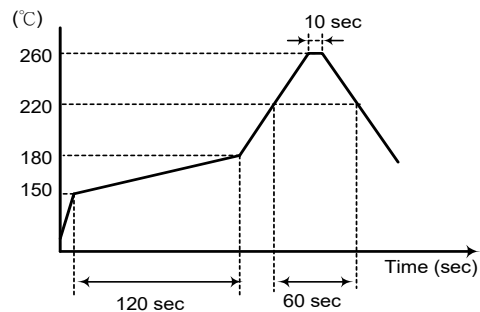
Production Location: Taiwan, China(Ningbo), China(Chungking).

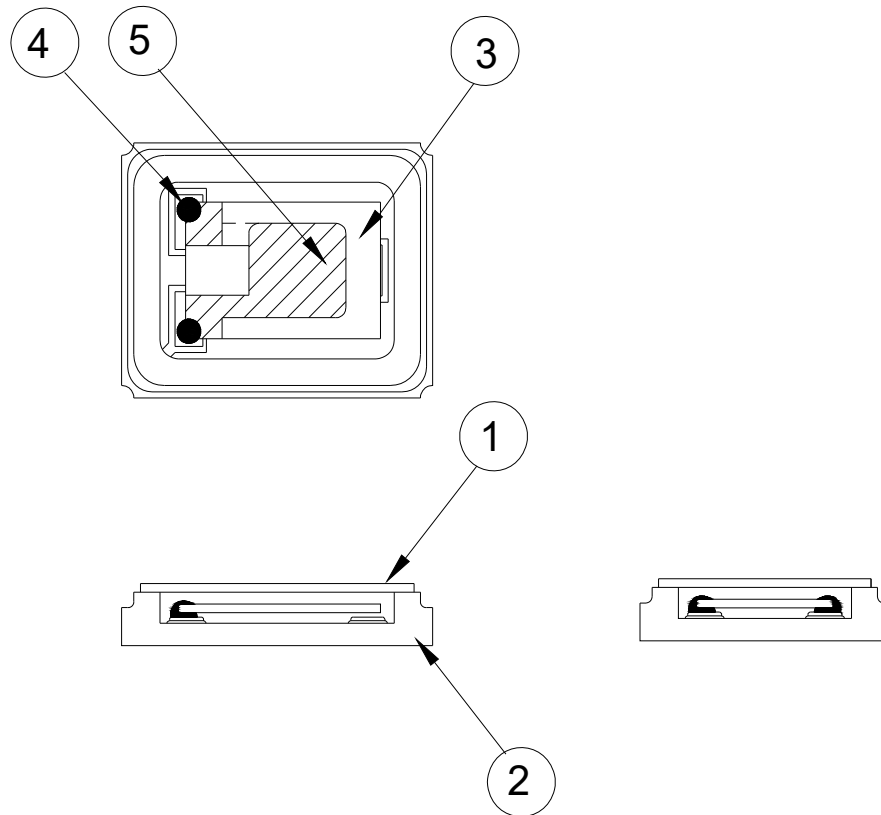
■ SUGGESTED REFLOW PROFILE

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

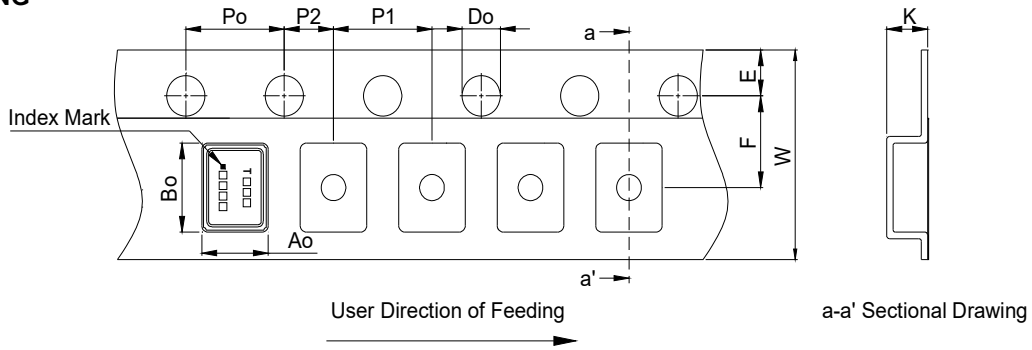
Temperature: 350 ± 10 °C
 Time: 3 sec.
 Re-solder times: twice



