TXC CORPORATION
4F, NO. 16, Sec. 2 Chung Yang S Rd., Peitou, Taipei, Taiwan.
TEL : 886-2-2894-1202 , 886-2-2895-2201 FAX : 886-2-2894-1206 , 886-2-2895-6207 www.txccorp.com

SPECIFICATION FOR APPROVAL

CUSTOMER : _____

PRODUCT TYPE : SMD TSX 2.5 * 2.0

NOMINAL FREQ. : 19.2 MHz

TXC P/N : OZ19200001

REVISION : S4

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.

Attachment(s):

- [V] 1. Product Specification Sheet
- [ ] 2. Testing Report(Electrical & Temperature)
- [ ] 3. Reliability Report

RoHS Compliant

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PRODUCT SPECIFICATION SHEET

CUSTOMER : _____

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NOMINAL FREQ. : 19.2 MHz

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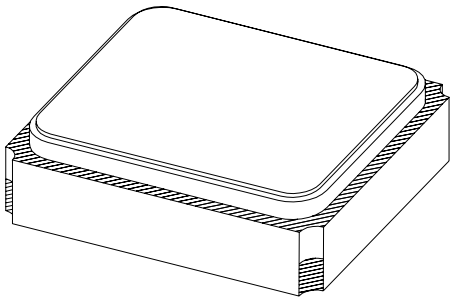
REVISION : S4



RD	QA	MFG
Bruce Hsu Kenneth Kao		
2011/4/19		

NOTE:

(1) Lead Free Products are " Directive 2002 / 95 / EC of The European Parliament of 27 January 2003 on the restriction of the use of certain hazardous substances (RoHS) in electrical and electronic equipment" Compliant (Attachment: SGS Test Report).

(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.

RoHS Compliant

PRODUCT TYPE : SMD TSX 2.5 * 2.0 P/N : OZ19200001 REVISION : S4

Rev	Revise page	Revise contents	Date	Ref.No.	Reviser
S1	N/A	Initial released	2011/01/26	N/A	Su-Chen Chiang
S2	2,3	1. Crystal first-order parameter update 2. Thesmistor B-Constant update	2011/02/25	N/A	Su-Chen Chiang
S3	3	Add note for pin function	2011/03/18	N/A	Su-Chen Chiang
S4	2	Crystal effective resistance Rr update	2011/4/19	N/A	Su-Chen Chiang

CRYSTAL 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±10℃
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 Equipment

Electrical characteristics measured by HP E5100A or equivalent

Crystal Cutting Type

The crystal is using AT CUT (thickness shear mode)

	Parameters	Symbol	Condition	Electrical Spec.				Note
				Min.	Typ.	Max.	Units	
1	Nominal Frequency	FL		19.200000			MHz	
2	Oscillation Mode	-		Fundamental				
3	Load Capacitance	CL			7		pF	1
4	Frequency Tolerance	-	+25℃ ± 3℃			±10	ppm	
5	Tolerance Over Temperature	-	-30 to +85°C			±12	ppm	2
6	Frequency Drift After Reflow	-	two reflows			±2	ppm	
7	Operating Temperature	-		-30		+105	℃	
8	Aging	-				±1	ppm/Year	
9	Drive Level	DL		10		100	μW	
10	Effective Resistance Rr	Rr				50	Ω	
11	Shunt Capacitance C0	C0		0.3		1.3	pF	
12	Motional Capacitance C1	C1		1.8		3.1	fF	
13	Insulation Resistance	-	at DC 100 V	500			MΩ	
14	Storage Temperature Range	-	-	-40		+105	℃	
15	Spurious Mode Series Resistance	-	±1 MHz	1100			Ω	
16	Q Factor	Q		75000				3
17	Third-order Curve Fitting Parameter	-		8.5	10	11.5	e^{-5}	4
18	First-order Curve Fitting Parameter	-		-0.4		-0.1		4

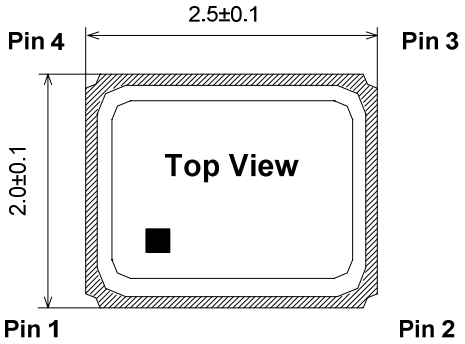
Note 1 The load capacitance is measured according to IEC Standard #60444-7
Note 2 Above 85°C tolerance over temperature bound by third-order coefficient range
Note 3 Minimum Q value calculated from ESR and L is smaller than this specification
Note 4 The curve fitting parameter is obtained from the Qualcomm crystal curve fitting algorithm (Refer to Curve Fitting Calculation Table: 80-V9690-23)
Note 5 This crystal specification complies to Qualcomm Mini-Specification 80-V9690-9 Rev E

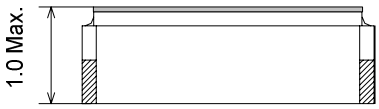
NTC THERMISTOR ELECTRICAL SPECIFICATIONS

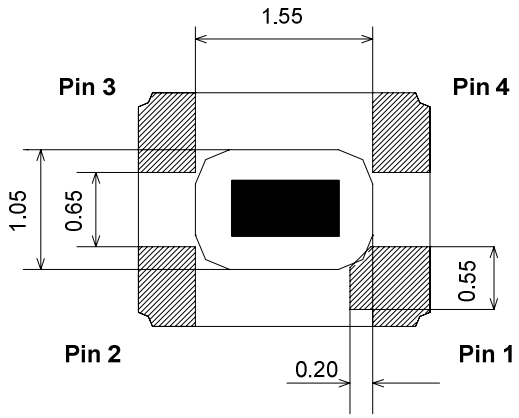
	Parameters	Symbol	Condition	Electrical Spec.				Note
				Min.	Typ.	Max.	Units	
1	Resistance (25 ℃)			100k ± 1%			Ω	
2	B-Constant (25-50 ℃)			4250 ± 1%			K	1
3	Dissipation Constant (25 ℃)		In air			1.5	mW/℃	
4	Thermal Time Constant		In air			5	Sec	
5	Rated Power					5	mW	
6	Operating Temperature			-30		+105	℃	

Note 1 The B constant is calculated using the zero-power resistance values measured at 25 ℃ and 50℃

DIMENSIONS







Bottom View

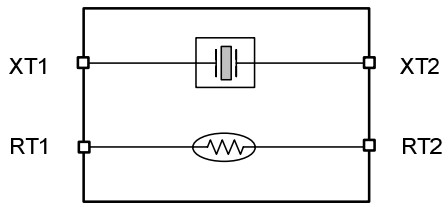
Unit:mm

PIN FUNCTION

	Symbol	Function
Pin 1	XT1	XTAL Terminal 1
Pin 2	RT2	Thermistor Terminal 2
Pin 3	XT2	XTAL Terminal 2
Pin 4	RT1	Thermistor Terminal 1

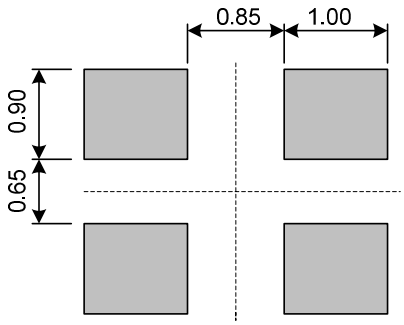
Note: Pin 2 is connected to the metal lid and thermistor
Pin 4 is connected to the thermistor only

BLOCK DIAGRAM



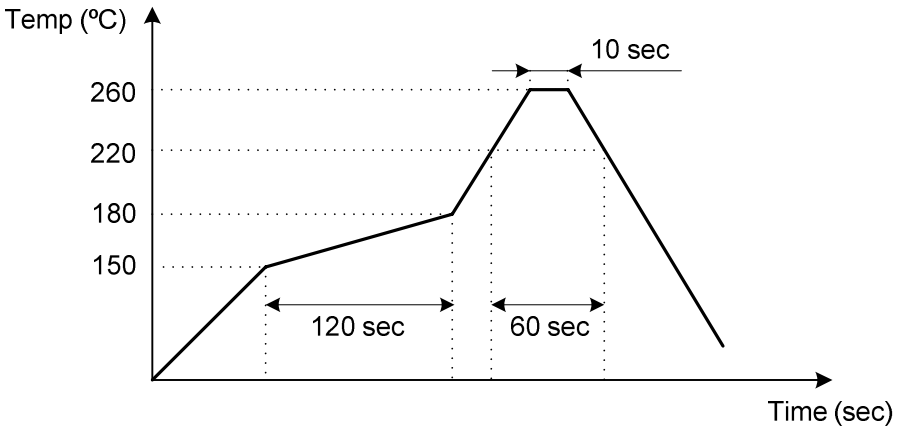
Note: RT2 shall be connected to GND is recommended