■ STRUCTURE ILLUSTRATION


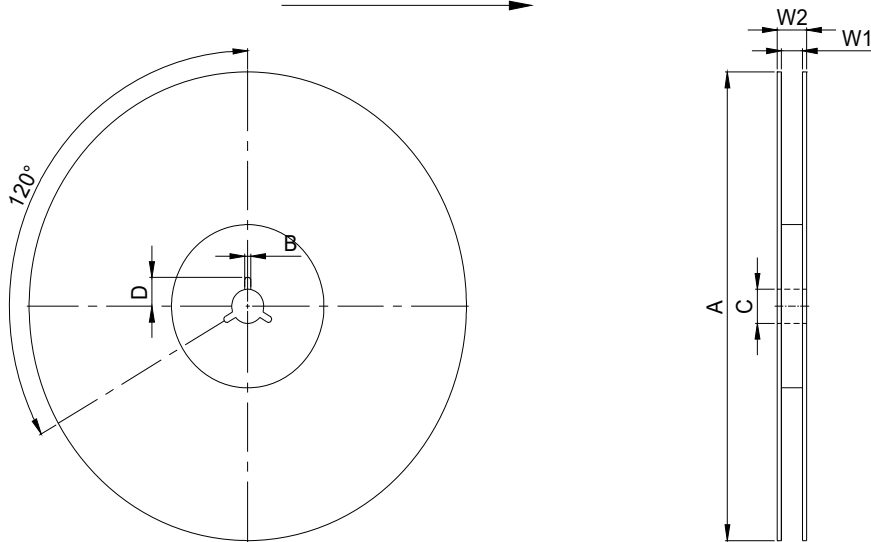
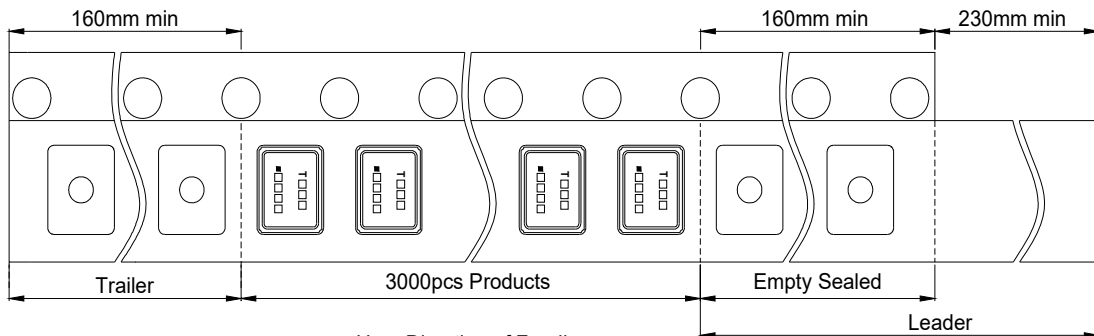
NO	COMPONENTS	MATERIALS	FINISH/SPECIFICATIONS
1	Lid	Kovar (Fe/Co/Ni)	-
2	Base(Package)	Ceramic (Al ₂ O ₃) + Kovar (Fe/Co/Ni)+Pad(Au)	Tungsten metalize + Ni plating + Au plating
3	Crystal blank	SiO ₂	-
4	Conductive adhesive	Resin+Ag	-
5	Electrode	Noble Metal.	-

PACKING



DIMENSIONS (Unit:mm)	A0	B0	D0	E	F
	1.90±0.10	2.30±0.10	1.55±0.10	1.75±0.10	3.50±0.10
	K	P0	P1	P2	W
	0.90±0.10	4.00±0.10	4.00±0.10	2.00±0.10	8.00±0.20

REMARK :



DIMENSIONS (Unit:mm)	A	B	C	D	W1	W2
	178.00±1.00	2.75±0.25	13.00±0.50	11.00±0.50	8.50±0.50	11.50±0.20