SUGGESTED LAYOUT



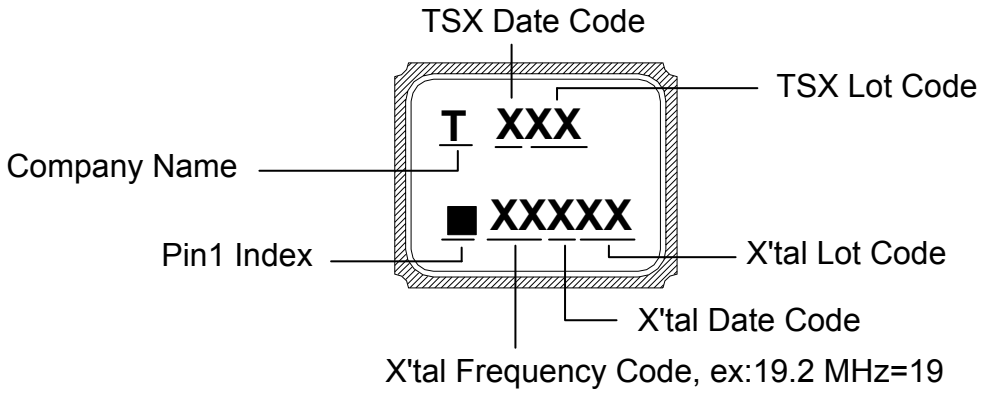
Unit:mm

■ SUGGESTED REFLOW PROFILE



Note : Total Time: 200 sec. Max., Solder Melting Point: 220°C

■ MARKING

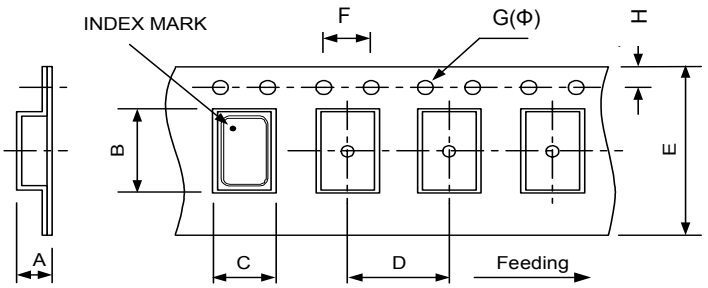


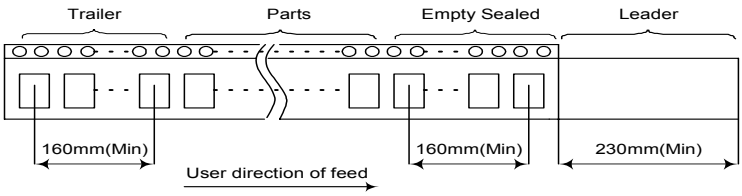
DATE CODE

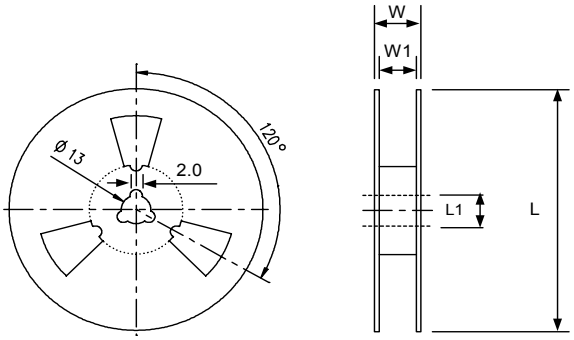
YEAR \ MONTH				JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2005	2009	2013	2017	A	B	C	D	E	F	G	H	J	K	L	M
2006	2010	2014	2018	N	P	Q	R	S	T	U	V	W	X	Y	Z
2007	2011	2015	2019	a	b	c	d	e	f	g	h	j	k	l	m
2008	2012	2016	2020	n	p	q	r	s	t	u	v	w	x	y	z

Note: This date code will be cycled every four years

PACKING : (EIA-481-2)