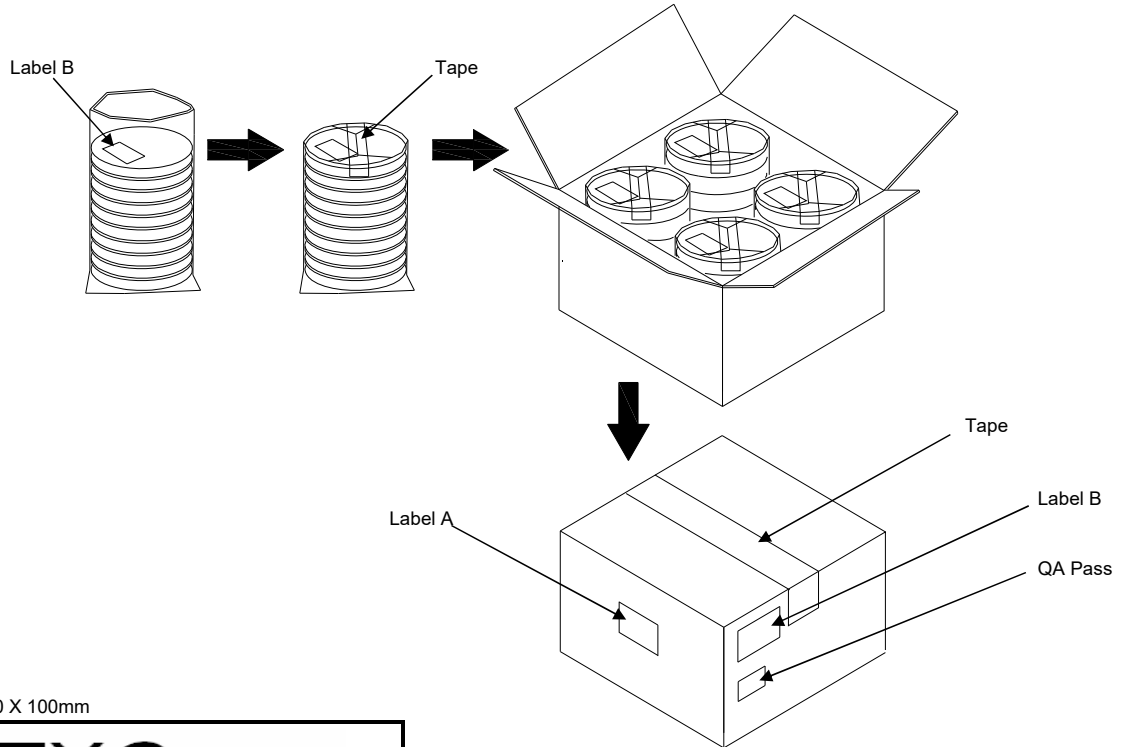
PACKING

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

TXC
Inv No: □□□□□□□□
Po No: □□□□□□□□
Part No: □□□□□□□□
Q'ty: □□□□ PCS
C/No: □□□□

(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
1.1	Drop Test	150 cm height, 3 times on concrete floor.	A . C
1.2	Mechanical Shock	Device are shocked to half sine wave (1000 G) three mutually perpendicular axes each 3 times. 0.5m sec. duration time	A . C
1.3	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
1.4	Gross Leak	Standard Sample For Automatic Gross Leak Detector, Test Pressure: 2kg / cm ²	F
1.5	Fine Leak	Helium Bombing 4.5 kg/ cm ² for 2 Hrs	G
1.6	Solder ability	Temperature 240 °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
2.1	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
2.2	High Temp. Storage	+ 125 °C ± 3 °C for 500 ± 12 Hrs	B . C . D
2.3	Low Temp. Storage	- 40 °C ± 3 °C for 500 ± 12 Hrs	
2.4	Temperature cycle	Total 100 cycles of the following temperature cycle 	B . C . D
2.5	High Temp & Humidity	85°C ± 3°C, RH 85% , 500Hrs	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.
F	Leak rate < 1×10^{-5} Pa*m ³ /Sec
G	Leak rate < 4×10^{-9} Pa*m ³ /Sec

Measurement condition

Electrical characteristics measured by S&A250B or equivalent.

APPLICATION NOTE

1. Don't be caught in the rain.
2. The storage environment shall be 5°C ~40°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 equivalent.
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 ultrasonic welding process has to be used.