Unit: mm

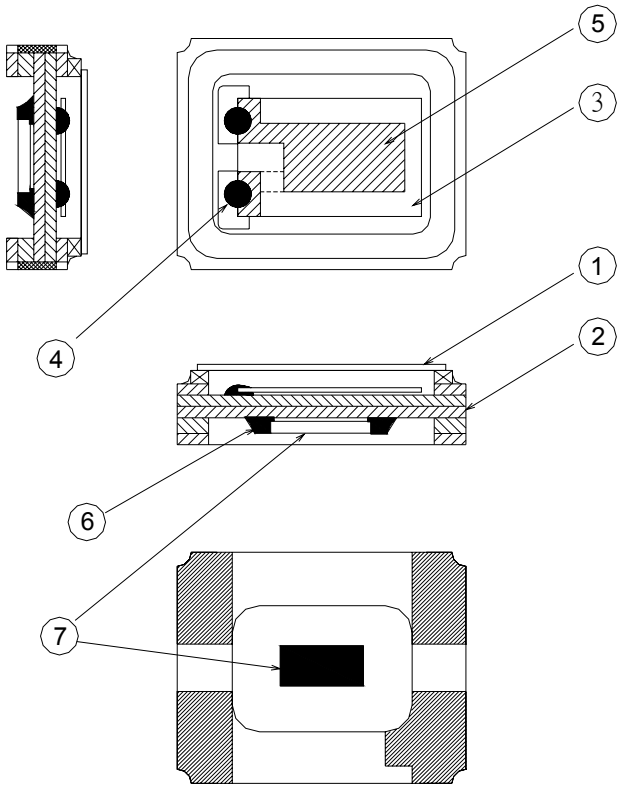
DIMENSIONS (mm)	A	B	C	D	E	F	G	H	L	L1	W	W1	Standard Reel Quantity is 3,000 pcs per reel
	1.15	2.70	2.25	4.00	8.00	4.00	1.55	1.75	178	13.0	11.6	8.4	

WEIGHT

0.0135 g / piece(TYP), 40 ± 2 g /3 kpcs(regardless of tape weight)

STRUCTURE ILLUSTRATION

Crystal Enclosure Seal : Seam Welding



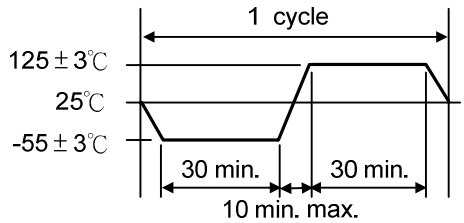
No.	COMPONENTS	MATERIALS	FINISH/SPECIFICATIONS
1	Lid	Metal (Fe+Co+Ni)	-
2	Base (Package)	Ceramic (Al_2O_3) + Kovar (Fe+Co+Ni) + Ag/Cu	Alumina Ceramics
3	Crystal Blank	SiO_2	-
4	Conductive Adhesive	Ag	Silicone Resin
5	Electrode	Noble Metal	-
6	Solder	Sn	-
7	Thermistor	Al_2O_3, Ag, Ni	-

■ RELIABILITY SPECIFICATIONS

1. Mechanical Endurance

No.	Test Item	Test Methods		Reference
1.1	Drop Test	150 cm height, 3 times on concrete floor.		JIS C6701
1.2	Mechanical Shock	Device are shocked to half sine wave (1000 G) three mutually perpendicular axes each 3 times. 0.5 msec. duration time		MIL-STD-202
1.3	Vibration	Frequency range Amplitude Sweep time Perpendicular axes each test time	10 ~ 2000 Hz 1.52 mm/20 G 20 minutes 4 Hrs (Total test time 12 Hrs)	MIL-STD-883
1.4	Gross Leak	Standard sample for automatic gross leak detector Test pressure: 2 kg / cm^2		MIL-STD-883
1.5	Fine Leak	Helium bombing 4.5 kg/ cm^2 for 2 Hrs		
1.6	Solderability	Temperature Immersing depth Immersion time Flux	245℃ ± 5℃ 0.5 mm minimum 5 ± 1 seconds Rosin resin methyl alcohol solvent (1 : 4)	MIL-STD-883

2. Environmental Endurance

No.	Test Item	Test Methods		Reference
2.1	Resistance To Soldering Heat	Pre-heat temperature Pre-heat time Test temperature Test time	125℃ 60 ~ 120 sec. 260 ± 5℃ 10 ± 1 sec.	MIL-STD-202
2.2	High Temp. Storage	+ 125 ℃ ± 3 ℃ for 500 ± 12 Hrs		MIL-STD-883
2.3	Low Temp. Storage	- 40℃ ± 3℃ for 500 ± 12 Hrs		
2.4	Thermal Shock	Total 100 cycles of the following temperature cycle 		MIL-STD-883
2.5	High Temp & Humidity	85℃ ± 3℃, RH 85% , 500 Hrs		JIS C5023